STATE OF NORTH CAROLINA C204654
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

CONTRACT AND
CONTRACT BONDS

FOR CONTRACT NO. C204654

WBS	49070.3.1 STATE FUNDED
T.I.P NO.	B-6054A
COUNTY OF	HAYWOOD
THIS IS THE	ROADWAY & STRUCTURE CONTRACT
ROUTE NUMBER	I 40 LENGTH 0.790 MILES
LOCATION	I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK,
CONTRACTOR	KIEWIT INFRASTRUCTURE SOUTH CO
ADDRESS	450 DIVIDEND DRIVE PEACHTREE CITY, GA 30269
BIDS OPENED	OCTOBER 04, 2021
CONTRACT EXECUTION	10/25/2021

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
CONTRACT NO. C204654

This Construction Contract ("Contract") is entered into between the North Carolina Department of Transportation and the Contractor named below:

Kiewit Infrastructure South Company
CONTRACTOR'S NAME

RECITALS

A. WHEREAS, Pursuant to 2018-5 North Carolina Session Law {Senate Bill 99} Section 34.13 has authorized the Department of Transportation ("Department") to engage in a construction manager/general contractor ("CMGC") project delivery method pilot program as specified for projects for the construction of transportation projects. The terms "Construction Manager" and "Contractor" are used interchangeably in the Contract and shall mean a partnership, corporation, or other legal entity that is able to provide appropriately licensed contracting and engineering services who will construct the Project under the terms of the Contract for the price bid pursuant to a Construction Manager/General Contractor method contract.

B. WHEREAS, The Department requested Statements of Qualifications ("SOQs") from qualified Proposers interested in entering a contract for preconstruction services, with the potential for continuing to a subsequent contract for construction of all or part of the scope of work for I-5986A, Haywood County Bridge No. 430057 Replacement Project ("Project") through a construction contract.

C. WHEREAS, The Contractor, named above, was selected by the Department to enter into a contract for the performance of preconstruction services (Preconstruction Services Contract No. 5300000000) for the Project. As part of the project team, the Contractor provided input on schedule, phasing, constructability, cost and estimates, value engineering, and plan review throughout the design process. In addition to aiding the design process, the selected Contractor was asked to prepare and submit a price ("Price") for the labor, equipment, and materials that will be required to construct the Project based on the design process, plans, specifications, and estimate packages of the Project. This price is a guaranteed maximum.

D. WHEREAS, upon the completion of the design phase of the Project or any portion thereof, the Department negotiated the costs of the construction phase of the Project with the Contractor. The Price was accepted by the Department and this Contract is issued to the Contractor after the completion of the preconstruction phase so that construction of the Project can begin. NOW, THEREFORE, in consideration of the sums to be paid to Contractor by Department, the foregoing premises and the covenants and agreements set forth herein, the parties hereto hereby agree as follows.

The parties agree to comply with the terms of the following exhibits that are incorporated by reference and made a part of this Contract.

- Exhibit A – Proposal Item Sheet(s) October 06, 2021
- Exhibit B – Project Proposal October 20, 2021
- Exhibit C – Project Plans Approved September 10, 2021
- Exhibit D – Project Permits October 20, 2021
- Exhibit E – Risk Register October 20, 2021

Notwithstanding the foregoing, the Contractor agrees that it has reviewed and accepted the above referenced exhibits as complete.

This Contract has been executed by the following parties:

CONTRACTOR	
CONTRACTOR'S NAME (if other than an individual, state whether a corporation, partnership, etc.) **Kiewit Infrastructure South Company**	
BY (Authorized Signature) DocuSigned by: Ben Carnazzo 45BF68CCF2A04AD...	DATE SIGNED 10/25/2021
PRINTED NAME AND TILTE OF PERSON SIGNING Benjamin J. Carnazzo, Sr. Vice President	
FEDERAL EMPLOYER IDENTIFICATION NUMBER 47-0530367	LICENSE NUMBER NC GC 6603

DEPARTMENT OF TRANSPORTATION	
By (Authorized Signature) DocuSigned by: Ronald E. Davenport, Jr. F81B6038A47A442...	DATE SIGNED 10/25/2021
PRINTED NAME AND TITLE OF PERSON SIGNING Ronald E. Davenport	

Appendix A

Proposal Item Sheets

North Carolina Department of Transportation

Letting ID: L211004
10/04/2021 02:00:00 PM

Contract ID: C204654
Call: 001

Line Number	Item Number	Quantity	Unit	Unit Price	Extension Price
Section 0001 ROADWAY ITEMS					
0001	0000100000-N MOBILIZATION	1.000	LS	$947,269.0000	$947,269.00
0002	0000400000-N CONSTRUCTION SURVEYING	1.000	LS	$311,773.4600	$311,773.46
0003	0000915000-N GENERIC MISCELLANEOUS ITEM WILDLIFE GUARDS	4.000	EA	$106,451.0000	$425,804.00
0004	0000915000-N GENERIC MISCELLANEOUS ITEM WILDLIFE JUMP OUTS	3.000	EA	$14,245.0000	$42,735.00
0005	0008000000-E SUPPLEMENTARY CLEARING & GRUB-BING	1.000	ACR	$10,065.0000	$10,065.00
0006	0029000000-N TYPE III REINFORCED APPROACH FILL, STATION ******* (28+62 -L-)	1.000	LS	$284,948.0000	$284,948.00
0007	0036000000-E UNDERCUT EXCAVATION	450.000	CY	$82.0000	$36,900.00
0008	0043000000-N GRADING	1.000	LS	$969,999.0000	$969,999.00
0009	0195000000-E SELECT GRANULAR MATERIAL	200.000	CY	$118.0000	$23,600.00
0010	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	400.000	SY	$4.0000	$1,600.00
0011	0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	540.000	TON	$48.0000	$25,920.00
0012	0320000000-E FOUNDATION CONDITIONING GEO- TEXTILE	1300.000	SY	$7.0000	$9,100.00
0013	0366000000-E 15" RC PIPE CULVERTS, CLASS III	64.000	LF	$339.0000	$21,696.00
0014	0378000000-E 24" RC PIPE CULVERTS, CLASS III	204.000	LF	$313.0000	$63,852.00
0015	0384000000-E 30" RC PIPE CULVERTS, CLASS III	112.000	LF	$374.0000	$41,888.00
0016	0448000000-E ****" RC PIPE CULVERTS, CLASS IV (60")	12.000	LF	$736.0000	$8,832.00
0017	0448300000-E 18" RC PIPE CULVERTS, CLASS IV	1772.000	LF	$217.0000	$384,524.00
0018	0448400000-E 24" RC PIPE CULVERTS, CLASS IV	472.000	LF	$248.0000	$117,056.00
0019	0448500000-E 30" RC PIPE CULVERTS, CLASS IV	768.000	LF	$270.0000	$207,360.00
0020	0448700000-E 42" RC PIPE CULVERTS, CLASS IV	240.000	LF	$387.0000	$92,880.00
0021	0986000000-E GENERIC PIPE ITEM 54" PIPE REHABILITATION CIPP LINER	150.000	LF	$414.0000	$62,100.00
0022	0995000000-E PIPE REMOVAL	1597.000	LF	$53.0000	$84,641.00
0023	1099500000-E SHALLOW UNDERCUT	100.000	CY	$37.0000	$3,700.00

0024	1099700000-E	200.000	TON	$78.0000	$15,600.00
	CLASS IV SUBGRADE STABILIZA- TION				
0025	1121000000-E	100.000	TON	$92.0000	$9,200.00
	AGGREGATE BASE COURSE				
0026	1297000000-E	1990.000	SY	$13.0000	$25,870.00
	MILLING ASPHALT PAVEMENT, ***"DEPTH (1-1/2")				
0027	1297000000-E	35780.000	SY	$6.0000	$214,680.00
	MILLING ASPHALT PAVEMENT, ***"DEPTH (2")				
0028	1297000000-E	3540.000	SY	$28.0000	$99,120.00
	MILLING ASPHALT PAVEMENT, ***"DEPTH (3/4")				
0029	1308000000-E	570.000	SY	$24.0000	$13,680.00
	MILLING ASPHALT PAVEMENT, ***"TO ******" (0" TO 2")				
0030	1491000000-E	1050.000	TON	$150.0000	$157,500.00
	ASPHALT CONC BASE COURSE, TYPE B25.0C				
0031	1503000000-E	1640.000	TON	$147.0000	$241,080.00
	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C				
0032	1523000000-E	1510.000	TON	$149.0000	$224,990.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5C				
0033	1524200000-E	5570.000	TON	$132.0000	$735,240.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5D				
0034	1575000000-E	220.000	TON	$818.0000	$179,960.00
	ASPHALT BINDER FOR PLANT MIX				
0035	1577000000-E	455.000	TON	$993.0000	$451,815.00
	POLYMER MODIFIED ASPHALT BIN- DER FOR PLANT MIX				
0036	1662000000-E	2230.000	TON	$183.0000	$408,090.00
	OPEN-GRADED ASPHALT FRICTION COURSE, TYPE FC-1 MODIFIED				
0037	1693000000-E	980.000	TON	$176.0000	$172,480.00
	ASPHALT PLANT MIX, PAVEMENT REPAIR				
0038	1891000000-E	30.000	SY	$111.0000	$3,330.00
	GENERIC PAVING ITEM 4" CONCRETE PAD FOR PIPES UNDER FENCE				
0039	1925000000-E	10661.000	LF	$1.0000	$10,661.00
	MILLED RUMBLE STRIPS (CONCRETE SHOULDERS)				
0040	2022000000-E	134.000	CY	$49.0000	$6,566.00
	SUBDRAIN EXCAVATION				
0041	2026000000-E	400.000	SY	$6.0000	$2,400.00
	GEOTEXTILE FOR SUBSURFACE DRAINS				
0042	2036000000-E	68.000	CY	$126.0000	$8,568.00
	SUBDRAIN COARSE AGGREGATE				
0043	2044000000-E	400.000	LF	$38.0000	$15,200.00
	6" PERFORATED SUBDRAIN PIPE				
0044	2070000000-N	2.000	EA	$500.0000	$1,000.00
	SUBDRAIN PIPE OUTLET				
0045	2077000000-E	12.000	LF	$185.0000	$2,220.00
	6" OUTLET PIPE				
0046	2209000000-E	7.000	CY	$2,368.0000	$16,576.00
	ENDWALLS				
0047	2220000000-E	6.000	CY	$4,660.0000	$27,960.00
	REINFORCED ENDWALLS				
0048	2275000000-E	85.000	CY	$527.0000	$44,795.00

	FLOWABLE FILL				
0049	2286000000-N	37.000	EA	$9,872.0000	$365,264.00
	MASONRY DRAINAGE STRUCTURES				
0050	2297000000-E	6.000	CY	$3,603.0000	$21,618.00
	MASONRY DRAINAGE STRUCTURES				
0051	2308000000-E	2.000	LF	$315.0000	$630.00
	MASONRY DRAINAGE STRUCTURES				
0052	2365000000-N	6.000	EA	$889.0000	$5,334.00
	FRAME WITH TWO GRATES, STD 840.22				
0053	2367000000-N	1.000	EA	$901.0000	$901.00
	FRAME WITH TWO GRATES, STD 840.29				
0054	2374000000-N	1.000	EA	$1,436.0000	$1,436.00
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)				
0055	2407000000-N	30.000	EA	$2,561.0000	$76,830.00
	STEEL FRAME WITH TWO GRATES, STD 840.37				
0056	2556000000-E	327.000	LF	$55.0000	$17,985.00
	SHOULDER BERM GUTTER				
0057	2619000000-E	60.000	SY	$100.0000	$6,000.00
	4" CONCRETE PAVED DITCH				
0058	2703000000-E	3502.000	LF	$200.0000	$700,400.00
	CONCRETE BARRIER, TYPE ******* (SINGLE SLOPE)				
0059	2724000000-E	190.000	LF	$273.0000	$51,870.00
	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED				
0060	3030000000-E	1413.000	LF	$27.0000	$38,151.00
	STEEL BEAM GUARDRAIL				
0061	3045000000-E	100.000	LF	$30.0000	$3,000.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0062	3150000000-N	5.000	EA	$166.0000	$830.00
	ADDITIONAL GUARDRAIL POSTS				
0063	3210000000-N	3.000	EA	$866.0000	$2,598.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0064	3288000000-N	2.000	EA	$3,496.0000	$6,992.00
	GUARDRAIL END UNITS, TYPE TL-2				
0065	3289000000-N	3.000	EA	$3,607.0000	$10,821.00
	GUARDRAIL END UNITS, TYPE MEDIAN TL-3				
0066	3317000000-N	5.000	EA	$2,109.0000	$10,545.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0067	3360000000-E	2466.000	LF	$1.0000	$2,466.00
	REMOVE EXISTING GUARDRAIL				
0068	3575000000-E	3880.000	LF	$22.0000	$85,360.00
	GENERIC FENCING ITEM WILDLIFE FENCE				
0069	3578000000-N	1.000	EA	$5,550.0000	$5,550.00
	GENERIC FENCING ITEM WILDLIFE DOUBLE GATES 9' HIGH, 6' WIDE, 12' OPENING				
0070	3578000000-N	221.000	EA	$53.0000	$11,713.00
	GENERIC FENCING ITEM WILDLIFE FENCE POST 4", 13'				
0071	3578000000-N	108.000	EA	$139.0000	$15,012.00
	GENERIC FENCING ITEM WILDLIFE FENCE POST 5", 13'				
0072	3642000000-E	55.000	TON	$117.0000	$6,435.00
	RIP RAP, CLASS A				

0073	3649000000-E	550.000	TON	$121.0000	$66,550.00
	RIP RAP, CLASS B				
0074	3656000000-E	2660.000	SY	$4.0000	$10,640.00
	GEOTEXTILE FOR DRAINAGE				
0075	3691000000-N	15.000	EA	$444.0000	$6,660.00
	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT				
0076	3691000000-N	15.000	EA	$222.0000	$3,330.00
	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTIONDEVICE				
0077	4048000000-E	2.000	CY	$1,332.0000	$2,664.00
	REINFORCED CONCRETE SIGN FOUN-DATIONS				
0078	4060000000-E	1447.000	LB	$19.0000	$27,493.00
	SUPPORTS, BREAKAWAY STEEL BEAM				
0079	4072000000-E	560.000	LF	$28.0000	$15,680.00
	SUPPORTS, 3-LB STEEL U-CHANNEL				
0080	4096000000-N	5.000	EA	$555.0000	$2,775.00
	SIGN ERECTION, TYPE D				
0081	4102000000-N	25.000	EA	$832.0000	$20,800.00
	SIGN ERECTION, TYPE E				
0082	4108000000-N	6.000	EA	$245.0000	$1,470.00
	SIGN ERECTION, TYPE F				
0083	4110000000-N	2.000	EA	$3,086.0000	$6,172.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)				
0084	4110000000-N	2.000	EA	$3,086.0000	$6,172.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)				
0085	4152000000-N	3.000	EA	$1,221.0000	$3,663.00
	DISPOSAL OF SIGN SYSTEM, STEELBEAM				
0086	4155000000-N	29.000	EA	$555.0000	$16,095.00
	DISPOSAL OF SIGN SYSTEM, U- CHANNEL				
0087	4402000000-E	1228.000	SF	$14.0000	$17,192.00
	HIGH VISIBILITY STATIONARY SIGNS				
0088	4407000000-E	1052.000	SF	$14.0000	$14,728.00
	HIGH VISIBILITY PORTABLE SIGNS				
0089	4410000000-E	32.000	SF	$14.0000	$448.00
	WORK ZONE SIGNS (BARRICADE MOUNTED)				
0090	4415000000-N	6.000	EA	$2,728.0000	$16,368.00
	FLASHING ARROW BOARD				
0091	4420000000-N	6.000	EA	$8,794.0000	$52,764.00
	PORTABLE CHANGEABLE MESSAGE SIGN				
0092	4432000000-N	700.000	EA	$80.0000	$56,000.00
	HIGH VISIBILITY DRUMS				
0093	4434000000-N	200.000	EA	$146.0000	$29,200.00
	SEQUENTIAL FLASHING WARNING LIGHTS				
0094	4445000000-E	360.000	LF	$94.0000	$33,840.00
	BARRICADES (TYPE III)				
0095	4455000000-N	20.000	DAY	$682.0000	$13,640.00
	FLAGGER				
0096	4465000000-N	4.000	EA	$23,613.0000	$94,452.00
	TEMPORARY CRASH CUSHIONS				
0097	4470000000-N	4.000	EA	$7,146.0000	$28,584.00

		REMOVE & RESET TEMPORARY CRASH CUSHION			
0098	4480000000-N	4.000	EA	$28,397.0000	$113,588.00
		TMA			
0099	4490000000-E	4550.000	LF	$84.0000	$382,200.00
		PORTABLE CONCRETE BARRIER (ANCHORED)			
0100	4505000000-E	4500.000	LF	$10.0000	$45,000.00
		REMOVE & RESET PORTABLE CONC-			
0101	4510000000-N	64.000	HR	$111.0000	$7,104.00
		LAW ENFORCEMENT			
0102	4589000000-N	1.000	LS	$27,471.0000	$27,471.00
		GENERIC TRAFFIC CONTROL ITEM DYNAMIC ZIPPER MERGE SYSTEM DEPLOYMENT			
0103	4600000000-N	16.000	EA	$21,821.0000	$349,136.00
		GENERIC TRAFFIC CONTROL ITEM PORTABLE CCTV CAMERA ASSEMBLY			
0104	4609000000-N	400.000	DAY	$30.0000	$12,000.00
		GENERIC TRAFFIC CONTROL ITEM DYNAMIC ZIPPER MERGE SYSTEM			
0105	4685000000-E	2000.000	LF	$2.0000	$4,000.00
		THERMOPLASTIC PAVEMENT MARKINGLINES (4", 90 MILS)			
0106	4688000000-E	30814.000	LF	$2.0000	$61,628.00
		THERMOPLASTIC PAVEMENT MARKINGLINES (6", 90 MILS)			
0107	4700000000-E	3000.000	LF	$7.0000	$21,000.00
		THERMOPLASTIC PAVEMENT MARKINGLINES (12", 90 MILS)			
0108	4725000000-E	8.000	EA	$405.0000	$3,240.00
		THERMOPLASTIC PAVEMENT MARKINGSYMBOL (90 MILS)			
0109	4775000000-E	1400.000	LF	$8.0000	$11,200.00
		COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (II)			
0110	4815000000-E	25302.000	LF	$1.0000	$25,302.00
		PAINT PAVEMENT MARKING LINES (6")			
0111	4835000000-E	50.000	LF	$7.0000	$350.00
		PAINT PAVEMENT MARKING LINES (24")			
0112	4855000000-E	8089.000	LF	$2.0000	$16,178.00
		REMOVAL OF PAVEMENT MARKING LINES (6")			
0113	4870000000-E	40.000	LF	$14.0000	$560.00
		REMOVAL OF PAVEMENT MARKING LINES (24")			
0114	4891000000-E	100.000	LF	$9.0000	$900.00
		GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)			
0115	4895000000-N	183.000	EA	$72.0000	$13,176.00
		GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKERS			
0116	6000000000-E	8000.000	LF	$10.0000	$80,000.00
		TEMPORARY SILT FENCE			
0117	6006000000-E	780.000	TON	$126.0000	$98,280.00
		STONE FOR EROSION CONTROL, CLASS A			
0118	6009000000-E	605.000	TON	$112.0000	$67,760.00
		STONE FOR EROSION CONTROL, CLASS B			
0119	6012000000-E	870.000	TON	$100.0000	$87,000.00
		SEDIMENT CONTROL STONE			
0120	6015000000-E	16.000	ACR	$1,110.0000	$17,760.00
		TEMPORARY MULCHING			
0121	6018000000-E	750.000	LB	$6.0000	$4,500.00

		SEED FOR TEMPORARY SEEDING			
0122	6021000000-E	4.000 TON		$960.0000	$3,840.00
		FERTILIZER FOR TEMPORARY SEED-ING			
0123	6024000000-E	200.000 LF		$61.0000	$12,200.00
		TEMPORARY SLOPE DRAINS			
0124	6029000000-E	680.000 LF		$4.0000	$2,720.00
		SAFETY FENCE			
0125	6030000000-E	860.000 CY		$25.0000	$21,500.00
		SILT EXCAVATION			
0126	6036000000-E	40000.000 SY		$3.0000	$120,000.00
		MATTING FOR EROSION CONTROL			
0127	6037000000-E	100.000 SY		$6.0000	$600.00
		COIR FIBER MAT			
0128	6038000000-E	335.000 SY		$7.0000	$2,345.00
		PERMANENT SOIL REINFORCEMENT MAT			
0129	6042000000-E	2150.000 LF		$17.0000	$36,550.00
		1/4" HARDWARE CLOTH			
0130	6070000000-N	2.000 EA		$832.0000	$1,664.00
		SPECIAL STILLING BASINS			
0131	6071020000-E	50.000 LB		$11.0000	$550.00
		POLYACRYLAMIDE (PAM)			
0132	6084000000-E	27.000 ACR		$2,775.0000	$74,925.00
		SEEDING & MULCHING			
0133	6087000000-E	27.000 ACR		$222.0000	$5,994.00
		MOWING			
0134	6090000000-E	450.000 LB		$11.0000	$4,950.00
		SEED FOR REPAIR SEEDING			
0135	6093000000-E	1.250 TON		$1,332.0000	$1,665.00
		FERTILIZER FOR REPAIR SEEDING			
0136	6096000000-E	675.000 LB		$11.0000	$7,425.00
		SEED FOR SUPPLEMENTAL SEEDING			
0137	6108000000-E	20.250 TON		$1,110.0000	$22,477.50
		FERTILIZER TOPDRESSING			
0138	6111000000-E	37.000 LF		$550.0000	$20,350.00
		IMPERVIOUS DIKE			
0139	6114500000-N	10.000 MHR		$111.0000	$1,110.00
		SPECIALIZED HAND MOWING			
0140	6117000000-N	100.000 EA		$832.0000	$83,200.00
		RESPONSE FOR EROSION CONTROL			
0141	6117500000-N	8.000 EA		$2,220.0000	$17,760.00
		CONCRETE WASHOUT STRUCTURE			
0142	6123000000-E	6.000 ACR		$5,550.0000	$33,300.00
		REFORESTATION			
0143	6126000000-E	1.000 ACR		$8,880.0000	$8,880.00
		STREAMBANK REFORESTATION			
0144	8035000000-N	1.000 LS		$686,359.0000	$686,359.00
		REMOVAL OF EXISTING STRUCTURE AT STATION ********** (30+68.60 -L-)			
0145	8065000000-N	1.000 LS		$2,370.0000	$2,370.00
		ASBESTOS ASSESSMENT			

0146	8091000000-N	1.000	LS	$162,480.0000	$162,480.00
	FOUNDATION EXCAVATION FOR BENT** AT STATION ********** (1, 30+12.56 -L-)				
0147	8112730000-N	1.000	EA	$18,446.0000	$18,446.00
	PDA TESTING				
0148	8121000000-N	1.000	LS	$261,923.0000	$261,923.00
	UNCLASSIFIED STRUCTURE EXCAVA-TION AT STATION ******** (30+68.60 -L-)				
0149	8147000000-E	16652.000	SF	$100.0000	$1,665,200.00
	REINFORCED CONCRETE DECK SLAB				
0150	8161000000-E	17323.000	SF	$3.0000	$51,969.00
	GROOVING BRIDGE FLOORS				
0151	8182000000-E	352.000	CY	$3,137.0000	$1,104,224.00
	CLASS A CONCRETE (BRIDGE)				
0152	8210000000-N	1.000	LS	$267,425.0000	$267,425.00
	BRIDGE APPROACH SLABS, STATION********** (30+68.60 -L-)				
0153	8217000000-E	71537.000	LB	$3.0000	$214,611.00
	REINFORCING STEEL (BRIDGE)				
0154	8238000000-E	3788.000	LB	$8.0000	$30,304.00
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)				
0155	8328200000-E	14.000	EA	$4,846.0000	$67,844.00
	PILE DRIVING EQUIPMENT SETUP (HP 14 X 73)				
0156	8384000000-E	400.000	LF	$362.0000	$144,800.00
	HP14X73 STEEL PILES				
0157	8391000000-N	14.000	EA	$646.0000	$9,044.00
	STEEL PILE POINTS				
0158	8503000000-E	472.000	LF	$197.0000	$92,984.00
	CONCRETE BARRIER RAIL				
0159	8510000000-E	266.000	LF	$253.0000	$67,298.00
	CONCRETE MEDIAN BARRIER				
0160	8531000000-E	24.000	SY	$100.0000	$2,400.00
	4" SLOPE PROTECTION				
0161	8608000000-E	1545.000	TON	$129.0000	$199,305.00
	RIP RAP CLASS II (2'-0" THICK)				
0162	8622000000-E	1499.000	SY	$4.0000	$5,996.00
	GEOTEXTILE FOR DRAINAGE				
0163	8657000000-N	1.000	LS	$167,088.0000	$167,088.00
	ELASTOMERIC BEARINGS				
0164	8706000000-N	1.000	LS	$303,667.0000	$303,667.00
	EXPANSION JOINT SEALS				
0165	8801000000-E	3170.000	SF	$194.0000	$614,980.00
	MSE RETAINING WALL NO **** (1)				
0166	8867000000-E	745.000	LF	$651.0000	$484,995.00
	GENERIC STRUCTURE ITEM 36" FLORIDA I-BEAM CONCRETE GIRDER				
0167	8867000000-E	962.000	LF	$807.0000	$776,334.00
	GENERIC STRUCTURE ITEM 54" FLORIDA I-BEAM CONCRETE GIRDER				
0168	8897000000-N	10.000	EA	$34,805.0000	$348,050.00
	GENERIC STRUCTURE ITEM 9-5/8" DIAMETER MICROPILES				
Section 0001 Total					$18,945,378.96

Item Total	$18,945,378.96

ELECTRONIC BID SUBMISSION

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

==========

NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

The prequalified bidder declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. §133-24 within the last three years, and that the prequalified bidder intends to do the work with his own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. §133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.

2. The terms covered transaction, debarred, suspended, ineligible, lower tier

covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal- Aid Provision titled Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or

commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder’s bid being considered non-responsive.

EXPLANATION:

==========

Award Limits on Multiple Projects

By answering YES to this statement, the bidder acknowleges that they are using the award limits on multiple projects? **Yes** ◯ **No** ◯

A bidder who desires to bid on more than one project on which bids are to be opened on the same date, and who also desires to avoid receiving an award of more projects than he is equipped to handle, may bid on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the AWARD LIMITS ON MULTIPLE PROJECTS.

The Award Limits on Multiple Projects must be filled in on each project bid for which the Bidder desires protection.

It is the desire of the Bidder to be awarded contracts, the value of which

will not exceed a total of for those

projects indicated herein, for which bids will be opened on (MM/DD/YY)

The Award Limits shall apply to the following projects:

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

It is agreed that if I am (we are) the low Bidder(s) on indicated projects, the total value of which is more than the above stipulated award limits, the Board of Transportation will award me (us) projects from among those indicated

that have a total value not to exceed the award limit and will result in the lowest total bids to the Department of Transportation.

DBE List Summary

Project: STATE FUNDED
Bid Total: 18,945,378.96
Goal: 4.00% (757,815.16)
Total Entered: 5.10% (967,019.28)

Bidder ID: 3583
Business Name:

ID	Name	Is Supplier?	Item Count	Amount	Is Complete?
15755	GOSALIA CONCRETE CONSTRUCTORS INC.	False	3	678,563.20	True
15521	4 D CONSTRUCTION	False	6	115,514.88	True
4247	SEAL BROTHERS CONTRACTING LLC	False	6	172,941.20	True

Name: GOSALIA CONCRETE CONSTRUCTORS INC. ID: 15755

Address: SUITE 200 WESTSHORE BLVD , TAMPA, FL 33607

Used As: SubContractor DBE Items Total:$678,563.20

Items for GOSALIA CONCRETE CONSTRUCTORS INC.

0001 ROADWAY ITEMS					
0058	2703000000-E CONCRETE BARRIER, TYPE ******* (SINGLE SLOPE)	3502.000	LF	$173.1000	$606,196.20
0158	8503000000-E CONCRETE BARRIER RAIL	472.000	LF	$99.5000	$46,964.00
0159	8510000000-E CONCRETE MEDIAN BARRIER	266.000	LF	$95.5000	$25,403.00
Section 0001 Total					$678,563.20
Item Total					$678,563.20

Name: 4 D CONSTRUCTION ID: 15521

Address: P.O. BOX 806 , MAXTON, NC 28364

Used As: SubContractor DBE Items Total:$115,514.88

Items for 4 D CONSTRUCTION

0001 ROADWAY ITEMS					
0149	8147000000-E	16652.000	SF	$4.7400	$78,930.48
	REINFORCED CONCRETE DECK SLAB				
Note: 2.80 SIP Decking 1.94 Rebar Installation					
0152	8210000000-N	1.000	LS	$7,890.0000	$7,890.00
	BRIDGE APPROACH SLABS, STATION********** (30+68.60 -L-)				
0153	8217000000-E	71537.000	LB	$0.3200	$22,891.84
	REINFORCING STEEL (BRIDGE)				
0154	8238000000-E	3788.000	LB	$0.3200	$1,212.16
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)				
0158	8503000000-E	472.000	LF	$6.8400	$3,228.48
	CONCRETE BARRIER RAIL				
0159	8510000000-E	266.000	LF	$5.1200	$1,361.92
	CONCRETE MEDIAN BARRIER				
Section 0001 Total					$115,514.88

Item Total	$115,514.88

Name: SEAL BROTHERS CONTRACTING LLC ID: 4247

Address: 131 W. CLEVE STREET , MOUNT AIRY, NC 27030

Used As: SubContractor DBE Items Total:$172,941.20

Items for SEAL BROTHERS CONTRACTING LLC

0001 ROADWAY ITEMS					
0068	3575000000-E GENERIC FENCING ITEM WILDLIFE FENCE	3880.000	LF	$19.6400	$76,203.20
0070	3578000000-N GENERIC FENCING ITEM WILDLIFE FENCE POST 4", 13'	221.000	EA	$48.0000	$10,608.00
0071	3578000000-N GENERIC FENCING ITEM WILDLIFE FENCE POST 5", 13'	108.000	EA	$125.0000	$13,500.00
0116	6000000000-E TEMPORARY SILT FENCE	8000.000	LF	$4.7500	$38,000.00
0124	6029000000-E SAFETY FENCE	680.000	LF	$3.5000	$2,380.00
0129	6042000000-E 1/4" HARDWARE CLOTH	2150.000	LF	$15.0000	$32,250.00
Section 0001 Total					$172,941.20

Item Total	$172,941.20

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)
GOSALIA CONCRETE CONSTRUCTORS INC./DBE: 0159 Price is over commmited
4 D CONSTRUCTION/DBE: 0159 Price is over commmited
GOSALIA CONCRETE CONSTRUCTORS INC./DBE: 0159 Price is over commmited
4 D CONSTRUCTION/DBE: 0159 Price is over commmited
GOSALIA CONCRETE CONSTRUCTORS INC./DBE: 0159 Price is over committed.
GOSALIA CONCRETE CONSTRUCTORS INC./DBE: 0159 Price is over committed.
GOSALIA CONCRETE CONSTRUCTORS INC./DBE: 0159 Price is over commmited
GOSALIA CONCRETE CONSTRUCTORS INC./DBE: 0159 Price is over commmited

This Bid contains 1 amendment files

Electronic Bid Submission

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

I hereby certify that I have the authority to submit this bid.

Signature _____

Agency Kiewit Infrastructure South Co.

Date 10/6/2021

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Attachments

Failure to complete and attach the Fuel Usage Factor Adjustment Form will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items included on the form. The contractor will not be permitted to change the option after the bids are submitted.

NOTE: The maximum upload limit is 5 MB. ☐ Verify

Appendix B

Project Proposal

PROPOSAL FOR THE CONSTRUCTION OF

CONTRACT No. C204654 IN HAYWOOD COUNTY, NORTH CAROLINA

Date_____ 20_____

DEPARTMENT OF TRANSPORTATION,

RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **C204654** has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **C204654** in **Haywood County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.

State Contract Officer

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PROJECT SPECIAL PROVISIONS

GENERAL

CONTRACT TIME AND LIQUIDATED DAMAGES:
(8-15-00) (Rev. 12-18-07) 108 SP1 G07 A

The date of availability for this contract is **October 20, 2021**, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **May 20, 2023**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Two Hundred Dollars ($ 200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:
(7-1-95) (Rev. 2-21-12) 108 SP1 G13 A

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **October 20, 2021**.

The completion date for this intermediate contract time is **May 20, 2022.**

The liquidated damages for this intermediate contract time are **Two Thousand Dollars ($ 2000.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:
(2-20-07) 108 SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **I-40** during the following restrictions:

DAY AND TIME RESTRICTIONS

From May 21st to October 31st (of any year)
Sunday thru Saturday, 7:00 A.M. to 7:00 P.M.

From November 1st to the following May 20th
No Restrictions

In addition, the Contractor shall not close or narrow a lane of traffic on **I-40 and/or Cold Springs Creek Road**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND SPECIAL EVENT LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.

2. For **New Year's Day**, between the hours of **6:00 A.M.** December 31st and **6:00 P.M.** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 P.M.** the following Tuesday.

3. For **Easter**, between the hours of **6:00 A.M.** Thursday and **6:00 P.M.** Monday.

4. For **Memorial Day**, between the hours of **6:00 A.M.** Friday and **6:00 P.M.** Tuesday.

5. For **Independence Day**, between the hours of **6:00 A.M.** the day before Independence Day and **6:00 P.M.** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **6:00 A.M.** the Thursday before Independence Day and **6:00 P.M.** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **6:00 A.M.** Friday and **6:00 P.M.** Tuesday.

7. For **Thanksgiving**, between the hours of **6:00 A.M.** Tuesday and **6:00 P.M.** Monday.

8. For **Christmas**, between the hours of **6:00 A.M.** the Friday before the week of Christmas Day and **6:00 P.M.** the following Tuesday after the week of Christmas Day.

The Contractor shall schedule his work so that lane closures will not be required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated above and place traffic in the existing traffic pattern.

Lane closures or narrowing necessary for Phase II may remain in place over the Holidays that occur during the work window.

The liquidated damages are **Five Hundred Dollars ($ 500.00)** per fifteen **(15)** minute time period not to exceed **Ten Thousand Dollars ($10,000.00)** per day.

PERMANENT VEGETATION ESTABLISHMENT:

(2-16-12) (Rev. 10-15-13) 104 SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed. The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control*, *Seeding and Mulching, Repair Seeding*, *Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation,* and *Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

CONSTRUCTION MORATORIUM:

(1-19-16) SP1 G18C

No tree cutting will be allowed from **April 15** through **October 15** of any year.

CONSTRUCTION AGREED PRICE (CAP)

Description

The Construction Agreed Price (CAP) is the summation of all contract line item amounts, which include all direct costs, indirect costs, and applied fixed fee, contained in this construction contract as negotiated between the Contractor and the Department which constitute the Contract Bid Amount. Payments due to the Contractor will be based on measurement of the contract line items in accordance with the 2018 Standard Specifications for Roads and Structures or as modified through the Project Special Provisions. Total payments to the contractor, excluding contractual price adjustments for fuel and materials and/or liquidated damages assessed, for performance of the work associated with this Contract shall not exceed the established CAP. If the monthly estimated or final dollar value, excluding adjustments and liquidated damages, owed to the Contractor exceeds the CAP, the payment due the Contractor will be reduced by the amount of the overage. The Contractor assumes all risk with the performance of the bid items, including management of its subcontractors, suppliers, and any associated cost impacts over and above the CAP not subject to Article 104-5 or agreed to as risk register items in Exhibit E as referenced in the Risk Register Special Provision contained herein.

The CAP shall not be increased except for the following reasons:

- Executed supplemental agreements or force accounts that provide additional compensation to the contractor. The adjustment to the CAP will be reflective of the value of the Supplemental Agreement and will not be based on final quantities associated with the agreement. For force account work, the CAP will be adjusted by the final value of the force account work.
- Approved claims providing additional compensation. The adjustment to the CAP will be reflective of the value of the additional compensation included in the approved claim.
- Line item overruns shall not constitute an increase in the CAP unless the contractor has requested a revised unit price in accordance with Article 104-5 of the 2018 Standard Specifications for Roads and Structures and a Supplemental Agreement is executed.

When the CAP is to be adjusted, the Resident Engineer shall notify the Contractor in writing of the newly established CAP.

CMGC RISK REGISTER

During preconstruction, the Department and the Contractor worked collaboratively to identify risk items that could impact the construction duration and cost to perform work within the scope of the project. The Risk Registry, included as Exhibit E, provides a description of the identified risks as well as identifies the party that shall be the owner of the individual risk items. If the Department and Contractor agree during the life of the project that any item on the registry has been realized, payment for these items of work will be made in accordance with Article 104-7 of the 2018 Standard Specifications for Roads and Structures. Adjustments to the Construction Agreed Price(CAP) will be made in accordance with the special provision titled “Construction Agreed Price” found elsewhere in the Contract.

MAJOR CONTRACT ITEMS:

(2-19-02) 104 SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2018 Standard Specifications*):

Line #	Description
33	Asphalt Conc. Surface Course, Type S9.5D
58	Concrete Barrier, Type*** (Single Slope)
149	Reinforced Concrete Deck Slab
167	54" Florida I-Beam Concrete Girder

SPECIALTY ITEMS:

(7-1-95)(Rev. 7-20-21) 108-6 SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the *2018 Standard Specifications*).

Line #	Description
60-67	Guardrail
68-71	Fencing
77-86	Signing
105-109, 114	Long-Life Pavement Markings
115	Permanent Pavement Markers
75-76	Erosion Control
116-141	
142-143	Reforestation

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 7-20-21) 109-8 SP1 G43

Revise the *2018 Standard Specifications* as follows:

Page 1-87, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is **$ 2.3102** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

The pay items and the fuel factor used in calculating adjustments to be made will be as follows:

Description	Units	Fuel Usage Factor Diesel
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Asphalt Concrete Base Course, Type ____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Intermediate Course, Type ____	Gal/Ton	0.90 or 2.90

Asphalt Concrete Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Open-Graded Asphalt Friction Course	Gal/Ton	0.90 or 2.90
Permeable Asphalt Drainage Course, Type ____	Gal/Ton	0.90 or 2.90
Sand Asphalt Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
__" Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to __" Pavement	Gal/SY	0.245

For the asphalt items noted in the chart as eligible for fuel adjustments, the bidder may include the *Fuel Usage Factor Adjustment Form* with their bid submission if they elect to use the fuel usage factor. The *Fuel Usage Factor Adjustment Form* is found at the following link:

https://connect.ncdot.gov/letting/LetCentral/Fuel%20Usage%20Factor%20Adjustment%20Form.pdf

Select either 2.90 Gal/Ton fuel factor or 0.90 Gal/Ton fuel factor for each asphalt line item on the *Fuel Usage Factor Adjustment Form*. The selected fuel factor for each asphalt item will remain in effect for the duration of the contract.

Failure to complete the *Fuel Usage Factor Adjustment Form* will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items noted above. The contractor will not be permitted to change the Fuel Usage Factor after the bids are submitted.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-13-19) 108-2 SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

	Fiscal Year	**Progress (% of Dollar Value)**
2022	(7/01/21 - 6/30/22)	**100** % of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2018 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:

(10-16-07)(Rev. 8-17-21) 102-15(J) SP1 G66

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE /WBE Goal. No submittal of a Letter of Intent is required.

Combined MBE/WBE Goal: A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

Committed MBE/WBE Subcontractor - Any MBE/WBE submitted at the time of bid that is being used to meet the Combined MBE /WBE goal by submission of a Letter of Intent. Or any MBE or WBE used as a replacement for a previously committed MBE or WBE firm.

Contract Goal Requirement - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

Goal Confirmation Letter - Written documentation from the Department to the bidder confirming the Contractor's approved, committed participation along with a listing of the committed MBE and WBE firms.

Manufacturer - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

MBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed MBE subcontractor(s).

Minority Business Enterprise (MBE) - A firm certified as a Disadvantaged Minority-Owned Business Enterprise through the North Carolina Unified Certification Program.

Regular Dealer - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

Replacement / Substitution – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) MBE/WBE firm.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

WBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage, that is anticipated to be performed by committed WBE subcontractor(s).

Women Business Enterprise (WBE) - A firm certified as a Disadvantaged Women-Owned Business Enterprise through the North Carolina Unified Certification Program.

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project. https://apps.dot.state.nc.us/Vendor/PaymentTracking/

DBE-IS *Subcontractor Payment Information* - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only. https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf

RF-1 *MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE. http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip

JC-1 *Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid. http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only. http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages. http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls

Combined MBE/WBE Goal

The Combined MBE/WBE Goal for this project is **4.0 %**

The Combined Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **2.0 %**

(1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **2.0 %**

(1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Bidder is required to submit only participation to meet the Combined MBE/WBE Goal. The Combined Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the Combined MBE/WBE Goal. The Directory can be found at the following link.
https://www.ebs.nc.gov/VendorDirectory/default.html

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit <u>all</u> MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE Goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE

subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

(1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.

(2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.

(3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

(1) *If the Combined MBE/WBE Goal is more than zero,*

(a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.

(b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

(c) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the

firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE Goal.

(2) *If the Combined MBE/WBE Goal is zero,* entries on the *Listing of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

MBE or WBE Prime Contractor

When a certified MBE or WBE firm bids on a contract that contains a Combined MBE/WBE goal, the firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet the Combined MBE/WBE Goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goal.

MBE/WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE/WBE Subcontractor* just as a non-MBE/WBE bidder would.

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE Goal of the contract, indicating the bidder's commitment to use the MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE Goal. If the lack of this participation drops the commitment below the Combined MBE/WBE Goal, the Contractor shall submit evidence of good faith efforts for the goal, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE/WBE Credit

If the bid of the lowest responsive bidder exceeds $500,000 and if the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE /WBE Goal by $1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE Goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

If the bidder fails to meet or exceed the Combined MBE/WBE Goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it would be due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

(A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE Goal will be achieved.

(1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

(2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).

(C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith

efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.

(E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get MBE or WBE quotes.

(I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised goal.

In addition, the Department may take into account the following:

(1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE Goal.

(2) The bidders' past performance in meeting the contract goal.

(3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE Goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

Non-Good Faith Appeal

The State Prequalification Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Prequalification Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal

(A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work actually performed by the MBE/WBE and the actual payments to MBE/WBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 *(Joint Check Notification Form)* and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does <u>not</u> count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Suppliers

A contractor may count toward its MBE/ WBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its MBE/ WBE requirement the following expenditures to MBE/WBE firms that are not manufacturers or regular dealers:

(1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.

(2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

The following factors will be used to determine if a MBE or WBE trucking firm is performing a commercially useful function:

(1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE Goal.

(2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

(3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.

(4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.

(5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

(6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for

use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the MBE/WBE subcontractor, with a copy to the Engineer of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the MBE/WBE subcontractor.

A committed MBE/WBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

(a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
(b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
(c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
(d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
(e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
(f) The listed MBE/WBE subcontractor is not a responsible contractor;
(g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
(h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;

(i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
(j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

When a committed MBE/WBE is terminated for good cause as stated above, an additional MBE/WBE that was submitted at the time of bid may be used to fulfill the MBE/WBE commitment to meet the Combined MBE/WBE Goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBE/WBEs submitted at the time of bid to cover the same amount of work as the MBE/WBE that was terminated.

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

(1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.

(2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:

(a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
(b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why MBE/WBE quotes were not accepted.

(4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

(1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.

(2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

(3) Exception: If the MBE/WBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement and overall goal.

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 *(DBE Replacement Request)*. If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

Reports and Documentation

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all MBE/WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

(A) Withholding of money due in the next partial pay estimate; or

(B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for work on future DOT projects until the required information is submitted.

Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:
(11-17-20) SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.**

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):
(8-20-19) SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites,* NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system,* and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

Prior to beginning operations, the Contractor shall complete the NCDOT UAS – Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

EQUIPMENT IDLING GUIDELINES:
(1-19-21) 107 SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.

4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).
11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

SUBSURFACE INFORMATION:

(7-1-95) 450 SP1 G112 C

Subsurface information is available on the roadway and structure portions of this project.

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11) 1170-4 SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2018 Standard Specifications* will apply to the portable concrete barrier.

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12) 104-10 SP1 G125

Revise the *2018 Standard Specifications* as follows:

Page 1-39, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-39, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in* accordance with this

article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.

Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

ELECTRONIC BIDDING:

(2-19-19) 101, 102, 103 SP1 G140

Revise the *2018 Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) *Electronic Bid,* line 1, replace "Bid Express®" with "the approved electronic bidding provider".

Page 1-15, Subarticle 102-8(B), Electronic Bids, lines 39-40, replace "to Bid Express®" with "via the approved electronic bidding provider".

Page 1-15, Subarticle 102-8(B)(1), Electronic Bids, line 41, delete "from Bid Express®"

Page 1-17, Subarticle 102-9(C)(2), Electronic Bids, line 21, replace "Bid Express® miscellaneous folder within the .ebs" with "electronic submittal".

Page 1-29, Subarticle 103-4(C)(2), Electronic Bids, line 32, replace ".ebs miscellaneous data file of Expedite" with "electronic submittal file"

TWELVE MONTH GUARANTEE:

(7-15-03) 108 SP1 G145

(A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.

(B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the

manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06) SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 12-15-20) 105-16, 225-2, 16 SP1 G180

General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

(A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.

(B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.

(C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.

(D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

Roles and Responsibilities

(A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:

(1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.

(a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
(b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
(c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
(d) Implement the erosion and sediment control/stormwater site plans requested.
(e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
(g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
(h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.

(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.

(k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.

(2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:

(a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

(b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(c) Maintain an onsite rain gauge or use the Department’s Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.

(d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.

(e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

(f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.

(g) Provide secondary containment for bulk storage of liquid materials.

(h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department’s NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000.*

(i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.

(3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:

(a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
(b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
(c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
(d) Conduct the inspections required by the NPDES permit.
(e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
(j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

(B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

(1) Foreman in charge of grading activities
(2) Foreman in charge of bridge or culvert construction over jurisdictional areas
(3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

(1) Seeding and Mulching
(2) Temporary Seeding
(3) Temporary Mulching

(4) Sodding
(5) Silt fence or other perimeter erosion/sediment control device installations
(6) Erosion control blanket installation
(7) Hydraulic tackifier installation
(8) Turbidity curtain installation
(9) Rock ditch check/sediment dam installation
(10) Ditch liner/matting installation
(11) Inlet protection
(12) Riprap placement
(13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
(14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) *Certified Designer* - Include the certification number of the Level III Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III Certified Designer on the design of the project erosion and sediment control/stormwater plan.

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA), Notice of Violation (NOV),* or C*ease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

(A) Failure to adequately perform the duties as defined within this certification provision.
(B) Issuance of an ICA, NOV, or Cease and Desist Order.
(C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.

(D) Demonstration of erroneous documentation or reporting techniques.
(E) Cheating or copying another candidate's work on an examination.
(F) Intentional falsification of records.
(G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
(H) Dismissal from a company for any of the above reasons.
(I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

Measurement and Payment

Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and *Certified Designer* will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 4-5-19) 105-16, 230, 801 SP1 G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

(A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or

(B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.

(C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.

(D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2018 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix,* available at https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor

exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

NOTE TO CONTRACTOR:

The Contractor Shall keep lighting of the project to a minimum. Direct illumination of the Pigeon River and its riparian area shall be avoided during construction. Shrouds or other light blocking measures shall be used, as needed, to accomplish this.

NOTE TO CONTRACTOR:

The Contractor shall notify the Engineer 30 days prior to commencing bridge demolition operations if bridge demolition is performed between March 15th and November 15th of any given year. The Department is required to have a biologist inspect the bridges within 15 days of demolition to determine if bats are present.

The Contractor shall notify the Engineer 45 days prior to commencing bridge demolition operations if bridge demolition is performed during the winter season, November 15th to March 15th of any given year. The Department is required to have a biologist inspect the bridges within 30 days of demolition to determine if bats are present.

If bats are present, it will be necessary for the Department to contact the U.S Fish & Wildlife Service and U.S. Army Corps of Engineers to determine what measures need to be implemented to protect bats during demolition.

PROJECT SPECIAL PROVISIONS

ROADWAY

CLEARING AND GRUBBING - METHOD III:

(4-6-06) (Rev.8-18-15) 200 SP2 R02B

Perform clearing on this project to the limits established by Method "III" shown on Standard Drawing No. 200.03 of the *2018 Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

SHOULDER AND FILL SLOPE MATERIAL:

(5-21-02) 235, 560 SP2 R45 A

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2018 Standard Specifications*.

Measurement and Payment

Where the material has been obtained from an authorized stockpile or from a borrow source and *Borrow Excavation* is not included in the contract, no direct payment will be made for this work, as the cost of this work will be part of the work being paid at the contract lump sum price for *Grading.* If *Borrow Excavation* is included in this contract and the material has been obtained from an authorized stockpile or from a borrow source, measurement and payment will be as provided in Section 230 of the *2018 Standard Specifications* for *Borrow Excavation*.

FLOWABLE FILL:

(9-17-02) (Rev 1-17-12) 300, 340, 1000, 1530, 1540, 1550 SP3 R30

Description

This work consists of all work necessary to place flowable fill in accordance with these provisions, the plans, and as directed.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Flowable Fill	1000-6

Construction Methods

Discharge flowable fill material directly from the truck into the space to be filled, or by other approved methods. The mix may be placed full depth or in lifts as site conditions dictate. The Contractor shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill.

Measurement and Payment

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *Flowable Fill* will be measured in cubic yards and paid as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including, but not limited to, the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

Pay Item	Pay Unit
Flowable Fill	Cubic Yard

POLYPROPYLENE CULVERT PIPE:

(8-20-19) 305,310 SP3 R35

Revise the *2018 Standard Specifications* as follows:

Page 3-5, Article 305-1 DESCRIPTION, lines 12-14, replace with the following:

Where shown in the plans, the Contractor may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, HDPE pipe, Polypropylene Pipe, or PVC pipe in accordance with the following requirements.

Page 3-5, Article 305-2 MATERIALS, add the following after line 16:

Item	Section
Polypropylene Pipe	1032-9

Page 3-6, Article 310-2 MATERIALS, add the following after line 9:

Item	Section
Polypropylene Pipe	1032-9

Page 3-6, Article 310-4 SIDE DRAIN PIPE, lines 24-25, replace the first sentence of the second paragraph with the following:

Where shown in the plans, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

Page 3-7, Article 310-5 PIPE END SECTIONS, lines 2-4, replace the second sentence with the following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

Page 3-7, Article 310-6 MEASUREMENT AND PAYMENT, add the following after line 14:

Pay Item	**Pay Unit**
__″ Polypropylene Pipe	Linear Foot

Page 10-60, add Article 1032-9:

(A) General

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA/QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being provided or test procedures are not being followed.

Use polypropylene culvert pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

(B) End Treatments, Pipe Tees and Elbows

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

(C) Marking

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QC/QA Program:

(1) AASHTO or ASTM Designation
(2) The date of manufacture
(3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker will be applied to the inside of the pipe. Do no use pipe sections, flared end sections, tees or elbows which do not have this seal of approval.

BRIDGE APPROACH FILLS:
(10-19-10) (Rev. 1-16-18) 422 SP4 R02A

Description

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or portions of bridge approach slabs. Install drains to drain water from bridge approach fills and geotextiles to separate approach fills from embankment fills, ABC and natural ground as required. For bridge approach fills behind end bents with mechanically stabilized earth (MSE) abutment walls, reinforce bridge approach fills with MSE wall reinforcement connected to end bent caps. Construct bridge approach fills in accordance with the contract, accepted submittals and 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10.

Define bridge approach fill types as follows:

Approach Fills – Bridge approach fills in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10;

Standard Approach Fill – Type I Standard Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.01;

Modified Approach Fill – Type II Modified Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.02 and

Reinforced Approach Fill – Type III Reinforced Bridge Approach Fill in accordance with Roadway Detail Drawing No. 422D10.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	**Section**
Geotextiles, Type 1	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and foundation material are approved.

For reinforced approach fills, cast MSE wall reinforcement or connectors into end bent cap backwalls within 3" of locations shown in the accepted MSE wall submittals. Install MSE wall reinforcement with the orientation, dimensions and number of layers shown in the accepted MSE wall submittals. If a reinforced approach fill is designed with geogrid reinforcement embedded in an end bent cap, cut geogrids to the required lengths and after securing ends of geogrids in place, reroll and rewrap portions of geogrids not embedded in the cap to protect geogrids from damage. Before placing aggregate, pull geosynthetic reinforcement taut so that it is in tension and free of kinks, folds, wrinkles or creases.

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent separation geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with separation geotextiles or MSE wall reinforcement.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the *2018 Standard Specifications* and place outlet pads in accordance with 2018 Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

Place select material or aggregate in 8" to 10" thick lifts. Compact fine aggregate for reinforced approach fills in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications* except compact fine aggregate to a density of at least 98%. Compact select material for standard or modified approach fills and coarse aggregate for reinforced approach fills with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, MSE wall reinforcement or drains when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics or drain pipes until they are covered with at least 8" of select material or aggregate. Replace any damaged geosynthetics or drains to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material or aggregate as shown in 2018 Roadway Standard Drawing No. 422.01 or 2018 Roadway Detail Drawing No. 422D10.

Measurement and Payment

Type I Standard Approach Fill, Station ____, *Type II Modified Approach Fill, Station ____* and *Type III Reinforced Approach Fill, Station ____* will be paid at the contract lump sum price. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and approach fill materials, excavating, backfilling, hauling and removing excavated materials, installing geotextiles and drains, compacting backfill and supplying select material, aggregate, separation geotextiles, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct approach fills behind bridge end bents.

The contract lump sum price for *Type III Reinforced Approach Fill, Station ____* will also be full compensation for supplying and connecting MSE wall reinforcement to end bent caps but not designing MSE wall reinforcement and connectors. The cost of designing reinforcement and connectors for reinforced approach fills behind bridge end bents with MSE abutment walls will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

Payment will be made under:

Pay Item	**Pay Unit**
Type I Standard Approach Fill, Station ____	Lump Sum
Type II Modified Approach Fill, Station ____	Lump Sum
Type III Reinforced Approach Fill, Station ____	Lump Sum

AGGREGATE SUBGRADE:

(5-15-18) 505 SP5 R8

Revise the *2018 Standard Specifications* as follows:

Page 5-8, Article 505-1 DESCRIPTION, lines 4-6, replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define "subbase" as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each are as shown below.

Type 1 – A 6 to 24 inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

Type 2 – An 8 inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, line 12, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, lines 16-17, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

Page 5-8, Article 505-4 MEASUREMENT AND PAYMENT, line 26, insert the following after the last sentence of the first paragraph:

Undercut Excavation of natural soil materials from subbases for Type 2 aggregate subgrades will be measured and paid in accordance with Article 225-7 or 226-3. No measurement will be made for any undercut excavation of fill materials from subbases.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00) 620 SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2018 Standard Specifications.*

The base price index for asphalt binder for plant mix is **$ 502.73** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **October 1, 2021**.

MILLING ASPHALT PAVEMENT:

(1-15-19) 607 SP6 R59

Revise the *2018 Standard Specifications* as follows:

Page 6-5, Article 607-2, EQUIPMENT, lines 14-16, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

OPEN GRADED ASPHALT FRICTION COURSE:

(1-15-19) 650 SP6 R63

Revise the *2018 Standard Specifications* as follows:

Page 6-37, Article 650-5, CONSTRUCTION METHODS, lines 2-4, delete items (A) and (B) and replace with the following:

(A) Use Asphalt Binder Grade PG 58-28, Grade PG 64-22 tack coat material, or an approved non-tracking hot-applied (NTHA) asphalt tack coat material.

(B) Uniformly apply the asphalt binder tack coat material at an applied rate of 0.06 to 0.08 gal/sy, or as directed. Uniformly apply the NTHA asphalt tack coat material at a rate of 0.10 to 0.14 gal/sy, or as directed.

ASPHALT CONCRETE PLANT MIX PAVEMENTS:

(2-20-18) (Rev.1-15-19) 610, 1012 SP6 R65

Revise the *2018 Standard Specifications* as follows:

Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS, replace with the following:

TABLE 609-3
LIMITS OF PRECISION FOR TEST RESULTS

Mix Property	Limits of Precision
25.0 mm sieve (Base Mix)	± 10.0%
19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT, replace with the following:

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	**JMF Temperature**
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), lines 38-39, delete the fourth paragraph.

Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), line 12, replace "SF9.5A" with "S9.5B".

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

TABLE 610-3
MIX DESIGN CRITERIA

Mix Type	Design ESALs millions [A]	Binder PG Grade	Compaction Levels G_{mm} @ N_{ini}	Compaction Levels G_{mm} @ N_{des}	Max. Rut Depth (mm)	Volumetric Properties [B] VMA % Min.	VTM %	VFA Min.-Max.	$\%G_{mm}$ @ N_{ini}
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
	Design Parameter					**Design Criteria**			
All Mix Types	Dust to Binder Ratio ($P_{0.075}$ / P_{be})					0.6 - 1.4 [C]			
	Tensile Strength Ratio (TSR) [D]					85% Min. [E]			

A. Based on 20 year design traffic.
B. Volumetric Properties based on specimens compacted to N_{des} as modified by the Department.
C. Dust to Binder Ratio ($P_{0.075}$ / P_{be}) for Type S4.75A is 1.0 - 2.0.
D. NCDOT-T-283 (No Freeze-Thaw cycle required).
E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.

Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

TABLE 610-5
BINDER GRADE REQUIREMENTS (BASED ON RBR%)

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR ≥ 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22[A]	PG-58-28
S9.5D, OGFC	PG 76-22[B]	n/a	n/a

A. If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.
B. Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT, replace with the following:

TABLE 610-6 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	**Minimum Surface and Air Temperature**
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F [A]
S9.5D	50°F

A. For the final layer of surface mixes containing recycled asphalt shingles (RAS), the minimum surface and air temperature shall be 50°F.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 34-35, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstate, US Routes, and NC Routes (primary routes) that have 4 or more lanes and median divided.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 36-38, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops, Y-line that have 4 or more lanes and are median divided, full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

Page 6-23, Table 610-7, DENSITY REQUIREMENTS, replace with the following:

TABLE 610-7 DENSITY REQUIREMENTS	
Mix Type	**Minimum % G_{mm} (Maximum Specific Gravity)**
S4.75A	85.0 [A]
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

A. Compaction to the above specified density will be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

Page 6-24, Article 610-13, FINAL SURFACE TESTING, lines 35-36, delete the second sentence and replace with the following:

Final surface testing is not required on ramps, loops and turn lanes.

Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 29-30, delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a 10-foot straightedge in accordance with Article 610-12.

Page 6-27, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 41-46, delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement exclusive of structures, approach slabs, paved shoulders, tapers, or other irregular shaped areas of pavement, unless otherwise approved by the Engineer. Test in accordance with this provision all mainline travel lanes, full width acceleration or deceleration lanes and collector lanes.

Page 6-28, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 1-2, delete these two lines.

Page 6-32, Article 610-16 MEASUREMENT AND PAYMENT, replace with the following:

Pay Item	**Pay Unit**
Asphalt Concrete Base Course, Type B25.0C	Ton
Asphalt Concrete Intermediate Course, Type I19.0C	Ton
Asphalt Concrete Surface Course, Type S4.75A	Ton
Asphalt Concrete Surface Course, Type S9.5B	Ton
Asphalt Concrete Surface Course, Type S9.5C	Ton
Asphalt Concrete Surface Course, Type S9.5D	Ton

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

TABLE 1012-1
AGGREGATE CONSENSUS PROPERTIES[A]

Mix Type	**Coarse Aggregate Angularity[B] % Minimum**	**Fine Aggregate Angularity % Minimum**	**Sand Equivalent % Minimum**	**Flat and Elongated 5 : 1 Ratio % Maximum**
Test Method	*ASTM D5821*	*AASHTO T 304*	*AASHTO T 176*	*ASTM D4791*
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.
B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has 2 or more fractured faces.

AUTOMATED MACHINE GUIDANCE

(1-2-11) 801 SP8 R01

General

This Special Provision contains requirements to be followed if the Contractor elects to use Global Positioning System (GPS) machine control grading and shall be used in conjunction with Section 801 of the *Standard Specifications*. The use of this technology is referenced as Automated Machine Guidance (AMG).

All equipment using AMG shall be able to generate end results that meet the *Standard Specifications*. Perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results cannot be achieved, conform to the requirements for conventional stakeout.

The Contractor shall be responsible for all errors resulting from the use of AMG and shall correct deficiencies to the satisfaction of the Engineer at no cost to the Department.

Submittals

If the Contractor elects to use AMG, a Digital Terrain Model (DTM) of the design surface and all intermediate surfaces shall be developed and submitted to the Engineer for review.

At least 90 days prior to beginning grading operations, the Contractor shall submit to the Engineer an AMG work plan to include, but not limited to, proposed equipment, control software manufacturer and version, types of work to be completed using AMG, project site calibration report, repetitive calibration methods for construction equipment and rover units to be used for the duration of the project, and local GPS base station to be used for broadcasting differential correction data to rover units (this may include the NC Network RTK). All surveys must be tied to existing project control as established by NCDOT.

Inspection

The Engineer will perform quality assurance checks of all work associated with AMG. If it is determined that work is not being performed in a manner that will assure accurate results, the Engineer may require corrective action at no cost to the Department.

The Contractor shall provide the Engineer with one GPS rover unit for use during the duration of the contract. The rover will be loaded with the same model that is used with the AMG and have the same capability as rover units used by the Contractor. The rover will be kept in the possession of the Engineer and will be returned to the Contractor upon completion of the contract. Any maintenance or repairs required for the rover will be the responsibility of the Contractor. Formal training of at least 8 hours shall be provided to the Engineer by the Contractor on the use of the proposed AMG system.

Subgrade and Base Controls

If the Contractor elects to use AMG for fine grading and placement of base or other roadway materials, the GPS shall be supplemented with a laser or robotic total station. Include details of the proposed system in the AMG work plan. In addition, the following requirements apply for the use of AMG for subgrade and base construction.

Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

Provide control points and conventional survey grade stakes at 500 foot intervals and at critical points such as, but not limited to, PCs, PTs, superelevation transition points, and other critical points as requested by the Engineer.

Provide hubs at the top of the finished subgrade at all hinge points on the cross section at 500 foot intervals. These hubs shall be established using conventional survey methods for use by the Engineer to check the accuracy of construction.

Measurement and Payment

No direct payment will be made for work required to utilize this provision. All work will be considered incidental to various grading operations.

SUPPLEMENTAL SURVEYING:

(4-20-21) 801 SP8 R03

Revise the *2018 Standard Specifications* as follows:

Page 8-7, Article 801-3 MEASUREMENT AND PAYMENT, lines 10-11, replace with the following:

Supplemental Surveying Office Calculations will be paid at the stated price of $85.00 per hour. *Supplemental Field Surveying* will be paid at the stated price of $145.00 per hour. The

GUARDRAIL END UNITS, TYPE - TL-2:

(10-21-08) (Rev. 7-1-17) 862 SP8 R64

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 2 in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail End Units, Type TL-2	Each

GUARDRAIL END UNITS, TYPE - TL-3:

(4-20-04) (Rev. 7-1-17) 862 SP8 R65

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Guardrail End Units, Type TL-3	Each

GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS:

(1-16-2018) 862 SP8 R70

Guardrail anchor units will be in accordance with the details in the plans and the applicable requirements of Section 862 of the *2018 Standard Specifications*.

Revise the *2018 Standard Specifications* as follows:

Page 8-42, Article 862-6 MEASUREMENT AND PAYMENT, add the following:

Guardrail Anchor Units, Type ___ and Temporary Guardrail Anchor Units Type ___ will be measured and paid as units of each completed and accepted. No separate measurement will be made of any rail, terminal sections, posts, offset blocks, concrete, hardware or any other components of the completed unit that are within the pay limits shown in the plans for the unit as all such components will be considered to be part of the unit.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type ____	Each
Temporary Guardrail Anchor Units, Type ___	Each

WILDLIFE GUARDS:

Description

Construct Wildlife Guards at locations indicated in accordance with the detail in the plans, the applicable requirements of the *Standard Specifications*, the manufacturer's recommendations and as directed by the Engineer.

Materials

Refer to applicable requirements of the *Standard Specifications* and the detail in the plans. Wildlife Guards manufactured by:

Doherty Welding LLC
P.O. Box 28
Pilot Rock, Oregon 97868
https://www.dohertywelding.com

True North Steel
702 13th Ave E.
West Fargo ND 58078
https://truenorthsteel.com/

Contech
9025 Centre Pointe Drive
West Chester OH 45069
https://www.conteches.com/

or approved equivalent.

Construction Methods

Construct Wildlife Guards in accordance with the detail in the plans, the applicable requirements of the *Standard Specifications*, the manufacturer's recommendations and as directed by the Engineer.

Measurement and Payment

Wildlife Guards will be measured and paid for as each that have been completed and accepted.

Work includes, but is not limited to, furnishing, installing and all other incidentals necessary to compete the work.
Payment will be made under:

Pay Item	Pay Unit
Wildlife Guards	Each

WILDLIFE JUMP OUTS:

Description

Construct Wildlife Jump Outs at locations indicated in accordance with the detail in the plans, the applicable requirements of the *Standard Specifications* and as directed by the Engineer.

Materials

Refer to applicable requirements of the *Standard Specifications* and the detail in the plans.

Construction Methods

Construct Wildlife Jump Outs in accordance with the detail in the plans, the applicable requirements of the *Standard Specifications* and as directed by the Engineer.

Measurement and Payment

Wildlife Jump Outs will be measured and paid for as each that have been completed and accepted.

Work includes, but is not limited to, clearing and grading, concrete block, fittings and all other incidentals necessary to compete the work. Fencing will be paid under a separate contract item.

Payment will be made under:

Pay Item	Pay Unit
Wildlife Jump Outs	Each

WILDLIFE FENCE:

Description

Construct Wildlife Fence at locations indicated in accordance with the detail in the plans, the applicable requirements of Section 866 of the *Standard Specifications* and as directed by the Engineer.

Materials

Refer to Article 866-2 of the *Standard Specifications* and the detail in the plans.

Construction Methods

Construct Wildlife Fence in accordance with the detail in the plans, the applicable requirements of Section 866 of the *Standard Specifications* and as directed by the Engineer.

Measurement and Payment

Wildlife Fence will be measured and paid for in linear feet of fence measured in place from center of each post or gate post to center of end post or gate post exclusive of gate sections that has been completed and accepted.

Wildlife Fence Posts (_" _') will be measured and paid for per each timber post satisfactorily installed.

Wildlife Gates (_ _ _) will be measured and paid for per each gate satisfactorily installed.

Work includes, but is not limited to, clearing and grading, furnishing and installing fence fabric, tie wires, stretcher bars, tension wire, posts and post braces, concrete, fittings and all other incidentals necessary to compete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Wildlife Fence	Linear Foot
Wildlife Fence Post (_" _')	Each
Wildlife Gates (_ _ _)	Each

4" CONCRETE PAD FOR PIPES UNDER FENCE:

Description

Construct 4" Concrete Pad in accordance with the plans and as directed by the Engineer.

Materials

Concrete shall be Class AA Concrete meeting the requirements of Section 1000 of the *2018 Standard Specifications*.

Wire mesh reinforcement shall be 4x4-W3.5xW3.5 welded wire fabric meeting the requirements of Section 1070 of the *2018 Standard Specifications*. The wire mesh reinforcement shall be centered in the 4" pad.

Construction Methods

Joint spacing shall be constructed as directed by the Engineer.

Measurement and Payment

4" Concrete Pad for Pipes Under Fence will be measured and paid for in square yards of 4" Concrete Pad that has been completed and accepted. Such price and payment will be full compensation for all work of constructing the jointed concrete pad, including but not limited to excavating and backfilling, furnishing and placing concrete, constructing joints, and sealing the concrete.

Pay Item	**Pay Unit**
4" Concrete Pad for Pipes Under Fence	Square Yard

PORTLAND CEMENT CONCRETE PRODUCTION AND DELIVERY:

(9-15-20) 1000, 1014, 1024 SP10 R01

Revise the *2018 Standard Specifications* as follows:

Page 10-6, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

Class of Concrete	Min. Compressive Strength at 28 days	Maximum Water-Cement Ratio				Consistency Maximum Slump		Cement Content			
		Air-Entrained Concrete		Non-Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	*psi*					*inch*	*inch*	*lb/cy*	*lb/cy*	*lb/cy*	*lb/cy*
AA	4500	0.381	0.426	---	---	3.5[A]	---	639	715	---	---
AA Slip Form	4500	0.381	0.426	---	---	1.5	---	639	715	---	---
Drilled Pier	4500	---	---	0.450	0.450	---	5 – 7 dry 7 - 9 wet	---	---	640	800
A	3000	0.488	0.532	0.550	0.594	3.5 [A]	4.0	564	---	602	---
B	2500	0.488	0.567	0.559	0.630	1.5 machine placed 2.5 [A] hand placed	4.0	508	---	545	---
Sand Light-weight	4500	---	0.420	---	---	4.0 [A]	---	715	---	---	---
Latex Modified	3000 (at 7 days)	0.400	0.400	---	---	6.0	---	658	---	---	---

Flowable Fill excavatable	150 max. (at 56 days)	as needed	as needed	as needed	as needed	---	Flowable	---	---	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	---	Flowable	---	---	100	as needed
Pavement	4500 Design, field 650 flexural, design only	0.559	0.559	---	---	1.5 slip form 3.0 hand placed	---	526	---	---	---
Precast	See Table 1077-1	as needed	as needed	---	---	6.0	as needed	as needed	as needed	as needed	as needed
Prestressed	per contract	See Table 1078-1	See Table 1078-1	---	---	8.0	---	564	as needed	---	---

A. The slump may be increased to 6 inches, provided the increase in slump is achieved by adding a chemical admixture conforming to Section 1024-3. In no case shall the water-cement ratio on the approved design be exceeded. Concrete exhibiting segregation and/or excessive bleeding will be rejected. Utilizing an Admixture to modify slump does not relinquish the contractor's responsibility to ensure the final product quality and overall configuration meets design specifications. Caution should be taken when placing these modified mixes on steep grades to prevent unintended changes to the set slope.

THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:

3-19-19 1087 SP10 R05

Revise the *2018 Standard Specifications* as follows:

Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, lines 9-11, delete and replace with the following:

Obtain Color Values Y,x,y per ASTM E1349 using C/2° illuminant/observer.
Results shall be Y ≥ 45%, and x,y shall fall within PR#1 chart chromaticity limits.

NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKERS:

10-19-21 1086, 1250, 1253 SP10 R08

Revise the *2018 Standard Specifications* as follows:

Pages 10-177 and 10-178, Subarticle 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:

(A) General

Use non-cast iron snowplowable pavement markers evaluated by NTPEP. The non-cast iron snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. The marker shall be

designed or installed in a manner that minimizes damage from snowplow blades. Plastic lens faces shall use an abrasion resistant coating.

(B) Housings

(1) Dimensions
The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans. The minimum area of each reflecting surface shall be 1.44 sq.in.

(2) Materials
Use non-cast iron snowplowable pavement markers that are on the NCDOT Approved Products List.

(3) Surface
The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

(4) Identification
Mark the housing with the manufacturer's name and model number of marker.

(C) Reflectors

(1) General
Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04".

Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, lines 19-29, delete and replace with the following:

Remove the existing raised pavement markers or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers. No direct payment will be made for removal or disposal of existing pavement markers or repair of pavement, as such work will be incidental to other items in the contract.

Pages 12-16, Subarticle 1253-1 DESCRIPTION, lines 4-5, delete and replace with the following:

Furnish, install and maintain non-cast iron snowplowable pavement markers in accordance with the contract.

Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS, delete items (A), (B) and (C) and replace with the following:

(A) General

Bond marker housings to the pavement with epoxy adhesive. Mechanically mix and dispense epoxy adhesives as required by the manufacturer's specifications. Place the markers immediately after the adhesive has been mixed and dispensed.

If saw cutting, milling, or grooving operations are used, promptly remove all resulting debris from the pavement surface. Install the marker housings within 7 calendar days after saw cutting, milling, or grooving the pavement. Remove and dispose of loose material from the slots by brushing, blow cleaning, or vacuuming. Dry the slots before applying the epoxy adhesive. Install non-cast iron snowplowable pavement markers according to the manufacturer's recommendations.

Protect the non-cast iron snowplowable pavement markers until the epoxy has initially cured and is track free.

(B) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer. This work is considered incidental if damage occurs during the initial installation of the marker housings and maintenance of initial non-cast iron snowplowable markers specified in this section. This work will be paid for under the pay item for the type of reflector replacement if the damage occurred after the initial installation of the non-cast iron snowplowable pavement marker.

Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

Pages 12-17, Subarticle 1253-4 MAINTENANCE, lines 5, delete and replace with the following:

Maintain all installed non-cast iron snowplowable pavement markers until acceptance.

Pages 12-17, Subarticle 1253-5 MEASUREMENT AND PAYMENT, lines 7-8, delete and replace with the following:

Non-Cast Iron Snowplowable Pavement Markers will be measured and paid as the actual number of non-cast iron snowplowable pavement markers satisfactorily placed and accepted by the Engineer.

Pages 12-17, Subarticle 1253-5 MEASUREMENT AND PAYMENT, lines 11, delete and replace with the following:

Payment will be made under:

Pay Item	**Pay Unit**

Non-Cast Iron Snowplowable Pavement Marker	Each
Replace Snowplowable Pavement Marker Reflector	Each

MATERIALS FOR PORTLAND CEMENT CONCRETE:

(9-15-20) 1000, 1024 SP10 R24

Revise the *2018 Standard Specifications* as follows:

Page 10-52, Article 1024-4, WATER, lines 3-6, delete and replace with the following:

Test water from wells at all locations. Test public water supplies from all out of state locations and in the following counties: Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrell and Washington unless the Engineer waives the testing requirements.

Page 10-52, Table 1024-2, PHYSICAL PROPERTIES OF WATER, replace with the following:

Property	Requirement	Test Method
Compression Strength, minimum percent of control at 3 and 7 days	90%	ASTM C1602
Time of set, deviation from control	From 1:00 hr. earlier to 1:30 hr. later	ASTM C1602
pH	4.5 to 8.5	ASTM D1293 *
Chloride Ion Content, Max.	250 ppm	ASTM D512 *
Total Solids Content (Residue), Max.	1,000 ppm	SM 2540B *
Resistivity, Min.	0.500 kohm-cm	ASTM D1125 *

*Denotes an alternate method is acceptable. Test method used shall be referenced in the test report.

TEMPORARY SHORING:

(2-20-07) (Rev. 10-19-21) SP11 R02

Description

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 feet from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide.*

(A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

(B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define "anchors" as ground, helical or driven anchors.

(C) Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define "temporary wall" as a temporary MSE wall and "Temporary Wall Vendor" as the vendor supplying the temporary MSE wall. Define "reinforcement" as geotextile, geogrid, geostrip, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextiles or geogrids wrapped behind welded wire facing or geostrips connected to welded wire facing. Define "temporary geotextile wall" as a temporary geosynthetic wall with geotextile reinforcement, "temporary geogrid wall" as a temporary geosynthetic wall with geogrid reinforcement and "temporary geostrip wall" as a temporary geosynthetic wall with geostrip reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define "Wire Wall Vendor" as the vendor supplying the temporary wire wall.

(D) Embedment

Define "embedment" for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define "embedment" for temporary walls as the wall embedment below the grade at the wall face.

(E) Positive Protection

Define "unanchored or anchored portable concrete barrier" as portable concrete barrier (PCB) that meets 2018 Roadway Standard Drawing No. 1170.01. Define "concrete barrier" as unanchored or anchored PCB or an approved equal. Define "temporary guardrail" as temporary steel beam guardrail that meets 2018 Roadway Standard Drawing No. 862.02.

Materials

Refer to the *2018 Standard Specifications*.

Item	**Section**
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement	1024-1
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Water	1024-4
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2018 Standard Specifications*. Use Class IV select material for temporary guardrail and Class A concrete that meets Article 450-2 of the *2018 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2018 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2018 Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

Use neat cement grout that only contains cement and water with a water cement ratio of 0.4 to 0.5 which is approximately 5.5 gallons of water per 94 pounds of Portland cement. Provide grout with a compressive strength at 3 and 28 days of at least 1,500 and 4,000 psi, respectively.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g., bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5 geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid and Geostrip Reinforcement

Use geogrids with a roll width of at least 4 feet. Use geogrids for geogrid reinforcement and geostrips for geostrip reinforcement with an “approved” status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids and geostrips is available from: connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide geogrids and geostrips with design strengths in accordance with the accepted submittals. Geogrids and geostrips are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *2018 Standard Specifications* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011.

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor's option or if clear distance for cantilever, braced and anchored shoring is less than 4 feet, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit PDF files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater or flood elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 pcf,

(b)

Friction Angle (ϕ)	**Shoring Backfill**
30°	A-2-4 Soil
34°	Class II, Type 1 or Class III Select Material
38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. Design temporary shoring for a traffic (live load) surcharge in accordance with Article 11.5.6 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or Type 1 grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define “top of shoring” for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design

cantilever, braced and anchored shoring for a traffic impact load of 2,000 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. Extend cantilever, braced and anchored shoring at least 32 inches above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6 inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6 inches. Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Design Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid and geostrip reinforcement, use approved geosynthetic reinforcement properties available from the website shown elsewhere in this provision. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio (R_c) of 1.0. For temporary geogrid walls with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use "L" shaped welded wire facing with 18 to 24 inch long legs. Locate geosynthetic reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 feet back behind facing into shoring backfill. Attach geostrip reinforcement to welded wire facing with a connection approved by the Department.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with a connection approved by the Department. For temporary geogrid, geostrip and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 feet back behind facing into backfill.

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing Nos. 862.01, 862.02 and 862.03.

(A) Tolerances

Construct shoring with the following tolerances:

(1) Horizontal wires of welded wire facing are level in all directions,

(2) Shoring location is within 6 inches of horizontal and vertical alignment shown in

the accepted submittals, and

(3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2018 Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or Type 1 grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

(2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

(3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

(a) Materials in accordance with this provision are required instead of materials

conforming to Articles 6.4 and 6.5.3 of the AASHTO LRFD Specifications,

(b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the AASHTO LRFD specifications are not required, and

(c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.

(d) Mix and place neat cement grout in accordance with Subarticles 1003-5, 1003-6 and 1003-7 of the *2018 Standard Specifications*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

(i) For ground and helical anchors, total movement is less than 0.04 inches between the 1 and 10 minute readings or less than 0.08 inches between the 6 and 60 minute readings.
(ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit PDF files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Attach geostrip reinforcement to welded wire facing and wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals. Cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8 to 10 inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8 inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

Measurement and Payment

Temporary Shoring will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define "top of shoring" as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define "bottom of shoring" as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *2018 Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Temporary Shoring	Square Foot

WORK ZONE INSTALLER:

(7-20-21) 1101, 1150 SP11 R04

Provide the service of at least one qualified work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way. The qualified work zone installer shall serve as crew leader and shall be on site and directing the installation and removal of temporary traffic control. If multiple temporary traffic control installations or removals are

occurring simultaneously, then each shall have a qualified work zone installer.

The work zone installer shall be qualified by an NCDOT approved training agency in the safe and competent set up of temporary traffic control. For a complete listing of approved training agencies, see the Work Zone Safety Training webpage.

A work zone supervisor, in accordance with Article 1101-13 of the *Standard Specifications*, may fulfill the role of the work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way provided they are on site and directing the installation and removal of temporary traffic control.

All other individuals participating in the setup, installation, and removal of temporary traffic control within the highway right of way shall be certified as a qualified flagger in accordance with Article 1150-3 of the *Standard Specifications*, even if flagging is not being performed as part of the traffic control.

Provide the name and contact information of all qualified work zone installers to the Engineer prior to or at the preconstruction conference. Additionally, provide a qualification statement that all other individuals participating in the setup, installation, and removal of temporary traffic control are qualified flaggers that have been properly trained through an NCDOT approved training agency.

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:

3-19-19 1205 SP12 R05

Revise the *2018 Standard Specifications* as follows:

Page 12-6, Subarticle 1205-4(A)(1) General, lines 5-8, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from 4 inches to 12 inches and multiple thickness settings to achieve a minimum pavement marking thickness of 0.090 inch above the surface of the pavement.

Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC, replace with the following:

TABLE 1205-3
MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC

Thickness	Location
240 mils	In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in 2 passes.
90 mils	Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols

PERMANENT SEEDING AND MULCHING:

(7-1-95) 1660 SP16 R02

The Department desires that permanent seeding and mulching be established on this project as soon as practical after slopes or portions of slopes have been graded. As an incentive to obtain an early stand of vegetation on this project, the Contractor's attention is called to the following:

For all permanent seeding and mulching that is satisfactorily completed in accordance with the requirements of Section 1660 in the *2018 Standard Specifications* and within the following percentages of elapsed contract times, an additional payment will be made to the Contractor as an incentive additive. The incentive additive will be determined by multiplying the number of acres of seeding and mulching satisfactorily completed times the contract unit bid price per acre for Seeding and Mulching times the appropriate percentage additive.

Percentage of Elapsed Contract Time	Percentage Additive
0% - 30%	30%
30.01% - 50%	15%

Percentage of elapsed contract time is defined as the number of calendar days from the date of availability of the contract to the date the permanent seeding and mulching is acceptably completed divided by the total original contract time.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08) Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

Restricted Noxious **Weed**	Limitations per Lb. Of Seed	Restricted Noxious **Weed**	Limitations per Lb. of Seed
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION

ERRATA

(10-16-18) (Rev.2-16-21) Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

Page 6-7, Article 609-1 DESCRIPTION, line 29, replace article number "609-10" with "609-9".

Division 7

Page 7-27, Article 725-1 MEASUREMENT AND PAYMENT, line 4, replace article number "725-1" with "724-4".

Page 7-28, Article 725-1 MEASUREMENT AND PAYMENT, line 10, replace article number "725-1" with "725-3".

Division 10

Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2, replace "Table 6[D]" with "Table 7[D]" and **Permittivity, Type 3[B],** replace "Table 7[D]" with "Table 8[D]".

Page 10-121, Article 1076-7, REPAIR OF GALVANIZING, line 8, replace article number "1080-9" with "1080-7".

Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, line 1, replace article number "1080-50" with "1080-10".

Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, line 5, replace article number "1080-61" with "1080-11".

Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, line 22, replace article number "1080-72" with "1080-12".

Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, line 25, replace article number "1080-83" with "1080-13".

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, lines 42-44, replace the second sentence with the following:

An example is an installation of a single 1.25 inch HDPE conduit would be paid as:

Directional Drill (1)(1.25″) Linear Foot

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES
(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guava Root Knot Nematode, And Other Noxious Weeds)

(3-18-03) (Rev. 5-21-19) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or *https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guava root knot nematode, or other noxious weeds.

STANDARD SPECIAL PROVISION

MINIMUM WAGES

(7-21-09) Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

STANDARD SPECIAL PROVISION

TITLE VI AND NONDISCRIMINATION:

(6-28-77)(Rev 6/19/2018) Z-6

Revise the *2018 Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) **Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts,

Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:
In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:
(i) Withholding payments to the contractor under the contract until the contractor complies; and/or
(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions
The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**
The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:
1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:
"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§

2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

1. Applicability
   Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
2. Eligibility
   Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.
3. Time Limits and Filing Options
   Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
   (i) The date of the alleged act of discrimination; or
   (ii) The date when the person(s) became aware of the alleged discrimination; or
   (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

   Title VI and related discrimination complaints may be submitted to the following entities:

- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
- Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
- US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints
   Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.
5. Discrimination Complaint Form
   Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.
6. Complaint Basis
   Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

TABLE 103-1
COMPLAINT BASIS

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. *(Executive Order 13166)*
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin *(Limited English Proficiency)*	Place of birth. Citizenship is not a factor. (*Discrimination based on language or a person's accent is also covered)*	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. *Note:* Sex under this program does not include sexual orientation.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990

Religion (in the context of employment) *(Religion/ Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

(a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

(b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

(c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

(d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;

(e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with

disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) **Additional Title VI Assurances**

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non¬ discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 4-21-15) Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC20210087 01/01/2021 NC87

Z-087

Date: January 1, 2021

General Decision Number: NC20210087 01/01/2021 NC87

Superseded General Decision Numbers: NC20200087

State: North Carolina

Construction Type: HIGHWAY

COUNTIES:

Alexander	Caldwell	Henderson
Buncombe	Catawba	Madison
Burke	Haywood	

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR.5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2) – (60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

SUNC2014-002 11/13/2014

	Rates	Fringes
BLASTER	20.93	
CARPENTER	13.48	
CEMENT MASON/CONCRETE FINISHER	14.40	
ELECTRICIAN		
Electrician	18.79	2.62
Telecommunications Technician	14.67	1.67
IRONWORKER	12.48	
LABORER		

	Rates	Fringes
Asphalt Raker and Spreader	11.76	
Asphalt Screed/Jackman	15.38	.08
Carpenter Tender	10.50	
Cement Mason/Concrete Finisher Tender	11.04	
Common or General	11.90	
Guardrail/Fence Installer	13.09	
Pipelayer	12.87	
Traffic Signal/Lighting Installer	15.33	.22
PAINTER		
Bridge	20.67	
POWER EQUIPMENT OPERATORS		
Asphalt Broom Tractor	10.00	
Bulldozer Fine	16.28	
Bulldozer Rough	14.51	
Concrete Grinder/Groover	19.20	
Crane Boom Trucks	18.19	
Crane Other	18.69	
Crane Rough/All-Terrain	19.19	
Drill Operator Rock	15.00	
Drill Operator Structure	21.07	
Excavator Fine	16.02	
Excavator Rough	14.67	
Grader/Blade Fine	19.86	
Grader/Blade Rough	15.12	
Loader 2 Cubic Yards or Less	12.38	
Loader Greater Than 2 Cubic Yards	17.91	
Material Transfer Vehicle (Shuttle Buggy)	15.44	
Mechanic	17.86	
Milling Machine	15.08	
Off-Road Hauler/Water Tanker	11.95	
Oiler/Greaser	15.05	
Pavement Marking Equipment	11.99	
Paver Asphalt	17.84	.08
Paver Concrete	18.20	
Roller Asphalt Breakdown	15.00	.08
Roller Asphalt Finish	16.08	.07
Roller Other	12.51	.03
Scraper Finish	12.86	
Scraper Rough	13.83	
Slip Form Machine	20.38	
Tack Truck/Distributor Operator	14.81	.02
TRUCK DRIVER		
GVWR of 26,001 Lbs or Greater	13.65	
GVWR of 26,000 Lbs or Less	12.48	

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave

for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union

average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

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MICROPILES **(10-19-21)**

1.0 GENERAL

A micropile is a small diameter, drilled and grouted non-displacement pile with a reinforcing casing and typically a center reinforcing bar. Load testing is required when noted in the plans. Design and construct micropiles with the required resistance in accordance with the contract and accepted submittals. Use a prequalified Micropile Contractor for micropile work. Define "pile" as a micropile, "casing" as reinforcing casing and "bar" as a center reinforcing bar.

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section
Portland Cement	1024-1
Water	1024-4

Use neat cement grout that only contains cement and water with a water cement ratio of 0.4 to 0.5 which is approximately 5.5 gallons of water per 94 lb of Portland cement. Provide grout with a compressive strength at 3 and 28 days of at least 1,500 psi and 4,000 psi, respectively.

A. Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel casings and bars. Store casings and bars on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store micropile materials so materials are kept clean and free of damage.

1. Reinforcing Casings

Use steel pipes that meet American Petroleum Institute (API) 5CT, Grade N80 or ASTM A252 with a yield strength of 80 ksi for reinforcing casings. Provide prime mill certified steel pipes that meet Subarticle 106-1(B) of the *Standard Specifications* for casings. Do not use "New or Mill Secondary", "Structural" or "Limited Service" steel pipes as described by the *National Association of Steel Pipe Distributors Tubular Products Manual*. Use casings with the nominal wall thickness shown in the plans and outside diameters ranging from the minimum shown in the plans to 3" larger.

2. Center Reinforcing Bars

Use deformed steel bars that meet AASHTO M 275 or M 31, Grade 60 or 75 for center reinforcing bars. Splice bars in accordance with Article 1070-9 of the

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Standard Specifications. Locate casing joints at least 2 ft from bar splices.

B. Centralizers

Use bar centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*. Size centralizers to position bars within 1" of drill hole centers and allow tremies to be inserted to bottom of holes. Use centralizers that do not interfere with grout placement or flow around bars.

C. Corrosion Protection

Provide epoxy coated bars that meet Article 1070-7 of the *Standard Specifications*. Galvanize exposed casings in accordance with Section 1076 of the *Standard Specifications*. After installing piles, clean exposed galvanized surfaces of casings with a 2,500 psi pressure washer. Apply organic zinc repair paint to exposed casing joints and repair damaged galvanized surfaces that are exposed in accordance with Article 1076-7 of the *Standard Specifications*.

3.0 PRECONSTRUCTION REQUIREMENTS

A. Micropile Designs

For micropile designs, submit PDF files of working drawings and design calculations at least 30 days before the preconstruction meeting. Do not begin micropile construction until a design submittal is accepted.

Use a prequalified Micropile Design Consultant to design piles. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Micropile Design Consultant.

The pile layout and inclination, casing dimensions and tip elevations, pile to cap/footing connection, top of pile elevations and pile resistances are shown in the plans. Verify existing site conditions and survey information before designing piles.

Design piles in accordance with the *AASHTO LRFD Bridge Design Specifications* unless otherwise required. Define “bond length” as the pile length below the casing tip elevation noted in the plans. Determine the bond length and reinforcement for the factored resistance noted in the plans. Assume a design casing wall thickness of 12.5% less than nominal plus an additional 0.125" less due to corrosion. A bond length of at least 10 ft is required for each pile. If verification load testing is required, use a resistance factor of 0.70 for axial compression and uplift resistance. Otherwise, use a resistance factor of 0.55. When using tension load tests to determine nominal grout-to-ground bond resistances for axial compression resistance, neglect pile tip resistance.

Either extend casings below required tip elevations or use bars for reinforcement. Extend bars or casings full length of piles and provide at least 0.50" of grout cover outside casings. Design and locate casing joints as shown in the plans.

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Submit working drawings and design calculations including estimated unit nominal resistances for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing all micropile details including any dimensions, quantities, elevations and cross-sections necessary to construct the piles.

B. Micropile Construction Plan

Submit a PDF file of a micropile construction plan at least 30 days before the preconstruction meeting. Do not begin micropile construction until the construction plan submittal is accepted. Provide detailed project specific information in the micropile construction plan that includes the following:

1. List and sizes of proposed equipment including micropile drilling rigs and tools, tremies and grouting equipment;
2. Sequence of pile construction and step-by-step description of pile installation including details of casing installation, drilling methods and flushing;
3. List of reinforcement including grades or yield strength and sizes;
4. Methods for placing reinforcement with procedures for supporting and positioning the reinforcement including centralizers;
5. Procedures for placing grout including how the grout will be initially placed in drill holes and acceptable ranges for grout pressures and volumes;
6. Equipment and procedures for monitoring and recording grout levels, pressures and volumes with calibration certificates dated within 90 days of the submittal date;
7. Examples of construction records to be provided that meet Section 4.0(C) of this provision;
8. Procedures for containment and disposal of drilling spoils, drill flush and waste grout;
9. Grout mix design with acceptable ranges for grout flow and density;
10. If load testing is required, load testing details, procedures and plan sealed by the Design Engineer or Project Engineer for the Load Test Supplier with calibration certificates dated within 90 days of the submittal date;
11. Load Test Supplier, when applicable, including Project Engineer; and
12. Other information shown in the plans or requested by the Engineer.

If alternate installation and testing procedures are proposed or necessary, a revised micropile construction plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend pile construction until a revised plan is accepted.

C. Demonstration Micropiles

When shown in the plans or as directed, construct demonstration piles in accordance with the accepted submittals and this provision. The pile inclination, minimum reinforcement and locations of demonstration piles are shown in the plans. Install demonstration piles

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to the depth of the longest pile on the project or the length required for verification load tests.

The purpose of demonstration piles is to demonstrate the Micropile Contractor's ability to successfully install micropiles. The demonstration pile results will be used to evaluate the grouting operation and possibly revise acceptable grouting ranges established with the micropile construction plan. If load testing is required for a demonstration pile, the results will be used to evaluate the pile design including estimated unit nominal resistances.

If the Engineer determines a demonstration pile is unsatisfactory, a replacement pile is required. Do not begin construction of any production piles until all demonstration piles are accepted.

D. Preconstruction Meeting

Before starting micropile construction, hold a preconstruction meeting to discuss the construction, monitoring and testing of the piles. If this meeting occurs before all pile submittals have been accepted, additional preconstruction meetings may be required before beginning pile construction without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Micropile Contractor Superintendent will attend preconstruction meetings.

4.0 CONSTRUCTION METHODS

Use equipment and methods accepted in the micropile construction plan or approved by the Engineer. Inform the Engineer of any deviations from the accepted plan. Install production piles in the same way as satisfactory demonstration piles, if applicable.

Dispose of drilling spoils, drill flush and waste grout as directed and in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all excavated material and fluids removed from drill holes.

Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements and fracturing rock and soil formations. If ground heave or subsidence occurs, suspend pile construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and a revised micropile design or construction plan may be required.

A. Drilling and Reinforcement

Use micropile drilling rigs capable of drilling through whatever materials are encountered to the dimensions and elevations required for the pile design. Install piles with tip elevations no higher than shown in the accepted submittals or approved by the Engineer.

Do not install casings or begin drilling within 6 pile diameters, center to center, or 5 ft,

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whichever is greater, of completed piles until grout in piles reaches initial set. More clearance may be necessary if pile construction affects adjacent piles.

Install casings to a tip elevation no higher than that noted in the plans. Also, when noted in the plans, install casings with a penetration of at least 5 ft into rock as determined by the Engineer. Locate casing joints in accordance with the accepted submittals. If any welding is required for casings, comply with Article 33.3.6 of the *AASHTO LRFD Bridge Construction Specifications*. Submit welding procedures for approval before welding casings.

Use drilling methods that result in the annulus between casings and the ground filled with grout. Check for correct pile location and plumbness or proper inclination before beginning drilling. Stabilize drill holes with casings from beginning of drilling through grouting if unstable material is anticipated or encountered. After drilling, flush drill holes with water or air to remove drill cuttings and other loose materials.

Use centralizers to center bars in drill holes. Securely attach bar centralizers at maximum 10 ft intervals along bars. Attach upper and lowermost centralizers 5 ft from the top and bottom of piles.

Place bars before grouting or after while grout is still fluid. Do not vibrate or drive reinforcement. Bars may be gently pushed into grout. If bars can only be partially inserted, redrill or clean drill holes to permit complete insertion.

B. Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and all other equipment in contact with grout before use. Size grouting equipment to grout each pile in one continuous operation. Field calibrate grout pumps at the beginning of construction.

Mix and place grout in accordance with Subarticles 1003-5, 1003-6 and 1003-7 of the *Standard Specifications*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/API Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Grout piles the same day the bond length is drilled and do not leave drill holes open overnight. Place grout with a tremie in accordance with the contract and accepted submittals until uncontaminated grout flows from the top of the pile. Extend tremie pipe into grout at least 5 ft at all times except when grout is initially placed in drill holes. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Monitor and record grout levels, pressures and volumes during placement. To monitor grout pressure, use pumps equipped with a pressure gauge and locate a second pressure

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gauge at the point of injection into the drill hole. Use pressure gauges that can measure pressures of at least 150 psi or twice the actual grout pressures, whichever is greater.

C. Construction Records

Provide 2 copies of pile construction records within 24 hours of completing each pile. Include the following in construction records:

1. Names of Micropile Contractor, Superintendent, Drill Rig Operator, Project Manager and Design Engineer;
2. Bridge description, county, Department's contract, TIP and WBS element number;
3. Bent station and number, pile location and identifier and required resistance;
4. Pile diameters, length and tip elevation and top of pile and ground surface elevations;
5. Reinforcement types, grades or yield strength, sizes and elevations;
6. Date and time drilling begins and ends, reinforcement is placed, grout is mixed and arrives on-site and grout placement begins and ends;
7. Grout level, pressure, volume, temperature, flow and density records;
8. Ground and surface water conditions and elevations;
9. Weather conditions including air temperature at time of grout placement; and
10. All other pertinent details related to pile construction.

After completing piles for each structure or stage of a structure, provide a PDF file of all corresponding construction records.

5.0 LOAD TESTING

When noted in the plans, load test piles in accordance with the accepted submittals, this provision and the plans. The piles to be tested are shown in the plans or as directed. "Verification tests" are performed on demonstration piles and "proof tests" are performed on piles incorporated into the structure, i.e., production piles based on test piles acceptable in accordance with Section 6.0 of this provision.

When using a Load Test Supplier, use a prequalified Load Test Supplier for foundation testing work. Provide load test reports sealed by an engineer approved as a Project Engineer (key person) for the Load Test Supplier.

Do not load test piles until grout attains the required 28-day compressive strength. Do not begin construction of any production piles until verification tests are satisfactorily completed. For proof tests, install only the test piles and those piles needed to anchor the reaction frame, if applicable. Do not install the remaining piles for the bent until the corresponding test piles are satisfactory.

Design test piles so that applied loads do not exceed 80% of the pile's structural resistance including steel yielding or buckling or grout failing. It may be necessary to design test piles

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with additional reinforcement to allow for higher applied loads. Use a center reinforcing bar for tension load tests when the reinforcement design for production piles does not include one.

If reinforcement design for production piles does not include a center reinforcing bar, tension load tests are required. Otherwise, test piles in either compression or tension at the Contractor's option.

Do not apply loads with known weights; a reaction frame and a hydraulic jack are required. Use reaction piles or cribbing and a frame with sufficient strength to prevent excessive deformation, misalignment or racking under peak loading. Do not use existing structures as part of the reaction frame.

Load test piles in accordance with the accepted submittals and Article 33.5 of the *AASHTO LRFD Bridge Construction Specifications*. For demonstration piles, cut off piles 2 ft below the ground surface when testing is complete.

Submit a PDF file of each load test report within 7 days of completing load testing. Submit reports sealed by the same engineer that sealed the load testing details, procedures and plan in the accepted micropile construction plan. Provide load test reports that meet ASTM D1143, D3689 or the Load Test Supplier's recommendations. Also, include load versus movement curves for the top of pile and pile tip.

6.0 MICROPILE ACCEPTANCE

The Engineer will review the load test reports, if applicable and construction records to determine if piles are acceptable. Micropile acceptance is based in part on the following criteria.

1. Grout pressures, volumes, flow and densities are within acceptable ranges. Grout is properly placed and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
2. Pile is within maximum tolerances per Article 33.4.4 of the *AASHTO LRFD Bridge Construction Specifications*.
3. Reinforcement is properly placed and inclination and top of reinforcement is within tolerances for the pile. Tip of casing is no higher than that noted in the plans and casing penetrates rock at least 5 ft when noted in the plans.
4. Pile is satisfactory based on results of load testing, when applicable. Creep and failure acceptance criteria for verification and proof tests is per Articles 33.5.2 and 33.5.3, respectively, of the AASHTO LRFD specifications. Movement acceptance criteria for verification and proof tests is per Articles 33.5.2 and 33.5.3, respectively, of the AASHTO LRFD specifications when the permissible total vertical movement at top of pile is noted in the plans.

If the Engineer determines a pile is unacceptable, remedial measures or replacement piles are required. Do not begin remediation work until remediation plans are approved. No extension of completion date or time will be allowed for remedial work or replacement piles.

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7.0 MEASUREMENT AND PAYMENT

9 5/8" Dia. Micropiles will be measured and paid in units of each. Micropiles will be measured as the number of acceptable piles and no payment will be made for any costs associated with unacceptable micropiles. The contract unit price for *9 5/8" Dia. Micropiles* will be full compensation for submittals, design, monitoring and recording, labor, tools, equipment and reinforcement complete and in place and all incidentals necessary to drill through any material and construct piles in accordance with this provision. The contract unit price for *9 5/8" Dia. Micropiles* will be full compensation for grout up to twice the theoretical drill hole volume. Grout in excess of twice the theoretical drill hole volume will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

Demonstration Micropiles will be measured and paid in units of each. *Demonstration Micropiles* will be measured as the number of satisfactory demonstration piles and no payment will be made for any costs associated with unsatisfactory demonstration piles. The contract unit price for *Demonstration Micropiles* will be full compensation for submittals, design, monitoring and recording, labor, tools, equipment and reinforcement complete and in place and all incidentals necessary to drill through any material and construct demonstration piles in accordance with this provision. The contract unit price for *Demonstration Micropiles* will be full compensation for grout up to twice the theoretical drill hole volume. Grout in excess of twice the theoretical drill hole volume will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*.

Micropile Verification Tests and *Micropile Proof Tests* will be measured and paid in units of each, depending on the type of test. Load tests will be measured as the number of initial tests shown in the plans or required by the Engineer. No payment will be made for subsequent load tests performed on the same or replacement piles. The contract unit prices for *Micropile Verification Tests* and *Micropile Proof Tests* will be full compensation for load testing in accordance with Section 5.0 of this provision.

Payment will be made under:

Pay Item	**Pay Unit**
9 5/8" Dia. Micropiles	Each
Demonstration Micropiles	Each
Micropile Verification Tests	Each
Micropile Proof Tests	Each

DocuSigned by:
Thomas J. Daily
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9/24/2021

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MECHANICALLY STABILIZED EARTH RETAINING WALLS (10-19-21)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geosynthetic reinforcement in the reinforced zone connected to vertical facing elements. Use precast concrete panels for vertical facing elements and coarse aggregate in the reinforced zone unless noted otherwise in the plans. Provide reinforced concrete coping and pile sleeves as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define MSE wall terms as follows:
Geosynthetic Reinforcement – Polyester Type (PET), HDPE or Polypropylene (PP) geosynthetic grids, i.e., geogrid reinforcement or polymer straps, i.e., geostrip reinforcement,
Geogrid – PET, HDPE or PP geogrid,
Reinforcement – Steel or geosynthetic reinforcement,
Aggregate – Coarse or fine aggregate,
Panel – Precast concrete panel,
Coping – Precast or CIP concrete coping,
Design Height (H) – Wall height + wall embedment as shown in the plans,
MSE Wall – Mechanically stabilized earth retaining wall,
MSE Wall Vendor – Vendor supplying the chosen MSE wall system,
MSE Panel Wall – MSE wall with panels,
MSE Segmental Wall – MSE wall with segmental retaining wall (SRW) units and
Abutment Wall – MSE wall with bridge foundations in any portion of the reinforced zone or an MSE wall connected to an abutment wall (even if bridge foundations only penetrate a small part of the reinforced zone, the entire MSE wall is considered an abutment wall).

For bridge approach fills behind end bents with MSE abutment walls, design reinforcement connected to end bent caps in accordance with the plans and this provision. Construct Type III Reinforced Bridge Approach Fills in accordance with the *Bridge Approach Fills* provision and Roadway Detail Drawing No. 422D10.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use MSE wall systems with an "approved for provisional use" status for MSE walls with design heights greater than 35 ft or walls supporting or adjacent to railroads or interstate highways. The list of approved MSE wall systems with approval status is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section
Aggregate	1014

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Asphalt Concrete Base Course, Type B25.0C	620
Corrugated Steel Pipe	1032-3
Epoxy, Type 3A	1081
Geosynthetics	1056
Grout, Type 3	1003
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Select Material, Class V	1016
Shoulder Drain Materials	816-2
Steel Pipe	1036-4(A)

Use galvanized corrugated steel pipe with a zinc coating weight of 2 oz/sf (G200) for pile sleeves. Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for CIP coping, leveling concrete and pads. Use galvanized steel pipe, threaded rods and nuts for the PET geogrid reinforcement vertical obstruction detail. Provide galvanized Grade 36 anchor rods and Grade A hex nuts that meet AASHTO M 314 for threaded rods and nuts.

Use panels and SRW units from producers approved by the Department and licensed by the MSE Wall Vendor. Provide steel strip connectors embedded in panels fabricated from structural steel that meets the requirements for steel strip reinforcement. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate and the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard Specifications* or

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2. Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with chemical properties that meet the following requirements:

AGGREGATE pH REQUIREMENTS		
Aggregate Type (in reinforced zone)	**Reinforcement or Connector Material**	**pH**
Coarse or Fine	Steel	5 – 10
Coarse or Fine	Geosynthetic	4.5 – 9

AGGREGATE ELECTROCHEMICAL REQUIREMENTS (Steel Reinforcement/Connector Materials Only)			
Aggregate Type (in reinforced zone)	**Resistivity**	**Chlorides**	**Sulfates**
Coarse	≥ 5,000 Ω · cm	≤ 100 ppm	≤ 200 ppm
Fine	≥ 3,000 Ω · cm		

Use aggregate from sources participating in the Department's Aggregate QC/QA Program as described in Section 1006 of the *Standard Specifications*. Sample and test aggregate in accordance with the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*.

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use reinforcement approved for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and steel strip reinforcement ("straps") that meet ASTM A572, A1011 or A463. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip reinforcement. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications* or provide aluminized steel strip reinforcement that meet ASTM A463, Type 2-100.

2. Geosynthetic Reinforcement

Provide Type 1 material certifications and identify geosynthetic reinforcement in

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accordance with Article 1056-3 of the *Standard Specifications*. Define machine direction (MD) and cross-machine direction (CD) for geogrids per Article 1056-3 of the *Standard Specifications*.

Use HDPE or PP geogrid for geogrid reinforcement cast into backwalls of end bent caps. Use PET or HDPE geogrid for geogrid reinforcement connected directly to SRW units and only HDPE geogrid for geogrid reinforcement cast into panels.

Provide extruded geogrids produced in the United States and manufactured from punched and drawn polypropylene sheets for PP geogrids that meet the following:

PP GEOGRID REQUIREMENTS		
Property	**Requirement[1]**	**Test Method**
Aperture Dimensions[2]	1" x 1.2"	N/A
Minimum Rib Thickness[2]	0.07" x 0.07"	N/A
Tensile Strength @ 2% Strain[2]	580 lb/ft x 690 lb/ft	ASTM D6637, Method B
Tensile Strength @ 5% Strain[2]	1,200 lb/ft x 1,370 lb/ft	
Ultimate Tensile Strength[2]	1,850 lb/ft x 2,050 lb/ft	
Junction Efficiency[3] (MD)	93%	ASTM D7737
Flexural Rigidity[4]	2,000,000 mg–cm	ASTM D7748
Aperture Stability Modulus[5]	0.55 lb–ft/degrees	ASTM D7864
UV Stability (Retained Strength)	100% (after 500 hr of exposure)	ASTM D4355

1. MARV per Article 1056-3 of the *Standard Specifications* except dimensions and thickness are nominal.
2. Requirement for MD x CD.
3. Junction Efficiency (%) = (Average Junction Strength (Xj_{ave}) / Ultimate Tensile Strength in the MD from ASTM D6637, Method A) × 100.
4. Test specimens two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs, and sufficiently long to enable measurement of the overhang dimension.
5. Applied moment of 17.7 lb–inch (torque increment).

C. Bearing Pads

For MSE panel walls, use preformed ethylene propylene diene monomer rubber bearing pads that meet ASTM D2000 Grade 2, Type A, Class A with a durometer hardness of 60 or 80 ± 5. Provide bearing pads with thicknesses that meet the following:

BEARING PAD THICKNESS	
Facing Area per Panel (A)	**Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)**
$A \leq 30$ sf	1/2"
30 sf $< A \leq 75$ sf	3/4"

D. Miscellaneous Components

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Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip panel anchors and connectors. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide miscellaneous components approved for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

For MSE wall designs, submit PDF files of working drawings and design calculations at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel or SRW unit production facility on working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Segmental Wall Design Consultant to design MSE segmental walls. Provide MSE segmental wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Segmental Wall Design Consultant. Provide MSE panel wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the MSE Wall Vendor.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. For abutment walls only, design MSE walls for seismic if wall sites meet either or both of the following:

- Wall site is in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*,
- Wall site is classified as AASHTO Site Class E, as noted in the plans, and is in or west of Pender, Duplin, Wayne, Johnston, Wake, Durham or Person County.

Connect reinforcement to panels or SRW units with methods or devices approved for the chosen system. Use a uniform reinforcement length throughout the height of the wall of at least 0.7H or 6 ft, whichever is longer, unless noted otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

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Use the simplified method for determining maximum reinforcement loads and design parameters approved for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. If an MSE wall system with geosynthetic reinforcement includes any steel parts for obstructions, bin walls, connections or other components, design steel exposed to aggregate for the design life noted in the plans and aggregate type in the reinforced zone. Use "loss of galvanizing" metal loss rates for nonaggressive backfill in accordance with the AASHTO LRFD specifications for galvanized and aluminized steel and metal loss rates for carbon steel in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in reinforced zone)	**Carbon Steel Loss Rate (after coating depletion)**
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For PET or HDPE geogrid and geostrip reinforcement and geosynthetic connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone. For geogrid reinforcement connected to end bent caps, embed reinforcement or connectors in caps as shown in the plans. For PP geogrid reinforcement connected to end bent caps, use the following design parameters for the aggregate type in the reinforced approach fill.

PP GEOGRID REINFORCEMENT DESIGN PARAMETERS				
Aggregate Type (in reinforced zone)	**T_{al} (MD)**	**F***	**α**	**ρ**
Coarse	400 lb/ft	0.70	0.8	32.0°
Fine	428 lb/ft	0.54	0.8	28.35°

Where,

T_{al} = long-term design strength (LTDS),
F* = pullout resistance factor,
α = scale effect correction factor and
ρ = soil-geogrid friction angle.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 psf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of *FHWA Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I* (Publication No. FHWA-NHI-10-024) except use the following for geosynthetic reinforcement rupture:

$$\phi\, T_{al}\, R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

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ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,

T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,

R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,

T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,

T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and

RF_{CR} = creep reduction factor approved for chosen MSE wall system.

When shown in the plans for abutment walls, use pile sleeves to segregate piles from aggregate in the reinforced zone. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Design reinforcement for obstructions and locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations. Modify PET geogrid reinforcement for obstructions as shown in the plans.

Use 6" thick CIP unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

WALL EMBEDMENT REQUIREMENTS		
Front Slope[1] (H:V)	**Minimum Embedment Depth[2] (whichever is greater)**	
6:1 or flatter (except abutment walls)	H/20	1 ft for H ≤ 10 ft 2 ft for H > 10 ft
6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. H is the maximum design height per wall.

When noted in the plans, locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Roadway Standard Drawing No. 816.02.

For MSE panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

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NUMBER OF BEARING PADS		
Facing Area per Panel (A)	**Maximum Height of Wall Above Horizontal Panel Joint**	**Minimum Number of Pads per Horizontal Panel Joint**
A ≤ 30 sf	25 ft	2
	35 ft[1]	3
30 sf < A ≤ 75 sf	25 ft	3
	35 ft[1]	4

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

For MSE segmental walls, coarse aggregate is required in any SRW unit core spaces and between and behind SRW units for a horizontal distance of at least 18".

Separation geotextiles are required between the aggregate and overlying fill sections. When noted in the plans, separation geotextiles are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. When placing pavement sections directly on the reinforced zone, cap aggregate with 4" of asphalt concrete base course. Unless required otherwise in the plans, use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or CIP concrete for MSE panel walls unless CIP coping is required as shown in the plans,
3. CIP concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, CIP concrete coping that extends down back of panels or SRW units or connects to panels or SRW units with dowels.

For MSE segmental walls with dowels, attach dowels to top courses of SRW units in accordance with the following:

1. Set dowels in core spaces of SRW units filled with grout instead of coarse aggregate or
2. Embed adhesively anchored dowels in holes of solid SRW units with epoxy.

For MSE panel walls with coping, connect CIP concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with foundation pressures, typical sections with reinforcement and

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connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, pile sleeves, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps, curved MSE walls with tight (short) radii and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact M&T before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, an MSE Wall Vendor representative is required to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall

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construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations and if required, pile sleeves located in the reinforced zone before placing aggregate or reinforcement. Brace piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct CIP concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units so the final wall position is as shown in the accepted submittals. Stagger SRW units to create a running bond by centering SRW units over joints in the row below as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Construct MSE walls with the following tolerances:

A. SRW units are level from front to back and between units when checked with a 4 ft long level,

B. Vertical joint widths are 1/4" maximum for SRW units and 3/4", ±1/4" for panels,

C. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and

D. Final wall plumbness (batter) is not negative (wall face leaning forward) and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Before placing aggregate, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a

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distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. If pile sleeves are required, fill sleeves with loose uncompacted sand before constructing end bent caps.

Install dowels as necessary for SRW units and place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct CIP concrete coping in accordance with Subarticle 452-4(B) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces. If the gap between a single faced barrier and wall face is wider than 2", fill gap with Class V select material (standard size No. 78M stone). Otherwise, fill gap with backer rod and seal joint between barrier and MSE wall with silicone sealant.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No.1 will be measured and paid in square feet. MSE walls will be measured as the square feet of wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define “top of wall” as top of coping or top of panels or SRW units for MSE walls without coping.

The contract unit price for *MSE Retaining Wall No.1* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, hauling and removing excavated materials, placing and compacting aggregate and backfill material and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, aggregate concrete base course, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No.1* will also be full compensation for reinforcement and connector design for reinforcement connected to end bent caps, wall modifications for obstructions, pile sleeves filled with sand, joints sealed with silicone sealant and gaps between barriers and MSE walls filled with backer rod or No. 78M stone, if required.

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No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No.1*.

The contract unit price for *MSE Retaining Wall No.1* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract. The contract unit price for *MSE Retaining Wall No.1* also does not include the cost for constructing bridge approach fills behind end bents with MSE abutment walls. See *Bridge Approach Fills* provision for measurement and payment of Type III Reinforced Bridge Approach Fills.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item	**Pay Unit**
MSE Retaining Wall No. 1	Square Foot

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Alyson Aarons
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9/24/2021

B-6054A Haywood County

WORK ZONE TRAFFIC CONTROL
Project Special Provisions
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Steve Miller
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10/14/2021

TC-2

B-6054A Haywood County

SEQUENTIAL FLASHING WARNING LIGHTS
(10/08/2016) (Rev. 5/10/2021)

Description

Furnish and install Sequential Flashing Warning Lights on drums used for the merging tapers of nightly lane closures on all multilane roadways with speed limits of 55 mph or greater.

Materials

The Sequential Flashing Warning Lights shall meet all of the requirements for warning lights within the current edition of the Manual of Uniform Traffic Control Devices (MUTCD).

Each light unit shall be capable of operating fully and continuously for a minimum of 200 hours when equipped with a standard battery set.

Each light in the sequence shall be flashed at a rate of not less than 55 times per minute and not more than 75 times per minute. The flash rate and flash duration shall be consistent throughout the sequence.

Supply a Type 3 Certification (Independent Test Lab results) documenting all actual test results for the specified parameters contained in the Institute of Transportation Engineer's (ITE's) *Purchase Specification for Flashing and Steady Burn Warning Lights*. The laboratory shall also identify all manufacturer codes and part numbers for the incandescent lamp or LED clusters, lenses, battery, and circuitry, and the total width of the light with the battery in place. The complete assembly shall be certified as crashworthy when firmly affixed to the channelizing device.

All Sequential Flashing Warning Lights shall be on the NCDOT Approved Products List.

Construction Methods

These lights shall flash sequentially beginning with the first light and continuing until the final light.

The Sequential Flashing Warning Lights shall automatically flash in sequence when placed on the drums that form the merging taper.

The number of lights used in the drum taper shall equal the number of drums used in the taper.

Drums are the only channelizing device allowed to mount sequential flashing warning lights.

The Sequential Flashing Warning Lights shall be weather independent and visual obstructions shall not interfere with the operation of the lights.

The Sequential Flashing Warning Lights shall automatically sequence when placed in line in an open area with a distance between lights of 10 to 100 feet. A 10-foot stagger in the line of lights shall have no adverse effect on the operation of the lights.

If one light fails, the flashing sequence shall continue. If more than 1 light fails, all of the lights are to be automatically turned to the "off" mode. Non-sequential flashing is prohibited.

When lane closures are not in effect, the Sequential Flashing Warning Lights shall be deactivated.

Measurement and Payment

Sequential Flashing Warning Lights will be measured and paid as the maximum number of sequential flashing warning lights satisfactorily installed and properly functioning at any one time during the life of the project.

This includes all materials and labor to install, maintain and remove all the Sequential Flashing Warning Lights.

Pay Item	**Pay Unit**
Sequential Flashing Warning Lights	Each

HIGH VISIBILITY DEVICES

(10/25/2019) (Rev. 5/10/2021)

Description

Furnish and install High Visibility Devices for projects on interstates and freeways. High Visibility Devices include drums, skinny drums, stationary work zone signs and rigid portable work zone signs. All of these devices shall be new. Used devices are not acceptable.

Materials

A) General

Use materials in accordance with the Manufacturer's recommendations that will retain both durability and retroreflectivity as described elsewhere in this specification for a period of at least 36 months.

The following are required High Visibility Devices to be used for work zone performance applications.

- Drums
- Skinny Drums (Daytime use only)
- Stationary Work Zone Signs
- Rigid Portable Work Zone Signs

All drums and skinny drums shall be new and meet the existing requirements of Section 1089-5 of the NCDOT Standard Specifications for Roads and Structures and shall have Grade B flexible, fluorescent orange sheeting that meets the retroreflective requirements of Section 1092-2 of the NCDOT Standard Specifications for Roads and Structures.

All stationary work zone signs shall be new and meet the existing requirements of Section 1089-1 of the NCDOT Standard Specifications for Roads and Structures. Legend overlays are prohibited and shall not be accepted on the interstate/freeway or associated intersecting roadways. Vertical sign post reflector strips shall be added to all stationary sign supports. Use Grade B fluorescent orange for work zone signs and Grade B fluorescent yellow for exit sign supports. Install strips a minimum of 6' in length on sign supports with one sign mounted and a minimum of 4.5' in length for sign supports with two or more signs mounted vertically.

All portable work zone signs shall be new and have composite substrates as described in Section 1089-1 of the NCDOT Standard Specifications for Roads and Structures. Roll-up signs do not meet the requirements of this provision. The remainder of the existing requirements of Section 1089-1 of the NCDOT Standard Specifications for Roads and Structures remain. Used sign stands are acceptable.

B) Material Qualifications/Certifications

Only use materials as listed above that are on the NCDOT Approved Products List. In addition, provide a Type 3 Material Certification for all materials in accordance with Section 106-3 and Section 1087-4.

(C) Performance

Poor performance of any device or sign at any site, whether or not related to a specific contract may be grounds for removing the material from the NCDOT Approved Products List and/or removing from any project under contract.

Construction Methods

All requirements of Section 1110-3 and Section 1130-3 of the NCDOT Standard Specifications for Roads and Structures shall apply except roll up signs are not permitted for use.

The use of skinny drums is prohibited for any nighttime lane closures on interstates/freeways.

Maintenance

Replace any sign or drum that prematurely fails due to any damage or defect that causes it to perform unsatisfactorily with an "in kind" device of similar quality and age according to the guidelines set forth in the American Traffic Safety Service Association's (ATSSA) Quality Guidelines for Work Zone Traffic Control Devices. An "in kind" replacement sign or drum is not required to be new, however, it shall be less than 1 year old and have 100% of its original sheeting

area and at least 85% of the retroreflective qualities of a new device, so that it is undetectable adjacent to the original devices and signs placed on the project.

Measurement and Payment

High Visibility Drums will be measured and paid as the maximum number of drums placed and in use at any one time during the life of the project.

High Visibility Skinny Drums will be measured and paid as the maximum number of skinny drums placed and in use at any one time during the life of the project.

High Visibility Stationary Signs will be measured as the actual number of square feet satisfactorily installed at each location and accepted by the Engineer. Where a particular sign is used at more than one location, measurement will be made at each location.

High Visibility Portable Signs will be measured and paid as the actual number of square feet satisfactorily installed and accepted by the Engineer. Payment will be made for the initial installation only. Relocation of signs will be incidental to the measurement of the quantity of High Visibility Portable Signs.

No direct payment will be made for stationary work zone sign supports or portable work zone sign stands. All stationary work zone sign support or portable work zone sign stands will be incidental to the work of providing work zone signs.

Payment will be made under:

Pay Item:	**Pay Unit**
High Visibility Drums	Each
High Visibility Skinny Drums	Each
High Visibility Stationary Signs	Square Foot
High Visibility Portable Signs	Square Foot

DYNAMIC ZIPPER MERGE SYSTEM:
(12/10/2019)

Description

Provide, install, program, relocate, operate, maintain, and remove an automated, stand-alone, real-time Dynamic Zipper Merge System meeting the requirements noted herein, until project completion for the duration specified by the Engineer.

A Dynamic Zipper Merge System is a group of devices that work together using software to automatically detect traffic conditions and respond using preprogrammed response algorithms. The purpose of this system is to provide advance notification to motorists of traffic queues in

advance of long-term lane closures in order to reduce the likelihood of high-speed crashes and to encourage either early or late lane merges depending on live traffic conditions.

The Dynamic Zipper Merge System shall detect the presence of a lane closure and slow/stopped traffic queues that develop in advance of the lane closure and display lane closure or slowed/stopped and driver merge instruction messages on the integrated message boards.

Materials and System Operational Requirements

A. General

These specifications cover the general operational requirements for the Dynamic Zipper Merge System. The Dynamic Zipper Merge System shall be positioned at locations indicated in the contract or designated by the Engineer.

Provide physical and electronic/software protections for all components of the system and processes pertaining thereto prevent access by unauthorized parties.

Provide the following for this project:

- Customized website integrated with each Dynamic Zipper Merge System for NCDOT and project partners.
- Traffic Management Software capable of analyzing data and accurately supplying the indicated information.

Provide the following equipment for each Dynamic Zipper Merge System:

- 8 Traffic Speed Sensors
- 5 ITS Portable CCTV Cameras
- 5 Portable Changeable Message Signs
- 2 Full Matrix Display Portable Changeable Message Signs, capable of displaying a flashing arrow indication
- Communication equipment for all above devices to include all components and communication methods necessary to allow each device to send and receive data to and from the website and Traffic Management Software.
- Integration equipment to receive lane closure status from Connected Lane Closure Devices (see separate Special Provision).

B. Documentation

Provide a set of complete specifications and literature on the selected Dynamic Zipper Merge System. Address all the requirements of the Contract Documents in the submittal. Provide documents for each device containing all information necessary to determine product specification compliance. Provide the detailed security plan and protocol used to protect data and communications of the Dynamic Zipper Merge System to the Engineer for approval at least 10 days prior to the delivery of the Dynamic Zipper Merge System. This plan includes physical locking mechanisms where the locks are unique for this Dynamic Zipper Merge System (a key to be provided to NCDOT), password handling techniques, and limited static IPs for remote access to equipment.

C. Power Source

Provide power for devices for continuous operation, as defined in the section Malfunctions, Maintenance, and Inspection below. All utility hookups, solar panels, batteries and other power sources are incidental.

D. Installation

Locate and aim the devices to ensure data accuracy. Coordinate installation locations and details with the Engineer prior to installation.

E. Traffic Sensors

Provide sensors to withstand and operate in, without deterioration, inclement weather and visibility conditions including sunlight, light precipitation, temperature, light, fog, darkness, excessive dust and road debris.

Provide sensors which:

- Collect and report individual vehicle data;
- Collect and report data on a per lane basis;
- Collect speed, volume, and lane occupancy data, for the required direction(s) of traffic; and
- Communicate data to the Traffic Management Software at least once per minute.

Install and maintain sensors to continuously detect all public traffic on **I-40 EAST AND WEST**. Configure sensors to allow active and inactive collection zones, so that construction traffic is differentiated from public traffic. At a minimum, detect speed, volume, and occupancy levels in each lane, each minute. Summarize data in 5 minute bins for data storage and transfer. Do not block or shield critical locations from the sensor. Test each sensor and re-test as needed to confirm the accuracy of the data reported.

Collect and report data to the Traffic Management Software which meets the following requirements at any given time during testing and operation:

- Per direction volume accuracy: greater than 90%;
- Per lane volume accuracy: greater than 90%; and
- Per direction average speed accuracy: greater than 90%.

F. Portable Changeable Message Signs (PCMS)

Provide and maintain Portable Changeable Message Signs (PCMS) capable of displaying the traffic queue length and travel time advisories to motorists. Provide PCMS that meet or exceed the material and functional requirements as described in the Contract Documents. The PCMS shall be capable of communicating wirelessly with and being controlled by the Traffic Management Software. Provide signs which display messages and log the date, time and text of the messages when being controlled by the Traffic Management Software.

No more than 1 pixel illumination failure on the board shall be allowed at any given time during testing and operation. Continuously monitor PCMS status. Include in the monitoring procedure an evaluation of power levels, communication connections, and the number of unlit pixels. Also, use

a human observer periodically to document that the correct message is displayed with the correct date and time.

G. Traffic Management Software

The software has three main functions: Queue Warning, Driver Merge Instructions, and Lane Closure Notification. Use software that meets or exceeds the following requirements for each function:

Queue Warning

The intent of the Queue Warning function is to detect traffic congestion and queue formation and notify approaching drivers of the conditions. Queue Warning is the most critical function of the system. Continuously monitor traffic and report the required operational characteristics to the software each minute. Use a combination of real-time speed and percent lane occupancy information reported by traffic sensors, compared with configurable thresholds, to initiate a slow, stopped, or driver merge instruction message. Display configurable messages on the PCMS located upstream of sensors that detect changes in speed and lane occupancy in such a way that approaching drivers see a slow message before a stopped message, and a stopped message before a late merge message. Include accurate distance until the condition in the slow and stopped messages, and round distances to the nearest ½ mile. Message examples include "SLOW TRAFFIC 2 MILES/WATCH FOR SLOW TRAFFIC," "STOPPED TRAFFIC 1 MILE/PREPARE TO STOP," and "USE BOTH LANES/TO MERGE POINT."

Configure Queue Warning messages to override all other messages on a PCMS. Send communication to project personnel when traffic conditions violate predetermined thresholds. Data collected by the Dynamic Zipper Merge System will be owned by NCDOT and must be in a file format compatible with the STOC's operating platform.

Include human observation in the monitoring procedure to document posted messages and times during an actual event. Compare those messages with the information available from the software. Complete software monitoring as needed and when requested by the Engineer.

Driver Merge Instructions

The intent of the Driver Merge Instructions function is to detect traffic congestion and queue formation and convert the lane closure from a traditional early merge scenario to a late lane merge condition. Driver Merge Instructions is another critical function of the system. Continuously monitor traffic and report the required operational characteristics to the software each minute. Use a combination of real-time speed and percent lane occupancy information reported by traffic sensors, compared with configurable thresholds, to initiate the appropriate driver merge instruction message. Display configurable messages on the PCMS located upstream of sensors that detect changes in speed and lane occupancy in such a way that approaching drivers see an early merge message when queueing is less than one mile in advance of the taper, and a late lane merge message when queueing extends beyond one mile in advance of the merge taper. Message examples include "RIGHT LANE CLOSED/1 MILE AHEAD," "USE BOTH LANES/TO MERGE POINT." and "MERGE HERE/TAKE TURNS."

Configure Queue Warning messages to override all other messages on a PCMS. Send communication to project personnel when traffic conditions violate predetermined thresholds. Data collected by the Dynamic Zipper Merge system will be owned by NCDOT and must be in a file format compatible with the STOC's operating platform.

Include human observation in the monitoring procedure to document posted messages and times during an actual event. Compare those messages with the information available from the software. Complete software monitoring as needed and when requested by the Engineer.

Lane Closure Notification
The intent of the lane closure notification function is to detect active lane closures when no queues are present and notify approaching drivers of the conditions. Lane closure notification is a secondary function and serves as the default function when Queue Warning is inactive. An example message for this function is "RIGHT LANE CLOSED/3 MILES AHEAD."

When no lane closures are in place and no queues are present, each PCMS shall display flashing dots in all four corners to indicate the system is operating correctly.

Include human observation in the monitoring procedure to document posted messages when a Queue Warning event is not occurring.

Reporting and Operational Requirements
Communicate with and/or control all of the devices belonging to the Dynamic Zipper Merge System. Poll the sensors and PCMS a minimum of once per minute. Collect from each device, as applicable, and store in configurable bins the following data: device name and location, 50th percentile and 85th percentile speeds, volume, lane occupancy, message sign history, as well as battery status and communication status. Make historical data available to NCDOT staff at all times for the duration of work zone activity. Provide an electronic copy of all data, including date and duration of system malfunctions, to NCDOT staff after all work zone activity is completed and the Dynamic Zipper Merge System has been removed.

H. Website

The purpose of the website is to be a real time traffic operations dashboard showing current traffic conditions, real time speeds, and posted messages to the nearest minute. Display a full color map of the project area, using Google Maps or equivalent, which shows roadways impacted by project activities and for which data is being collected. Display current average speed at each traffic sensor for which data is available. Display a representation of each device in its approximate location, relative to the roadway and other nearby features, and indicate the operational status of each device. Display the messages posted on the message signs. Refresh information at least once per minute. In the event devices are moved to a new location in the field, automatically reflect these changes to the system layout on the website.

I. Traffic Control Devices

Provide traffic control devices as needed to set up, operate, maintain and tear down the Dynamic Zipper Merge System as shown in the Contract Documents. Coordinate device placement with other Contractors as needed to meet or exceed placement requirements in the Contract Documents.

If applicable, all PCMS used for advance notice of a variable speed zone within the Dynamic Zipper Merge System shall be removed and replaced with double indicated "VARIABLE SPEED ZONE AHEAD" static sign as shown on the detail.

J. Malfunctions, Maintenance, and Inspection

Operate the Dynamic Zipper Merge System, including all components listed above, continuously (24 hours per day, 7 days per week) when deployed on the project, for the duration specified by the Engineer.

In addition, the Contractor shall have portable mounted lane closure signs as detailed in Roadway Standard Drawing 1101.02, Sheet 4, available on site to be used in the case of a system malfunction. These static lane closure signs shall not be visible to traffic except in the case of a system malfunction and will remain in place until the system is fully functional again.

Continuously operate the Dynamic Zipper Merge System with no major malfunctions throughout its operation. System malfunctions include, but are not limited to; the inability of the equipment to provide accurate, real-time traffic data, inability of the equipment to determine lane closure status from connected lane closure devices; inability to withstand a construction roadside environment or normal weather conditions; or interference from construction equipment. Monitor and inspect equipment and data, and on a regular basis to avoid malfunctions. Upon discovery or notification of a system malfunction, the Contractor shall immediately make the pre-staged static lane closure signs visible to traffic and make all necessary corrections to the components of the system such that system malfunctions are corrected within a 24-hour period through repair or replacement of the equipment.

Components include sensors, message signs, communications equipment and all hardware and software required to place the real time information on the devices to operate according to Contract Documents.

It is the responsibility of the Contractor to detect data malfunctions. Monitor, inspect, and maintain sensors so that malfunctions in data collection can be detected as soon as possible. Causes of malfunction may include high winds, shifting earth beneath or around the device, or interference by construction equipment. Monitoring, at a minimum, includes evaluation and documentation of power levels, communication connections, and accuracy of data provided to the Traffic Management Software. Monitoring data accuracy may include re-calibration and aiming of the device or retesting accuracy using human observers. Monitor as needed and when requested by the Engineer.

K. Complete and Operational System

Direct and indirect costs associated with operating the Dynamic Zipper Merge System are incidental to this bid item and may include FCC licensing, cellular communication, wireless data networks, satellite and internet subscription charges, solar power system support and battery charging and maintenance.

Construction Methods

A. System Manager

Provide one person, available 24 hours per day, as the System Manager for the Dynamic Zipper Merge System. Provide this person's 24-hour contact information to the Engineer. Provide a system manager who is locally available to supervise, monitor, and maintain the system components including the website, relocate devices as necessary, and respond to emergencies.

B. Dynamic Zipper Merge System Deployment

Deliver all of the required devices to the place and time designated by the Engineer and confirm they are in good condition and in working order. Each PCMS shall be in new condition when delivered to the project site. Coordinate with the Engineer to determine final sensor locations, then deploy and install sensors. Complete stand-alone tests, system operational tests, final deployment, and system initiation prior to impacting traffic.

System Logic and Programming

The Contractor shall use the logic provided by NCDOT to program the Dynamic Zipper Merge System. This logic indicates what each PCMS will display in response to changing traffic conditions according to each speed sensor. Coordinate with the Engineer, Work Zone Traffic Control, and the State Traffic Operations Center staff prior to system installation to verify the system programming is accurate. Coordinate with the Engineer in the event system programming adjustments are necessary due to field conditions.

Stand-alone Testing

Conduct stand-alone tests of each device. Test sensors from their installed locations. PCMS may be tested in other locations. Turn all PCMS away from traffic during testing.

Complete a stand-alone test for each PCMS prior to installation, and to verify that the unit operates as specified. Include in the stand-alone test procedure tests for the following functions:

- Turning the sign on and off;
- Displaying and removing a test message;
- Counting pixels not illuminated (no more than 1 malfunctioning pixel);
- Checking message logs for accuracy; and
- Measuring sign legibility and visibility.

If a unit fails to pass the stand-alone test, repair or replace the unit, and repeat the test until successful.

System Operational Testing

Provide a System Operational Testing Plan to the Engineer for approval, at least 7 days prior to beginning testing. The Plan shall detail a five-day operational test procedure of the System Operational Requirements. Include in the plan procedures operation of the software using real time information from sensors already tested and installed and tested signs located in an off-project location. Begin testing 14 days prior to implementation to verify the system operates in a fully functional manner and as described.

Provide complete operations support from the Software supplier during the operational test, if applicable. Provide verification that the reported drive times, speeds, and volumes through the work zone accurately reflect actual field conditions. Use a human observer to monitor and document the posted messages. Post test messages two times per day during the test period to verify functionality and communications and verification that proper messages are being posted to the PCMS. If any equipment malfunctions occur for a combined period of two hours or more during the operational test on any day, restart the five-day test and no credit will be given for that day of the operational test period.

The Contractor shall be responsible for replacing all defective equipment at no additional cost to the Department.

Indicate the date and time of any activity necessary to maintain operation of the Dynamic Zipper Merge System during the operational test period. Include in each entry, at a minimum, the following information:

- A description of the malfunction;
- Identity of the malfunctioning equipment;
- Cause of equipment malfunction (if known);
- A description of the type of work performed; and
- Time and date of repair completion.

Once the operational test report is received and approved by the Engineer, the Dynamic Zipper Merge System will be considered operational, and the system will be accepted for use.

Measurement and Payment

Dynamic Zipper Merge System Deployment will be measured and paid on a Lump Sum basis upon completion of the first Dynamic Zipper Merge System delivered to the project site, installed, tested, and found to be fully operational.

Dynamic Zipper Merge System Relocation will be measured and paid on a per each basis upon completion of each system removal from one location on the project and installation to a different location on the project. Payment will be paid once the system is fully operational.

Dynamic Zipper Merge System will be measured and paid on a daily basis for each satisfactorily installed Dynamic Zipper Merge System, including all necessary labor, equipment, materials, communications, licensing, and software to maintain operation of the system. Each Dynamic Zipper Merge System is expected to operate continuously (24 hours per day, 7 days per week) with no major malfunctions. Monitor and maintain the system according to the Malfunctions, Maintenance, and Inspection section above.

All work zone signs will be paid for at the contract unit price according to Article 1110-04 in the 2018 Standard Specifications for Roads and Structures.

In the event of a system or data malfunction, payment will be made for the first day of the malfunction. If the malfunctioning Dynamic Zipper Merge System is not completely operational at the end of 24 hours, additional payment will not be made until the system's operation is fully restored.

Pay Item	Pay Unit
Dynamic Zipper Merge System Deployment	Lump Sum
Dynamic Zipper Merge System Relocation	Each
Dynamic Zipper Merge System	Day

PORTABLE CCTV CAMERA AND TRAILER

Description

Furnish, install, operate, maintain, relocate and remove a Portable CCTV Camera, designed to be towed by a ½ ton and ¾ ton pickup truck and erected in work zones and on roadside right of ways for remote video monitoring and incident management. Ensure the CCTV Camera equipmentis fully compatible with all features of the existing video management software (Protronix Video Pro) currently in use by NCDOT in this region and at the State Traffic Operations Center (STOC).

Furnish, deploy, install, test, integrate and make fully operational the new Portable CCTV Camera assembly at the location described or shown in the Plans and/or as directed by the Engineer.Contact the Engineer to confirm the Portable CCTV Camera assembly location prior to deploying inthe field.

Each unit shall be new, and of the latest design of a model in current production or an update of an existing model. Prototype equipment will not be acceptable. Each unit shall be furnished with identical and interchangeable equipment, options and features. It shall be furnished completely assembled, fully serviced, and ready for immediate operation.

The Department will provide a cellular modem to establish the communications link between the Portable CCTV Camera and the State Traffic Operations Center (STOC).

TRAILER

The trailer shall be specifically designed to support and secure the Portable CCTV assembly, photovoltaic power source and other systems both in a deployed and travel position. It shall be capable of being towed at 65 miles per hour over extensive distances. Provide trailers that comply with Federal Motor Safety Regulations 393.

A. Trailer Construction

The frame including the trailer tongue shall be designed, constructed, and rated for the full capacity of the trailer. The frame shall be constructed of 3" x 3" and 3" x 5" square steel tubing (ASTM A36) with a minimum of 3/16 inch wall thickness and welded in accordance with applicableAmerican Welding Society (AWS) standards. If counterweights are required, they shall be incorporated as an integral part of the frame. Provide a mast support assembly that will safely support the camera mount and CCTV Camera when they are not deployed, and the trailer is in travelmode and when the camera mount and CCTV Camera are deployed.

Provide the trailer with heavy-duty fenders capable of supporting a minimum of 200 lbs. Ensure the fenders are designed to minimize road surface water and debris from being thrown up on to the trailer equipment when being transported.

The towing tongue or drawbar shall be removable and shall include a 2-inch ball hitch. The trailer shall tow level when attached to a 2-inch ball mounted 18" high. Ensure the trailer tongue is removable and that no tools are required to remove or re-install the tongue. Provide an electrical connector for separation of the trailer safety lighting system where the trailer tongue connects to the trailer. Ensure the trailer tongue is rated for 6,000 lbs. Provide a tongue jack stand, heavy-duty; swivel mount castor wheel type design with a 1,200 lb. capacity (minimum). Ensure the tongue jackstand can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

Safety chains shall be provided, of adequate length, meeting SAE J-697 Standard, latest edition. Chain shall be a minimum of 5/16", and meet the National Association of Chain Manufacturer's (NACM) welded chain standard rating of Grade 70 with a Working Load Limit of4700 lbs.

The trailer, springs and axels shall be rated for 2,500 lbs. and supplied with 15" (minimum) radial tires. Total combined load rating of the tires and wheels shall exceed the GVWR of the unit.Load ratings shall be determined by reference to the current yearbook of the Tire and Rim Association, Inc., or the manufacturer's published load rating. Tire ratings shall be calculated at 65mph.

Trailer GVWR shall not exceed 2,500 lbs. so a trailer braking system shall not be required. The trailer must not require any special towing package, electric brakes or specialized heavy-duty truck to tow.

The trailer shall include a leveling system to allow for the trailer to be in a stable and level position when the jack legs are deployed. The trailer shall be equipped with (4) four crank style leveling jacks, one at each corner of the trailer that extend straight down with adequate lifting capacity and a large steel footpad to level and stabilize the trailer. Ensure the leveling jacks can be swiveled up and out of the way and held in place by a locking mechanism for transporting the trailer.

Lights/Reflectors and Safety Markings

The trailer shall be equipped with lights and reflectors in compliance with applicable North Carolina motor vehicle laws and the Federal Motor Safety Carrier Regulations, including turn signals, dual taillights, and brake lights.

An illuminated license plate holder will be mounted so that a license plate is protected and does not extend past sides of fenders.

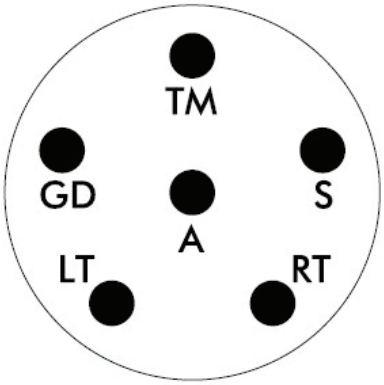
The trailer sides and rear shall be marked with continuous red/white striped retroreflective tape in a pattern meeting applicable NHTSA (DOT) regulations using certified retroreflective material meeting ASTM D4956. The tape must be 3 inches wide and installed in a repeating patternof 11 inches long (red) followed by 7 inches long (white).

Provide a standard 6-way plug and receptacle connector, equal to and interchangeable with a

Velvac 055049 assembly, and a heavy-duty jacketed multi-conductor cable shall be furnished for connecting the truck and trailer wiring system. All wiring shall be properly protected and secured.

The receptacle shall be furnished loose, while the cable and plug shall be attached to the trailer of sufficient length to reach a truck-mounted receptacle, additionally provide an intermediate electricalconnector where the wiring harness leaves the removeable tongue and the trailer body. The plug shall be connected to the trailer wiring system in accordance with the following drawing:

6–Way Trailer Connection



Letter Code	Trailer Color Code
GD – Brake Wire Ground	WHITE
TM – Tail & Marker Lamp	BLACK
S – Stop Lamp	RED
RT – Right Turn Signal	GREEN
LT – Left Turn Signal	YELLOW
A – Live Brake Wire	BROWN

B. Solar Power System

The CCTV Camera shall be powered by a photovoltaic system consisting of photovoltaic panels, deep-cycle batteries, solar charge controller and ancillary equipment and wiring. Under normal conditions, the power system should automatically recharge the battery system with no manual intervention. A motorized power supply requiring fossil fuels (i.e. gas, diesel generators, etc.) is not acceptable, however the system shall be designed and supplied with a NEMA L6-20 locking receptacle in an outdoor rated enclosure to allow for use of a stand-by generator or land- power (120V, single phase) when necessary. Land-Power can be used to charge the batteries whenthe units are in storage.

The unit shall satisfactorily operate in all weather conditions between -40 degrees F and +165 degrees F.

A bank of batteries forming a 12 VDC system shall power the unit during standard operations. The battery bank shall consist of 6 VDC deep cycle heavy duty lead/acid batteries wiredin series/parallel as to form a 12 VDC system. Warranty service for the power source batteries shallbe locally available on a nationwide basis.

The charging system for a trailer mounted device shall be solar, consisting of a photovoltaic array supplying electrical energy to the batteries through a solar regulator. The system shall provide“on demand” charging consistent with battery condition and with the ambient solar luminance at thephotovoltaic array. The trailer shall also be equipped with a standard 120 VAC receptacle as well asa temperature-stable 120 VAC battery trickle charger and ammeter. The 120 VAC charging system shall initiate charging automatically when 120 VAC service is connected and shall be capable of completely charging the battery pack within a 24 to 48-

hour time period. The actual charging time will vary depending upon conditions and state of charge/discharge of the batteries.

A Maximum Power Point Tracking (MPPT) solar charge controller shall be provided and solar charging circuitry shall include voltage regulators and automatic battery temperature compensation control circuitry components to prevent battery overcharging. Batteries shall be of the, deep-cycle golf cart type/acid batteries (BCI Group GC-2) type. Ensure the battery capacity is adequate to operate the CCTV Camera continuously for at least 20 days with no external charging (no sunlight). Additionally, provide a trickle charger circuitry to allow for standby generator or Land-Power operation when necessary. The system shall have the ability to remotely disconnect the power to the camera load when the available operating power falls below a specified thresholdvoltage.

The photovoltaic panels shall be mounted to the trailer structure in a rigid steel frame. The photovoltaic panel assembly shall be designed with tilt and rotation capabilities. For travel, ensure that the photovoltaic panel assemble is mounted so as not to interfere with the mast and camera. Thepanels and panel assembly shall be attached using anti-theft fasteners. Panels must have tempered glass faces and be sealed.

The vendor, upon request, must provide solar panel specifications including dimensions, voltage, wattage and the number of panels and cells to be used. Additionally, the vendor must provide load calculations for the photovoltaic power system to operate the CCTVCamera and its supporting components in accordance with these specifications.

Loads for NCDOT furnished equipment are shown below. The solar and load calculations shall be performed and certified by a certified NABCEP Solar PV Installation Professional. The Manufacturer must specify the power requirements for each component of the system including thecamera, digital cellular modem and any other electrical loads present during normal operation.

The trailer shall include a NEMA 4X hinged, lockable enclosure to contain the power system control components to operate the CCTV Camera system, unless these components are located in a separate compartment within the battery compartment. The battery enclosure shall be lockable to prevent unauthorized access to the battery(s) and control components. All locks shall be keyed to accept a Corbin #2 key.

Additionally, a separate 12 x 12 x 6 (minimum) NEMA 4X hinged, lockable enclosure shall be provided to install switches, cellular communications modules, and control equipment for the CCTV Camera assembly.

The power system including solar panels shall be mounted onto the trailer and shall not exceed the dimensions of the trailer or cause the trailer GVWR (2,500 lb.) to be exceeded.

C. Equipment Variables (Typical) for Power Usage Calculations

a. Sierra Wireless Modem (Typical) – Provided by NCDOT
Transmit/Receive (Typical/Max) – 230 mA/440mA
@12 VDCIdle – 180 mA @ 12VDC

D. Camera Mast

The camera shall be mounted on a self-supporting mast allowing a camera to be raised to a height of 30 feet. The mast shall be made from galvanized steel and shall allow for telescoping action.

The unit shall satisfactorily operate in all weather conditions including up to a 100-MPH wind load with the vertical post fully extended per the ASHTO Wind Load Standard. The mast maybe raised and lowered by a single individual using a manual winch. In the raised position the cameramast shall be capable of being rotated 360 degrees. The mast shall mechanically lock in the raised position.

Once lowered, the mast may rotate down to be secured for transport. The mast shall mechanically lock in the lowered position for transport without removing the installed camera.

The vendor must provide a drawing that shows camera mounting provisions provided.

Camera wiring shall spiral around the mast to allow the mast to raise and lower. A 2" diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiringthrough mount into camera.

E. Data Plaques and Serial Number

Each unit shall be provided with data plaque containing the manufacturer's serial number, model number and other manufacturer's data unique to each unit, permanently attached and easily identified. The serial number shall be used by the Department and the manufacturer to identify unitsfor recall, to aid in the recovery of stolen units, to establish ownership, and for other similar reasons.At a minimum the serial number shall contain 17 characters and shall conform to Federal Vehicle Identification Numbering Standards (49 CFR 565).

A permanent data plaque shall be attached to each unit indicating serial number and model number using block lettering. Decals are not permitted.

F. Safety Plaques or Details

Product safety plaques or decals shall be furnished and affixed at the operator's station and at any hazardous area. The safety plaques or decals shall describe the nature of the hazard, level of hazard seriousness, how to avoid the hazard, and the consequence of human interaction with the hazard.

Permanent plaques mechanically attached are preferred to decals. Type, size and location of product safety plaques or decals shall be in accordance with current ANSIZ 535.4, or latest revisionthereto.

G. Color

Each unit shall be thoroughly cleaned and prime coated with a rust preventative paint with a final coat that is either painted or powder coated meeting Federal Standard 595C Color Chip ID #12473 with a minimum paint thickness of 2.5 mils. Paint and primers used shall be leadfree. All data plaques and safety decals/plaques shall be protected from being painted over.

CCTV CAMERA

Furnish and install CCTV assemblies described in these Project Special Provisions. All new CCTV cameras shall be fully compatible with the video management software (Protronix Video Pro)currently in use by NCDOT at the STOC.

MATERIALS

Furnish and install a new CCTV camera assembly per portable trailer. Each assembly consists of the following:

- One dome CCTV color digital signal processing camera unit with zoom lens, filter, controlcircuit, and accessories in a single enclosed unit
- A NEMA-rated enclosure constructed of aluminum with a clear acrylic dome or approvedequal Camera Unit housing.
- Motorized pan, tilt, and zoom
- Built-in video encoder capable of H.264/MPEG-4 compression for video-over IPtransmission
- Pole-mount camera attachment assembly
- A lightning arrestor installed in-line between the CCTV camera and the equipment cabinetcomponents.
- All necessary cable, connectors and incidental hardware to make a complete and operablesystem.

A. Camera

Furnish new 1/3-inch charged-coupled device (CCD) color cameras. The sensors shall use Complementary Metal-Oxide-Semiconductor (CMOS) technology. The camera must meet the following minimum requirements:

- Sensor size: 2 megapixels
- Video Resolution: 1920x1080 (HDTV 1080p)
- Aspect Ratio: 16:9
- Overexposure protection: The camera shall have built-in circuitry or a protectiondevice to prevent any damage to the camera when pointed at strong light sources,including the sun
- Low light condition imaging
- Wide Dynamic Range (WDR) operation
- Electronic image stabilization
- Automatic focus with manual override
- Incoming session IP logging allows the monitoring of excess data usage.

B. Lens

Furnish each camera with a motorized zoom lens that is high performance integrated dome system or approved equivalent with automatic iris control with manual override and neutral densityspot filter. Furnish lenses that meet the following optical specifications:

- 30X optical zoom, and 12X electronic zoom

- Preset positioning: 64 Presets

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. Mechanical or electrical meansmust be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

C. Communications Standards

The CCTV camera shall support the appropriate NTCIP 1205 communication protocol (version 1.08 or higher), ONVIF, or approved equal.

D. Networking Standards

- Network Connection: 10/100 Mbps auto-negotiate
- Frame Rate: 30 to 60 fps
- Data Rate: scalable
- Built-in Web Server
- Unicast & multicast support
- Two simultaneous video streams (Dual H.264 and MJPEG):
    - Video 1: H.264 (Main Profile, at minimum)
    - Video 2: H.264 or MJPEG
- Supported Protocols: DNS, IGMPv2, NTP, RTSP, RTP, TCP, UDP, DHCP, HTTP, IPv4

The video camera shall allow for the simultaneous encoding and transmission of the two digital video streams, one in H.264 format (high-resolution) and one in H.264 or MJPEG format(low- resolution).

Initially use UDP/IP for video transport and TCP/IP for camera control transport unless otherwise approved by the Engineer.

The 10/100 Base TX port shall support half-duplex or full-duplex and provide auto negotiation and shall be initially configured for full-duplex.

The camera unit shall be remotely manageable using standard network applications via web browser interface administration. Telnet or SNMP monitors shall be provided.

E. Camera Housing

Furnish new dome style enclosure for the CCTV assemblies. Equip each housing with mounting assembly for attachment to the CCTV camera telescoping pole. The enclosures must beequipped with a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure must meet or exceed NEMA 4X ratings. The viewing area of the enclosure must be tempered glass.

F. Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit must be integralto the high-performance integrated dome system. The pan and tilt unit must be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units must meet or exceed the following

specifications:

- Pan: continuous 360 Degrees
- Tilt: up/down +2 to -90 degrees minimum
- Motors: Two-phase induction type, continuous duty, instantaneous reversing
- Preset Positioning: 64 PTZ presets per camera

G. Video Ethernet Encoder

Furnish cameras with a built-in digital video Ethernet encoder to allow video-over-IP transmission. The encoder units must be built into the camera housing and require no additionalequipment to transmit encoded video over IP Networks.

Encoders must have the following minimum features:

- Network Interface: Ethernet 10/100 Base-T (RJ-45 connector)
- Protocols: IPv4, IPv6, HTTP, HTTPS, SSL, QoS, FTP, SMTP, UPnP, SNMPv2c/v3, DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, and DHCP
- Security: SSL, SSH, 802.1x, HTTPS encryption with password-controlled browser interface
- Video Streams: Minimum 2 simultaneous streams, user configurable
- Compression: H.264 (MPEG-4 Part 10/AVC)
- Resolution Scalable; NTSC-compatible 320x176 to 1920x1080 (HDTV 1080p, 16:9aspect ratio)
- Frame Rate: 1-30 FPS programmable (full motion)
- Bandwidth 30 kbps – 6 Mbps, configurable depending on resolution
- Edge Storage: SD/SDHC/SDXC slot supporting up to 64GB memory card

H. Central Receiver/Driver

Provide each new camera unit with a control receiver/driver that is integral to the CCTV dome assembly. The control receiver/driver will receive serial asynchronous data initiated from a camera control unit, decode the command data, perform error checking, and drive the pan/tilt unit,camera controls, and motorized lens. As a minimum, the control receiver/drivers must provide thefollowing functions:

- Zoom in/out
- Automatic focus with manual override
- Tilt up/down
- Automatic iris with manual override
- Pan right/left
- Minimum 64 preset positions for pan, tilt, and zoom

In addition, each control receiver/driver must accept status information from the pan/tilt unit and motorized lens for preset positioning of those components. The control receiver/driver will relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control receiver/driver must accept “goto” preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and

motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

I. Surge Protection

Protect all equipment with metal oxide varistors connecting each power conductor to ground.

Protect the electrical and Ethernet cables from the CCTV unit entering the equipment cabinet with surge protection. Provide an integrated unit that accepts unprotected electrical and Ethernet connections and outputs protected electrical and Ethernet connections. Ethernet connections shall be RJ45 with full gigabit Ethernet transmission speeds and electrical connections shall be #22-#14 AWG screw terminals. The surge protection unit shall comply with EIA/TIA568A and EIA/TIA568B standards for data transmission and automatically reset.

J. Wiring Diagrams

Provide a wiring diagram for each Portable CCTV assembly detailing the power system, including but not limited to, Solar charge controller, photovoltaic panels, batteries, standby-by generator/land power hook up, trickle charger circuitry and cellular modem. Ensure the wiring diagram references connections for CCTV Camera and controller and all other supporting devicesand systems that comprise the whole system.

K. Routine Operations

Describe the operational routine, from necessary preparations for placing the equipment into operation to securing the equipment after operation. Show appropriate illustrations with the sequence of operations presented in tabular form wherever applicable. Include in this section a totallist of the test instruments, aids and tools required to perform necessary measurements and measurement techniques for each component, as well as set-up, test, and calibration procedures.

TRAINING

A minimum one day of on-site training shall be conducted at the time of delivery or at a time as approved by the Engineer by representatives of the manufacturer’s technical service personnel or factory trained authorized representative.

A. Training Materials

In conjunction with the delivery of each unit, contractor shall supply one complete set of video operator training materials (DVD format preferred). This material shall adequately cover thesafe and correct operation of the equipment.

CONSTRUCTION METHODS

A. Description

This article establishes practices and procedures and gives minimum standards and requirements for the installation of Portable CCTV camera and trailers and auxiliary equipment. Provide electrical equipment described in this specification that conforms to the standards of NEMA,UL, or Electronic Industries Association (EIA), wherever applicable.

Provide stainless steel screws, nuts, and locking washers in all external locations. Do not use

self-tapping screws unless specifically approved by the Engineer. Use parts made of corrosion-resistant materials, such as plastic, stainless steel, brass, or aluminum. Use construction materials that resist fungus growth and moisture deterioration. Separate dissimilar metals by an inertdielectric material.

Mount the camera to the pole mount camera attachment assembly and secure to the assembly to the camera mast. Ensure camera wiring spirals around the mast to allow mast to raise and lower. A 2” diameter minimum (or acceptable equivalent) grommeted entrance way shall be provided to feed wiring through mount into camera.

B. Deployment

The Engineer will establish the actual location of each Portable CCTV camera trailer assembly to be deployed. It is the Contractor’s responsibility to ensure proper elevation, leveling,offset, and orientation of all Portable CCTV camera trailer assemblies.

C. Construction Submittal

When the work is complete, submit "as built" plans, inventory sheets, and any other data required by the Engineer to show the details of actual location and any modifications made during installation. The "as built" plans will show each Portable CCTV camera trailer assembly location ona map with GPS coordinates, and dimensioned from fixed objects or intersecting roadways.

WARRANTY

Units shall be warranted against defects in materials and workmanship for a period of not less than twelve (12) months. The warranty period start date shall begin on the date of deploymentand acceptance by the Engineer.

The unit shall be furnished with a copy of the warranty statement and any necessary cards, booklets, or certificates needed to receive warranty repairs at a dealership. Provide a list of approvedfactory-authorized part, service and warranty facilities.

MEASUREMENT AND PAYMENT

Portable CCTV Camera Assembly will be measured and paid as the actual number of Portable CCTV assemblies furnished, delivered, and accepted. Portable CCTV Camera assembly shall include camera, mounting assembly, solar power system, trailer, and all other parts and components necessary to provide a fully function portable CCTV Camera assembly as described inthis document. No separate measurement will be made for relocating the device throughout the lifeof the project, set-up and take downs, transporting and storage as these items of work will be considered incidental.

Payment will be made under:

Pay Item	Pay Unit
Portable CCTV Camera Assembly	Each

Project Special Provisions
Erosion Control

STABILIZATION REQUIREMENTS:
(4-30-2019)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective April 1, 2019 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING: **(WestEd)**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

Shoulder and Median Areas

August 1 - June 1		**May 1 - September 1**	
20#	Kentucky Bluegrass	20#	Kentucky Bluegrass
75#	Hard Fescue	75#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1		**May 1 - September 1**	
100#	Tall Fescue	100#	Tall Fescue
15#	Kentucky Bluegrass	15#	Kentucky Bluegrass
30#	Hard Fescue	30#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Tall Fescue Cultivars

06 Dust
2nd Millennium
3rd Millennium
Apache III
Avenger
Barlexas
Barlexas II
Bar Fa
Barrera
Barrington
Barrobusto
Barvado
Biltmore
Bingo
Bizem
Blackwatch
Blade Runner II
Bonsai
Braveheart
Bravo
Bullseye
Cannavaro
Catalyst
Cayenne
Cessane Rz
Chipper
Cochise IV
Constitution
Corgi
Corona
Coyote
Darlington
Davinci
Desire
Dominion
Dynamic
Dynasty
Endeavor
Escalade
Essential
Evergreen 2
Falcon IV
Falcon NG
Falcon V
Faith
Fat Cat
Festnova
Fidelity
Finelawn Elite
Finelawn Xpress
Finesse II
Firebird
Firecracker LS
Firenza
Five Point
Focus
Forte
Garrison
Gazelle II
Gold Medallion
Grande 3
Greenbrooks
Greenkeeper
Gremlin
Greystone
Guardian 21
Guardian 41
Hemi
Honky Tonk
Hot Rod
Hunter
Inferno
Innovator
Integrity
Jaguar 3
Jamboree
Justice
Kalahari
Kitty Hawk 2000
Legitimate
Lexington
LSD
Magellan
Matador
Millennium SRP
Monet
Mustang 4
Ninja 2
Ol' Glory
Olympic Gold
Padre
Patagonia
Pedigree
Picasso
Piedmont
Plantation
Proseeds 5301
Prospect
Pure Gold
Quest
Raptor II
Rebel Exeda
Rebel Sentry
Rebel IV
Regiment II
Regenerate
Rendition
Rhambler 2 SRP
Rembrandt
Reunion
Riverside
RNP
Rocket
Scorpion
Serengeti
Shelby
Sheridan
Signia
Silver Hawk
Sliverstar
Shenandoah Elite
Sidewinder
Skyline
Solara
Southern Choice II
Speedway
Spyder LS
Sunset Gold
Taccoa
Tanzania
Trio
Tahoe II
Talladega
Tarheel
Terrano
Titan ltd
Titanium LS
Tracer
Traverse SRP
Tulsa Time
Turbo
Turbo RZ
Tuxedo RZ
Ultimate
Venture
Umbrella
Van Gogh
Watchdog
Wolfpack II
Xtremegreen

Approved Kentucky Bluegrass Cultivars:

4-Season	Blue Velvet	Gladstone	Quantum Leap
Alexa II	Blueberry	Granite	Rambo
America	Boomerang	Hampton	Rhapsody
Apollo	Brilliant	Harmonie	Rhythm
Arcadia	Cabernet	Impact	Rita
Aries	Champagne	Jefferson	Royce
Armada	Champlain	Juliet	Rubicon
Arrow	Chicago II	Jump Start	Rugby II
Arrowhead	Corsair	Keeneland	Shiraz
Aura	Courtyard	Langara	Showcase
Avid	Delight	Liberator	Skye
Award	Diva	Madison	Solar Eclipse
Awesome	Dynamo	Mercury	Sonoma
Bandera	Eagleton	Midnight	Sorbonne
Barduke	Emblem	Midnight II	Starburst
Barnique	Empire	Moon Shadow	Sudden Impact
Baroness	Envicta	Moonlight SLT	Total Eclipse
Barrister	Everest	Mystere	Touche
Barvette HGT	Everglade	Nu Destiny	Tsunami
Bedazzled	Excursion	NuChicago	Unique
Belissimo	Freedom II	NuGlade	Valor
Bewitched	Freedom III	Odyssey	Voyager II
Beyond	Front Page	Perfection	Washington
Blacksburg II	Futurity	Pinot	Zinfandel
Blackstone	Gaelic	Princeton 105	
Blue Note	Ginney II	Prosperity	

Approved Hard Fescue Cultivars:

Aurora II	Eureka II	Oxford	Scaldis II
Aurora Gold	Firefly	Reliant II	Spartan II
Berkshire	Granite	Reliant IV	Stonehenge
Bighorn GT	Heron	Rescue 911	
Chariot	Nordic	Rhino	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza and 15# Crown Vetch January 1 - December 31.

The Crown Vetch Seed should be double inoculated if applied with a hand seeder. Four times the normal rate of inoculant should be used if applied with a hydroseeder. If a fertilizer-seed slurry is used, the required limestone should also be included to prevent fertilizer acidity from killing the inoculant bacteria. Caution should be used to keep the inoculant below 80° F to prevent harm to the bacteria. The rates and grades of fertilizer and limestone shall be the same as specified for *Seeding and Mulching*.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding And Mulching (West)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation and/or trout stream construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

August 1 - June 1		**May 1 – September 1**	
18#	Creeping Red Fescue	18#	Creeping Red Fescue
8#	Big Bluestem	8#	Big Bluestem
6#	Indiangrass	6#	Indiangrass
4#	Switchgrass	4#	Switchgrass
35#	Rye Grain	25#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen	Boreal	Epic	Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be six inches.

REFORESTATION:

Description

Reforestation will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

Materials

Reforestation shall be bare root seedlings 12"-18" tall.

Construction Methods

Reforestation shall be planted as soon as practical following permanent S*eeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

Measurement and Payment

Reforestation will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

RESPONSE FOR EROSION CONTROL:

Description

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN
1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB

1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item	**Pay Unit**
Response for Erosion Control	Each

ENVIRONMENTALLY SENSITIVE AREAS:

Description

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

Construction Methods

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only

clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications*.

(D) Seeding and Mulching

Seeding and mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

STOCKPILE AREAS:

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

ACCESS AND HAUL ROADS:

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

CONSTRUCTION MATERIALS MANAGEMENT
(3-19-19) (rev. 04-27-19)

Description

The requirements set forth shall be adhered to in order to meet the applicable materials handling requirements of the NCG010000 permit. Structural controls installed to manage construction materials stored or used on site shall be shown on the E&SC Plan. Requirements for handling materials on construction sites shall be as follows:

Polyacrylamides (PAMS) and Flocculants

Polyacrylamides (PAMS) and flocculants shall be stored in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures designed to protect adjacent surface waters. PAMS or other flocculants used shall be selected from the NC DWR List of Approved PAMS/Flocculants The concentration of PAMS and other flocculants used shall not exceed those specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. The NC DWR List of Approved PAMS/Flocculants is available at:

https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/ATU/ApprovedPAMS4_1_2017.pdf

Equipment Fluids

Fuels, lubricants, coolants, and hydraulic fluids, and other petroleum products shall be handled and disposed of in a manner so as not to enter surface or ground waters and in accordance with applicable state and federal regulations. Equipment used on the site must be operated and maintained properly to prevent discharge of fluids. Equipment, vehicle, and other wash waters shall not be discharged into E&SC basins or other E&SC devices. Alternative controls should be provided such that there is no discharge of soaps, solvents, or detergents.

Waste Materials

Construction materials and land clearing waste shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules governing the disposal of solid waste (15A NCAC 13B). Areas dedicated for managing construction material and land clearing waste shall be at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. Paint and other liquid construction material waste shall not be dumped into storm drains. Paint and other liquid construction waste washouts should be located at least 50 feet away from storm drain inlets unless there is no alternative. Other options are to install lined washouts or use portable, removable bags or bins. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules at 15A NCAC, Subchapter 13A. Litter and sanitary waste shall be managed in a manner to prevent it from entering jurisdictional waters and shall be disposed of offsite.

Herbicide, Pesticide, and Rodenticides

Herbicide, pesticide, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, North Carolina Pesticide Law of 1971 and labeling restrictions.

Concrete Materials

Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. No concrete or cement slurry shall be discharged from the site. (Note that discharges from onsite concrete plants require coverage under a separate NPDES permit – NCG140000.) Concrete wash water shall be managed in accordance with the *Concrete Washout Structure* provision. Concrete slurry shall be managed and disposed of in accordance with *NCDOT DGS and HOS DCAR Distribution of Class A Residuals Statewide* (Permit No. WQ0035749). Any hardened concrete residue will be disposed of, or recycled on site, in accordance with state solid waste regulations.

Earthen Material Stock Piles

Earthen material stock piles shall be located at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available.

Measurement and Payment

Conditions set within the *Construction Materials Management* provision are incidental to the project for which no direct compensation will be made.

WASTE AND BORROW SOURCES:

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/ContractedReclamationProcedures.pdf

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

SAFETY FENCE AND JURISDICTIONAL FLAGGING:

Description

Safety Fence shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

Materials

(A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross

section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. Posts shall be installed a minimum of 2 ft. into the ground. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications.* No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid

for as *Construction Surveying,* except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(5) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment

Safety Fence will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

Pay Item	**Pay Unit**
Safety Fence	Linear Foot

PERMANENT SOIL REINFORCEMENT MAT:

Description

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

Property	Test Method	Value	Unit
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	0.40	in
Mass Per Unit Area	ASTM D6566	0.55	lb/sy
Tensile Strength	ASTM D6818	385	lb/ft
Elongation (Maximum)	ASTM D6818	49	%
Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	≥80	%
Porosity (Permanent Net)	ECTC Guidelines	≥85	%
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	≥8.0	lb/ft^2
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥16.0	ft/s

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

(A) the chemical and physical properties of the mat used, and
(B) conformance of the mat with this specification.

Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Permanent Soil Reinforcement Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

Pay Item	Pay Unit
Permanent Soil Reinforcement Mat	Square Yard

TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):

Description

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

Materials

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

Construction Methods

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications*, Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Temporary Rock Silt Checks Type A will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	**Pay Unit**
Polyacrylamide(PAM)	Pound

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item	Pay Unit
Impervious Dike	Linear Foot

COIR FIBER MAT:

Description

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

Materials

Item	Section
Coir Fiber Mat	1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

Measurement and Payment

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

Pay Item	Pay Unit
Coir Fiber Mat	Square Yard

STREAMBANK REFORESTATION:

Description

Streambank Reforestation will be planted in areas designated on the plans and as directed. See the Streambank Reforestation Detail Sheets.

The entire *Streambank Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

Materials

Item	**Section**
Coir Fiber Mat	1060-14

Live Stakes:

Type I Streambank Reforestation shall be live stakes, planted along both streambanks. Live stakes shall be ½"- 2" in diameter. Stakes shall also be 2 ft. - 3 ft. in length.

Live staking plant material shall consist of a random mix made up of 50% Black Willow (*Salix nigra*) and 50% Silky Dogwood (*Cornus amomum*). Other species may be substituted upon approval of the Engineer. All plant material shall be harvested locally (within the same physiographic ecoregion and plant hardiness zone) or purchased from a local nursery, with the approval of the Engineer. All live stakes shall be dormant at time of acquisition and planting.

Staples, stakes, or reinforcement bars shall be used as anchors and shall meet the following requirements:

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Bare Root Seedlings:

Type II Streambank Reforestation shall be bare root seedlings 12"-18" tall.

Construction Methods

Coir fiber matting shall be installed on the streambanks where live staking is to be planted as shown on the Streambank Reforestation Detail Sheets and in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat.

Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the matting with the soil. Place the matting immediately upon final grading and permanent seeding. Take care to preserve the required line, grade, and cross section of the area covered.

Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Bury the top slope end of each piece of matting in a narrow trench at least 6" deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6" overlap. Construct check trenches at least 12" deep every 50 ft. longitudinally along the edges of the matting, or as directed. Fold over and bury matting to the full depth of the trench, close and tamp firmly. Overlap matting at least 6" where 2 or more widths of matting are installed side by side.

Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the Streambank Reforestation Detail Sheets and as directed. Place anchors across the matting at ends, junctions, and check trenches approximately 1 ft. apart. Place anchors down the center of each strip of matting 3 ft. apart. Place anchors along all lapped edges 1 ft. apart. Refer to the Streambank Reforestation Detail Sheets for anchoring pattern. The Engineer may require adjustments in the trenching or anchoring requirements to fit individual site conditions.

During preparation of the live stakes, the basal ends shall be cleanly cut at an angle to facilitate easy insertion into the soil, while the tops shall be cut square or blunt for tamping. All limbs shall be removed from the sides of the live cutting prior to installation.

Live stakes shall be installed within 48 hours of cutting. Outside storage locations should be continually shaded and protected from wind and direct sunlight. Live cut plant material shall remain moist at all times before planting.

Stakes shall be spaced approximately 4 ft. on center. Live stakes shall be installed according to the configuration presented on the Streambank Reforestation Detail Sheets.

Tamp live stakes perpendicularly into the finished bank slope with a dead blow hammer, with buds oriented in an upward direction. Stakes should be tamped until approximately ¾ of the stake length is within the ground. The area around each live stake shall be compacted by foot after the live stake has been installed.

1"- 2" shall be cut cleanly off of the top of each live stake with loppers at an angle of approximately 15 degrees following installation. Any stakes that are split or damaged during installation shall be removed and replaced.

The bare root seedlings shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted from top of bank out, along both sides of the stream, as designated on the plans.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: Streambank reforestation shall be planted from November 15 through March 15.

Measurement and Payment

Streambank Reforestation will be measured and paid for as the actual number of acres of land measured along the surface of the ground, which has been acceptably planted in accordance with this section.

Payment will be made under:

Pay Item	Pay Unit
Streambank Reforestation	Acre

CONCRETE WASHOUT STRUCTURE:
(12-10-20)

Description

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete wash water.

Materials

Item	Section
Temporary Silt Fence	1605

Safety Fence shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil think geomembrane. If the minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Construction Methods

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.

Post a sign with the words "Concrete Washout" in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructuredetail.pdf

Alternate details for accommodating concrete washout may be submitted for review and approval.

The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Maintenance and Removal

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

Measurement and Payment

Concrete Washout Structure will be paid for per each enclosure installed in accordance with the details. If alternate details or commercially available devices are approved, then those devices will also be paid for per each approved and installed device.

Temporary Silt Fence will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

Safety Fence shall be measured and paid for as provided elsewhere in this contract.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
Concrete Washout Structure	Each

FABRIC INSERT INLET PROTECTION DEVICE (HIGH FLOW)
(6-29-17)
Description

This work shall consist of installing, maintaining, and removing *Fabric Insert Inlet Protection Device*, of the type specified, in inlet structures (catch basins, drop inlets, etc) in areas where asphalt or concrete may prevent the proper installation of a Rock Inlet Sediment Traps Type C, or as directed.

Materials

The product shall be a fabric inlet protection device composed of a fitted woven polypropylene geotextile double sewn with nylon thread suspended sack. The *Fabric Insert Inlet Protection Device* shall be manufactured to fit the opening of the catch basin or drop inlet or shall have a deflector to direct runoff from the curb opening into the fabric sack. The *Fabric Insert Inlet Protection Device* shall have a rigid frame or support system to support the loaded weight of the product. The product shall have lifting loops for removing the device from the basin and will have dump straps attached at the bottom to facilitate the emptying of the device. The *Fabric Insert Inlet Protection Device* shall have an overflow system to allow stormwater to enter the inlet structure and avoid ponding on the roadway when the device reaches capacity

The stitching shall meet the following physical properties:

Physical	Test Method	English
Average Wide Width Strength	ASTM D-4884	165 lb/in

The fitted filter assembly shall have the following physical properties:

Physical	Test Method	English
Grab Tensile	ASTM D-4632	255 x 275 lbs
Minimum Puncture Strength	ASTM D-4833	125 lbs
Mullen Burst	ASTM D-3786	420 PSI
Minimum UV Resistance	ASTM D-4355	70 %.
Flow Rate	ASTM D-4491	200 gal/min/ft^2
Apparent Opening	ASTM D-4751	20 US Sieve
Permittivity	ASTM D-4491	1.5 sec^{-1}

Construction Methods

Strictly comply with manufacturer's installation instructions and recommendations. Maintenance shall include regular daily inspections and after each qualifying rain event. The *Fabric Insert Inlet Protection Device* shall be emptied, cleaned and placed back into the basin when it reaches 50% capacity or as directed.

Measurement and Payment

This work will be paid for at the contract unit price per *Fabric Insert Inlet Protection Device* of the type specified, complete in place and accepted. Such payment shall be full compensation for furnishing and installing the *Fabric Insert Inlet Protection Device* in accordance with this specification and for all required maintenance.

Maintenance of the device, cleanout and disposal of accumulated sediments shall be paid for by *Fabric Insert Inlet Protection Device Cleanout*.

Payment will be made under:

Pay Item	**Pay Unit**
Fabric Insert Inlet Protection Device	Each
Fabric Insert Inlet Protection Device Cleanout	Each

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NORTH CAROLINA PROFESSIONAL
DocuSigned by:
Joy Saddler
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JOY M. SADDLER
9/30/2021

SPECIAL PROVISION FOR PIPE REHABILITATION.

I. DESCRIPTION

This work shall consist of the rehabilitation of existing storm water pipes, or culverts by the method or methods specified at the designated locations described in the Contract.

Pipe liner systems used for rehabilitation shall be from the NCDOT Approved Products List and may be subject to limitations for use as specified herein, by site-specific limitations for those locations listed in the Contract, or limitations as shown on the NCDOT Approved Products List for the specific liner system. The Contractor shall consult the Contract to determine the method or methods that are permitted at each rehabilitation location.

Liners provided per this special provisions shall be designed per the *NCDOT Manual for Pipe Rehabilitation*.

The Contractor shall provide contract submittals as called for herein to the Engineer a minimum of 10 days prior to start of installation.

Designated Locations and Allowable Methods

Site	Latitude (decimal degrees)	Longitude (decimal degrees)	County	Route	Allowable Liner Categories	Notes
1	35°43'58.1"N	83°01'26.7"W	Haywood	I-40	A	54” CIPP

II. MATERIALS

Category A - Cured-In-Place Pipe (CIPP) liners are lining an existing culvert by either pulling or inverting a resin-impregnated fabric tube and curing the tube in place. When CIPP liners are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must list cure method (e.g., UV, steam, hot water, etc.).
- Must list typical, minimum, maximum application thicknesses.
- Calculated minimum thickness of liner
- Designation of air or water inversion or pull-in-place method
- Maximum allowable pulling force

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- Site specific cure time
- Minimum pressure to hold liner tight against the host pipe
- Maximum pressure to ensure liner does not sustain damage
- Maximum and minimum cure temperatures
- Ambient temperature range allowable during installation
- Post cure temperature
- Temperature cure profile.
- Sample of temperature and pressure log to be used for monitoring the curing process
- Certification on manufacturer's letterhead indicating that the contractor is approved by the fabric tube and resin manufacturer to perform CIPP installation work.
- Manufacturer moisture limitations (e.g. installation in the dry, humidity restrictions, etc.).
- Material safety data sheets for all hazardous chemicals that will be used on the job site including resin, catalyst, cleaners, and repair agents. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as approved by the Engineer:
    - ASTM D5813
    - ASTM F1216 for inverted CIPP
    - ASTM F1743 for pulled-in-place CIPP
    - ASTM F2019 for pulled-in-place GRP CIPP
    - ASTM F2599 for sectional inverted CIPP (applies to pipe sections, not full length)

- Long Term Modulus of Elasticity for calculations = 150,000 psi. NCDOT Type 2 or Type 5 certifications may be submitted by vendors or contractors for proof of alternate Long Term Modulus of Elasticity extrapolated from ASTM D2990, 10000-hour test. Design value of Long Term Modulus of Elasticity may be no greater than 50% of Initial Modulus of Elasticity. Tested value must be greater than or equal to value used in design equations.

- Initial Modulus of Elasticity for calculations = 300,000 psi. NCDOT Type 2 or Type 5 certifications may be submitted by vendors or contractors for proof of alternate Initial Modulus of Elasticity based on ASTM D790. Tested value must be greater than or equal to value used in design equations.

- Long Term Flexural Strength = 2250 psi. NCDOT Type 2 or Type 5 certifications may be submitted by vendors or contractors for proof of alternate Long Term Flexural Strength extrapolated from ASTM D2990, 10000-hour test. Tested value must be greater than or equal to value used in design equations.

When **Category B Fold and Form flexible liners** are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must list type of reforming method (steam, hot water, etc.).
- Certification on manufacturer's letterhead indicating that the contractor is approved by the manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Calculated minimum thickness of liner.

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- Maximum allowable pulling force
- Site specific reforming & cooling time
- Minimum pressure to hold liner tight against the host pipe
- Maximum pressure to ensure liner does not sustain damage
- Maximum and minimum forming temperatures
- Ambient temperature range for installation.
- Sample of temperature and pressure log to be used for monitoring the curing process.
- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as approved by the Engineer:
    - ASTM D1784 defines PVC cell class referenced below
    - ASTM F1504 for PVC cell classification 12334 or 13223
    - ASTM F1533 for polyethylene
    - ASTM F714 for polyethylene min. cell classification 335420 and 2-4% carbon black
    - ASTM F1606 for deformed polyethylene
    - ASTM F1947 for folded PVC
- Methods & pipe classification not permitted for use due to low pipe strength:
    - ASTM F1867 for folded / formed PVC Type A
    - ASTM F1871 for PVC Type A cell classification 12111

- NCDOT Type 2 or Type 5 certifications must be submitted by vendors or contractors for proof of Long Term Modulus of Elasticity, 50-year sustained loading value, if the following values are not used in design calculations: 22,000 psi shall be used for HDPE, PE, PP; and 140,000 psi shall be used for PVC; per AASHTO LRFD Bridge Design Specifications 8th ed., Table 12.12.3.3-1.

When **Category C HDPE, PE, PVC, PP, solid wall slip liners** are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must be closed profile; i.e. no definable bell and spigot that protrudes from the outer wall of the pipe.
- Certification on manufacturer's letterhead indicating that the contractor is approved by the manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Calculated minimum thickness of liner.
- Maximum allowable pulling and/or pushing force
- Grouting mix design and manufacturer recommendations
- Installation procedures and recommendations.
- Must provide inside diameter and outside diameter of pipe.

- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as approved by the Engineer:
    - ASTM D1784 defines PVC cell class referenced below
    - ASTM D3350 defines PE cell class referenced below
    - ASTM F714 for solid wall polyethylene min cell classification 345464 and 2–4% carbon black
    - AASHTO M326 for solid wall polyethylene

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- ASTM D3034 for solid wall PVC, min. cell classification 12454
- ASTM F679 for solid wall PVC, large diameter, min. cell classification 12454
- ASTM D2241 for solid wall PVC, min. cell classification 12454
- ASTM F585 for polyethylene slip-line
- ASTM F2620 for polyethylene heat fusion joining

- NCDOT Type 2 or Type 5 certifications must be submitted by vendors or contractors for proof of Long Term Modulus of Elasticity, 50-year sustained loading value, if the following values are not used in design calculations: 22,000 psi shall be used for HDPE, PE, PP; and 140,000 psi shall be used for PVC; per AASHTO LRFD Bridge Design Specifications 8th ed., Table 12.12.3.3-1.

When **Category D HDPE, PVC, PP corrugated, profile wall, steel reinforced, or spiral wound slip liners** are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Certification on manufacturer's letterhead indicating that the contractor is approved by the manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Calculated minimum thickness of liner.
- Maximum allowable pulling and/or pushing force
- Grouting mix design and manufacturer recommendations
- Installation procedures and recommendations.

- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as determined by the Engineer:
  - ASTM D1784 defines PVC cell class referenced below
  - AASHTO M294 for polyethylene profile wall (See NCDOT Standard Specifications 1032-7)
  - ASTM F894 for profile polyethylene
  - ASTM F2562 or F2435 for steel reinforced polyethylene min. cell classification 334452 and 2-4% carbon black
  - AASHTO M304 for profile PVC (see NCDOT Standard Specifications 1032-8)
  - ASTM F1803 for closed profile PVC
  - ASTM F949 and F794 for corrugated PVC min cell classification 12454
  - AASHTO M330 for corrugated polypropylene
  - AASHTO MP20-13 for steel reinforced polyethylene ribbed
  - ASTM F1735 PVC for profile strip / spiral wound, min. cell classification 12454
    - Steel Reinforced – Resin conforms to ASTM D3350, min. cell classification 335420 and 2-4% carbon black. Steel fully encapsulated.
  - ASTM F1697 PVC for profile strip / machine spiral wound, min. cell classification 13354 (for Type A) or 12344 (for Type B) or higher, as defined in Specification D1784.
    - Steel Reinforced – Resin conforms to ASTM D3350, min. cell classification 335420 and 2-4% carbon black. Steel fully encapsulated.
  - ASTM F585 for polyethylene slip-line
  - ASTM F1698 for PVC spiral wound
  - ASTM F1741 for PVC machine spiral wound

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- NCDOT Type 2 or Type 5 certifications must be submitted by vendors or contractors for proof of Long Term Modulus of Elasticity, 50-year sustained loading value, if the following values are not used in design calculations: 22,000 psi shall be used for HDPE, PE, PP; and 140,000 psi shall be used for PVC; per AASHTO LRFD Bridge Design Specifications 8th ed., Table 12.12.3.3-1.

Category E - Spray-on liners consist of conduit lining with spray applied, factory blended cementitious, geopolymer, or other material. The liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must list liner material type.
- Must list typical, minimum, maximum application thicknesses.
- Must include documentation of specification or standard practice for installation.
- Minimum thickness of liner from design calculations.
- Manufacturer moisture limitations (e.g. installation in the dry, humidity restrictions, etc.).
- Certification on manufacturer's letterhead indicating that the contractor is approved by manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Site specific cure time
- Must provide volume (cubic yards or cubic feet) of liner material planned for use in each host pipe. For example, cubic yards of dry, unmixed cementitious liner material. This must match the value provided by design calculations.
- Ambient temperature range during installation.
- Other submittals as appropriate for the type of spray-on liner, as determined by the Engineer.

- Minimum thickness for cementitious or geopolymer liner material is 1 inch (clear of corrugations and / or bolt heads).

- For cementitious or geopolymer liners, submit to the Engineer NCDOT Type 2 or Type 5 certifications for the categories below, and a letter of certification from the manufacturer that states the material to be used conforms to manufacturer specifications. Actual properties must meet or exceed the values used in structural calculations when field tested.

Property	Test Method	Duration	Provide Value
Compressive Strength	AASHTO T106	3 Day	psi
		28 Days	psi
Flexural Strength	ASTM C 293	7 Days	psi
		28 Days	psi
Modulus of Elasticity	ASTM C 469	28 Days	psi
Tensile Strength	ASTM C 496	---	psi
Bond Strength	ASTM C 882	28 Days	psi

- For onsite or offsite Ready Mix or Project Produced cementitious or geopolymer liners (i.e. not “bag mixes” produced by a manufacturer), submit a mix design to the Engineer for approval.

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- One of the following two submittal sets shall be required depending on whether the liner exhibits Rigid Pipe or Flexible Pipe behavior:

    - Liners which exhibit Rigid Pipe behavior, such as Cementitious or geopolymer liners, shall be treated as non-reinforced concrete pipe. Rigid Pipe behavior is characterized by cracking when subjected to 2% or greater deflection.

        - Provide NCDOT Type 2 or Type 5 certifications of allowable D-Load of proposed liner assuming fully deteriorated host pipe condition in accordance with ASTM C497 three edge bearing test for non-reinforced pipe.

            - The D-Load documentation submitted must be for test specimens that are less than or equal to the proposed liner thickness, equal to host pipe inside diameter and shape, and greater than or equal to host pipe ovality in the case of a deformed host pipe.

            - If manufacturer's ASTM C497 test is conducted on a smooth wall host form (such as a cardboard or plastic sonotube), and the proposed liner is to be installed in a host pipe with internal corrugations or bolt heads, only the liner thickness clear of the corrugations or bolt heads may be considered as structural.

    - Liners which exhibit Flexible Pipe behavior (can withstand greater than 2% deflection without structural damage) shall be treated as Thermoplastic Pipe. Cementitious and geopolymer liners are not eligible for this method:

        - Long Term Modulus of Elasticity, 50-year sustained loading value shall be used. Vendor or contractor must provide value used in calculations. It shall be estimated by using 50% of the Initial Modulus of Elasticity value provided by ASTM D790. Provide NCDOT Type 2 or Type 5 certifications for value used in calculations.

        - Tensile Strength 50-year sustained loading value (Fu) shall be used. Vendor or contractor must provide value used in calculations. It shall be estimated by using 50% of the Initial Tensile Strength value provided by ASTM D638. Provide NCDOT Type 2 or Type 5 certifications for value used in calculations.

Category F - Smooth-wall steel pipe liner rehabilitation materials shall conform to 1032-5 of the Standard Specifications, except as altered herein.

Grade B pipe shall be used with minimum wall thicknesses as listed in the *NCDOT Manual for Pipe Rehabilitation*.

The Contractor shall submit the folllowing items to the Engineer:

- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Grouting mix design and manufacturer recommendations.

III. CONSTRUCTION

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Pre-Installation Inspection – The Contractor shall perform a pre-installation video inspection of pipe using NASSCO certified personnel. The camera shall be situated at the centerline of the pipe, and shall be mounted on a rubber tired or tracked pipe rover that allows for a 360-degree inspection. Inspection equipment shall be capable of measuring protrusions and obstructions of ½ inch or greater. Provide a pipe profile, on which deflections that may affect the installation of the liner are located and noted. The inspection shall be performed in the presence of the Engineer, unless waived by the Engineer. Dewater the host pipe to the satisfaction of the Engineer, and in accordance with NCDOT Best Management Practices for Construction and Maintenance Activities. A thorough culvert inspection is required to determine the number of existing “pipe to pipe” connections and the extent, if any, of obstruction removal and voids. The inspection shall be performed by experienced personnel trained in locating breaks, obstacles, voids and service connections. Video inspections shall be clearly labeled on the media with the time, date, and location of the pipe inspected. A copy of the video inspection shall be furnished to the Engineer at least 10 days prior to the start of rehabilitative construction. In the event the Contractor’s inspection shows the method of rehabilitation the Contractor has selected is no longer viable at that location as verified by the Engineer, the Contractor shall select another allowable method, if specified, from those designated in the Contract.

Pipe Clean-out - The Contractor shall clear the existing pipe(s) designated for rehabilitation of any debris, sediment, protrusions greater than ½ inch in height, and any other potential obstructions prior to the start of rehabilitation efforts. The Contractor shall then thoroughly clean and prepare the host pipe prior to the liner installation. Cleaning shall conform to the recommendations of the liner manufacturer, and any additional requirements of this special provision. In the absence of manufacturer recommendations, the Contractor shall submit his/her proposed method for cleaning and preparing the host pipe for the Engineer’s review and acceptance at least 10 working days prior to beginning the work at that location.

Grouting Host Pipe - The Contractor shall perform grouting work described in the contract, prior to pipe liner installation to correct existing deficiencies, such as voids.

Inlet & Outlet Sealing – All pipe liner installations shall be sealed to the host pipe at the terminal ends of the liner to prevent flow between the liner and host pipe.

De-Watering – All pipe liners and grout shall be installed in dry conditions. The Contractor shall de-water by diverting, pumping, or bypassing any water flow through an existing pipe or drainage system prior to and during the lining process. The method of de-watering is to be determined by the contractor but must be approved by the Engineer prior to implementing.

Disposal Plan – The Contractor shall submit a Disposal Plan to the Engineer a minimum of 10 days prior to installation. The Disposal Plan shall indicate how by-products and waste are to be contained, captured, transported offsite, and disposed of in accordance with project permits and local, state and federal regulations. It shall be the Contractor’s responsibility to report and take appropriate corrective actions to remediate any water quality alteration resulting from lining operations in accordance with project permits and applicable local, state or federal regulations. The cost for such remediation shall be at the Contractor’s expense.

Category A – Cured-In-Place Pipe liner method. The Cured-In-Place Pipe liner system shall be fabricated and installed in such a manner as to result in a maintained full contact tight fit to the internal

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circumference of the host pipe for its entire length. The installation shall adhere to the cure times and temperatures stipulated in the manufacturer's recommended installation and cure specifications and the finished product shall be free of de-lamination, bubbling, rippling or other signs of installation failure.

Install per specification or standard practice for installation (ASTM F1216 inverted CIPP, or F1743 pulled-in-place CIPP, or F2019 pulled-in-place GRP CIPP, or F2599 sectional inverted CIPP for example).

Pulled-in-place liner installation must be accomplished without significant liner twisting, or stretching the liner greater than 1% of its original length during installation. At no time shall the pulling force, as measured by a contractor-provided dynamometer or load cell, exceed that established by the liner manufacturer. For liner lengths greater than 100 feet, protect the pipe liner end using a device that uniformly distributes the applied load around the perimeter of the liner.

Curing for styrene-based, epoxy-based, and vinyl ester-based CIPP may be accomplished by water, steam or ultraviolet light and shall be in accordance with the liner manufacturer's recommendations.

Installation and curing requirements of pipe sections shall be in accordance with the manufacturer's recommendations for the specific product, as applicable. The Contractor shall furnish installation and curing requirements for the various flexible liners including individual components of the system, tube type (reinforced or non-reinforced), manufacturer name and type of resin including catalyst, volume of resin required to achieve proper impregnation and curing. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers and expiration dates.

The Contractor shall place an impermeable barrier immediately upstream and downstream of the host pipe, prior to liner insertion, to capture any possible raw resin spillage during installation and shall dispose of any materials in accordance with the submitted disposal plan.

Where the pulled-in-place method of installation is used, the Contractor shall install a semi-rigid plastic slip sheet over any interior portions of the host pipe that could tear the outer film or over any significant voids in the host pipe.

Reconnect the existing storm drain lateral connections immediately after the liner has been cured in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes.

The Contractor shall monitor temperature via a minimum of three thermocouples on the outer surface (interface between the host pipe and liner) of the liner (one each at the upstream and downstream ends and one approximately mid-length of the host pipe). The Contractor shall monitor pressure during inversion and curing, and maintain pressure between minimum and maximum allowable pressures as provided by the manufacturer. The Contractor shall automatically log cure time-temperature and time-pressure data at 30 second intervals with a data logger and provide such information in a format acceptable to the Engineer.

Submit the tape and log of recorded temperatures and pressure to the Engineer within 48 hours after completing the resin-curing process.

The Contractor shall thoroughly rinse the cured lined pipe with clean water prior to re-introducing flow. The Contractor shall capture all cure water and/or steam condensate and rinse water and dispose of, in accordance with the submitted disposal plan.

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Within 21 days of completing the resin curing at a given culvert location, submit the test results from a ISO 17025 lab suitable to the Engineer. The report must be signed by a representative of the independent testing lab. The report must include:

- Flexural strength and flexural modulus test results for field samples.
- Thickness measurements for the liner using prepared core samples.
- Description of the defects in the tested samples in terms of the effect on CIPP performance.

Make cured samples from the identical materials (tube, resin and catalyst) to be used for the CIPP. Identify each sample by date, contract number, drainage system number of the corresponding culvert, thickness, name of resin, and name of catalyst.
The samples must be 6 by 16 inches in size: Comply with the following sampling procedures unless UV cured:

- Place 3 aluminum-plate clamped molds, each containing a flat plate sample, inside the downtube when heated circulated water is used, and in the silencer when steam is used during the resin curing period
- Seal each flat plate sample in a heavy-duty plastic envelope inside the mold
- Remove the 3 cured flat plate samples after draining all of the moisture from the cured CIPP

If UV cured, comply with field sampling procedures under ASTM F2019, Section 7: Recommended Inspection Practices.

Test the samples for flexural properties under ASTM D790, ASTM D5813, ASTM F1216, ASTM F1743, or ASTM F2019. Verify that physical properties of the field samples comply with the minimum values under:

- ASTM F1216, Table 1 (modified values), for heat cured polyester, vinyl ester, and epoxy resins. The flexural strength must be at least 5,000 psi. The flexural modulus must be at least 300,000 psi.
- ASTM F2019, Table 1, for UV cured CIPP. The flexural strength must be at least 6,500 psi. The flexural modulus must be at least 725,000 psi. Comply with sampling and testing procedures under ASTM F2019, Section 7: Recommended Inspection Practices.

Take core samples in the presence of the Engineer. Comply with the following core sample requirements:

- Take 2 samples. Take the samples at least 1 foot from each end of the culvert at a location near the top of the culvert. Samples must be at least 2 inches in diameter.
- If culvert material is corrugated metal, obtain samples at the corrugation crests.

Prepare the core samples by separating the CIPP material from the culvert material. If heat cured, remove the film from the inner lining or preliner. If UV cured, remove the film from the inner and outer foil. Measure the thickness of the liner at 3 spots on each sample. If the culvert material is corrugated metal, measure the thickness at 3 spots that are along a line corresponding to the corrugation crests. Calculate the thickness as an average of at least 6 measurements.

If UV cured, comply with sampling and testing procedures under ASTM F2019, Section 7: Recommended Inspection Practices. If the culvert material is corrugated metal, measure the thickness at 3 spots that are along a line corresponding to the corrugation crests. Calculate the thickness as an average of at least 6 measurements.

All voids from core samples are to be filled with Type 1 epoxy resin as specified in NCDOT Standard Specifications for Roads and Structures, Section 1081.

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CIPP may be rejected if any of:

- Actual temperature and curing time and schedule do not comply with those shown in the authorized work plan
- Pressure deviates more than 1 psi from the required pressure
- At any time during installation the manufacturer's required minimum cool-down time or maximum cool-down rate is violated
- There are defects including:
    - Concentrated ridges, including folds and wrinkles exceeding 8 percent of the CIPP diameter
    - Dry spots
    - Lifts
    - Holes
    - Tears
    - Soft spots
    - Blisters or bubbles
    - Delaminations
    - Gaps in the length of the CIPP
    - Gaps or a loose fit between the exterior of the CIPP and the culvert
- Test results indicate one of the following:
    - If heat cured, 2 of the 3 flat plate samples do not have any of the following:
        - the specified modulus of elasticity
        - the specified flexural strength
        - either the specified modulus of elasticity or the specified flexural strength
    - If UV cured, 2 of the 3 cured samples do not have any of the following:
        - the specified modulus of elasticity
        - the specified flexural strength
        - either the specified modulus of elasticity or the specified flexural strength
- The liner thickness is less than the greater of either one of the following:
    - Specified thickness
    - Calculated minimum thickness shown in your authorized work plan
- Materials and installation methods are not those shown in your authorized installation plan
- Defects are excessive or unrepairable
- CIPP is not continuous or does not fit tightly for the full length of the culvert

If UV cured, and post installation inspections reveal signs of incomplete curing (dripping resin, etc), contractor will trim liner obscuring uncured liner, re-wet, and re-cure with UV.

Category B - Fold and form flexible liners shall be installed per specification or standard practice for installation (ASTM F1606 deformed polyethylene, ASTM F1867 folded/formed PVC Type A, or ASTM F1947 folded PVC, for example).

The liner system shall be fabricated and installed in such a manner as to result in a maintained full contact tight fit to the internal circumference of the host pipe for its entire length. The installation shall adhere to the reforming pressures and temperatures stipulated in the manufacturer’s recommended installation specifications and the finished product shall be free of bubbling, rippling or other signs of installation failure.

Installation and reforming requirements of pipe sections shall be in accordance with the manufacturer recommendations for the specific product as applicable. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers. The Contractor shall submit documentation from the manufacturer to verify compliance with the requirements of this paragraph as well as installation recommendations to the Engineer.

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Reconnect the existing storm drain lateral connections immediately after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes.

The Contractor shall monitor temperature via a minimum of three thermocouples on the outer surface (interface between host pipe and liner) of the liner (one each at the upstream and downstream ends and one approximately mid-length of the host pipe). The Contractor shall automatically log cure time-temperature and time-pressure data at 30 second intervals with a data logger and provide such information in a format acceptable to the Engineer.

Submit the tape and log of recorded temperatures to the Engineer within 48 hours after completing the lining process. Submit the recorded pressure to the Engineer within 48 hours after completing the lining process.

Liner may be rejected if any of:

- Actual temperature and curing time and schedule do not comply with those shown in the authorized work plan
- Pressure deviates more than 1 psi from the required pressure
- There are defects including:
    - Concentrated ridges, including folds and wrinkles exceeding 8 percent of the liner diameter
    - Lifts
    - Holes
    - Tears
    - Soft spots
    - Blisters or bubbles
    - Gaps in the length of the liner
    - Gaps or a loose fit between the exterior of the liner and the culvert
- The liner thickness is less than the greater of either one of the following:
    - Specified thickness
    - Calculated minimum thickness shown in your authorized work plan
- Materials and installation methods are not those shown in installation plan
- Defects are excessive or unrepairable
- Liner is not continuous or does not fit tightly for the full length of the culvert

Category C – HDPE, PE, PVC, or PP solid wall slip liner shall be installed per specification or standard practice for installation (ASTM F585 polyethylene slip-line, ASTM F2620 polyethylene heat fusion joining, for example).

Installation requirements of pipe sections shall be according the manufacturer recommendations for the specific product as applicable. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers.

Before lining, pull or push a mandrel through the existing pipe or perform laser survey to verify liner clearance. The liner must be positioned and secured to facilitate its complete encapsulation by grout. Follow the Manufacturer's recommendations for handling and assembling the pipe, and all provisions included in the design calculations. Reconnect the existing storm drain lateral connections immediately after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes. Prior to filling the annular space, connect and seal all laterals between the new liner pipe and the existing lateral.

Grout the entire annular space with non-shrink grout or an expansive admixture approved by the Manufacturer for use with the liner system. In the absence of Manufacturer recommendations for grout,

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refer to Section 1003 of Standard Specifications. Provide a minimum annular space of 1 inch for grouting between the new and existing pipes. Provide details on how to hold the liner pipe to line and grade until the grout has set. Ensure the maximum pressure developed by the grout does not exceed the manufacturer's recommendation for the maximum allowable external pressure for the liner pipe. If the volume of the grout used is less than the anticipated (calculated) volume, or an inspection of the relined culvert indicates that there are voids in the annular space, the Contractor must provide the Engineer with a plan to rehabilitate all identified voids. Depending on the location and size of the voids, additional grouting may be required in these areas. This may be accomplished by re-grouting in those areas from within the culvert. The voids must be filled to the satisfaction of the Engineer at no additional cost. Grouting is included with the cost of pipe liner installation.

Lining with HDPE or PP: Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. Perform all butt fusion, welding and extrusion welding of pipe in accordance with the Manufacturer's recommendation. Based on existence of alignment breaks or pinch points in the host pipe, all joints shall be butt fusion welded, or extrusion welded unless alternate joining methods are approved by the Engineer, in which case limit joint separations to less than ½ inch between adjoining sections.

Lining with Polyvinyl Chloride Pipe: Reline with a PVC Pipe with integral bell and spigot joints. Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. The submittals must address the following PVC specific issues: Will the PVC liner will be pulled or pushed through the culvert, along with the type of pushing or pulling ring/plate to be used? Will a nose cone or different device be used in the process? How will the jacking, pulling or pushing loads on the liner be monitored in order to conform to Manufacturer's specifications and guidelines?

Category D - HDPE, PVC, or PP corrugated, profile, or spiral wound slip liner shall be installed per specification or standard practice for installation (ASTM F585 polyethylene slip-line, ASTM F1698 PVC spiral wound, ASTM F1741 PVC machine spiral wound, for example).

Installation requirements of pipe sections shall be according the manufacturer recommendations for the specific product as applicable. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers.

Before lining, pull or push a mandrel through the existing pipe to verify liner clearance. The liner must be positioned and secured to facilitate its complete encapsulation by grout. Follow the Manufacturer's recommendations for handling and assembling the pipe, and all provisions included in the design calculations. Immediately reconnect the existing storm drain lateral connections after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes. Prior to filling the annular space, connect and seal all laterals between the new liner pipe and the existing lateral.

Grout the entire annular space with non-shrink grout approved by the Manufacturer for use with the liner system. In the absence of Manufacturer recommendations for grout, refer to Section 1003 of Standard Specifications. Provide a minimum annular space of 1 inch around the circumference for grouting between the new and existing pipes. (Spiral Wound liner that is designed to fit tightly to the interior wall of the host pipe is not subject to the 1 inch annular space and grouting.) Provide details on how to hold the liner pipe to line and grade until the grout has set. Ensure the maximum pressure developed by the grout does not exceed the manufacturer's recommendation for the maximum allowable external pressure for the liner pipe. If the volume of the grout used is less than the anticipated (calculated) volume, or an inspection of the relined culvert indicates that there are voids in the annular space, the Contractor must

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provide the Engineer with a plan to rehabilitate all identified voids. Depending on the location and size of the voids, additional grouting may be required in these areas. This may be accomplished by re-grouting in those areas from within the culvert. The voids must be filled to the satisfaction of the Engineer at no additional cost. Grouting is included with the cost of pipe liner installation.

Lining with HDPE or PP (does not apply to spiral-wound): Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. Perform all butt fusion, welding and extrusion welding of pipe in accordance with the Manufacturer's recommendation. Based on existence of alignment breaks or pinch points in the host pipe, all joints shall be butt fusion welded, or extrusion welded unless alternate joining methods are approved by the Engineer, in which case limit joint separations to less than ½ inch between adjoining sections.

Lining with Polyvinyl Chloride Pipe (does not apply to spiral-wound): Reline with a PVC Pipe with integral bell and spigot joints. Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. The submittals for this item provided for Department approval shall also address the following PVC specific issues prior to any work approval is granted: Will the PVC liner will be pulled or pushed through the culvert, along with the type of pushing or pulling ring/plate to be used? Will a nose cone or different device be used in the process? How will the jacking, pulling or pushing loads on the liner be monitored in order to conform to Manufacturer's specifications and guidelines?

Category E - Spray-On cementitious, geopolymer, or other materials shall be installed in accordance with the liner material manufacturer's recommendations. For spray-on cementitious, geopolymer, or other liner systems, the following requirements shall apply:

Control the temperature and humidity in the host pipe according to the manufacturer's recommendation, including stopping air drafts through the pipe. Measure and record the temperature and humidity. The Contractor shall automatically log cure time-humidity and time-temperature data at 30 minute intervals with a data logger and provide such information in a format acceptable to the Engineer.

Patch and fill voids, holes, and gaps in the host pipe with an approved hydraulic cement or the same cementitious or geopolymer based material to be used for the liner to provide a solid continuous surface on which to spray. Stop water infiltration into the host pipe by applying dry hydraulic cement, or other methods approved by the Engineer. Prepare lateral connections to the host pipe according to the manufacturer's recommendations. Record the batch or lot number from the containers used each day.

To achieve bonding to the host pipe: Before placing liner, remove all coatings, corrosion, and other surface material until only base steel (or other host pipe material) is exposed by sandblasting the portion of the culvert to be coated. Where human access is limited, you must substitute sandblasting with mechanical scraping tools, water-jetting and a swab. Ensure cleaning methods will not affect chemical properties of liner, or adhesion of liner.

Application of liner material must be uninterrupted and continuous. Use a machine approved by the manufacturer, and capable of projecting liner material against the culvert wall without rebound and at a velocity sufficient to cause liner material to pack densely and adhere in place. Obtain authorization from the Engineer for placing liner material by hand to fill gaps left by dewatering pipe during the time period after application before fully cured, while material may be added.

The machine operator must continuously monitor the application of cementitious material.

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The travel of the projecting machine and the discharge rate of liner material must be entirely mechanically controlled and must produce a uniform thickness of liner material without segregation around the perimeter and along the culvert length. The pipeliner must be free of sand pockets or visible lack of homogeneity.

Contractor must submit an installation plan to the Engineer which details the number of passes, sled travel speed, and installation parameters relevant to the work.

Remove splatter and the accumulation of other undesirable substances along the culvert invert.

Obtain authorization from the Engineer for placing liner material by hand methods at sharp bends and special locations where machine placement is impracticable.

Provide a smooth finished surface texture.

After placement, the lining must be the greater of 1 inch thick (cementitious or geopolymer), or calculated thickness. For corrugated pipe, the thickness must be measured over the top of the corrugation crests. For host pipe with protruding bolt heads, the thickness must be measured over the top of the bolt heads. The tolerance for the pipe liner's thickness is plus 0.12 inch with no minus tolerance.

Depth gauges shall be installed in the soffit (12 o’clock position) of the host pipe every 10 feet along the length to allow determination of liner thickness. Depth gauges shall protrude from the host pipe wall a distance equivalent to the final surface of the liner, and shall remain in place permanently. Depth gauges shall be metal screws or rods with the shaft not greater than 3/16” diameter.

During the time period after application before fully cured, while material may be added, verify the applied thickness at least once every 10 feet to the satisfaction of the Engineer. Apply additional material to any areas found to be less than the design thickness.

Ensure the liner is continuous over the entire length of the host pipe and free from defects such as foreign inclusions, holes and cracks no larger than 0.01 inches wide. Ensure the renewed conduit is impervious to infiltration and exfiltration.

Protect walls, surfaces, streambed and plants at the entrance and exit of the host pipe from overspray. The Contractor shall install a temporary curtain at the outlet and inlet to prevent overspray during installation.

The Contractor shall thoroughly rinse the cured pipe with clean water and dispose of it in accordance with the disposal plan.

The Contractor shall reinstate water flow no sooner than recommended by manufacturer or 24 hours following installation, whichever is greater.

For cementitious or geopolymer spray-on liners, the Contractor shall prevent the escape of any rinse water from the lined pipe or otherwise capture it until he/she can either (1) dispose of it in accordance with the submitted disposal plan; or (2) continuously monitor the pH of the rinse water until the pH is less than 9 whereupon it may be released.

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For other liner types, the Contractor shall capture and dispose of the rinse water in accordance with the submitted disposal plan, prior to reinstating flow.

Quality Control for Geopolymer or Cementitious Liner:

The Contractor shall submit NCDOT Type 1 or Type 4 certifications for each lined pipe in accordance with required cementitious liner properties table in the Materials section. Engineer, at his option, may collect concrete mix samples for testing. If the material does not achieve the specified properties listed in the Materials section, the pipe liner may be rejected. Submit a new work plan for the placement of material before replacing the rejected pipeliner.

The Contractor shall take core samples of the liner under direction and in the presence of the Engineer. Core sample diameter shall be at least twice the liner thickness. Repair cored area with liner material. The Department transports core samples to a Materials and Tests Regional Laboratory for testing.

- If there are visible defects in the pipeliner, submit a work plan for repairing the defects. Measure the length of the defect along the centerline of the culvert.
- If the length of the defect is 60 inches long or less, patch defects using the same cementitious material used in the work. Hand methods may be used.
- If the length of the defect is greater than 60 inches long, replace the defective length of the pipeliner for the full diameter of the pipeliner. Replace the defective length using machine methods.

Quality Control for other liner material will be determined per manufacturer recommendations and the Engineer.

Category F – Smooth wall steel pipe liner rehabilitation methods shall conform to Section 330 of the Standard Specifications, except as altered herein. The work shall be rehabilitation by the insertion of a smooth wall steel pipe into a host pipe. Where field welding is required, pipe shall be joined by butt welds in accordance with AWWA C-206. Field welded butt joints shall be complete joint penetration (CJP) and the adjoining members shall be assembled so that the seams in the adjacent pipe sections are offset from each other by at least five (5) times the thickness of the thinner member.

Welding procedures employed for welding shall be qualified by testing or prequalified in accordance with AWS D1.1

Personnel performing field welding operations shall have been tested and qualified by the Department.

The contractor shall provide a Certified Welding Inspector (CWI) on site during all welding and inspection operations to perform the necessary quality control examinations. Non-destructive testing/examination for testing to include visual outlined in the AWWA C-206 shall be provided at the contractor’s expense.

Personnel performing these functions shall be qualified in accordance with AWS QC1 and/or the recommendations of the current edition of ASNT SNT-TC-1A. Radiographic and Hydrostatic testing is not required.

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Before lining, pull or push a mandrel through the existing pipe to verify liner clearance. The liner must be positioned and secured to facilitate its complete encapsulation by grout. Follow the Manufacturer's recommendations for handling and assembling the pipe, and all provisions included in the design calculations. Reconnect the existing storm drain lateral connections after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes. Prior to filling the annular space, connect and seal all laterals between the new liner pipe and the existing lateral.

Grout the entire annular space with non-shrink grout approved by the Manufacturer for use with the liner system. In the absence of Manufacturer recommendations for grout, refer to Section 1003 of Standard Specifications. Provide a minimum annular space of 1 inch for grouting between the new and existing pipes. Provide details on how to hold the liner pipe to line and grade until the grout has set. Ensure the maximum pressure developed by the grout does not exceed the manufacturer's recommendation for the maximum allowable external pressure for the liner pipe. If the volume of the grout used is less than the anticipated (calculated) volume, or an inspection of the relined culvert indicates that there are voids in the annular space, the Contractor must provide the Engineer with a plan to rehabilitate all identified voids. Depending on the location and size of the voids, additional grouting may be required in these areas. This may be accomplished by re-grouting in those areas from within the culvert. The voids must be filled to the satisfaction of the Engineer at no additional cost. Grouting is included with the cost of pipe liner installation.

Post Installation Inspection – In addition to the inspection performed by the Department, the Contractor shall perform two post-installation video inspections using NASSCO certified personnel. The first inspection shall take place between 90 and 100 calendar days after completion of installation for each culvert or system to a single outfall. The second inspection shall take place 30 calendar days prior to the end of the liner warranty period (5 years, secured by construction bond). The camera shall be situated at the centerline of the pipe, and shall be mounted on a rubber tired or tracked pipe rover that allows for a 360-degree inspection. Inspection equipment shall be capable of measuring protrusions and obstructions of ½ inch or greater. The inspection shall be performed in the presence of the Engineer. Dewater the host pipe to the satisfaction of the Engineer. Video inspections shall be clearly labeled on the media with the time, date, and location of the pipe inspected. A copy of the video inspection shall be furnished to the Engineer prior to acceptance of the work.

The finished liner may be rejected if not continuous over its entire length and free from visual defects such as foreign inclusions, joint separation, cracks, insufficient liner thickness, material loss, roughness, deformation, dry spots, pinholes, insufficient bonding to host pipe, delamination, or other material or installation deficiencies as described herein.

Remedies for rejection of liner - In the event the first post inspection of the installation reveals defects in localized areas of the liner pipe (comprising less than 20 percent of the pipe length) the localized defects shall be repaired as specified by the manufacturer. Where defects occur on 20 percent or more of the pipe length the defects shall be repaired, however, the Contractor will not be allowed to continue with his methodology of installation and/or the liner system used until he/she can demonstrate to the Engineer that he/she has remedied his/her operations to a sufficient level of quality as determined by the engineer. All such remedial efforts shall be at the Contractor's expense. Further failure(s) to perform a proper installation may result in the disallowance of the use of that liner system and an adjustment in the cost or non-payment of the failed installations depending on the severity of the failure.

In the event the first post installation inspection is not conducted until all or most of the locations in the Contract permitting this methodology have been performed, and the inspection reveals defects on 20

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percent or more of the host pipe's length, then an adjustment in the cost or non-payment of the failed installations may be made by the Engineer depending on the severity of the failure.

In the event the second post inspection of the installation reveals defects, the Department may execute the option to call the construction bond to reimburse the Department for repairs or corrections, or to act as an adjustment in the cost, or both.

IV. MEASUREMENT AND PAYMENT

Pre Installation Inspection will be measured and paid for as the actual number of linear feet of pipe inspected, including mobilization of equipment, and production of records. Linear footage is not increased for multiple passes of inspection equipment through a length of pipe.

Pipe Rehabilitation will be measured and paid for as the actual number of linear feet of pipe for the Size, and Method that has been incorporated into the completed and accepted work. Note: At locations shown in the Contract where multiple methods are permitted, the Contractor may select any of the methods specified, however, if only one method is specified, this will be the only method permitted at that location. This price shall include post installation inspection, cleaning and preparation of the host pipe, furnishing and installing the liner, lateral reconnection, coupling and expansion devices, annular cement grout, design (if necessary) and shop drawing preparation, furnishing and installing liner and all components of the liner system, capturing any discharges or releases during installation or curing operations, furnishing any documentation or fees required for effluent or condensate disposal, all testing and sampling including furnishing reports and pre and post installation video inspections, waste disposal costs, excavation, sheeting, shoring, disposing of surplus and unsuitable material; backfilling and backfill material; compaction, restoring existing surfaces, and clearing debris and obstructions.

De-Watering will be measured and paid as the actual number of water diversions or bypasses required to complete Pipe Rehabilitation work. Each instance of De-Watering paid includes De-Watering for pre-inspection, installation, post inspections, and remediation (if necessary). All materials, equipment, labor, or other resources required to de-watering a site shall be incidental to the unit cost for De-watering.

Payment will be made under:

Pay Item	**Pay Unit**
Pre Installation Inspection	Linear Foot
(Size) Pipe Rehabilitation CIPP Liner	Linear Foot
(Size) Pipe Rehabilitation Fold & Form Liner	Linear Foot
(Size) Pipe Rehabilitation Solid Wall Thermoplastic Slip Liner	Linear Foot
(Size) Pipe Rehabilitation Corrugated Thermoplastic Slip Liner	Linear Foot
(Size) Pipe Rehabilitation Spiral Wound Liner	Linear Foot
(Size) Pipe Rehabilitation Cementitious / Geopolymer Spray Liner	Linear Foot

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(Size) Pipe Rehabilitation Spray Liner – Other	Linear Foot
(Size) Pipe Rehabilitation Smooth Wall Steel Slip Liner	Linear Foot
De-Watering	Each

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ST-1

B-6054A Haywood County

Project Special Provisions

Structure

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ST-2

STEEL REINFORCED ELASTOMERIC BEARINGS **(6-22-16)**

The 2018 Standard Specifications shall be revised as follows:

In **Section 1079-2(A) – Elastomeric Bearings** add the following after the second paragraph:

Internal holding pins are required for all shim plates when the contract plans indicate the structure contains the necessary corrosion protection for a corrosive site.

Repair laminated (reinforced) bearing pads utilizing external holding pins via vulcanization. Submit product data for repair material and a detailed application procedure to the Materials and Tests Unit for approval before use and annually thereafter.

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ST-3

THERMAL SPRAYED COATINGS (METALLIZATION) (12-1-2017)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces in accordance with the Thermal Sprayed Coatings (Metallization) Program and as specified herein when called for on the plans or by other Special Provisions. Use only Arc Sprayed application methods to apply TSC. The Engineer must approve other methods of application.

The Thermal Sprayed Coatings (Metallization) Program is available on the Materials and Tests Unit website.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the requirements outlined in the Thermal Sprayed Coatings (Metallization) Program.

3.0 MATERIALS

Use only materials meeting the requirements of Section 7 of the Thermal Sprayed Coatings (Metallization) Program.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Surface preparation of TSC surfaces shall meet the requirements of Section 8 of the Thermal Sprayed Coatings (Metallization) Program. Apply TSC with the alloy to the thickness specified on the plans or as required by Thermal Sprayed Coatings (Metallization) Program.

5.0 INSPECTION AND TESTING

The TSC Contractor must conduct inspections and tests listed in the Thermal Sprayed Coatings (Metallization) Program.

6.0 REPAIRS

Perform all shop repairs in accordance with the procedures outlined in the Thermal Sprayed Coatings (Metallization) Program.

Repairs associated with field welding shall be made by removing the existing metallizing by blast or power tool cleaning. Affected areas shall be addressed as follows:

- For Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved epoxy mastic coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

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- For Non-Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved organic zinc-rich coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

    1. Minor localized areas less than or equal to 0.1 ft^2 with exposed substrate shall be repaired as outlined above for marine and non-marine environments.

    2. Large localized areas greater than 0.1 ft^2 with exposed substrate shall require the Contractor to submit a detailed repair procedure to the Engineer for review and approval.

- Repair methods for areas where the substrate has not been exposed shall be mutually agreed upon between the Contractor and TSC Contractor as approved by the Engineer.

7.0 TWELVE MONTH OBSERVATION PERIOD

All TSC materials applied under the Thermal Sprayed Coatings (Metallization) Program shall be evaluated twelve (12) months after project acceptance for defective materials and workmanship.

8.0 BASIS OF PAYMENT

The contract price bid for the metal component to which the TSC is applied will be full compensation for the thermal sprayed coating.

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ST-5

EXPANSION JOINT SEALS (9-30-11)

1.0 GENERAL

The work covered by this Special Provision consists of furnishing and installing the expansion joint seals as shown on the contract drawings. All materials, labor, equipment and incidentals necessary for the proper installation of the expansion joint seals are included.

2.0 MATERIAL

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:

	ASTM TEST METHOD	REQUIREMENTS
Hardness, Durometer - Shore A	D2240	60 ± 5, Neoprene (upward corrugated shape - fabric reinforced) 75 ± 5, EPDM and Neoprene (upward non-corrugated shape) 80 ± 5, EPDM (upward corrugated shape-fabric reinforced)
Tensile Strength	D412	2000 psi (min.)
Elongation at Break	D412	250% (min.)
Width of Gland in Relaxed Condition	N/A	10" ± 0.25"

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Thickness of Upturned portion of gland	N/A	0.25" non-corrugated shape, -0.032" to +0.032"
Thickness of Upturned portion of gland	N/A	0.1875" corrugated shape, -0.032" to +0.032"
Thickness of Flat portion of gland	N/A	0.1563", -0.032" to +0.032"

For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Only field splice hold-down plates at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100°.

Do not use welded shop splices in hold-down plates.

3.0 SHOP DRAWINGS

Submit nine sets of working drawings to the Engineer for review, comments and acceptance. Show complete details drawn to scale and include:

- The proposed template details including the makeup of the template
- The proposed method of holding the base angle assembly in place while concrete is cast around it
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening
- The proposed chronology of installation including the sequence and direction of the concrete casting
- The details of cross connectors between base angles, such as steel bars with slots bolted to angles, to maintain evenness between the adjacent base angles while accommodating movement that occurs when concrete is cast. Indicate when bolts are loosened to allow movement.
- The proposed method for removing the hold-down plate
- A section detail through the joint showing horizontal offset dimensions of the base angles from the centerline joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

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Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal.

4.0 INSTALLATION

Provide supports for the base angle assembly at a maximum spacing of 9 feet. Place supports near field splices of base angles to ensure that field splices are straight and even. Provide base angles with ½" diameter weep holes at 12 inch centers to allow bleeding of trapped air and/or water. Do not obstruct the weep holes with falsework. Make the bottom of the trough parallel to grade and the sides parallel to the sides of the expansion joint seal.

For damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint, submit a proposed method of repair and repair material specifications for approval.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

5.0 INSPECTION

When concrete is cast, use a non-aluminum, 10 foot, true to line straight edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same

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responsibility as the original test and are performed at no extra cost to the Department.

6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seals will be at the lump sum contract price for "Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the expansion joint seal in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

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FALSEWORK AND FORMWORK (4-5-12)

1.0 DESCRIPTION

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term "temporary works" is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS

A. Working Drawings

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

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When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screed Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 ½" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

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If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than ¾".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

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Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

   Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft^2 for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

   The following requirements replace those of Article 3.4.8.2.

   Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

   Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

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Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

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B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

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B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

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ST-16

SUBMITTAL OF WORKING DRAWINGS (1-29-21)

1.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structures Management Unit, use the following addresses:

Via US mail:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

Submittals may also be made via email.

Send submittals to:

jlbolden@ncdot.gov (James Bolden)

Send an additional e-copy of the submittal to the following address:

eomile@ncdot.gov (Emmanuel Omile)

DocuSign Envelope ID: 9F3939EB-19E5-4BE1-A2C9-FEA8C975D7B2

ST-17

mrorie@ncdot.gov (Madonna Rorie)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. David Hering, L. G., P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. David Hering, L. G., P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

Via Email: EastGeotechnicalSubmittal@ncdot.gov

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Western Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via Email: WestGeotechnicalSubmittal@ncdot.gov

The status of the review of structure-related submittals sent to the Structures Management Unit can be viewed from the Unit's website, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: James Bolden (919) 707 – 6408
(919) 250 – 4082 facsimile
jlbolden@ncdot.gov

DocuSign Envelope ID: 9F3939EB-19E5-4BE1-A2C9-FEA8C975D7B2

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451
Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):
David Hering (919) 662 – 4710
dthering@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):
Eric Williams (704) 455 – 8902
ewilliams3@ncdot.gov

3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit.

The first table below covers "Structure Submittals". The Engineer will receive review comments and drawing markups for these submittals from the Structures Management Unit. The second table in this section covers "Geotechnical Submittals". The Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structures Management Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS

Submittal	Copies Required by Structures Management Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal [1]
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework [7]	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Cofferdams	6	2	Article 410-4

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Foam Joint Seals [6]	9	0	"Foam Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	9	0	"Expansion Joint Seals"
Expansion Joint Seals (modular)	2, then 9	0	"Modular Expansion Joint Seals"
Expansion Joint Seals (strip seals)	9	0	"Strip Seals"
Falsework & Forms [2] (substructure)	8	0	Article 420-3 & "Falsework and Formwork"
Falsework & Forms (superstructure)	8	0	Article 420-3 & "Falsework and Formwork"
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	"Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___"
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings [4,5]	7	0	Article 1072-8
Miscellaneous Metalwork [4,5]	7	0	Article 1072-8
Disc Bearings [4]	8	0	"Disc Bearings"
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Precast Concrete Box Culverts	2, then 1 reproducible	0	"Optional Precast Reinforced Concrete Box Culvert at Station ___"

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Prestressed Concrete Cored Slab (detensioning sequences) [3]	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	"Modular Expansion Joint Seals"
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & "Sound Barrier Wall"
Sound Barrier Wall Steel Fabrication Plans [5]	7	0	Article 1072-8 & "Sound Barrier Wall"
Structural Steel [4]	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings [4]	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.

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5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

GEOTECHNICAL SUBMITTALS

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structures Management Unit	Contract Reference Requiring Submittal [1]
Drilled Pier Construction Plans [2]	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports [2]	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms [2,3]	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports [2]	1	0	Subarticle 450-3(F)(3)
Retaining Walls [4]	1 drawings, 1 calculations	2 drawings	Applicable Provisions
Temporary Shoring [4]	1 drawings, 1 calculations	2 drawings	"Temporary Shoring" & "Temporary Soil Nail Walls"

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.

2. Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email), US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.

3. The Pile Driving Equipment Data Form is available from: https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

   See second page of form for submittal instructions.

4. Electronic copy of submittal is required. See referenced provision.

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ST-22

CRANE SAFETY **(6-20-19)**

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration (OSHA) regulations.

Submit all items listed below to the Engineer prior to beginning crane operations. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.

B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.

C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.

D. **Certifications:** Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

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ST-23

GROUT FOR STRUCTURES (12-1-17)

1.0 DESCRIPTION

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, decks, end bent caps, or bent caps. Mix and place grout in accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

4.0 BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

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ST-24

ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES (12-30-15)

1.0 INSPECTION FOR ASBESTOS CONTAINING MATERIAL

Prior to conducting bridge demolition or renovation activities, the Contractor shall thoroughly inspect the bridge or affected components for the presence of asbestos containing material (ACM) using a firm prequalified by NCDOT to perform asbestos surveys. The inspection must be performed by a N.C. accredited asbestos inspector with experience inspecting bridges or other industrial structures. The N.C. accredited asbestos inspector must conduct a thorough inspection, identifying all asbestos-containing material as required by the Environmental Protection Agency National Emission Standards for Hazardous Air Pollutants (NESHAP) Code of Federal Regulations (CFR) 40 CFR, Part 61, Subpart M.

The Contractor shall submit an inspection report to the Engineer, which at a minimum must include information required in 40 CFR 763.85 (a)(4) vi)(A)-(E), as well as a project location map, photos of existing structure, the date of inspection and the name, N.C. accreditation number, and signature of the N.C. accredited asbestos inspector who performed the inspection and completed the report. The cover sheet of the report shall include project identification information. Place the following notes on the cover sheet of the report and check the appropriate box:

___ ACM was found
___ ACM was not found

2.0 REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIAL

If ACM is found, notify the Engineer. Compensation for removal and disposal of ACM is considered extra work in accordance with Article 104-7 of the Standard Specifications.

An Asbestos Removal Permit must be obtained from the Health Hazards Control Unit (HHCU) of the N.C. Department of Health & Human Services, Division of Public Health, if more than 35 cubic feet, 160 square feet, or 260 linear feet of regulated ACM (RACM) is to be removed from a structure and this work must be completed by a contractor prequalified by NCDOT to perform asbestos abatement. RACM is defined in 40 CFR, Part 61, Subpart M. Note: 40 CFR 763.85 (a)(4) vi)(D) defines ACM as surfacing, TSI and Miscellaneous which does not meet the NESHAP RACM.

3.0 DEMOLITION NOTIFICATION

Even if no ACM is found (or if quantities are less than those required for a permit), a Demolition Notification (DHHS-3768) must be submitted to the HHCU. Notifications and Asbestos Permit applications require an original signature and must be submitted to the HHCU 10 working days prior to beginning demolition activities. The 10 working day period starts based on the post-marked date or date of hand delivery. Demolition that does not begin as originally notified requires submission of a separate revision form HHCU 3768-R to HHCU. Reference the North Carolina Administrative Code, Chapter 10A, Subchapter 41C, Article .0605 for directives on revision submissions.

DocuSign Envelope ID: 9F3939EB-19E5-4BE1-A2C9-FEA8C975D7B2

Contact Information
Health Hazards Control Unit (HHCU)
N.C. Department of Health and Human Services
1912 Mail Service Center
Raleigh, NC 27699-1912
Telephone: (919) 707-5950
Fax: (919) 870-4808

4.0 SPECIAL CONSIDERATIONS

Buncombe, Forsyth, and Mecklenburg counties also have asbestos permitting and NESHAP requirements must be followed. For projects involving permitted RACM removals, both the applicable county and the state (HHCU) must be notified.

For demolitions with no RACM, only the local environmental agencies must be notified. Contact information is as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
49 Mt. Carmel Road
Asheville, NC 28806
(828) 250-6777

Forsyth County
Environmental Affairs Department
537 N. Spruce Street
Winston-Salem, NC 27101
(336) 703-2440

Mecklenburg County
Land Use and Environmental Services Agency
Mecklenburg Air Quality
700 N. Tryon Street
Charlotte, NC 28202
(704) 336-5430

5.0 ADDITIONAL INFORMATION

Additional information may be found on N.C. asbestos rules, regulations, procedures and N.C. accredited inspectors, as well as associated forms for demolition notifications and asbestos permit applications at the N.C. Asbestos Hazard Management Program website:

https://epi.dph.ncdhhs.gov/asbestos/ahmp.html

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ST-26

6.0 BASIS OF PAYMENT

Payment for the work required in this provision will be at the lump sum contract unit price for “Asbestos Assessment”. Such payment will be full compensation for all asbestos inspections, reports, permitting and notifications.

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ST-27

36" FLORIDA I BEAM (FIB) GIRDERS **(SPECIAL)**

The contractor shall provide girders in accordance with the plans and standard specifications.

Measurement and payment will be for the actual number of linear feet of prestressed concrete girders.

Payment will be made under:

Pay Item	Pay Unit
36" Florida I Beam (FIB) Girders	Linear Foot

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ST-28

54" FLORIDA I BEAM (FIB) GIRDERS **(SPECIAL)**

The contractor shall provide girders in accordance with the plans and standard specifications.

Measurement and payment will be for the actual number of linear feet of prestressed concrete girders.

Payment will be made under:

Pay Item	Pay Unit
54" Florida I Beam (FIB) Girders	Linear Foot

LISTING OF MBE & WBE SUBCONTRACTORS

Sheet 1 of 2

FIRM NAME AND ADDRESS	MBE or WBE	ITEM NO.	ITEM DESCRIPTION	* AGREED UPON UNIT PRICE	** DOLLAR VOLUME OF ITEM
Gosalia Concrete	MBE	8510000000-E	Median Rail on Bridge - Bridge	$95.50	$46,964.00
Gosalia Concrete	MBE	8503000000-E	Concrete Barrier Rail - Bridge	$99.50	$25,403.00
Gosalia Concrete	MBE	2703000000-E	Concrete Median Barrier - Roadway	$173.10	$606,196.20
4D	MBE	8147000000-E	Reinforced Concrete Deck Slab –SIP Decking	$2.80	$44,954
4D	MBE	8147000000-E	Reinforced Concrete Deck Slab – Rebar Installation	$1.94	$32,276
4D	MBE	8210000000-N	Bridge Approach Slab – Rebar Installation	$0.32	$7,890
4D	MBE	8217000000-E	Reinforcing Steel – Rebar Installation	$0.32	$22,891.84
4D	MBE	8238000000-E	Spiral Column Reinforcing Steel – Rebar Installation	$0.32	$1,212.16
4D	MBE	8503000000-E	Concrete Barrier Rail – Rebar Installation	$6.84	$3,229.44
4D	MBE	8510000000-E	Concrete Median Barrier – Rebar Installation	$5.12	$1,362.56
Subtotal MBE					**$792,379.20**

LISTING OF MBE & WBE SUBCONTRACTORS

Sheet 2 of 2

FIRM NAME AND ADDRESS	MBE or WBE	ITEM NO.	ITEM DESCRIPTION	* AGREED UPON UNIT PRICE	** DOLLAR VOLUME OF ITEM
Seal Brothers	WBE	3575000000-E	Woven Wire Fence, 120" Fabric – Wildlife Fencing	$19.64	$76,198.00
Seal Brothers	WBE	3578000000-N	4" Timber Fence Posts. 13' Long – Wildlife Fencing Timber Post	$48.00	$10,608
Seal Brothers	WBE	3578000000-N	5" Timber Fence Posts, 13' Long – Wildlife Fencing Timber Post	$125.00	$13,500
Seal Brothers	WBE	6000000000-E	Temporary Silt Fence - 160	$4.75	$38,000
Seal Brothers	WBE	6029000000-E	Safety Fence-SP	$3.50	$2,380
Seal Brothers	WBE	6042000000-E	1/4" Hardware Cloth-1632	$15.00	$32,250
Subtotal WBE					**$172,936.00**

County Haywood County **Firm** Kiewit Infrastructure South Co.

Contract No.

This form must be completed in order for the Bid to be considered responsive.

COST OF CONSTRUCTION WORK ONLY $ 18,945,378.96

** Dollar Volume of MBE Subcontractor $ 792,379.20

MBE Percentage of Total Construction Cost 4.18 %
(Including Right of Way Acquisition Costs)

** Dollar Volume of WBE Subcontractor $ 172,936.00

WBE Percentage of Total Construction Cost 0.91 %
(Including Right of Way Acquisition Services)

* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE and/or WBE subcontractor, and these prices will be used to determine the percentage of the MBE and/or WBE participation in the contract.

** Must have entry even if figure to be entered is zero.

This form must be completed in order for the Bid to be considered responsive.

Appendix C

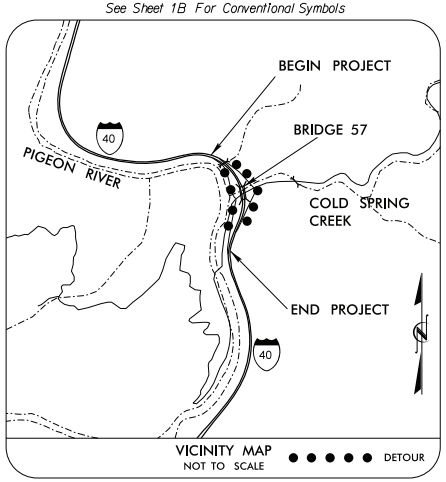
Project Plans Approved

DocuSign Envelope ID: 9DA8D73A-D944-4C73-97DE-131B81F 166FB

09/08/99

CONTRACT: C204654 TIP PROJECT: B-6054A

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HAYWOOD COUNTY

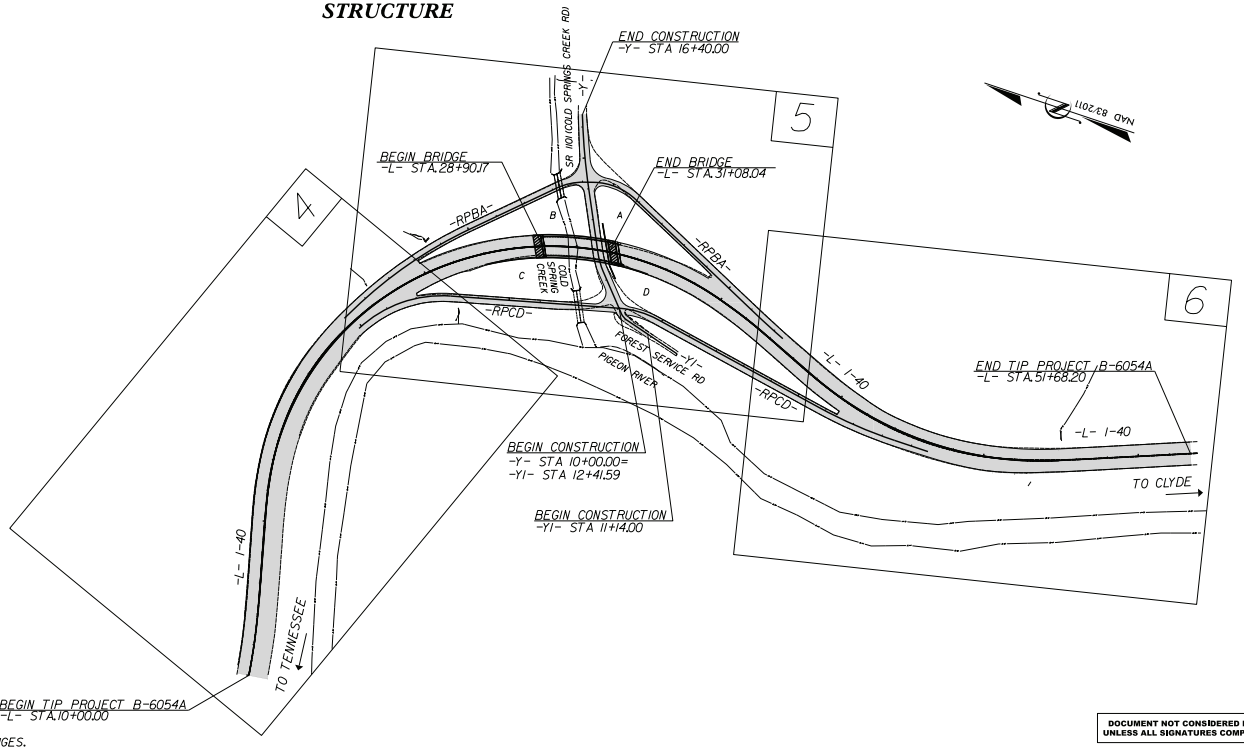
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6054A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
49070.1.1		PE
49070.2.1		R/W & UTILITIES
49070.3.1		CONSTRUCTION

SUBMITTAL: 100% FINAL PLANS
DATE: SEPTEMBER 10, 2021

LOCATION: *BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK*

TYPE OF WORK: *GRADING, RETAINING WALL, DRAINAGE, PAVING, AND STRUCTURE*



DESIGN EXCEPTION IS REQUIRED FOR MINIMUM RADIUS ON -L-
THIS IS A CONTROLLED ACCESS FACILITY WITH ACCESS LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2018 = 28,500
K = 10 %
D = 55 %
T = 26 % *
V = 60 MPH
* TTST =23 DUAL=3
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-6054A = *0.749 MI*
LENGTH STRUCTURE TIP PROJECT B-6054A = *0.041 MI*
TOTAL LENGTH TIP PROJECT B-6054A = *0.790 MI*

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 2021

LETTING DATE: SEPTEMBER 2021

GREG A. STEWART, PE
PROJECT ENGINEER

LAURA C. FISHER, PE
PROJECT DESIGN ENGINEER

JOSHUA B. DEYTON, PE
NCDOT CONTACT

HYDRAULICS ENGINEER
9/9/2021
NORTH CAROLINA PROFESSIONAL SEAL 049357 ENGINEER JOY M. SADLER P.E.
SEAL NOT VALID UNLESS SIGNED AND DATED

ROADWAY DESIGN ENGINEER
9/9/2021
NORTH CAROLINA PROFESSIONAL SEAL 030877 ENGINEER LAURA C. FISHER P.E.
SEAL NOT VALID UNLESS SIGNED AND DATED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

$$$$$$SYSTIME$$$$$$
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USER:slouk1ll

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	1A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042866 LAURA C. FISHER
DocuSigned by: Laura C. Fisher
9/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS. GENERAL NOTES. AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-5	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-3	WILDLIFE DETAILS
2C-1	WILDLIFE FENCE SPECIAL DETAIL
2C-2	SINGLE SLOPE CONCRETE BARRIER SPECIAL DETAIL
2C-3	TYPE III REINFORCED APPROACH FILLS SPECIAL DETAIL
2C-4	GUARDRAIL INSTALLATION SPECIAL DETAIL
3B-1	GUARDRAIL SUMMARY. EARTHWORK SUMMARY. PAVEMENT REMOVAL SUMMARY. AND SHOULDER BERM GUTTER SUMMARY
3D-1 THRU 3D-3	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
4 THRU 11	PLAN AND PROFILE SHEETS
RW02C-1 THRU RW02C-5	SURVEY CONTROL SHEETS
TMP-1 THRU TMP-17	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-4	PAVEMENT MARKING PLANS
EC-1 THRU EC-11	EROSION CONTROL PLANS
RF-1 THRU RF-3	REFORESTATION PLANS
SIGN-1 THRU SIGN-7	SIGNING PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-32	CROSS-SECTIONS
S-01 THRU S-53	STRUCTURE PLANS

GENERAL NOTES:

2018 SPECIFICATIONS
EFFECTIVE: 01-16-2018
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN. THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 &225.05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01 & 560.02

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE NONE

EFF. 01-16-2018 REV.

2018 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project
and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.05	Method of Obtaining Superelevation - Divided Highways
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.02	Parallel Pipe End Section - Precast Concrete Section for 15" to 24" Pipe
310.03	Cross Pipe End Section - Precast Concrete Section for 18" to 30" Pipe
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
665.01	Asphalt Shoulders - Milled Rumble Strips
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
840.37	Steel Grate and Frame
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.04	Drop Inlet Installation in Shoulder Berm Gutter
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

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12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Property Monument (ECM)
- Parcel/Sequence Number (123)
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary (WLB)
- Proposed Wetland Boundary (WLB)
- Existing Endangered Animal Boundary (EAB)
- Existing Endangered Plant Boundary (EPB)
- Existing Historic Property Boundary (HPB)
- Known Contamination Area: Soil (S)
- Potential Contamination Area: Soil (S)
- Known Contamination Area: Water (W)
- Potential Contamination Area: Water (W)
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign (S)
- Well (W)
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream (JS)
- Buffer Zone 1 (BZ 1)
- Buffer Zone 2 (BZ 2)
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch (FLOW)
- False Sump

RAILROADS:

- Standard Gauge (CSX TRANSPORTATION)
- RR Signal Milepost (MILEPOST 35)
- Switch (SWITCH)
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line (RW)
- New Right of Way Line with Pin and Cap (RW)
- New Right of Way Line with Concrete or Granite R/W Marker (RW)
- New Control of Access Line with Concrete C/A Marker (CA)
- Existing Control of Access (CA)
- New Control of Access (CA)
- Existing Easement Line (E)
- New Temporary Construction Easement (E)
- New Temporary Drainage Easement (TDE)
- New Permanent Drainage Easement (PDE)
- New Permanent Drainage / Utility Easement (DUE)
- New Permanent Utility Easement (PUE)
- New Temporary Utility Easement (TUE)
- New Aerial Utility Easement (AUE)

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut (C)
- Proposed Slope Stakes Fill (F)
- Proposed Curb Ramp (CR)
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub

- Hedge
- Woods Line
- Orchard
- Vineyard (Vineyard)

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert (CONC)
- Bridge Wing Wall, Head Wall and End Wall (CONC WW)

MINOR:

- Head and End Wall (CONC HW)
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB (CB)
- Paved Ditch Gutter
- Storm Sewer Manhole (S)
- Storm Sewer (S)

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole (P)
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) (P)
- U/G Power Line LOS C (S.U.E.*) (P)
- U/G Power Line LOS D (S.U.E.*) (P)

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole (T)
- Telephone Pedestal (T)
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole (HH)
- U/G Telephone Cable LOS B (S.U.E.*) (T)
- U/G Telephone Cable LOS C (S.U.E.*) (T)
- U/G Telephone Cable LOS D (S.U.E.*) (T)
- U/G Telephone Conduit LOS B (S.U.E.*) (TC)
- U/G Telephone Conduit LOS C (S.U.E.*) (TC)
- U/G Telephone Conduit LOS D (S.U.E.*) (TC)
- U/G Fiber Optics Cable LOS B (S.U.E.*) (T FO)
- U/G Fiber Optics Cable LOS C (S.U.E.*) (T FO)
- U/G Fiber Optics Cable LOS D (S.U.E.*) (T FO)

WATER:

- Water Manhole (W)
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) (W)
- U/G Water Line LOS C (S.U.E*) (W)
- U/G Water Line LOS D (S.U.E*) (W)
- Above Ground Water Line (A/G Water)

TV:

- TV Pedestal (C)
- TV Tower
- U/G TV Cable Hand Hole (HH)
- U/G TV Cable LOS B (S.U.E.*) (TV)
- U/G TV Cable LOS C (S.U.E.*) (TV)
- U/G TV Cable LOS D (S.U.E.*) (TV)
- U/G Fiber Optic Cable LOS B (S.U.E.*) (TV FO)
- U/G Fiber Optic Cable LOS C (S.U.E.*) (TV FO)
- U/G Fiber Optic Cable LOS D (S.U.E.*) (TV FO)

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) (G)
- U/G Gas Line LOS C (S.U.E.*) (G)
- U/G Gas Line LOS D (S.U.E.*) (G)
- Above Ground Gas Line (A/G Gas)

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line (SS)
- Above Ground Sanitary Sewer (A/G Sanitary Sewer)
- SS Forced Main Line LOS B (S.U.E.*) (FSS)
- SS Forced Main Line LOS C (S.U.E.*) (FSS)
- SS Forced Main Line LOS D (S.U.E.*) (FSS)

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box (S)
- Utility Unknown U/G Line LOS B (S.U.E.*) (?UTL)
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. (UST)
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records (AATUR)
- End of Information (E.O.I.)

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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2A-1

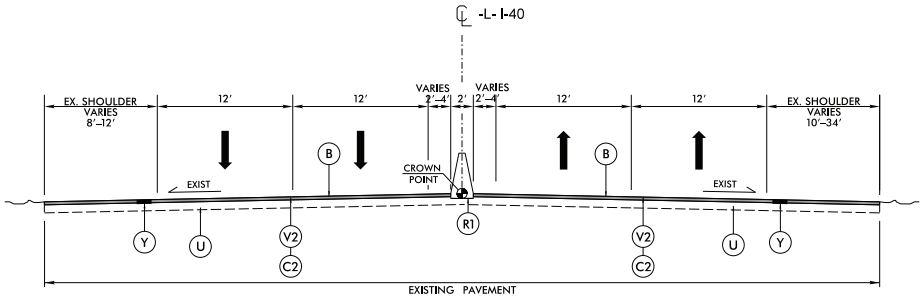
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042180 LAURA C. FISHER 9/9/2021

Electronically Signed by: Laura C. Fisher

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

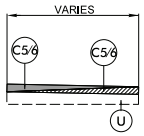


TYPICAL SECTION NO. 1

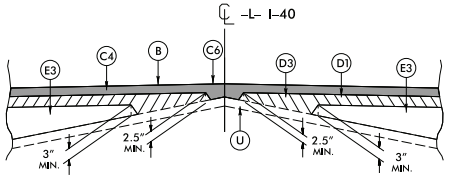
-L- STA. 10+00.00** TO STA. 25+14.00

-L- STA. 36+06.00 TO STA. 51+68.20**

**EXISTING MEDIAN BARRIER TO REMAIN:
STA. 10+00.00 TO STA. 12+43.10
STA. 47+44.63 TO STA. 51+68.20



MILLING DETAIL AT TIE INS



(W1) – Detail Showing Method of Wedging

FOR USE WITH TYPICAL SECTION NO. 2

FINAL PAVEMENT SCHEDULE

B	PROP. APROX. 0.75" OPEN-GRADED ASPHALT FRICTION COURSE, TYPE FC-1 MODIFIED, AT AN AVERAGE RATE OF 90 LBS. PER SQ. YD.
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C AT AN AVERAGE RATE OF 224 LBS PER SQ. YD.
C2	PROP. APPROX. 2.0" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5D AT AN AVERAGE RATE OF 224 LBS PER SQ. YD.
C3	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C AT AN AVERAGE RATE OF 168 LBS PER SQ. YD. IN EACH OF TWO LAYERS
C4	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5D AT AN AVERAGE RATE OF 168 LBS PER SQ. YD. IN EACH OF TWO LAYERS
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER 1" DEPTH IN LAYERS NOT TO EXCEED 2" IN DEPTH.
C6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE S9.5D AT AN AVERAGE RATE OF 112 LBS PER SQ. YD. PER 1" DEPTH IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C AT AN AVERAGE RATE OF 399 LBS PER SQ. YD.
D2	PROP. APPROX. 3.5" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C AT AN AVERAGE RATE OF 399 LBS PER SQ. YD.
D3	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C AT AN AVERAGE RATE OF 456 LBS PER SQ. YD.
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE TYPE B25.0C AT AN AVERAGE RATE OF 456 LBS PER SQ. YD.
E2	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE TYPE B25.0C AT AN AVERAGE RATE OF 627 LBS PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE TYPE B25.0C AT AN AVERAGE RATE OF 114 LBS PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5.5" IN DEPTH.
J	PROP. 12" AGGREGATE BASE COURSE
R1	REINFORCED DOUBLE FACED CONCRETE BARRIER, TYPE SINGLE SLOPE
R2	REINFORCED SINGLE FACE CONCRETE BARRIER
R3	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	MILLED ASPHALT PAVEMENT 1.5" IN DEPTH
V2	MILLED ASPHALT PAVEMENT 2" IN DEPTH
V3	VARIABLE DEPTH MILLED ASPHALT PAVEMENT 0" TO 1.5" IN DEPTH
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING).
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING).
Y	ASPHALT SHOULDERS MILLED RUMBLE STRIPS

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

5/14/99

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2A-2

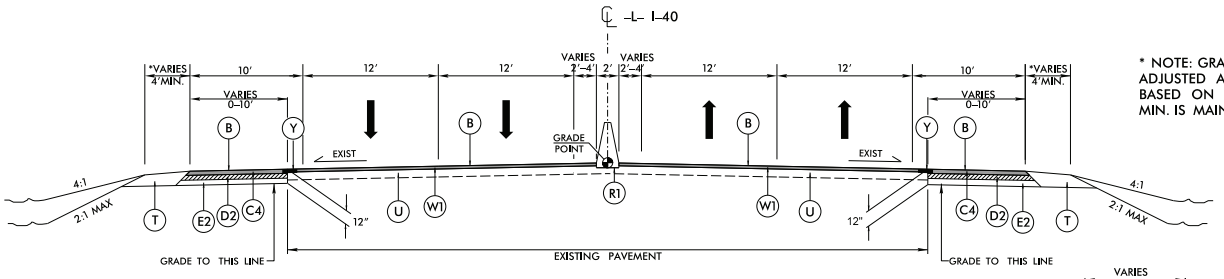
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER LAURA C. FISHER 9/9/2021

Digitally Signed by: Laura C. Fisher

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

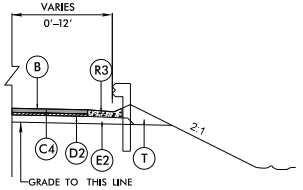


TYPICAL SECTION NO. 2

–L– STA. 25+14.00 TO STA. 28+90.17

–L– STA. 31+08.04 TO STA. 36+06.00

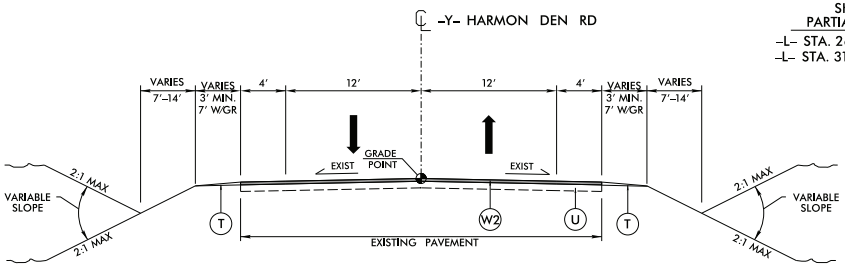
* NOTE: GRADED SHOULDER WIDTH CAN BE ADJUSTED AT THE DIRECTOR OF HE ENGINEER BASED ON SITE CONDITIONS AS LONG AS 4' MIN. IS MAINTAINED.



SHOULDER BERM GUTTER
PARTIAL TYPICAL SECTION NO. 2A

–L– STA. 26+97.05 TO STA. 28+94.99 RT.

–L– STA. 31+21.50 TO STA. 32+50.00 RT.



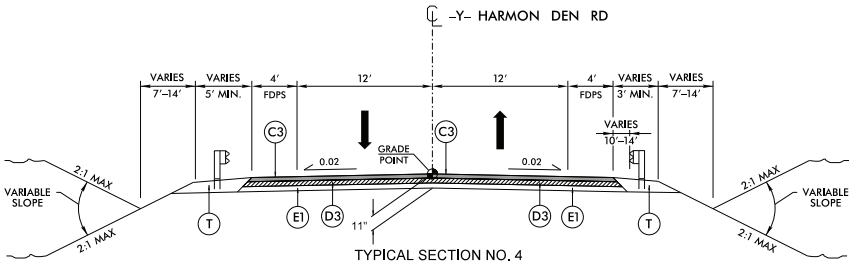
TYPICAL SECTION NO. 3

–Y– STA. 10+04.88 TO 10+40.00

–Y– STA. 14+34.00 TO 16+40.00

PAVEMENT SCHEDULE	
B	ASPHALT FRICTION COURSE
C1	1.5" S9.5C
C2	2.0" S9.5D
C3	3.0" S9.5C
C4	3.0" S9.5D
C5	VAR. S9.5C
C6	VAR. S9.5D
D1	2.5" I19.0C
D2	3.5" I19.0C
D3	4.0" I19.0C
D4	VAR. I19.0C
E1	4.0" B25.0C
E2	5.5" B25.0C
E3	VAR. B25.0C
R1	DOUBLE FACE CONC. BARRIER
R2	SINGLE FACE CONC. BARRIER
R3	SHOULDER BERM GUTTER
J	12" ABC
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	MILL 1.5"
V2	MILL 2"
V3	VAR. MILL 0"- 1.5"
W1	VAR. (WEDGING)
W2	VAR. (WEDGING)

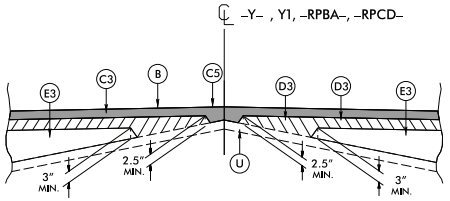
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 4

-Y- STA. 10+40.00 TO STA. 10+90.02

-Y- STA. 12+87.42 TO STA. 14+16.00



(W2) – Detail Showing Method of Wedging

FOR USE WITH TYP. 3, 6, 8, 9, 10A, 12, & 13.

$$$$$$SYSTIME$$$$
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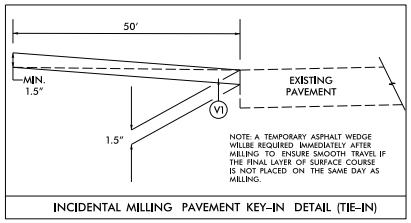
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2A-3

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — Digitally Signed by: Laura C. Fisher — LAURA C. FISHER — 9/9/2021

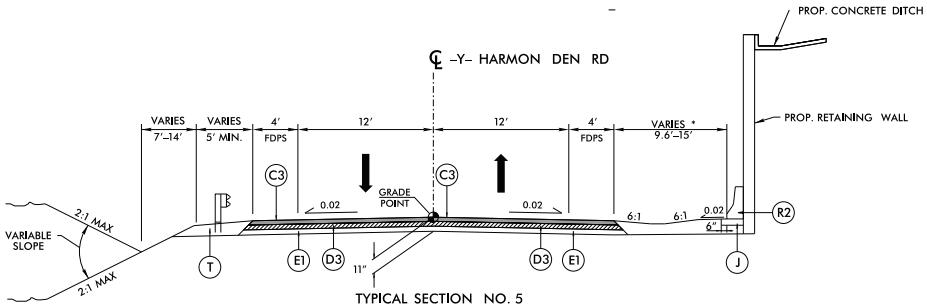
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



INCIDENTAL MILLING PAVEMENT KEY-IN DETAIL (TIE-IN)

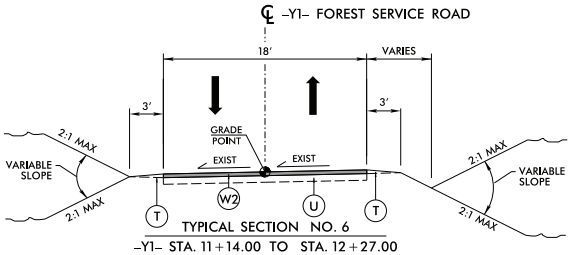
-RPBA- STA 13+09.30 TO 13+59.30
-RPBA- STA 24+40.00 TO 24+90.00
-RPCD- STA 12+04.42 TO 12+54.42
-RPCD- STA 25+89.01 TO 26+39.01

STATION RANGES ARE APPROXIMATE ONLY. GRADE MAY BE ADJUSTED BY ENGINEER TO ENSURE A PROPER TIE-IN.

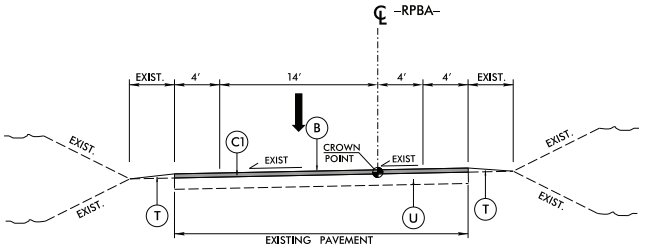


TYPICAL SECTION NO. 5
-Y- STA. 10+90.02 TO STA. 12+87.42

* NATURAL SURFACE WIDTH FOR WILDLIFE PASSAGE



TYPICAL SECTION NO. 6
-Y1- STA. 11+14.00 TO STA. 12+27.00

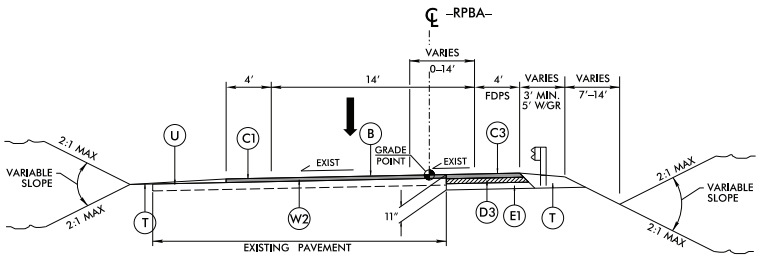


TYPICAL SECTION NO. 7
-RPBA- STA. 10+06.30 TO STA. 18+00.00

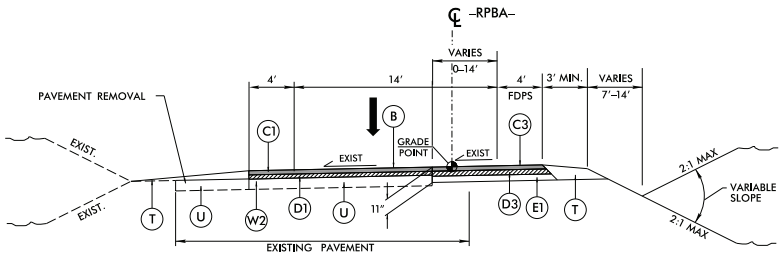
NOTE: THIS IS THE FINAL CONDITION OVERLAY AFTER TRAFFIC HAS BEEN MOVED BACK TO -L- AFTER BRIDGE CONSTRUCTION.

PAVEMENT SCHEDULE	
B	ASPHALT FRICTION COURSE
C1	1.5" S9.5C
C2	2.0" S9.5D
C3	3.0" S9.5C
C4	3.0" S9.5D
C5	VAR. S9.5C
C6	VAR. S9.5D
D1	2.5" I19.0C
D2	3.5" I19.0C
D3	4.0" I19.0C
D4	VAR. I19.0C
E1	4.0" B25.0C
E2	5.5" B25.0C
E3	VAR. B25.0C
R1	DOUBLE FACE CONC. BARRIER
R2	SINGLE FACE CONC. BARRIER
R3	SHOULDER BERM GUTTER
J	12" ABC
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	MILL 1.5"
V2	MILL 2"
V3	VAR. MILL 0"- 1.5"
W1	VAR. (WEDGING)
W2	VAR. (WEDGING)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 8
-RPBA- STA. 18+00.00 TO STA. 19+27.00



TYPICAL SECTION NO. 9
-RPBA- STA. 19+27.00 TO STA. 20+90.00

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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2A-4

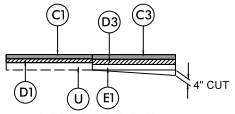
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

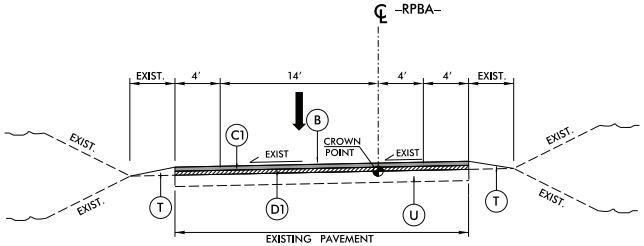
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042160 LAURA C. FISHER 9/9/2021

Electronically Signed by: Laura C. Fisher

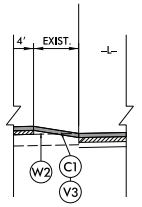
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



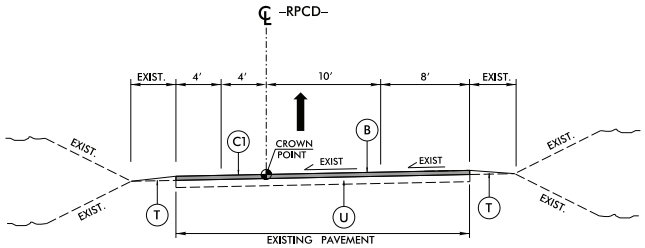
DETAIL AT TIE IN
PARTIAL TYPICAL SECTION NO. 10B
–RPBA– STA 24+28 TO 26+18



TYPICAL SECTION NO. 10
–RPBA– STA. 20+90.00 TO STA. 27+37.80

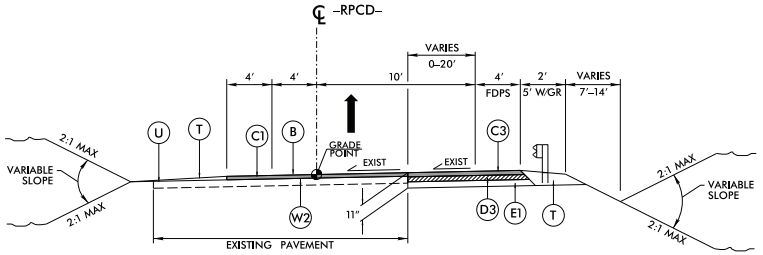


GORE AREA TIE IN
PARTIAL TYPICAL SECTION NO. 10A
–RPBA– STA. 24+29.21 TO STA. 25+60.85 RT.



TYPICAL SECTION NO. 11
–RPCD– STA. 9+89.34 TO STA. 16+55.00

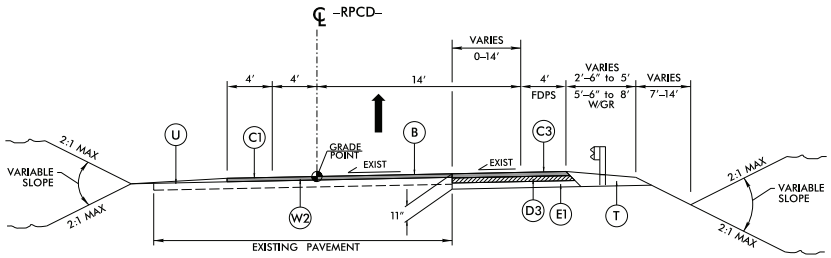
NOTE: THIS IS THE FINAL CONDITION OVERLAY AFTER TRAFFIC HAS BEEN MOVED BACK TO –L– AFTER BRIDGE CONSTRUCTION.



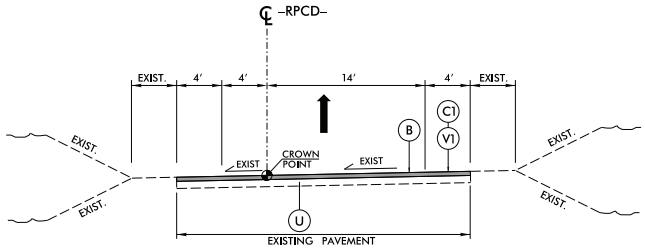
TYPICAL SECTION NO. 12
–RPCD– STA. 16+55.00 TO STA. 18+54.97

PAVEMENT SCHEDULE	
B	ASPHALT FRICTION COURSE
C1	1.5" S9.5C
C2	2.0" S9.5D
C3	3.0" S9.5C
C4	3.0" S9.5D
C5	VAR. S9.5C
C6	VAR. S9.5D
D1	2.5" I19.0C
D2	3.5" I19.0C
D3	4.0" I19.0C
D4	VAR. I19.0C
E1	4.0" B25.0C
E2	5.5" B25.0C
E3	VAR. B25.0C
R1	DOUBLE FACE CONC. BARRIER
R2	SINGLE FACE CONC. BARRIER
R3	SHOULDER BERM GUTTER
J	12" ABC
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	MILL 1.5"
V2	MILL 2"
V3	VAR. MILL 0"- 1.5"
W1	VAR. (WEDGING)
W2	VAR. (WEDGING)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 13
–RPCD– STA. 18+54.97 TO STA. 19+85.63



TYPICAL SECTION NO. 14
–RPCD– STA. 19+85.63 TO STA. 29+56.49

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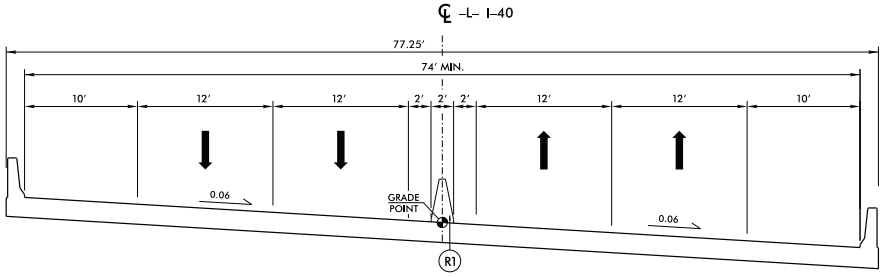
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2A-5

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042641 — Electronically Signed by: Laura C. Fisher — LAURA C. FISHER — 9/9/2021

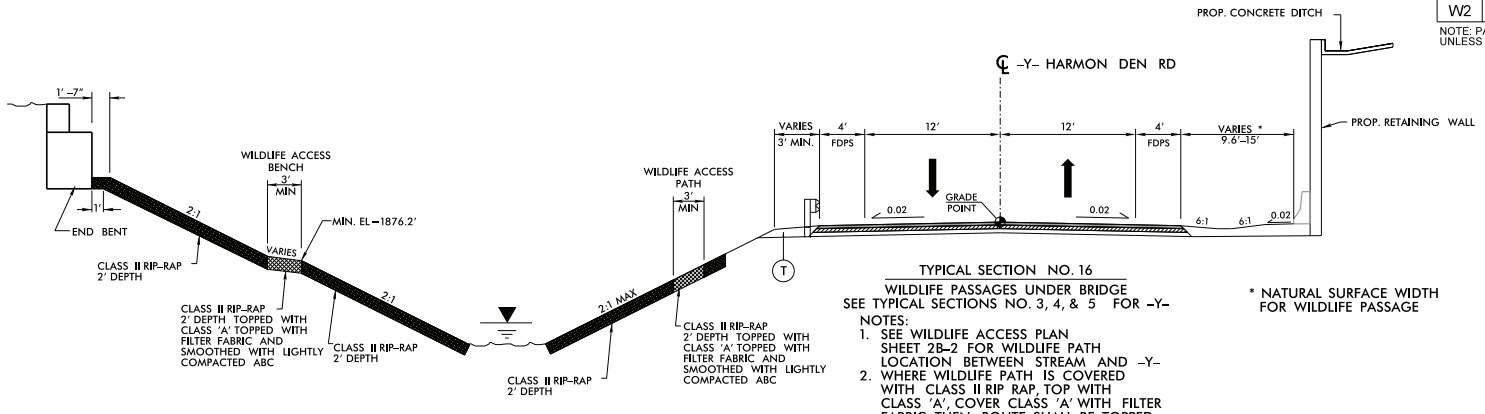
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



TYPICAL SECTION NO. 15
–L– STA. 28+90.17 TO STA. 31+08.04

PAVEMENT SCHEDULE	
B	ASPHALT FRICTION COURSE
C1	1.5" S9.5C
C2	2.0" S9.5D
C3	3.0" S9.5C
C4	3.0" S9.5D
C5	VAR. S9.5C
C6	VAR. S9.5D
D1	2.5" I19.0C
D2	3.5" I19.0C
D3	4.0" I19.0C
D4	VAR. I19.0C
E1	4.0" B25.0C
E2	5.5" B25.0C
E3	VAR. B25.0C
R1	DOUBLE FACE CONC. BARRIER
R2	SINGLE FACE CONC. BARRIER
R3	SHOULDER BERM GUTTER
J	12" ABC
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	MILL 1.5"
V2	MILL 2"
V3	VAR. MILL 0"- 1.5"
W1	VAR. (WEDGING)
W2	VAR. (WEDGING)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 16
WILDLIFE PASSAGES UNDER BRIDGE
SEE TYPICAL SECTIONS NO. 3, 4, & 5 FOR –Y–

NOTES:
1. SEE WILDLIFE ACCESS PLAN SHEET 2B–2 FOR WILDLIFE PATH LOCATION BETWEEN STREAM AND –Y–
2. WHERE WILDLIFE PATH IS COVERED WITH CLASS II RIP RAP, TOP WITH CLASS 'A' COVER CLASS 'A' WITH FILTER FABRIC, THEN ROUTE SHALL BE TOPPED AND SMOOTHED WITH ABC.
3. ALL CLASS II RIP RAP SHALL BE QUANTIFIED AS A STRUCTURES PAY ITEM.

* NATURAL SURFACE WIDTH FOR WILDLIFE PASSAGE

5/14/99

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$$$$$$$LOG$$$$$$$
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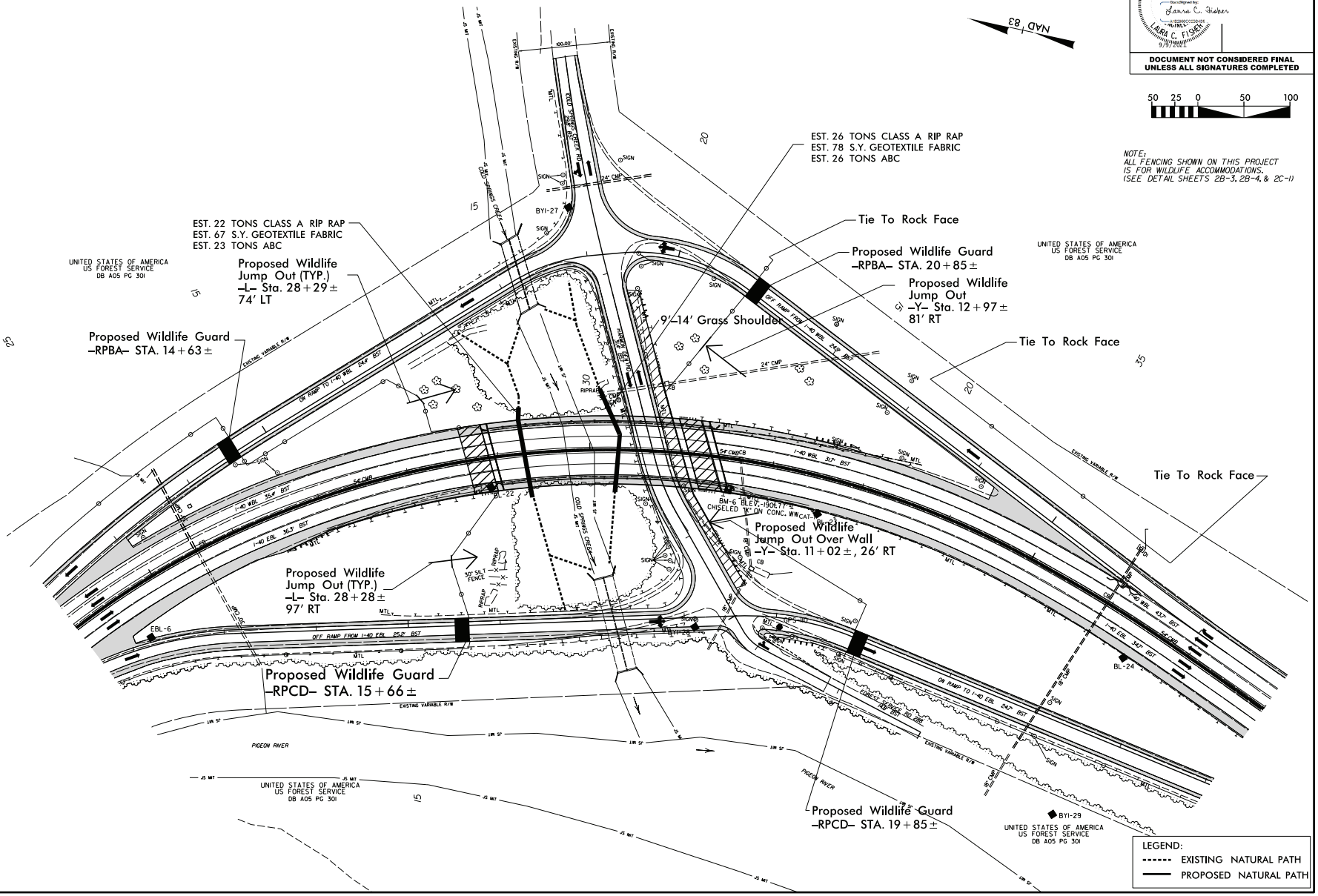
WILDLIFE ACCOMMODATIONS



NOTE:
ALL FENCING SHOWN ON THIS PROJECT IS FOR WILDLIFE ACCOMMODATIONS.
(SEE DETAIL SHEETS 2B-3, 2B-4, & 2C-1)

50 25 0 50 100

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2B-1

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 049165 ENGINEER LAURA C. FISHER 9/8/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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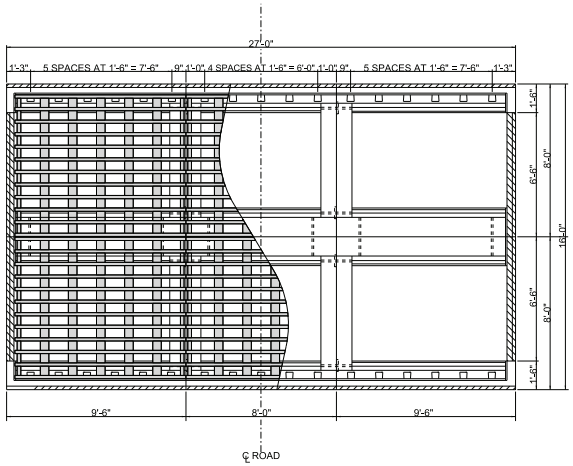
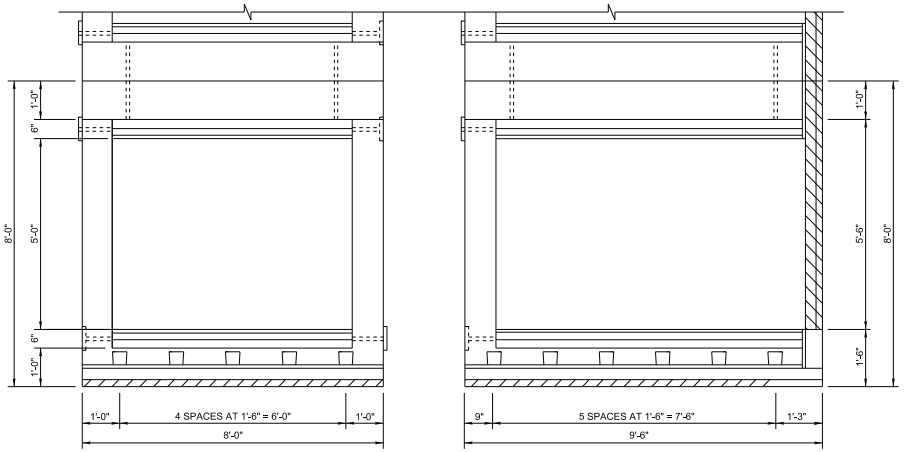
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2B-2

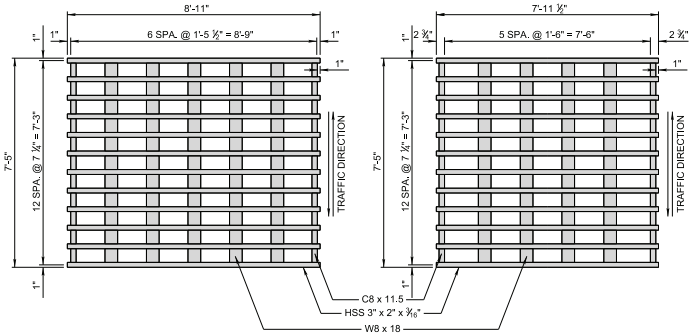


PRECAST GAME GUARD LAYOUT

NOTE: REFER TO ROADWAY PLANS FOR FINAL PLACEMENT LOCATIONS



PLAN VIEW - PRECAST GAME GUARD DETAILS



7'-6" STEEL GRID UNIT 8'-0" STEEL GRID UNIT

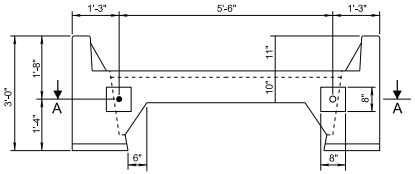
PLAN VIEW - TYPICAL GRID UNITS

NOTES:

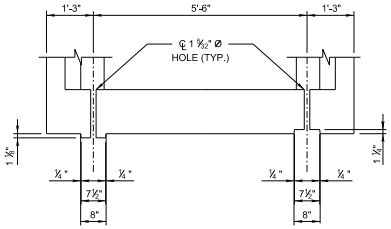
1. GAME GUARD SHALL COVER ENTIRE PAVED WIDTH OF ROADWAY PLUS SHOULDERS.

2. END OF FRAME SHALL HAVE AN OPENING LARGE ENOUGH TO SMALL ANIMALS TO CROSS UNDER THE ROADWAY. AREA UNDER THE GRATES SHALL BE PREPARED ACCORDING TO MANUFACTURER SPECIFICATIONS AND IN SUCH A WAY THAT A CLEAR PATH IS MAINTAINED FOR SMALL WILDLIFE.

3. WILDLIFE FENCING SHALL BE TERMINATED AT WILDLIFE GUARDS IN SUCH A WAY AS TI DETER LARGE WILDLIFE FROM ATTEMPTING TO CIRCUMVENT GUARDS.



TYPICAL KEYED END DETAIL



SECTION A-A

PRECAST GAME GUARD DETAILS

REVISIONS

8/17/99

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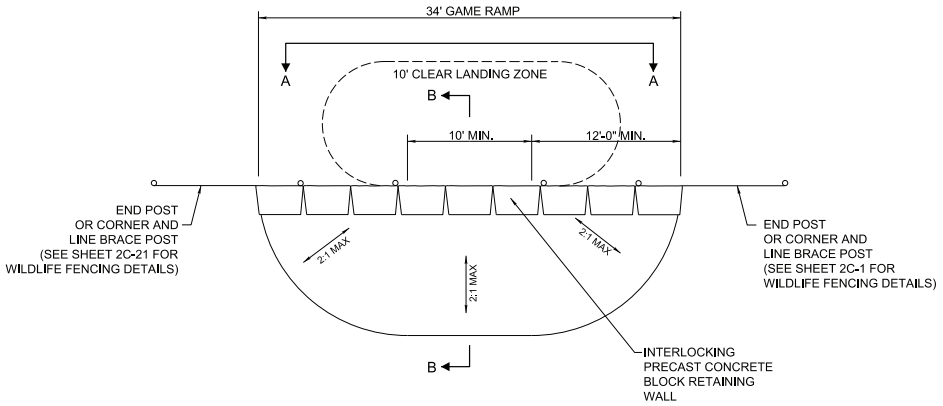
USER:bakill

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2B-3

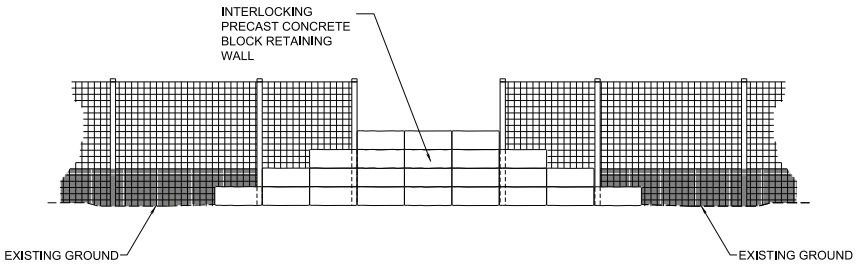
WILDLIFE JUMP OUT DETAILS

NOTES:

1. THE LANDING ZONE SHALL BE FLAT, STABLE, AND EARTHEN. THE AREA SHALL BE VOID OF OBJECTS THAT MAY HINDER OR ENDANGER WILDLIFE. THE ENGINEER MAY ADJUST THE GAME RAMP LOCATION AND WIDTH AS NEEDED.
2. THERE SHALL BE NO DISTURBANCE BEYOND THE ROW OR TEMPORARY/PERMANENT EASEMENTS.
3. FILL MATERIAL SHALL BE NO.57 STONE
4. FOUR INCHES OF TOPSOIL SHALL BE PLACED.
5. FINISHED HEIGHT OF BACKFILL/TOPSOIL SHALL BE 2" ABOVE CONCRETE BLOCK.
6. SEEDING SHALL BE COMPLETED AFTER THE ENGINEER APPROVES GRADING.
7. WALL FACE NOT TO BE MORE THAN 2" OUT OF VERTICAL.
8. INTERLOCKING PRECAST CONCRETE BLOCK RETAINING WALL H18"-24" x W36"-48" x D VARIES. VARIATION IN BLOCK SIZE IS ALLOWED WITH DIRECTION FROM THE ENGINEER.
9. WILDLIFE FENCE SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE PRECAST CONCRETE BLOCK.

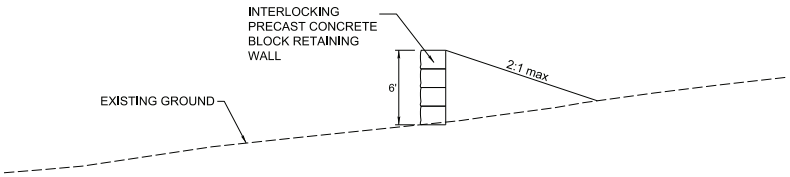


PLAN VIEW

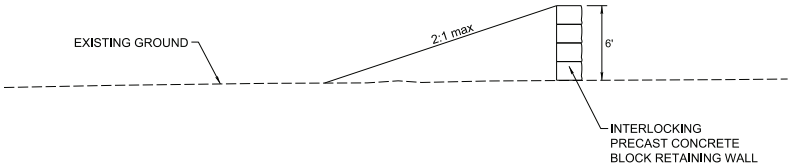


SECTION A-A
REAR ELEVATION VIEW

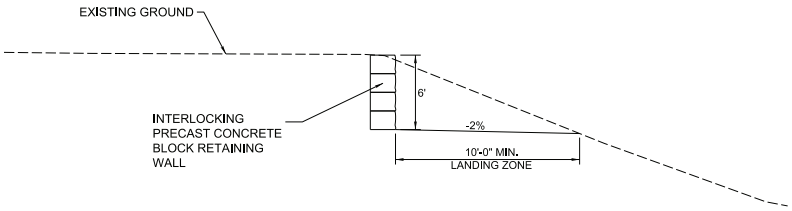
TYPICAL SECTIONS B-B



JUMP OUT QUADRANT A



JUMP OUT QUADRANT B



JUMP OUT QUADRANT C

REVISIONS

8/17/99

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USERNAME

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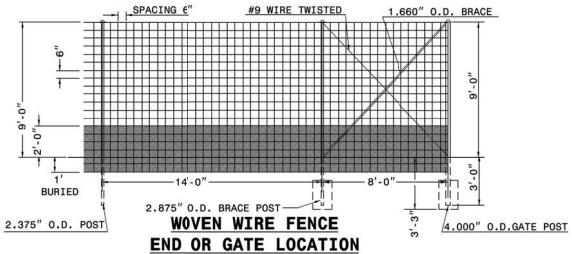
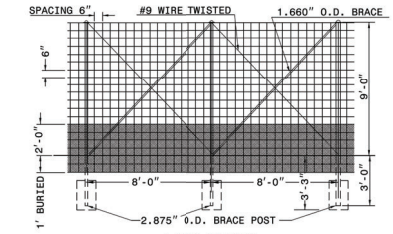
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2C-1

8/17/99

REVISIONS



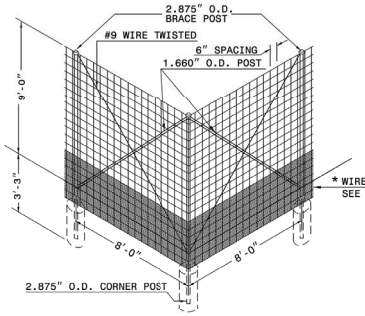
WOVEN WIRE FENCE END OR GATE LOCATION



LINE BRACES

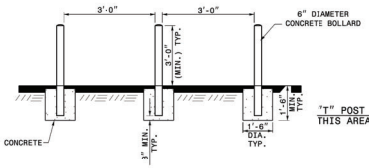
PLACE THE BRACE WIRE AROUND THE POST. DRAW THE WIRE TAUT BY TWISTING BETWEEN EACH POST. THIS APPLIES TO ALL BRACE WIRES.

ERECT LINE BRACES BETWEEN END, CORNER OR GATE POSTS AT INTERVALS NOT EXCEEDING 324 FEET.
THIS MAXIMUM INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES.
PLACE LINE BRACES AT THE END OF EACH ROLL OR PIECE OF WOVEN WIRE.



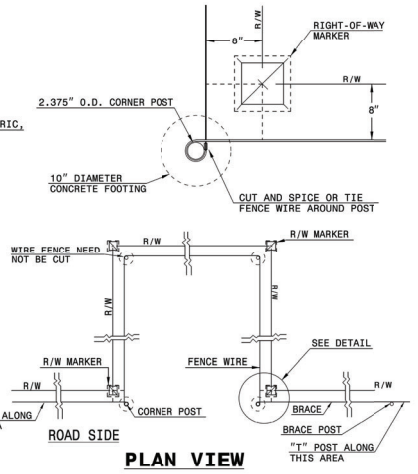
FENCE CORNER

USE WHEN CORNER ANGLE IS 15° OR GREATER

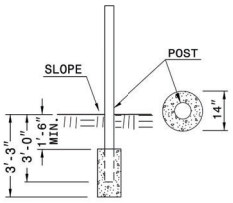


BOLLARDS FOR BLOCKING DRIVEWAYS AND OTHER ENTRANCES

INSTALL IN ADDITION TO FENCE WHERE SHOWN IN PLANS OR WHERE DIRECTED BY THE ENGINEER



PLAN VIEW

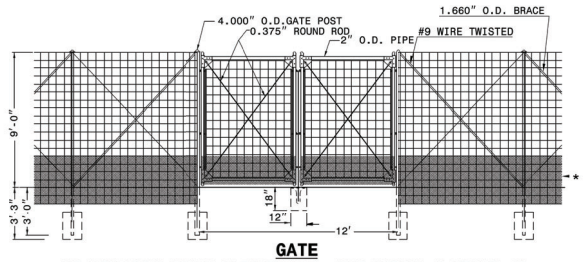


DETAIL OF POST ANCHOR

USE CONCRETE FOOTING ON ALL CORNER, END, GATE AND BRACE POSTS.

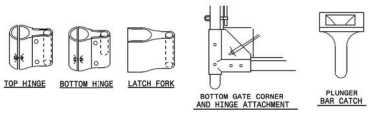
GENERAL NOTES:

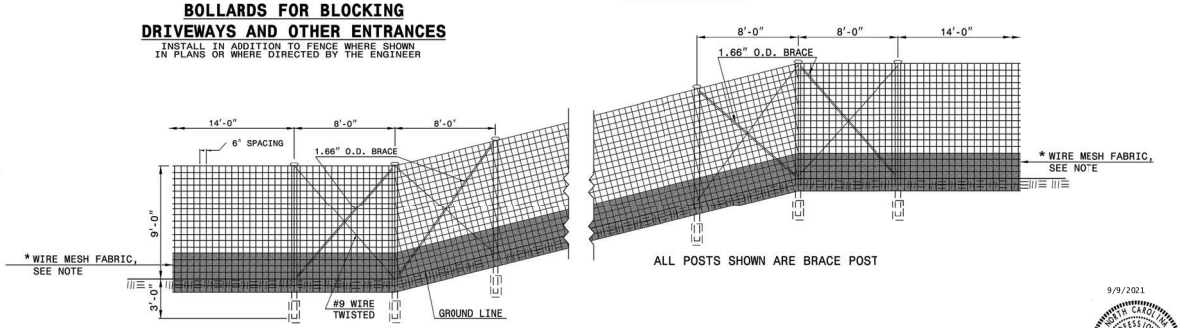
- INSTALL THE FENCE FACING THE PROPERTY OWNER EXCEPT ON HORIZONTAL CURVES GREATER THAN THREE DEGREES, INSTALL THE FENCE TO PULL AGAINST ALL POSTS.
- IN LIEU OF 2.375" O.D. TUBULAR POSTS 2½" x 2½" x¼" ANGLE SECTIONS MAY BE USED.
- IN LIEU OF 1.660" O.D. TUBULAR BRACES 2" x 2" x¼" ANGLE SECTIONS MAY BE USED.



GATE

USE LATCH DEVICE APPROVED BY THE ENGINEER. HINGE ASSEMBLY, AS DETAILED, IS SUGGESTED. SUBSTITUTION MAY BE MADE SUBJECT TO THE APPROVAL OF THE ENGINEER.



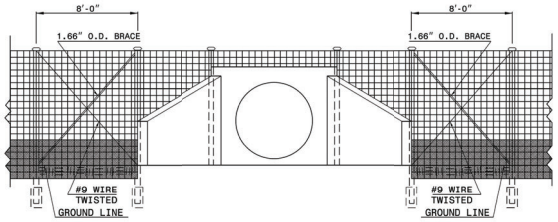


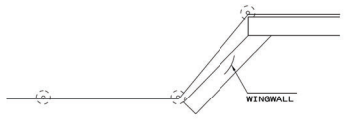
ALL POSTS SHOWN ARE BRACE POST

DETAIL SHOWING METHOD OF CONSTRUCTING FENCE ON SHARP BREAK IN GRADE

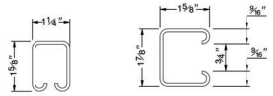
9/9/2021

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032810 ENGINEER S. Hamilton

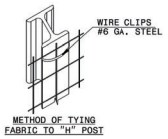




PLAN



ROLL FORMED LINE POST MAY BE DRIVEN TO A MINIMUM OF 3'-0" IN LIEU OF CONCRETE ANCHOR, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



* — 1¼" X 1¼" OPENING, 23 GAUGE HOT DIPPED GALVANIZED WIRE MESH.

— MESH TIES @ 24' CENTERS TO WELDED FABRIC. 18 GA OR 20 GA STAINLESS STEEL.

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

WILDLIFE FENCE

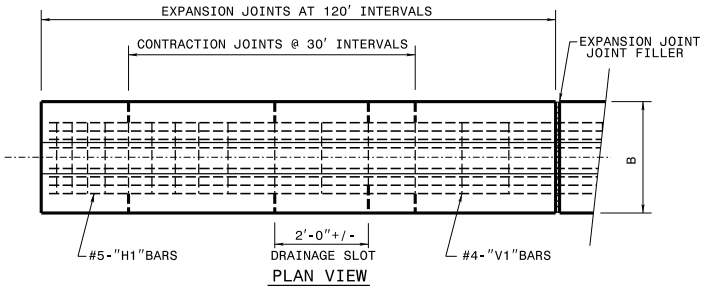
ORIGINAL BY:	K A KEMPF	DATE:	10/30/12
MODIFIED BY:		DATE:	
CHECKED BY:		DATE:	
FILE SPEC.:	kkempf\english\wildlifefence.dgn		

\$\$\$\$\$\$SYSTM\$\$\$\$\$ ...\Wildlife Fencing Details.dgn
USER:kkempf

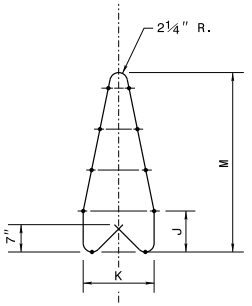
DocuSign Envelope ID: 9DA8D73A-D944-4C73-97DE-131B81F166FB

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2C-2



PLAN VIEW

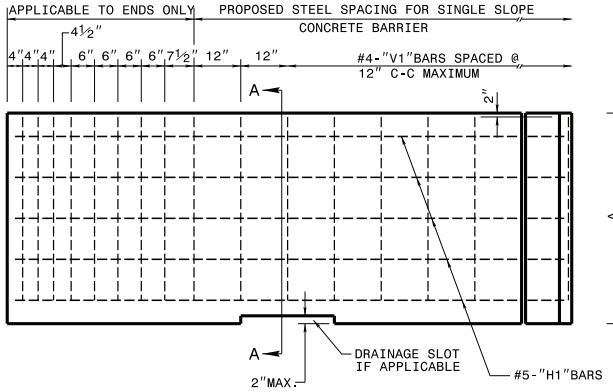


#4-"V1" BAR REINFORCING DETAIL

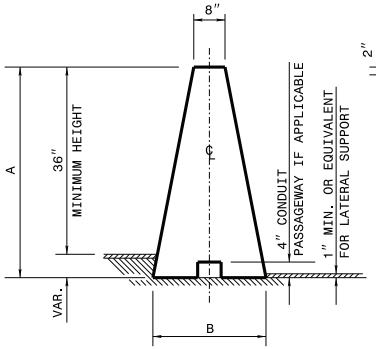
GENERAL NOTES:

1. USE CLASS "AA" CONCRETE.
2. MAINTAIN 2" OF COVER OVER ALL REBAR. CHAMFER TOP AND ENDS OF BARRIER ½ INCH.
3. USE BAR SPLICE LENGTHS A MINIMUM OF 20 TIMES THE NORMAL DIAMETER OF THE BAR. ANY METHOD DEVISED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL ROADWAY STEEL WILL BE POSITIONED +/-½INCH AS DIMENSIONED WILL BE SATISFACTORY.

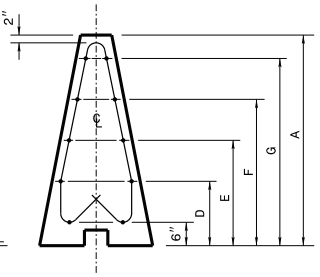
   WELDED WIRE FABRIC MAY BE USED AS AN OPTION TO CONVENTIONAL REINFORCMENT FOR CAST-IN-PLACE BARRIER. WELDED WIRE FABRIC SHALL BE MADE IN ACCORDANCE WITH ASTM A497. CONDUIT TO BE PROVIDED ONLY WHEN CALLED FOR ELSEWHERE IN THE PLANS. POSITION OF THE CONDUIT OR CONDUIT PASSAGEWAY MAY BE ADJUSTED TO FACILITATE CONSTRUCTION, SUBJECT TO APPROVAL BY THE ENGINEER.
4. REFER TO ROADWAY STANDARD DRAWING NO.854.01 FOR EXPANSION AND CONTRACTION JOINT, FILLER AND OTHER SPECIFICATIONS.



ELEVATION



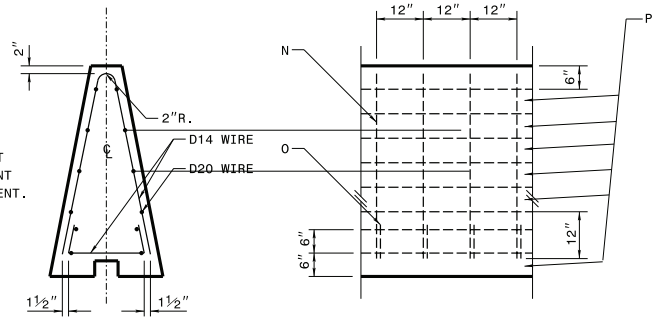
TYPICAL SECTION



SECTION A-A

WHEN BARRIER IS TO BE USED WITH THE WELDED WIRE FABRIC, OPTION CONVENTIONAL BAR REINFORCMENT WILL BE REQUIRED WITHIN 2 FEET, PLUS A DEVELOPMENT LENGTH OF 18" FROM THE ENDS OF EACH BARRIER SEGMENT.

WELDED WIRE FABRIC
4 X 12 - C20 % D14
60 X S1 MINIMUM YIELD STRENGTH



END VIEW SIDE VIEW

WELDED WIRE FABRIC OPTIONAL REINFORCING

BARRIER HEIGHT (IN.)	DIMENSIONS											
	A	B	D	E	F	G	K	L	M	N	O	P
48"	48	26 9/32	15	24	33	42	17½	10¾	42	84	31½	5
52"	54	28⁹⁄₁₆	16½	27	37½	48	19½	12¼	48	96	34¾	6

9/9/2021

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036961 S. Howington

DocuSigned by:

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CONTRACT SERVICES & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-707-6950 FAX 919-250-4119

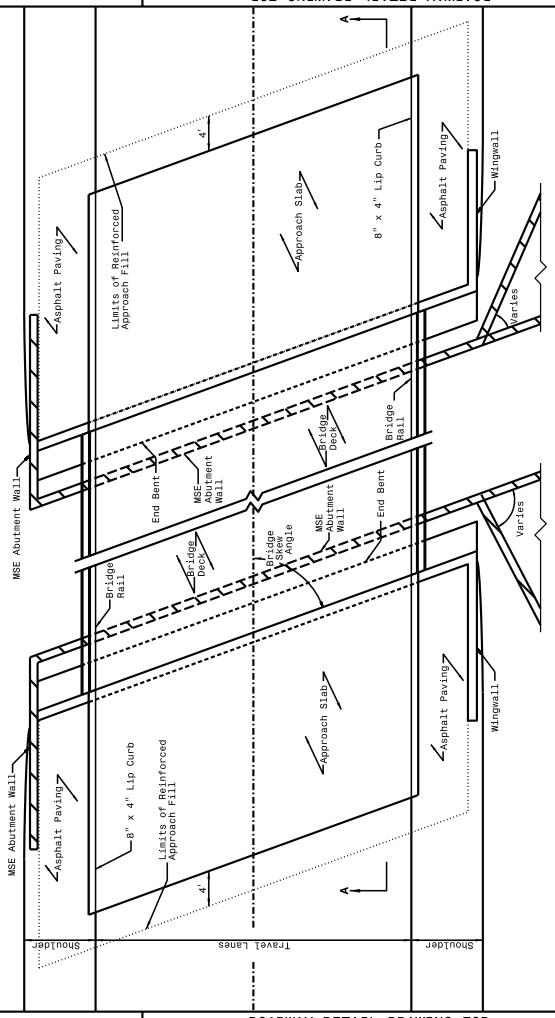
SINGLE SLOPE CONCRETE BARRIER

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 08-18-06
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/guardrail/single slope concrete barrier.dgn

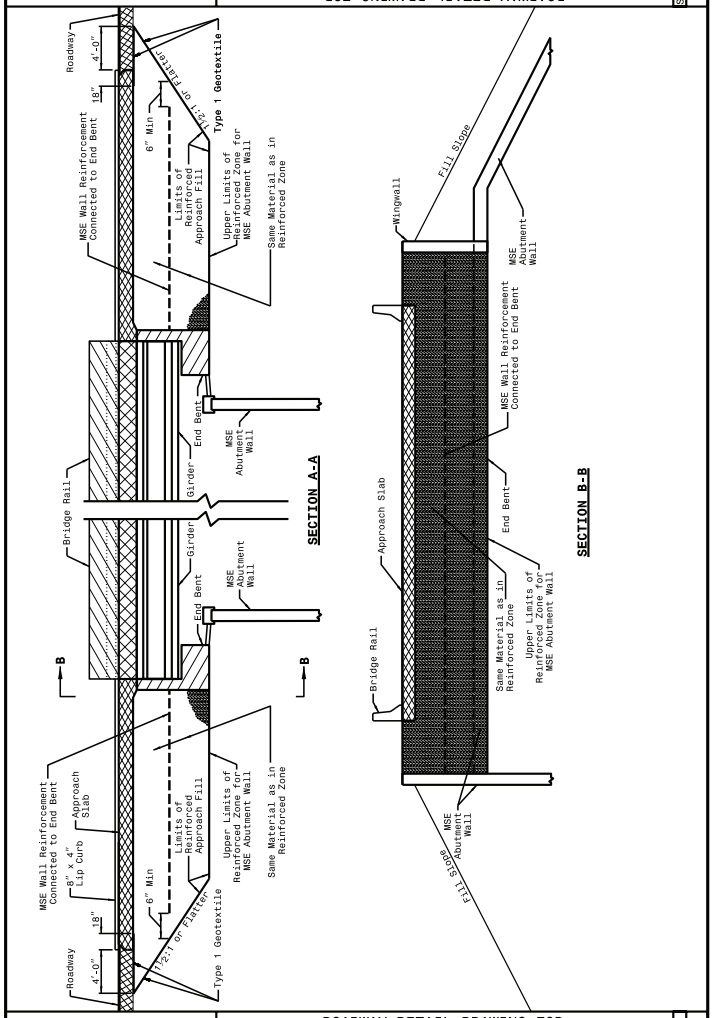
DocuSign Envelope ID: 9DA8D73A-D944-4C73-97DE-131B81F166FB

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2C-3

ROADWAY DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
TYPE III - REINFORCED APPROACH FILL FOR MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL
SHEET 1 OF 2 422D10
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.



ROADWAY DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
TYPE III - REINFORCED APPROACH FILL FOR MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL
SHEET 2 OF 2 422D10
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.



STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
TYPE III - REINFORCED APPROACH FILL FOR MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL

SHEET 1 OF 2 422D10

9/9/2021

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CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

TYPE III REINFORCED APPROACH FILLS

ORIGINAL BY: K. A. KEMPF DATE: JULY 2017
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: 2018 standard drawings\division 422d10.dgn

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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	2C-4

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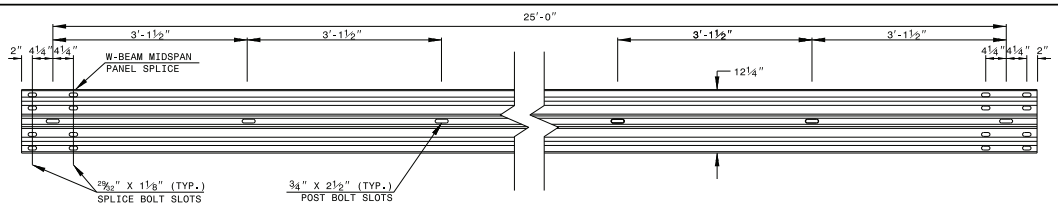
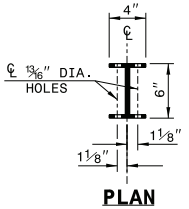
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

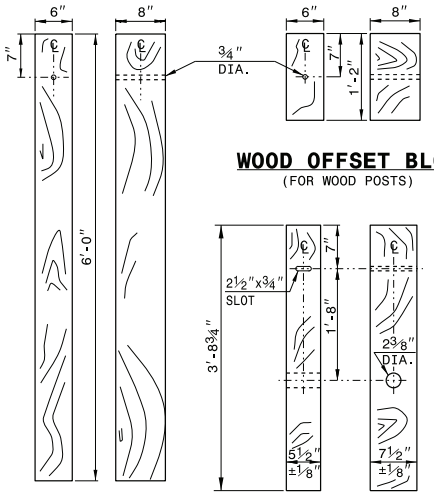
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL



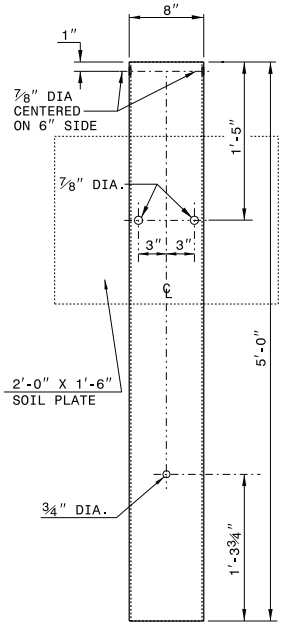
PLAN



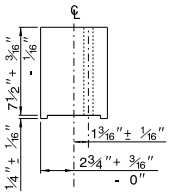
WOOD OFFSET BLOCK
(FOR WOOD POSTS)

STANDARD LINE POST

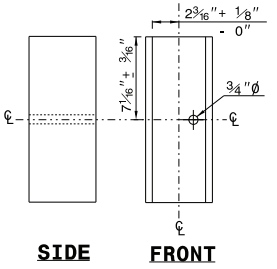
SHORT WOOD BREAKAWAY POST



STEEL TUBE
TS 6"x8"x0.1875"

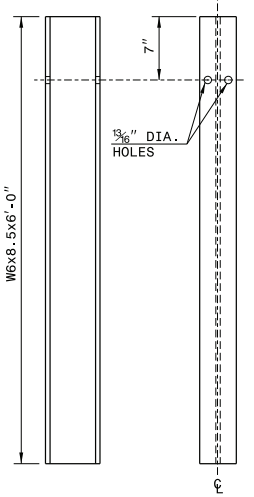


PLAN



SIDE FRONT

ROUTED OFFSET BLOCK



SIDE **FRONT**

"W6" STEEL POST

SYSTEM PARTS

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

9/9/2021

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047180 JOHN LINE HOWERTON
DocuSigned by:

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: J.HOWERTON DATE: 3-7-2018
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

COMPUTED BY: ____SSL_____ DATE: _01/25/21_____	PROJECT NO.	SHEET NO.
CHECKED BY: _____LF_____ DATE: _02/24/21____	B-6054A	3B-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
RPBA	16+50	16+66	CL	43.3			
RPBA	19+44	20+72	LT	549.6			
RPBA	20+85	21+01	CL	44.7			
RPCD	15+52	15+68	CL	38.6			
RPCD	16+87	17+84	LT	249.2			
RPCD	18+25	19+61	RT	251.9			
RPCD	19+02	19+39	LT	23.0			
RPCD	19+86	20+02	CL	43.4			
Y1	12+31	11+11	LT	136.7			
Y	10+00	15+50	CL	1947.7			
		TOTAL:		3328.10			
		SAY:		3330			

SHOULDER BERM GUTTER SUMMARY

IN FEET

LINE	Station	Station	LENGTH
-L-	26+97.05	28+94.99	197.94
-L-	31+21.50	32+50.00	128.50
		TOTAL:	326.44
		SAY:	327.00

SUMMARY OF EARTHWORK

IN CUBIC YARDS

Station	Station	Uncl. Excav.	Embank. +15%	Borrow	Waste
-L- STA. 25+40.00	-L- STA. 28+90	91	2,890	2,799	
-L- STA. 31+06.00	-L- STA. 36+06.00	212	6946	6734	
Subtotals:		303	9,836	9,533	0
-Y- STA. 10+00	-Y- STA. 16+40	1691	155		1536
Subtotals:		1691	155	0	1536
-Y1- STA. 11+14.00	-Y1- STA. 12+00	14	3		11
Subtotals:		14	3	0	10
-RPBA- STA. 13+00	-RPBA- STA. 25+00.00	398	313		85
Subtotals:		398	312	0	85
-RPCD- STA. 18+54.97	-RPCD- STA. 19+85.00	52	35		18
Subtotals:		52	34	0	17
SUBTOTALS:		2458	10341	9532	1649
Loss Due to Clearing and Grubbing		-150			
Waste In Lieu of Borrow				-1647	
Est. 5% To Replace Top Soil on Borrow Pit				394	
PROJECT TOTALS:		2,308	10,341	8,279	1,649
SAY:		2,400		8,300	
CONTINGENCY UNDERCUT = 450 CY					
CONTINGENCY SELECT GRANULAR MAT.= 200 CY					
CONTINGENCY GEOTEXTILE FOR SOIL STAB. = 400 SY					
CONTINGENCY SHALLOW UNDERCUT= 100 CY					
CONTINGENCY CLASS IV SUBGRADE STABILIZATION = 200 TON					
CONTINGENCY GEOTEXTILE FOR EMBANKMENT STAB. = 200SY					

Note: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for grading.

Note: Earthwork quantities are calculated by Alfred Benesch. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

COMPUTED BY: SSL DATE: 1/12/2021	PROJECT REFERENCE NO.	SHEET NO.
CHECKED BY: SWC DATE: 2/23/21	B-6054A	3B-1

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

GUARDRAIL SUMMARY

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS						IMPACT ATTENUATOR		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	Type III	B-77 SAU	GREU, TL-3	GREU, TL-2	CAT-1	AT-1	Type III SC	G	NG			
-L-	26+96.76	28+96.60	RT	250.0				28+96.60	10			50		1		1	1		1					219.11		
-L-	31+21.50	32+50.00	RT	137.5					10							1								704		
-L-	30+93.37	32+84.89	LT	200.0			32+84.89		10	13	50		1			1	1							231.68		
-Y-	10+24.50	10+91.02	RT	75.0				10+91.02	14			50		1		1		1						348.12		
-Y-	12+84.41	13+73.13	RT	100.0				13+73.13	16	15		50		1		1		1						200		
-Y-	10+72.47	13+95.16	LT	325.0					6	5														645.07		
-RPBA-	17+38.76	18+99.26	RT	125.0	37.5				6	5									1							
-RPCD-	16+47.87	17+98.29	LT	125.0	62.5				7.5	7																Tie to exisiting Guardrail at Beg. Station
-RPCD-	16+00.00	18+20.54	RT	231.3					6	5									1					151.5		Tie to exisiting Guardrail at Beg. Station
-RPCD-	18+95.12	20+54.15	RT	162.5					6	5							1							167		Tie to exisiting Guardrail at End Station
			SUB-TOTAL (FT)	1731.250	100.00																					
	LESS ANCHOR DEDUCTIONS																									
		GREU TL-2 @25'	2	50.000																						
		GREU TL-3 @50'	3	150.000																						
		B-77 SAU @ 22.875	5	114.375																						
		CAT-1 @6.25'	3	18.750																						
			PROJECT TOTAL	1400.00	100.00											5	3	2	3					200	2466.5		
	Additional Guardrail Posts 5 Each																									

NCDOT-SHL3

COMPUTED BY: Joy Saddler, PE DATE: 05/07/2021

CHECKED BY: Sara Loukili, EI DATE: 05/10/2021

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-6054A	3D-1

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

| LINE & STATION | OFFSET | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | R. C. PIPE CLASS III 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | R. C. PIPE CLASS IV 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | ENDWALLS STD. 838.11 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | REINFORCED ENDWALLS CY | DRAINAGE STRUCTURE MASONRY CY | QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B) A: 0' THRU 5' EACH | A: 5' THRU 10' LIN. FT. | B: 10' AND ABOVE LIN. FT. | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E | F | G | CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06 | C.B. STD. 852.05 | OPEN THROAT C.B. STD. 840.04 OR STD. 840.05 | CONCRETE BRIDGE APPROACH D.I. STD. 840.13 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26 | G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.2 | G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840. | G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22 | G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.2 | G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24 | G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.2 | G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29 | G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.3 | J.B. STD. 840.31 OR STD. 840.32 | ANGLED VANE GRATES AND FRAMES STD. 840.3 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | T.B.D.I. FOR STEEL GRATES STD. 840.36 | STEEL FRAME WITH TWO GRATES STD. 840.37 | TEMP STEEL PLATE COVER MASONRY DRAINAG | BERM DITCH OUTLET STD. 850.11 (PER EACH) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | CONCRETE AND BRICK PIPE PLUG STD. 840.7 CY | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

NCDOT-SHL3

COMPUTED BY: Joy Saddler, PE DATE: 05/07/2021

CHECKED BY: Sara Loukili, EI DATE: 05/10/2021

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-6054A	3D-2

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

| LINE & STATION | OFFSET | | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | R. C. PIPE CLASS III: 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | R. C. PIPE CLASS IV: 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | ENDWALLS STD. 838.11 (UNLESS NOTED OTHERWISE) CY | REINFORCED ENDWALLS CY | DRAINAGE STRUCTURE MASONRY CY | QUANTITIES FOR DRAINAGE STRUCTURES (NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)) 0' THRU 5' EACH | A: 5' THRU 10' LIN. FT. | B: 10' AND ABOVE LIN. FT. | C.B. STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E | F | G | CONCRETE TRANSITIONAL SECTION D.I. STD. 852.04 OR STD. 852.06 | C.B. STD. 852.05 | OPEN THROAT C.B. STD. 840.04 OR STD. 840.05 | CONCRETE BRIDGE APPROACH D.I. STD. 840.13 | D.I. STD. 840.14 OR STD. 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26 | G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | G.D.I. (W.S. FLAT) FRAME WITH GRATE STD. 840.2 | G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD. 840. | G.D.I. (W.S. SAG) FRAME W/ GRATE STD. 840.22 | G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD. 840.2 | G.D.I. (N.S. SAG) FRAME W/ GRATE STD. 840.24 | G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD. 840.2 | G.D.I. (N.S. FLAT) FRAME W/ GRATE STD. 840.29 | G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.3 | J.B. STD. 840.31 OR STD. 840.32 | ANGLED VANE GRATES AND FRAMES STD. 840.33 | T.B.J.B. STD. 840.34 | T.B.D.I. STD. 840.35 | T.B.D.I. FOR STEEL GRATES STD. 840.36 | STEEL FRAME WITH TWO GRATES STD. 840.37 | TEMP STEEL PLATE COVER MASONRY DRAINAGE | BERM DITCH OUTLET STD. 850.11 (PER EACH) | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

NCDOT-SHA-3

COMPUTED BY: Joy Saddler, PE DATE: 05/07/2021

CHECKED BY: Sara Loukili, EI DATE: 05/10/2021

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-6054A	3D-3

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 54 INCHES & OVER)

| LINE & STATION | OFFSET | STRUCTURE NUMBER FROM | STRUCTURE NUMBER TO | TOP ELEVATION FT. | INVERT ELEVATION FT. | INVERT ELEVATION FT. | MINIMUM REQUIRED SLOPE % | R. C. PIPE CLASS IV 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | STRUCTURAL PLATE PIPE 60 | 66 | 72 | ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CY | REINFORCED ENDWALLS CY | DRAINAGE STRUCTURE MASONRY CY | QUANTITIES FOR DRAINAGE STRUCTURES A 0' THRU 5' EACH | A 5' THRU 10' LIN. FT. | B 10' AND ABOVE LIN. FT. | C.B., STD. 840.01 OR STD. 840.02 | FRAME, GRATES, AND HOOD STD. 840.03 GRATE TYPE E | F | G | CONCRETE TRANSITION STRUCTURE SECTION D.I., STD. 852.04 OR STD. 852.06 | C.B., STD. 852.05 | OPEN THROAT C.B., STD. 840.04 OR STD. 840.05 | CONCRETE BRIDGE APPROACH D.I., STD. 840.13 | D.I., STD. 840.14 OR STD. 840.15 | D.I., FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR STD. 840.26 | G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27 | G.D.I. TYPE "D" STD. 840.19 OR STD. 840.28 | G.D.I. (W.S.-FLAT) FRAME WITH GRATE STD. 840.21 | G.D.I. (W.S.-FLAT) FRAME W/ 2 GRATES STD. 840.31 | G.D.I. (W.S.-SAG) FRAME W/ GRATE STD. 840.22 | G.D.I. (W.S.-SAG) FRAME W/ 2 GRATES STD. 840.32 | G.D.I. (N.S.-SAG) FRAME W/ GRATE STD. 840.24 | G.D.I. (N.S.-SAG) FRAME W/ 2 GRATES STD. 840.23 | G.D.I. (N.S.-FLAT) FRAME W/ GRATE STD. 840.29 | G.D.I. (N.S.-FLAT) FRAME W/ 2 GRATES STD. 840.33 | DRIVEWAY D.I. STD. 840.30 | FRAME W/ GRATE FOR DRIVEWAY STD. 840.30 | J.B., STD. 840.31 OR STD. 840.32 | ANGLED VANE GRATES AND FRAMES STD. 840.33 | T.B./J.B., STD. 840.34 | T.B./D.I. STD. 840.35 | T.B./D.I. FOR STEEL GRATES STD. 840.36 | STEEL FRAME WITH TWO GRATES STD. 840.37 | MODIFIED CONC. FLUME | FLOWABLE FILL CY | CONCRETE COLLARS CL. "B" STD. 840.72 CY | CONCRETE AND BRICK PIPE PLUG STD. 840.71 CY | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

COMPUTED BY: Joey Daily DATE: 6/28/2021

CHECKED BY: Stewart Laney DATE: 6/28/2021

(12-17-19)

PROJECT NO.	SHEET NO.
B-6054A	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	200
				TOTAL LF:	200

*UD = Underdrain
*BD = Blind Drain
*SD = Subsurface Drain

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU	12	100	200	400		
			TOTAL CY/TONS/SY:		100	200**	400**	0	0

*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)
*AST = Aggregate Stabilization
**Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	4

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER
Docu Signed by: Laura C. Fisher
LAURA C. FISHER
9/9/2021

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER
Docu Signed by:
JOY M. SACOLICK
9/9/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-L-

PI Sta 11+24.49
△ = 6° 38' 13.2" (LT)
D = 2° 47' 41.7"
L = 237.47'
T = 118.87'
R = 2,050.00'
e = EXIST.

PI Sta 21+82.49
△ = 7° 01' 22.6" (RT)
D = 6° 26' 15.8"
L = 1,087.70'
T = 623.45'
R = 890.00'
e = EXIST.

-RPBA-

PI Sta 12+81.81
△ = 18° 25' 23.8" (RT)
D = 4° 05' 33.2"
L = 450.17'
T = 227.04'
R = 1,400.00'
e = EXIST.

-RPCD-

PI Sta 11+60.60
△ = 45° 49' 19.1" (RT)
D = 15° 04' 40.2"
L = 303.90'
T = 160.60'
R = 380.00'
e = EXIST.

NAD 83/2011

S 62° 19' 33.6" E

-RPBA- PC Sta. 10+51.44

BEGIN OVERLAY
-RPBA- POT Sta. 10+06.30=
-L- Sta. 22+07.42
LT 29.00

UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301

TIE TO ROCK FACE
BEG. FENCE
-L- +16.54

2' DOUBLE FACED CONC. MEDIAN BARRIER

120' TAPER TO MAINTAINING EXIST. EOP

REMOVE 56' SIGN

REMOVE 66' SIGN

-L- PC Sta. 15+59.04

200' TAPER

120' TAPER 2' TO 4' MEDIAN PAVED SHOULDER WB

BEG. NEW CONC. BARRIER
-L- +43.10

-L- PT Sta. 12+43.10

-L- POT Sta. 9+98.18
-L- PC Sta. 10+05.63

N 75° 56' 02.0" E

N 82° 34' 15.2" E

BEGIN TIP PROJECT B-6054A
-L- STA. 10+00.00
BEGIN MILL & RESURFACE

EXISTING R/W

RETAIN EXISTING NETWORK

RETAIN EXISTING OUTFALL

BM 1 ELEV.=189.05' SPIKE SET IN 12" BIRCH

UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301

EST. 2 TONS CLASS B RIP RAP
EST. 7 S.Y. GEOTEXTILE FABRIC

G/R TO BE RETAINED

EST. 5 TONS CLASS B RIP RAP
EST. 16 S.Y. GEOTEXTILE FABRIC

INSERT PLUGS AND FLOWABLE FILL FOR 37'

INSERT PLUGS AND FLOWABLE FILL FOR 85'

BEG. FENCE
TIE TO EXIST. RETAINING WALL
-L- +05.18

BEGIN OVERLAY
-RPCD- PC Sta. 9+89.34=
-L- Sta. 22+19.59
RT 27.00

UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301

PIGEON RIVER

MATCH LINE -L- STA. 24+00 SEE SHEET 5

NOTE:
ALL FENCING SHOWN ON THIS PROJECT IS FOR WILDLIFE ACCOMMODATIONS.
(SEE DETAIL SHEETS 2B-2 THRU 2B-4, & 2C-1)

PAVED SHOULDER

FOR -L- PROFILE SEE SHEET 7
FOR -RPBA- PROFILE SEE SHEET 9
FOR -RPCD- PROFILE SEE SHEET 10

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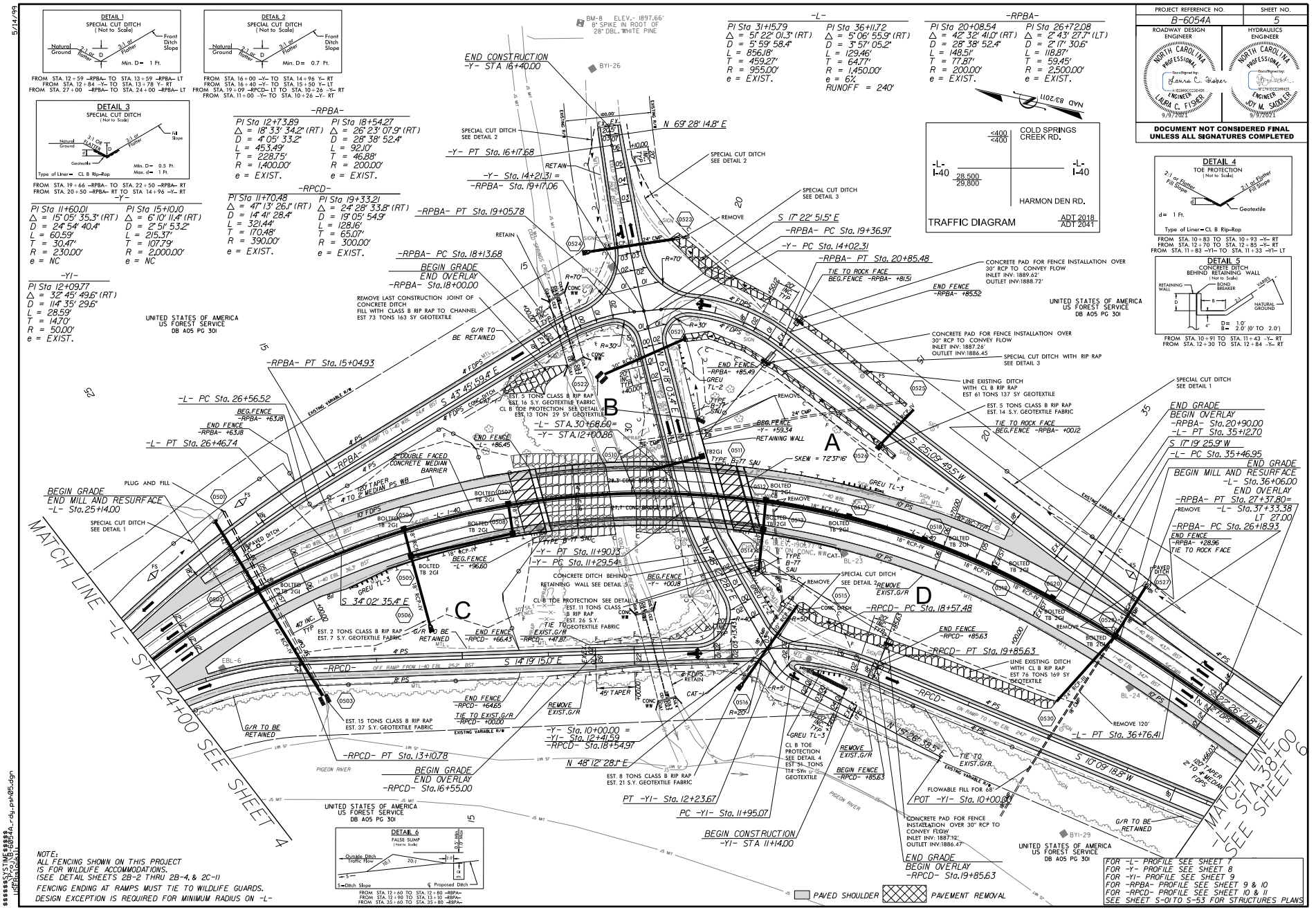

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5/14/99

-L-	-RPCD-
PI Sta 43+37.67	PI Sta 27+21.78
△ = 43° 55' 23.3" (LT)	△ = 10° 09' 50.6" (LT)
D = 5° 06' 56.5"	D = 3° 49' 11.0"
L = 858.60'	L = 266.09'
T = 451.64'	T = 133.40'
R = 1,120.00'	R = 1,500.00'
e = EXIST.	e = EXIST.

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	6

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER
Laura C. Fisher
LAURA C. FISHER
9/9/2021

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER
JOY M. SACKLER
9/9/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTE:
ALL FENCING SHOWN ON THIS PROJECT IS FOR WILDLIFE ACCOMMODATIONS.
(SEE DETAIL SHEETS 2B-2 THRU 2B-4, & 2C-1)

PAVED SHOULDER.

NAD 83/2011

MATCH LINE -L- STA. 38+00 SEE SHEET 5

-L- PC Sta. 38+86.03

-L- PT Sta. 47+44.63

-L- POT Sta. 51+68.20

END TIP PROJECT B-6054A
-L- STA. 51+68.20
END MILL AND RESURFACE

-RPCD- PC Sta. 25+87.54

-RPCD- PT Sta. 28+43.81

-RPCD- POT Sta. 29+56.49=
-L- Sta. 43+24.84
RT 29.00

END OVERLAY

UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301

2' DOUBLE FACED CONC. MEDIAN BARRIER

MAINTAIN EXIST. EOP

REMOVE CONC. DITCH

REMOVE

REPLACE PIPE WITH 60" RCP BURRIED 1'

BEVELED HW

DOWNSTREAM PIPE TO BE LINED WITH CLASS A CIPP. RETAIN EXISTING OUTFALL.

RETAIN DI IF POSSIBLE

END NEW CONC. BARRIER
-L- +44.63
TIE TO EXIST.

BOLTED TB 2GI

18" RCP-IV

4' FDPS

2' PS

10' PS

4' PS

120' TAPER 2' TO MEDIAN FDPS EB

200' TAPER

-L- I-40

I-40 EBL 362' BST

I-40 EBL 402' BST

I-40 EBL 358' BST

S 21° 29' 01.5" E

S 0° 00' 31.8" E

CL B RIP RAP DOWN OUTFALL TO FOREST SERVICE ROAD
EST 22 TONS, 22 SY GEOTEXTILE

CL B RIP RAP DOWN OUTFALL TO FOREST SERVICE ROAD
EST 29 TONS 65 SY GEOTEXTILE

G/R TO BE RETAINED

PIPE PLUGS AND FLOWABLE FILL

END FENCE
TIE TO RIP-RAP PAD
-L- +27.97

BM-7 ELEV.- 1914.96'
8" SPIKE IN ROOT OF 10" POPLAR

BM-9 ELEV.-1875.47'
8" SPIKE SET IN ROOT OF AN 18" POPLAR

BM-10 ELEV.- 1923.40'
SPIKE SET IN 20" POPLAR

BYI-30

BYI-31

BL-33

PIGEON RIVER

DETAIL 6
FALSE SUMP
(Not to Scale)

Outside Ditch Traffic Flow

10:1

2:1

4.0 min.

S = Ditch Slope

℄ Proposed Ditch

FROM STA. 41+95 TO STA. 42+15 -L-

FOR -L- PROFILE SEE SHEET 8
FOR -RPCD- PROFILE SEE SHEET 11

$$$$$$$SYSTIME$$$$$$$
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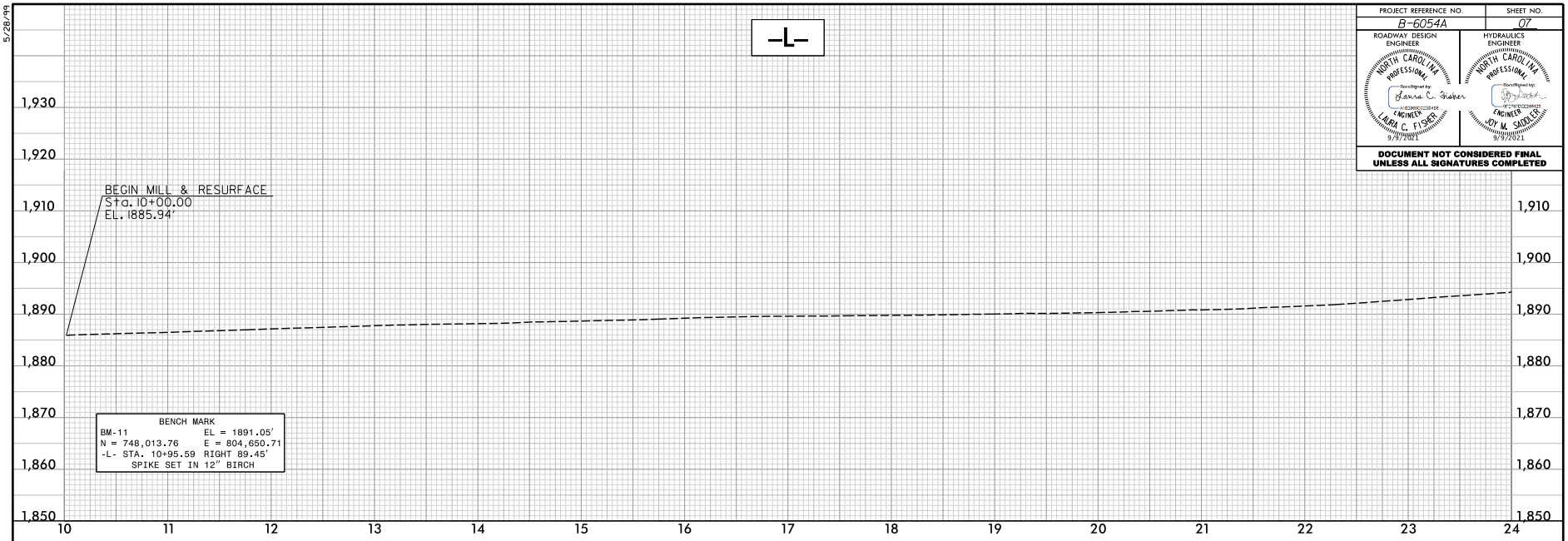
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	07

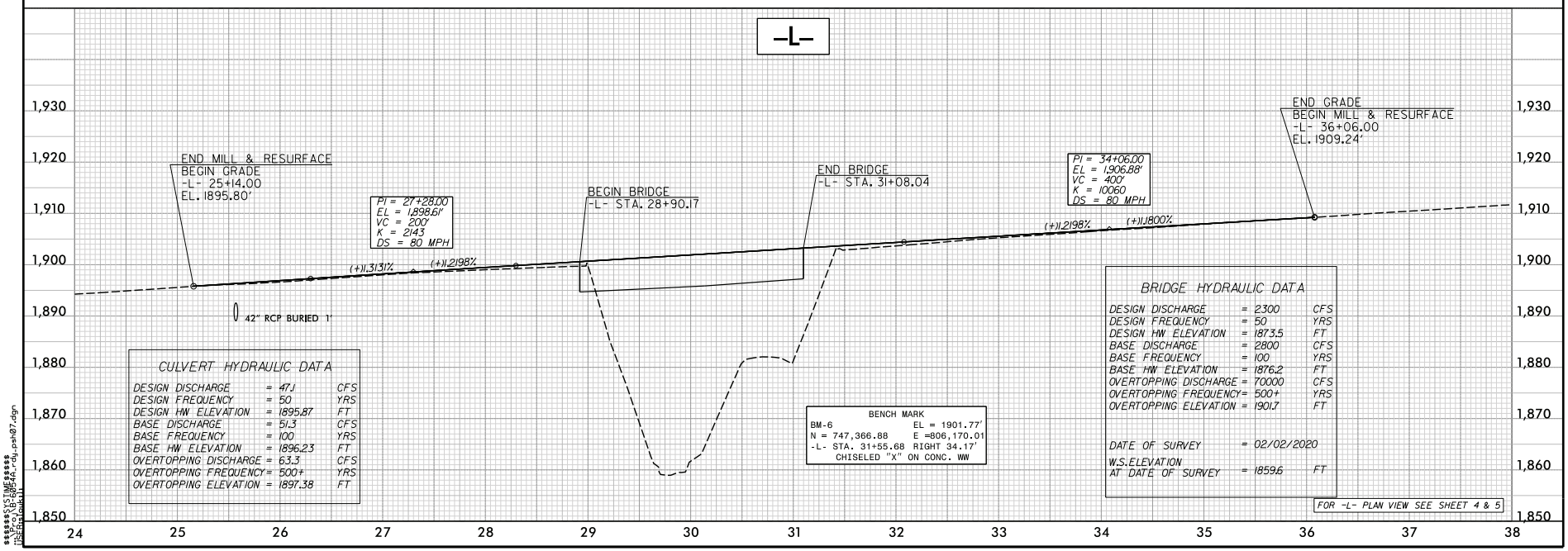
ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER — LAURA C. FISHER — 9/9/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER — JOY M. SKIDLESS — 9/9/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/28/99





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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	08

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL — LAURA C. FISHER — 9/9/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL — JOY M. SADDLER — 9/9/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/28/99

-L-

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 20.4	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 1912.1	FT
BASE DISCHARGE	= 24.5	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1912.4	FT
OVERTOPPING DISCHARGE	= 29	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 1913.0	FT

END MILL & RESURFACE
Sta. 51+68.20
EL 1929.65'

30" RCP

54" CMP TO BE LINED

BENCH MARK
BM-9 EL = 1875.47'
N =746,482.83 E =805,792.75
-L- STA. 41+14.89 RIGHT 171.23'
8" SPIKE SET IN ROOT OF AN 18" POPLAR

BENCH MARK
BM-7 EL = 1914.96'
N =746,328.21 E =805,873.19
-L- STA. 42+43.63 RIGHT 71.38'
8" SPIKE SET IN ROOT OF AN 10" POPLAR

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 10.4	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 1921.6	FT
BASE DISCHARGE	= 12.7	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1922.3	FT
OVERTOPPING DISCHARGE	= 142.5	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 1922.8	FT

BENCH MARK
BM-10 EL = 1923.40'
N = E =
-L- STA. 51+69.82 RIGHT 92.66'
SPIKE SET IN 20" POPLAR

FOR -L- PLAN VIEW SEE SHEETS 5 & 6

1,940 1,930 1,920 1,910 1,900 1,890 1,880

38 39 40 41 42 43 44 45 46 47 48 49 50 51

-Y-

-Y- 10+00.00=
-RPCD- 18+54.97=
-Y1- 12+41.59
BEGIN GRADE
-Y- 10+04.51
EL 1885.58'

-Y- 14+21.31=
-RPBA- 19+16.94

END GRADE
-Y- 14+17.26
EL 1884.31'

END V DITCH LT
PI= 15+50
EL= 1885.47'

PI = 14+75.00
EL = 1,885.84'
VC = 75'
K = 98
DS = 50 MPH

END GRADE
Sta. 16+41.44
EL 1890.33'

BEGIN GRADE
-Y- 14+35.47
EL 1884.70'

PI = 15+70.00
EL = 1,887.86'
VC = 90'
K = 67
DS = 40 MPH

PI = 12+32.00
EL = 1,878.70'
VC = 230'
K = 38
DS = 30 MPH

END V DITCH RT
PI= 13+78
EL= 1878.56'

30" RCP

(-)5.9%
(+) 2.0%
(-)3.0255%
(+)3.0282%
(-) 0.30%
(+)2.890%
(+)2.1222%
(-) 3.7%
(+) 5.8%
(+)3.4594%
(+) 4.259%

BEGIN V DITCH LT
PI= 16+40
EL= 1889.87'

BEGIN V DITCH RT
PI= 11+00
EL= 1882.13

BEGIN V DITCH RT
PI= 16+00.00
EL= 1886.55'

END V DITCH RT
PI= 10+26
EL= 1880.67'

CONT.V DITCH RT
PI= 14+50
(-RPBA- STA.19+91 LT)
EL= 1882.22'
24" RCP

END V DITCH RT
PI= 14+96.00
EL= 1880.50'

BEGIN V DITCH RT
PI= 12+84
EL= 1879.70'

CONT.V DITCH RT
PI= 10+00
(-RPCD- STA.19+09 LT)
EL= 1882.23'

BENCH MARK
BM-8 EL = 1897.66'
N = E =
-Y- STA. 17+63.80 LEFT 9.43'
8" SPIKE IN ROOT OF 28" DBL. WHITE PINE

CULVERT HYDRAULIC DATA (10+26)

DESIGN DISCHARGE	= 21.4	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1885.1	FT
BASE DISCHARGE	= 25.6	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1883.2	FT
OVERTOPPING DISCHARGE	= 22	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1885.1	FT

CULVERT HYDRAULIC DATA (13+71)

DESIGN DISCHARGE	= 17.1	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1880.6	FT
BASE DISCHARGE	= 20.5	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1880.9	FT
OVERTOPPING DISCHARGE	= 51	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1882.6	FT

CULVERT HYDRAULIC DATA (14+99)

DESIGN DISCHARGE	= 6.4	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1879.6	FT
BASE DISCHARGE	= 7.0	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1879.8	FT
OVERTOPPING DISCHARGE	= 22	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1885.5	FT

LEFT DITCH -------
RIGHT DITCH ·····

FOR -Y- PLAN VIEW SEE SHEET 5

1,900 1,890 1,880 1,870 1,860 1,850

10 11 12 13 14 15 16

$$$$$$$SYSTIME$$$$$$
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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	09

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER — LAURA C. FISHER — 9/7/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER — JOY M. SKOGLER — 9/7/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/28/99

-Y1-

BEGIN GRADE
Sta. 11+14.00
EL. 1881.23'

END GRADE
Sta. 12+25.81
EL. 1885.41'

-Y1- 12+41.59=
-Y- 10+00.00=
-RPCD- 18+54.97
EL. 1885.72'

(+)14.5346%

(+)1.7301%

PI = 11+46.00
EL = 1,881.78'
VC = 60'
K = 21
DS = 20 MPH

FOR -Y1- PLAN VIEW SEE SHEET 5

1,890
1,880
1,870
1,860
1,850
10
11
12

-RPBA-

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 47.1	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 1895.87	FT
BASE DISCHARGE	= 51.3	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1896.23	FT
OVERTOPPING DISCHARGE	= 63.3	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1897.38	FT

BEGIN OVERLAY
-RPBA- 10+06.30
EL. 1893.59'

END V DITCH LT
PI= 13+59.7
EL= 1891.40'

BEGIN V DITCH LT
PI= 12+60.9
EL= 1894.45'

(-)3.01%

42" RCP BURIED 1'

END OVERLAY
BEGIN GRADE
Sta. 18+00.00
EL. 1888.39'

PI = 19+39.50
EL = 1,883.19'
VC = 100'
K = 10
DS = 20 mph

-RPBA- 19+16.94=
-Y1- 14+21.31
EL 1884.40'

CONT.V DITCH LT
PI= 19+91
(-Y- STA.14+50 RT)
EL= 1882.22'

(-)13.7309%

(+)16.0700%

(+)6.87%

(+)6.5325%

END V DITCH RT
PI= 19+66
EL= 1879.45'

BEGIN V DITCH LT
PI= 20+50
EL= 1886.30'

PI= 21+50
EL= 1890.71'

PI = 23+50.00
EL = 1,908.10'
VC = 250'
K = 47
DS = 30 mph

BEGIN V DITCH RT
PI= 22+50
EL= 1897.06'

(+)10.7397%

(+)16.0700%

END V DITCH LT
PI= 24+00
EL= 1903.42'

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 131	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1897.6	FT
BASE DISCHARGE	= 16	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1898.0	FT
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1899.5	FT

LEFT DITCH -------
RIGHT DITCH ·····

FOR -RPBA- PLAN VIEW SEE SHEETS 4 & 5

1,920
1,910
1,900
1,890
1,880
1,870
1,860
1,850
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	10

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER — LAURA C. FISHER — 9/7/2021

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER — JOY M. SKOGLER — 9/7/2021

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–RPBA–

END OVERLAY
-RPBA- 27+37.80
EL. 1910.68'

END GRADE
BEGIN OVERLAY
-RPBA- 24+90.00
EL. 1909.14'

(+)0.7397%
(+) 2.4%
(+) 0.5%
PROPOSED 24" RCP

PI= 25+00
EL= 1906.79'

BEGIN V DITCH LT
PI= 27+00
EL= 1906.79'

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 13.1	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1897.6	FT
BASE DISCHARGE	= 16	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1898.0	FT
OVERTOPPING DISCHARGE	= 2.3	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1899.5	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 13.3	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1907.6	FT
BASE DISCHARGE	= 15.9	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1907.9	FT
OVERTOPPING DISCHARGE	= 2.2	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 1909.0	FT

LEFT DITCH -------
RIGHT DITCH -·-·-·-

FOR -RPBA- PLAN VIEW SEE SHEETS 5 & 6

–RPCD–

BEGIN OVERLAY
-RPCD- 9+89.34
EL. 1890.02'

END OVERLAY
BEGIN GRADE
Sta. 16+55.00
EL. 1886.51'

-RPCD- 18+54.97=
-Y- 10+00.00=
-Y1- 12+41.59
EL 1885.75'1

END GRADE
BEGIN OVERLAY
-RPCD- 19+85.00
EL. 1890.40'

(-)0.7970%
(+)4.3749%
(+) 5.9%

BEGIN V DITCH LT
PI= 19+50
EL= 1884.66'

CONT.V DITCH LT
PI= 19+09
(-Y- STA.10+00 RT)
EL= 1882.23'

PI = 18+59.00
EL = 1,884.89'
VC = 140'
K = 27
DS = 25 MPH

LEFT DITCH -------
RIGHT DITCH -·-·-·-

FOR -RPCD- PLAN VIEW SEE SHEETS 4 & 5

5/28/99

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5/28/99

END OVERLAY
-RPCD- 29+53.98
EL. 1920.18'

-RPCD-

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	11

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER
LAURA C. FISHER
9/7/2021

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER
JOY M. SKOGLUND
9/7/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BENCH MARK	
BM-9	EL = 1875.47'
N =	E =
-RPCD- STA. 27+23.53	RIGHT 128.54'
8" SPIKE SET IN ROOT OF AN 18" POPLAR	

BENCH MARK	
BM-7	EL = 1914.96'
N =	E =
-RPCD- STA. 28+69.93	RIGHT 42.90'
8" SPIKE SET IN ROOT OF AN 10" POPLAR	

FOR -RPCD- PLAN VIEW SEE SHEETS 5 & 6

1,920
1,910
1,900
1,890
1,880
1,870
1,860
1,850

24 25 26 27 28 29 30

$$$$$$$SYSTIME$$$$$$$
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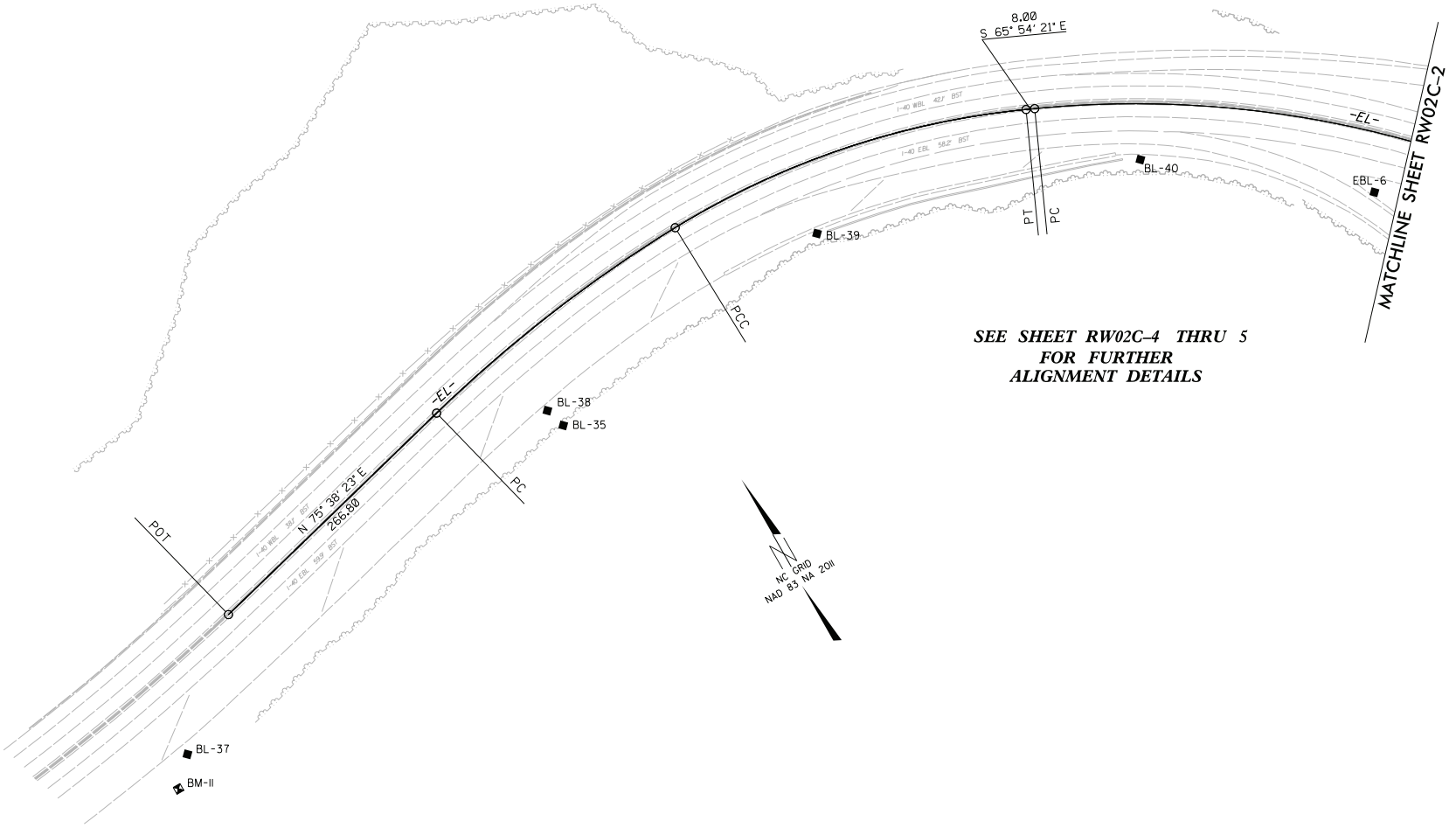
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RW02C-1
Location and Surveys	
Vaughn&Melton	

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



SEE SHEET RW02C-4 THRU 5
FOR FURTHER
ALIGNMENT DETAILS

NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

6/2/99

REVISIONS

28-JUN-2021 14:21
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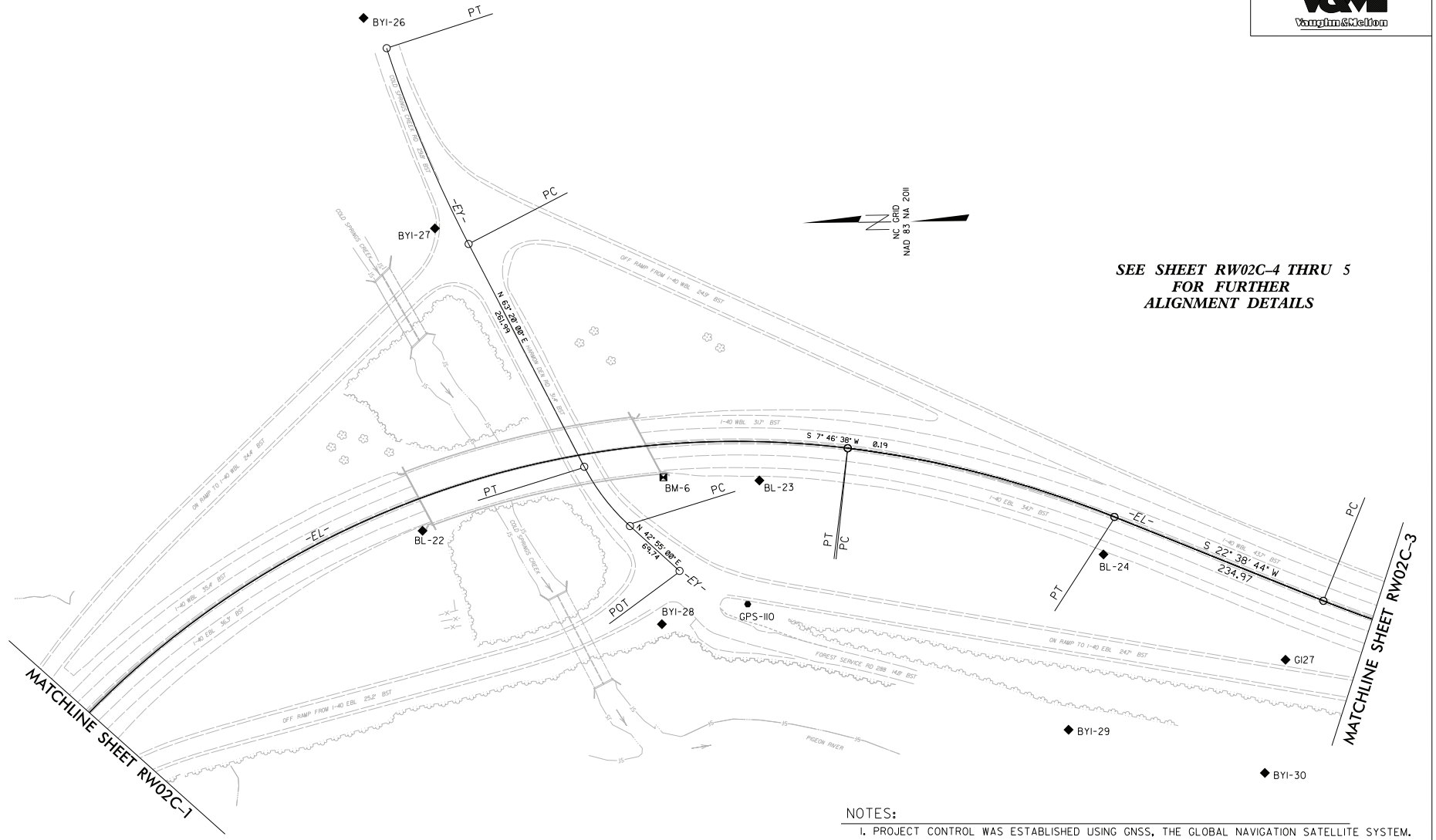
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RW02C-2
Location and Surveys	
Vaughn&Melton	

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



NOTES:

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REVISIONS

6/2/99

28-JUN-2021 13:09
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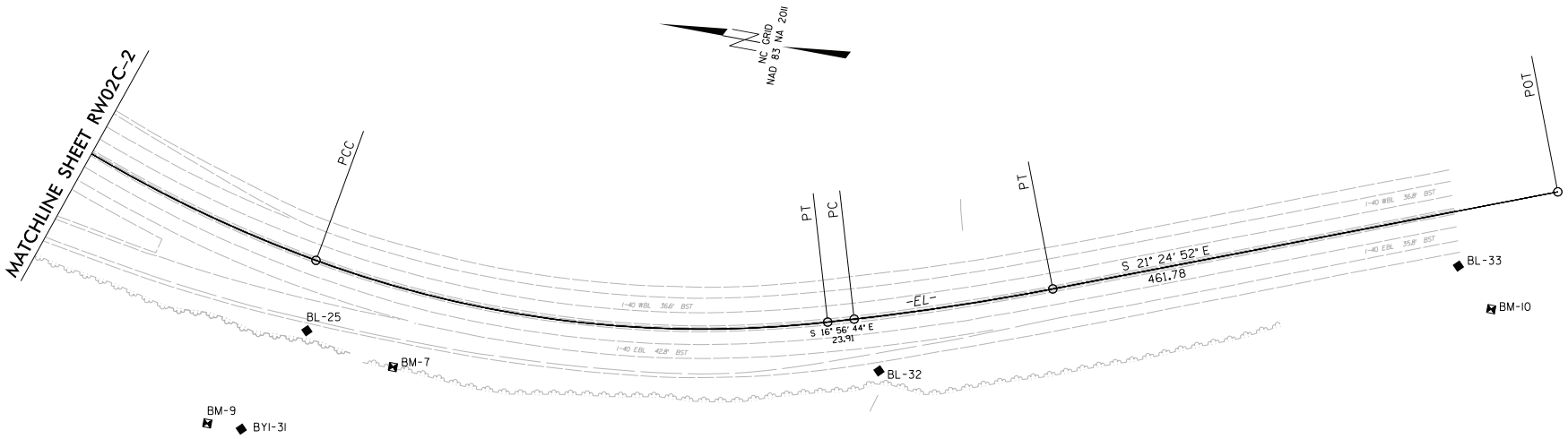
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RW02C-3
Location and Surveys	

Vaughn&Melton

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION



SEE SHEET RW02C-4 THRU 5 FOR FURTHER ALIGNMENT DETAILS

NOTES:

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baberwait AT LS-317402

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RW02C-4

Location and Surveys

Vaughn&Melton

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

BL

POINT	DESC.	NORTH	EAST	ELEVATION
36	BL-36	748006.3990	804333.4850	1886.86
37	BL-37	748037.3180	804673.6370	1888.53
38	BL-38	748147.8640	805118.4250	1885.74
39	BL-39	748166.3990	805414.9700	1885.09
40	BL-40	748077.9510	805707.4250	1887.11
6	EBL-6	747945.0370	805879.7880	1889.64
22	BL-22	747618.9180	806117.4380	1897.93
23	BL-23	747266.8270	806165.3020	1901.83
24	BL-24	746908.8780	806083.4100	1907.77
25	BL-25	746410.1220	805891.1420	1917.20
32	BL-32	745898.4390	805949.5260	1922.70
33	BL-33	745404.0990	806137.1960	1926.69

BY

POINT	DESC.	NORTH	EAST	ELEVATION
26	BY1-26	747673.3970	806653.4460	1894.00
27	BY1-27	747601.8480	806432.8630	1885.64
Y22	BL-22	747618.9180	806117.4380	1897.93
28	BY1-28	747370.5000	806016.6960	1883.46
29	BY1-29	746947.6980	805900.8980	1878.19
30	BY1-30	746743.5090	805853.1950	1877.29
31	BY1-31	746451.8820	805793.4400	1875.74

BM6 ELEVATION - 1901.77
N 747367 E 806170
CHISELED "X" ON CONC. WW AT SW END OFBRIDGE

BM7 ELEVATION - 1914.96
N 746328 E 805873
8" SPIKE SETIN THE ROOT OF A 10" POPLARTREE

BM8 ELEVATION - 1897.66
N 747698 E 806702
8" SPIKE SET IN THE ROOT OF A 28"DOUBLE WHITE PINE TREE

BM9 ELEVATION - 1875.47
N 746483 E 805793
8" SPIKE SET IN THE ROOT OF A 18"POPLAR TREE

BM10 ELEVATION - 1923.40
N 745368 E 806105
SPIKE NAIL SET IN 20" POPLAR

BM11 ELEVATION - 1891.05
N 748014 E 804651
SPIKE NAIL SET IN 12" BIRCH

G110 ELEVATION - 1886.41
N 747281 E 806036
GPS-110

G127 ELEVATION - 1911.29
N 746720 E 805971
COLD SPRINGS

NOTES:

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2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

6/2/99

28-JUN-2021 13:13
21.00.00 Microstation CONNECT Edition
baberwatt
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AT LS-317402

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RW02C-5

Location and Surveys

Vaughn&Melton

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

EL

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	748130.305	804770.215							
LINE			N 75°38'22.8" E	266.80					
PC	748196.476	805028.677							
CURVE			N 81°51'56.7" E	278.29	12°27'07.8"(RT)	04°27'56.8"	278.84	139.97	1283.00
PCC	748235.851	805304.165							
CURVE			S 78°54'25.2" E	341.06	26°00'08.3"(RT)	07°33'31.7"	344.00	175.01	758.00
PT	748170.232	805638.849							
LINE			S 65°54'21.1" E	8.00					
PC	748166.965	805646.152							
CURVE			S 29°03'51.7" E	1135.65	73°40'58.7"(RT)	06°03'00.9"	1217.85	709.52	947.00
PT	747174.324	806197.841							
LINE			S 07°46'37.6" W	0.19					
PC	747174.136	806197.816							
CURVE			S 15°12'40.7" W	287.24	14°52'06.2"(RT)	05°09'42.4"	288.05	144.84	1110.00
PT	746896.960	806122.450							
LINE			S 22°38'43.8" W	234.97					
PC	746680.107	806031.981							
CURVE			S 16°08'55.5" W	277.44	12°59'36.6"(LT)	04°40'24.2"	278.03	139.61	1226.00
PCC	746413.618	805954.817							
CURVE			S 03°38'48.4" E	462.82	26°35'51.2"(LT)	05°41'43.5"	467.00	237.79	1006.00
PT	745951.737	805984.254							
LINE			S 16°56'43.9" E	23.91					
PC	745928.868	805991.222							
CURVE			S 19°10'48.1" E	180.44	04°28'08.4"(LT)	02°28'33.8"	180.49	90.29	2314.00
PT	745758.441	806050.505							
LINE			S 21°24'52.4" E	461.78					
POT	745328.539	806219.107							

EY

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	747351.397	806072.088							
LINE			N 42°55'00.0" E	69.74					
PC	747402.469	806119.575							
CURVE			N 53°07'30.0" E	78.11	20°25'00.0"(RT)	26°00'00.0"	78.53	39.68	220.37
PT	747449.341	806182.060							
LINE			N 63°20'00.0" E	261.99					
PC	747566.923	806416.183							
CURVE			N 68°02'44.9" E	221.51	09°25'29.8"(RT)	04°15'00.0"	221.76	111.13	1348.14
PT	747649.739	806621.634							

NOTES:

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REVISIONS

6/2/99

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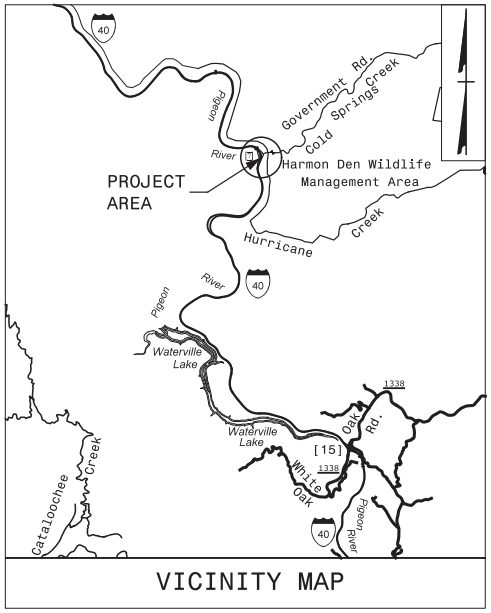
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

HAYWOOD COUNTY



VICINITY MAP

LOCATION: *BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD /COLD SPRINGS CREEK RD) AND COLD SPRING CREEK*

TYPE OF WORK: *GRADING, RETAINING WALL, DRAINAGE, PAVING, AND STRUCTURE*

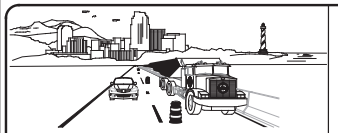
INDEX OF SHEETS

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B	WORK ZONE SPEED LIMIT REDUCTION
TMP-1C	TEMPORARY SHORING STANDARD DETAILS
TMP-1D	TEMPORARY SHORING NOTES
TMP-1E	DYNAMIC ZIPPER MERGE SYSTEM LAYOUT
TMP-2	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, AND LOCAL NOTES)
TMP-2A	GENERAL NOTES CONTINUED
TMP-3	TRAFFIC CONTROL PHASING
TMP-3A	PHASE I OVERVIEW
TMP-3B	PHASE II OVERVIEW
TMP-3C	PHASE III OVERVIEW
TMP-4-6	PHASE I DETAILS
TMP-7-9A	PHASE II DETAILS
TMP-10-12A	PHASE III DETAILS
TMP-13	CLOSURE AND DETOUR OF INTERSTATE/FREEWAY RAMPS
TMP-14	OFF-SITE DETOUR
TMP-15	PHASE I TEMPORARY LANE CLOSURE SIGNING
TMP-16-17	PHASE II LANE CLOSURE AND SPEED REDUCTION SIGNING
TMP-18	PHASE III LANE CLOSURE SIGNING

SHEET NO.
TMP-1

B-6054A

TIP PROJECT:



PLANS PREPARED BY:

JOHN BAUMAN, EI

STEVE MILLER, PE

NCDOT CONTACTS:

JOSHUA B. DEYTON, PE
NCDOT CONTACT

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WORK ZONE TRAFFIC CONTROL

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED Steve Miller
DATE: 9/28/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037026 ENGINEER STEVEN D. MILLER

9/28/2021
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PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.06	WARNING SIGNS FOR BLASTING ZONES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES - TYPE III
1150.01	FLAGGERS
1160.01	TEMPORARY CRASH CUSHION - REFLECTIVE END TREATMENT
1165.01	TRUCK MOUNTED ATTENUATOR
1170.01	PORTABLE CONCRETE BARRIER
1180.01	SKINNY DRUMS
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.03	PAVEMENT MARKINGS - EXIT AND ENTRANCE RAMPS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1205.12	PAVEMENT MARKINGS - BRIDGES
1205.13	PAVEMENT MARKINGS - LANE REDUCTIONS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1253.01	RAISED PAVEMENT MARKERS - SNOWPLOWABLE

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)
- WORK AREA
- REMOVAL
- CONSTRUCTION UNDER TRAFFIC

SIGNALS

EXISTING PROPOSED TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

TEMPORARY PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
	PAINT(6")
P20	WHITE EDGELINE
P23	3 FT. - 9 FT./SP WHITE MINISKIP
P30	YELLOW EDGELINE
	PAINT(24")
P61	WHITE STOPBAR

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED: DocuSigned by: Steven Miller 3FBDCDC1-5CEE8466...

DATE: 9/10/2021

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D. MILLER

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND, & PAVEMENT MARKING SCHEDULE

9/10/2021
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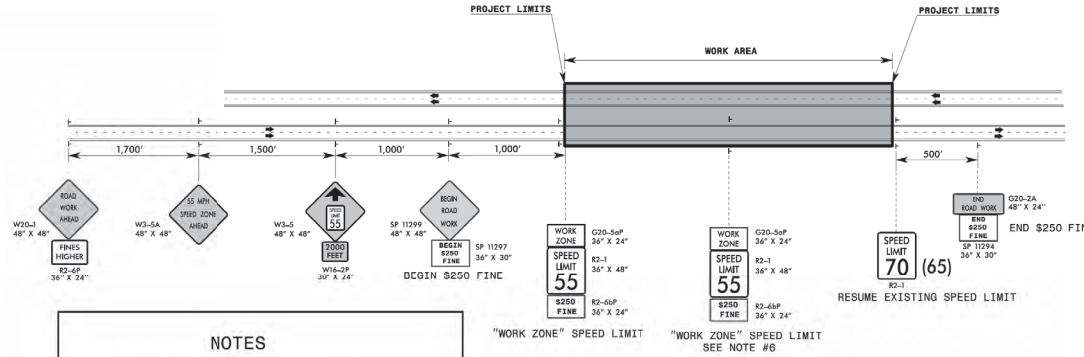


NOTES

1) THE WORK ZONE SPEED LIMIT WILL BE ESTABLISHED IN COLLABORATON BETWEEN THE REGIONAL TRAFFIC ENGINEER, THE DIVISION AND THE WORK ZONE TRAFFIC CONTROL SECTION. THIS DRAWING SHOWS THE TYPICAL APPLICATION OF REDUCING THE "WORK ZONE SPEED LIMIT" TO 55 MPH.

2) IF THE "WORK ZONE SPEED LIMIT" ONLY APPLIES TO A SPECIFIC PORTION AND NOT THE ENTIRE PROJECT, THE EXISTING SPEED LIMIT IS TO BE REESTABLISHED INSIDE THE PROJECT LIMITS. THE EXISTING SPEED LIMIT SIGNS AND THE "END $250 FINE" SIGNS ARE TO BE INSTALLED AT THE LOCATION WHERE THE EXISTING SPEED LIMIT IS TO RESUME. (SEE GUIDELINE- D)

3) IF THE WORK ZONE SPEED LIMIT REDUCTION IS INSIDE THE WORK AREA, SIGNS W3-5A, W3-5, AND THE R2-1'S ALONG WITH THE SPEEDING FINE SIGNS ARE TO BE INSTALLED AT THE DISTANCE SHOWN ABOVE IN ADVANCE OF WHERE THE SPEED LIMIT IS REDUCED.

4) THE WORK ZONE SPEED LIMIT SIGNS ARE TO BE MOUNTED FROM 7' ABOVE EDGE OF PAVEMENT ELEVATION.

5) WHEN TEMPORARY LANE CLOSURES ARE INSTALLED AT THE BEGINNING OF THE PROJECT LIMITS, THE PORTABLE LANE CLOSURE SIGNS ARE TO BE ADJUSTED TO AVOID SIGN OVERLAP/CLUTTER

6) THE NEED AND LOCATION OF ADDITIONAL POSTED "WORK ZONE SPEED LIMIT" SIGNS WITHIN THE WORK AREA IS TO BE DETERMINED BY THE REGIONAL TRAFFIC ENGINEER.

GUIDELINES

A) THIS DRAWING IS FOR USE ONLY AFTER AN ENGINEERING INVESTIGATION AND CRITERIA REVIEW HAS BEEN PERFORMED BY THE REGIONAL TRAFFIC ENGINEER AND THE WORK ZONE TRAFFIC CONTROL SECTION. THE WORK ZONE SPEED LIMIT REDUCTION IS INTENDED FOR USE ON FREEWAYS WITH SPEED LIMITS 65 MPH OR GREATER. SEE WORK ZONE SPEED LIMIT GUIDELINES FOR CRITERIA.

B) THE STATE TRAFFIC ENGINEER HAS TO ORDINANCE THE SPEED LIMIT REDUCTION IN ORDER FOR THE REDUCTION TO BE VALID AND ENFORCEABLE. NO SPEED LIMIT SIGNS SHALL BE INSTALLED PRIOR TO RECEIVING A SIGNED ORDINANCE. IN ADDITION, THE $250 SPEEDING FINE ALSO REQUIRES A SEPARATE SIGNED ORDINANCE BY THE STATE TRAFFIC ENGINEER.

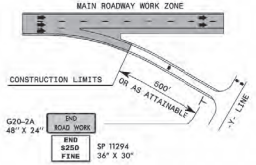
C) EACH DIRECTION OF THE PROJECT IS TO BE EVALUATED FOR THE "WORK ZONE" SPEED LIMIT REDUCTION. THIS DRAWING INTENTIONALLY HAS 1 DIRECTION SIGNED AS A REMINDER TO CAREFULLY CONSIDER WHETHER BOTH DIRECTIONS OF THE PROJECT NEED TO HAVE THE SPEED LIMIT REDUCED.

D) FOR PROJECTS THAT EXCEED 2 MILES IN LENGTH, AN EVALUATION IS TO BE MADE TO DETERMINE IF THE "WORK ZONE" SPEED LIMIT REDUCTION APPLIES TO THE ENTIRE PROJECT LENGTH OR IF ONLY A PORTION OF THE PROJECT LENGTH. THE "WORK ZONE" SPEED LIMIT REDUCTION MAY TERMINATE BEFORE THE END OF THE PROJECT LIMITS. THE DRAWING IS TO BE MODIFIED AS NEEDED TO REFLECT THESE CONDITIONS.

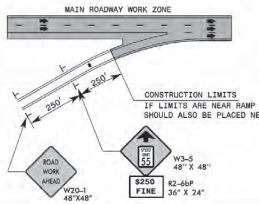
E) THE $250 SPEEDING FINE APPLIES FOR ALL PROJECTS THAT QUALIFY FOR A "WORK ZONE" SPEED LIMIT REDUCTION.

F) ALL "WORK ZONE" SPEED LIMIT REDUCTION SIGNAGE SHALL BE REMOVED WHEN THE CONDITION/S THAT WARRANTED THE REDUCTION AND FINE IS REMOVED. THE REGIONAL TRAFFIC ENGINEER WILL BE NOTIFIED BY THE RESIDENT ENGINEER AT THIS TIME TO RESCIND THE ORDINANCES AND RETURN THE EXISTING POSTED SPEED LIMIT. THIS SHOULD TAKE PLACE BEFORE THE PROJECT IS 100% COMPLETE AND ACCEPTED FOR MAINTENANCE.

EXIT RAMPS



ENTRANCE RAMPS



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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

"WORK ZONE" SPEED LIMIT REDUCTION

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED: Steven Miller
DocuSigned by: 3FBC0D13CCEB46C...
DATE: 9/10/2021

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D. MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

WORK ZONE SPEED LIMIT REDUCTION

9/10/2021
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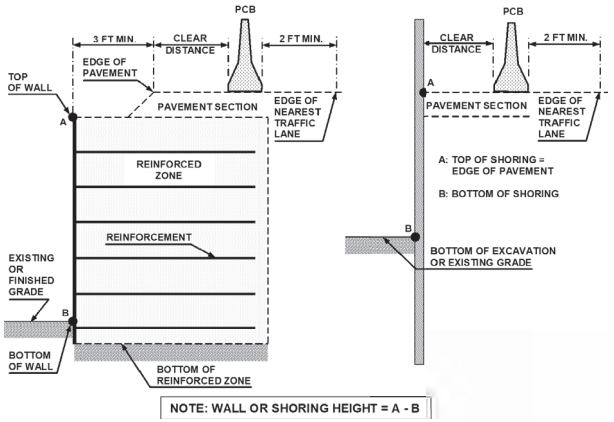

FIGURE A

NOTES

1- REFER TO THE TRAFFIC CONTROL PLANS FOR TEMPORARY SHORING LOCATIONS AND NOTES.

2- REFER TO THE "TEMPORARY SHORING" PROJECT SPECIAL PROVISION FOR INFORMATION ABOUT TEMPORARY SHORING AND PORTABLE CONCRETE BARRIER (PCB).

3- PCB IS REQUIRED IF TEMPORARY SHORING IS LOCATED WITHIN THE CLEAR ZONE IN ACCORDANCE WITH THE AASHTO ROADSIDE DESIGN GUIDE. DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE. (CONTACT NCDOT PAVEMENT MANAGEMENT UNIT FOR APPLICABLE PAVEMENT DESIGN).

4- BASED ON THE CLEAR DISTANCE, OFFSET, DESIGN SPEED AND PAVEMENT TYPE, CHOOSE AN UNANCHORED OR ANCHORED PCB FROM THE TABLE SHOWN IN FIGURE B. CLEAR DISTANCE IS DEFINED AS SHOWN IN FIGURE A AND OFFSET IS DEFINED AS SHOWN IN FIGURE B.

5- AT THE CONTRACTOR'S OPTION OR IF THE MINIMUM REQUIRED CLEAR DISTANCE IS NOT AVAILABLE, SET PCB NEXT TO AND UP AGAINST THE TRAFFIC SIDE OF THE TEMPORARY SHORING EXCEPT FOR BARRIER ABOVE TEMPORARY WALLS. PCB WITH THE MINIMUM REQUIRED CLEAR DISTANCE IS REQUIRED ABOVE TEMPORARY WALLS.

6- USE NCDOT PORTABLE CONCRETE BARRIER (PCB) IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1170.01 AND SECTION 1170 OF THE STANDARD SPECIFICATIONS.

7- PCB REQUIREMENTS FOR TEMPORARY WALLS APPLY TO TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS AND TEMPORARY SOIL NAIL WALLS.

8- SET PCB WITH A MINIMUM HORIZONTAL DISTANCE OF 2 FT BETWEEN THE FRONT FACE OF THE BARRIER AND THE EDGE OF THE NEAREST TRAFFIC LANE AS SHOWN IN FIGURE A UNLESS OTHERWISE SHOWN IN THE PLANS AND OR AS APPROVED BY THE ENGINEER.

9- FOR PCB ABOVE AND BEHIND TEMPORARY WALLS, PROVIDE A MINIMUM DISTANCE OF 3 FT BETWEEN THE EDGE OF PAVEMENT AND THE WALL FACE AS SHOWN IN FIGURE A. IF THESE MINIMUM REQUIRED DISTANCES ARE NOT AVAILABLE, CONTACT THE ENGINEER.

10- TABLE SHOWN IN FIGURE B IS BASED ON NCDOT RESEARCH PROJECT NO. 2005-010 WITH VEHICLE TYPE USED FOR NCHRP 350 CRASH TESTS. BARRIER DEFLECTIONS AND RESULTING MINIMUM REQUIRED CLEAR DISTANCES MIGHT VARY SIGNIFICANTLY FOR LARGER HEAVIER VEHICLES, RUNS OF BARRIER LESS THAN 200 FT IN LENGTH AND WET OR DRY PAVEMENT.

MINIMUM REQUIRED CLEAR DISTANCE, inches

Barrier Type	Pavement Type	Offset * ft	Design Speed, mph					
			<30	31-40	41-50	51-60	61-70	71-80
Unanchored PCB	Asphalt	<8	24	26	29	32	36	40
		8-14	26	28	31	35	38	42
		14-20	27	29	34	36	39	43
		20-26	28	31	35	38	40	44
		26-32	29	32	36	39	42	45
		32-38	30	34	38	41	43	46
		38-44	31	34	41	43	45	48
		44-50	31	35	41	43	46	49
		50-56	32	36	42	44	47	50
		>56	32	36	42	45	47	51
	Concrete	<8	17	18	21	22	25	26
		8-14	19	20	23	25	26	29
		14-20	22	22	24	26	28	31
		20-26	23	24	26	27	30	34
		26-32	24	25	27	28	32	35
		32-38	24	26	27	30	33	36
		38-44	25	26	28	30	34	37
		44-50	26	26	28	32	35	37
		50-56	26	26	28	32	35	38
		>56	26	27	29	32	36	38
Anchored PCB	Asphalt	All Offsets	24 for All Design Speeds					
Anchored PCB	Concrete (including bridge approach slabs)	All Offsets	12 for All Design Speeds					

* See Figure Below

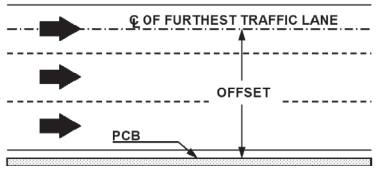

FIGURE B

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED: Steven Miller
DATE: 9/10/2021
SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D. MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TEMPORARY SHORING STANDARD DETAILS

9/10/2021
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TEMPORARY SHORING NOTES

Shoring Number	ALN	Begin Station	Offset(FT.)	End Station	Offset(FT.)	Average Height(FT.)	Max Height(FT.)	Avg. SqFt.(SqFt.)	Section
1	-L-	STA. 12+75	21 L	STA. 12+95	21 L	8	9	160	CUT
2	-L-	STA. 41+00	19 L	STA. 41+20	19 L	9	10	180	CUT
3	-L-	STA. 42+17	19 L	STA. 42+36	19 L	7	8	133	CUT
4	-L-	STA. 12+75	21 L	STA. 12+95	21 L	8	9	160	FILL
5	-L-	STA. 41+00	19 L	STA. 41+20	19 L	9	10	180	FILL
6	-L-	STA. 42+17	19 L	STA. 42+36	19 L	7	8	133	FILL
							Total SqFt.	946	

TEMPORARY SHORING NOTES:

1. ALL "CUT" SHORING IS EITHER STANDARD TEMPORARY SHORING OR TEMPORARY SNW.
2. ALL "FILL" SHORING IS STANDARD TEMPORARY WALL.
3. THE CONTRACTOR, WITH APPROVAL FROM THE ENGINEER, MAY ELECT TO DETERMINE THE METHOD OF SHORING TO USE AT EACH LOCATION.

THE TEMPORARY SHORING NOTES SHOWN ON THIS SHEET WERE PROVIDED FROM NCDOT GEOTECHNICAL ENGINEERING UNIT. THE DOCUMENT WAS SUBMITTED TO SEPI, INC. ON JULY 9, 2021.

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED: Steven Miller
DATE: 9/10/2021
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037026 ENGINEER STEVEN D MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TEMPORARY SHORING NOTES

9/10/2021
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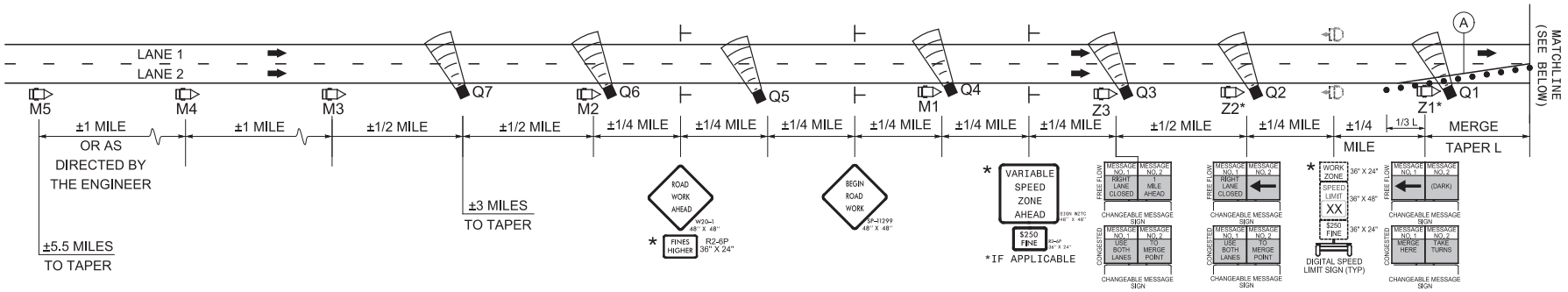
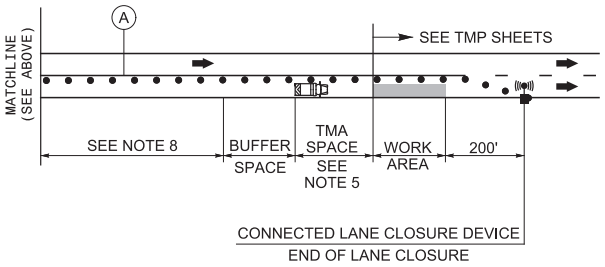
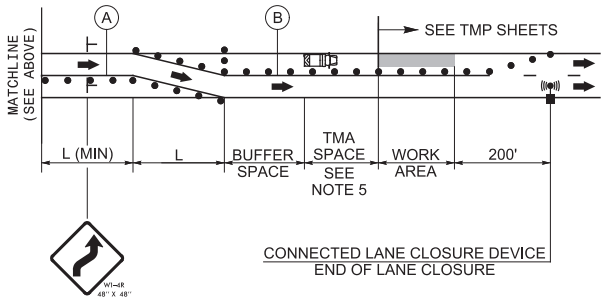




RIGHT LANE WORK AREA



LEFT LANE WORK AREA
*(IF APPLICABLE)

LEGEND

- SPEED SENSOR Q#(1-7)
- PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)
  - M#(1-5) = MAINLINE
  - Z#(1-3) = ZIPPER MERGE
  - *Z1 & Z2 SHALL BE FULL MATRIX
- CONNECTED LANE CLOSURE DEVICE
- DRUM
- TRUCK MOUNTED ATTENUATOR (TMA)
- STATIONARY SIGN

(A) 6" WHITE EDGELINE

(B) 6" YELLOW EDGELINE

GENERAL NOTES

1- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL TO 2 TIMES THE POSTED SPEED LIMIT.

2- REFER TO RSD. 1101.11, SHEETS 1 & 2, FOR "L" DISTANCE AND BUFFER SPACE.

3- REFER TO RSD. 1101.02, SHEETS 9 & 10, FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.

4- INSTALL LANE CLOSURES WITH THE FLOW OF TRAFFIC, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE FLOW OF TRAFFIC, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

5. POSITION THE TMAS TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMAS AS WORK PROGRESSES. USE TMAS AS REQUIRED TO SHIELD WORKERS FROM ERRANT VEHICLES AND TRAFFIC FROM POTENTIAL HAZARDS IN THE WORK AREA.

6. REMOVE OR COVER EXISTING ADVANCED WARNING SIGNS PREVIOUSLY INSTALLED USING RSD 1101.01, SHEET 2 OF 3.

7. IN THE EVENT OF A SYSTEM MALFUNCTION, IMMEDIATELY INSTALL WORK ZONE SIGNS ACCORDING TO RSD 1101.02, SHEET 4. SIGNAGE SHOULD REMAIN IN PLACE UNTIL SYSTEM OPERATION IS FULLY RESTORED.

8. IF A LEFT LANE WORK AREA WILL BE NEEDED AT ANY TIME DURING THE PROJECT, USE 2L. IF NO LEFT LANE WORK AREA IS NEEDED, OMIT THIS SPACE.

9. REMOVE ANY CONFLICTING PAVEMENT MARKINGS & MARKERS.

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DATE: 9/10/2021
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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

DYNAMIC ZIPPER MERGE SYSTEM LAYOUT

9/10/2021
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MANAGEMENT STRATEGIES

- LOCAL ACCESS WILL BE MAINTAINED DURING CONSTRUCTION.
- PROVIDE ONE MONTH NOTICE TO THE ENGINEER, HAYWOOD COUNTY EMERGENCY SERVICES, AND HAYWOOD COUNTY SCHOOL OFFICIALS PRIOR TO ROAD CLOSURE.
- COORDINATE WITH DIVISION TO DEVELOP A SCHEDULE AND TIME LINE THAT OVERSIZED LOADS WILL BE IMPACTED. EXPECTED WIDE LOAD PERMIT IMPACTS SHOULD BE PROVIDED TO THE PERMIT OFFICE AS SOON AS POSSIBLE SO THE RESTRICTION MAY BE INCLUDED IN PERMITS PULLED IN ADVANCE.
- USE WORKZONE SPEED LIMIT REDUCTION TO LOWER VEHICLE SPEEDS WHEN INTERSTATE TRAFFIC IS SHIFTED ONTO THE RAMPS.
- IMPLEMENT SMART WORKZONE QUEUE MANAGEMENT SYSTEM.

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS. THE CONTRACTOR MUST NOT CLOSE OR NARROW TRAVEL LANES FOR HOLIDAYS THAT OCCUR DURING THE WORK WINDOW. HOWEVER, LANE CLOSURES OR NARROWING NECESSARY FOR PHASE II MAY REMAIN IN PLACE OVER THE HOLIDAYS THAT OCCUR DURING THE WORK WINDOW.

ROAD NAME	DAY AND TIME RESTRICTIONS
I-40	MAY 21 - OCTOBER 31

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME: I-40 & COLD SPRINGS CREEK RD.

HOLIDAY

1. FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.
2. FOR NEW YEAR'S, BETWEEN THE HOURS OF 6:00 A.M. DECEMBER 31ST TO 6:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 6:00 P.M. THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 6:00 A.M. THURSDAY AND 6:00 P.M. MONDAY.
4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY TO 6:00 P.M. TUESDAY.
5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 6:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 6:00 P.M. THE DAY AFTER INDEPENDENCE DAY.

   IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 6:00 A.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 6:00 P.M. THE TUESDAY AFTER INDEPENDENCE DAY.
6. FOR LABOR DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY AND 6:00 P.M. TUESDAY.
7. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 6:00 A.M. TUESDAY TO 6:00 P.M. MONDAY.
8. FOR CHRISTMAS, BETWEEN THE HOURS OF 6:00 A.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 6:00 P.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

LANE AND SHOULDER CLOSURE REQUIREMENTS

C) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

G) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

H) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

I) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 200 FEET IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

J) NOTIFY THE ENGINEER ONE MONTH(30 DAYS) PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

K) INSTALL ADVANCE WORK ZONE WARNING SIGNS NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

L) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

M) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

N) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC BARRIER

O) INSTALL TEMPORARY BARRIER ACCORDING TO THE TRANSPORTATION MANAGEMENT PLANS A MAXIMUM OF TWO (2) WEEKS PRIOR TO BEGINNING WORK IN ANY LOCATION. ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION PROCEED IN A CONTINUOUS MANNER TO COMPLETE THE PROPOSED WORK IN THAT LOCATION UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS OR AS DIRECTED BY THE ENGINEER.

DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE.

ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION AND NO WORK IS PERFORMED BEHIND THE TEMPORARY BARRIER FOR A PERIOD LONGER THAN TWO (2) MONTHS, REMOVE / RESET TEMPORARY BARRIER AT NO COST TO THE DEPARTMENT UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS, TEMPORARY BARRIER IS PROTECTING A HAZARD, OR AS DIRECTED BY THE ENGINEER.

INSTALL TEMPORARY BARRIER WITH THE TRAFFIC FLOW BEGINNING WITH THE UPSTREAM SIDE OF TRAFFIC. REMOVE TEMPORARY BARRIER AGAINST THE TRAFFIC FLOW BEGINNING WITH THE DOWNSTREAM SIDE OF TRAFFIC.

INSTALL AND SPACE DRUMS NO GREATER THAN TWICE THE POSTED SPEED LIMIT (55 MPH) TO CLOSE OR KEEP THE SECTION OF THE ROADWAY CLOSED UNTIL THE TEMPORARY BARRIER CAN BE PLACED OR AFTER THE TEMPORARY BARRIER IS REMOVED.

P) PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER AT ALL TIMES DURING THE INSTALLATION AND REMOVAL OF THE BARRIER BY EITHER A TRUCK MOUNTED ATTENUATOR (MAXIMUM 72 HOURS) OR A TEMPORARY CRASH CUSHION.

PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER FROM ONCOMING TRAFFIC AT ALL TIMES BY A TEMPORARY CRASH CUSHION UNLESS THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER IS OFFSET FROM ONCOMING TRAFFIC AS FOLLOWS OR AS SHOWN IN THE PLANS: (SEE ALSO 1101.05)

POSTED SPEED LIMIT	MINIMUM OFFSET
40 OR LESS	15 FT
45 - 50	20 FT
55	25 FT
60 MPH OR HIGHER	30 FT

TRAFFIC CONTROL DEVICES

Q) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

R) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

S) PLACE ADDITIONAL SETS OF THREE DRUMS PERPENDICULAR TO THE EDGE OF TRAVELWAY ON 500 FT CENTERS WHEN UNOPENED LANES ARE CLOSED TO TRAFFIC.

PAVEMENT MARKINGS AND MARKERS

T) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
I-40 & COLD SPRINGS CREEK RD.	PAINT	TEMPORARY

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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DocuSigned by: 3F8C5D13CEE844C...
DATE: 9/10/2021
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

TRANSPORTATION OPERATIONS PLAN

9/10/2021
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GENERAL NOTES CONTINUED

U) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

V) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

W) REMOVE AND REPLACE ANY CONFLICTING OR DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

MISCELLANEOUS

X) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS AS DIRECTED BY THE ENGINEER.

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED: DocuSigned by: Steve Miller
DATE: 9/28/2021
SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D MILLER

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GENERAL NOTES CONTINUED

9/28/2021
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PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-3

PHASING

PHASE I

STEP 1: USING ROADWAY STANDARD DRAWING (RSD) 1101.01 SHEETS 2 AND 3 OF 3 PLACE ADVANCE WARNING SIGNS ON I-40 AND COLD SPRINGS CREEK RD. PLACE CHANGEABLE MESSAGE BOARDS OUT FOR 2 WEEKS BEFORE RAMP DETOUR IMPLEMENTED.

STEP 2: USING WORK OUTSIDE THE EDGE OF PAVEMENT, WORK BEHIND PORTABLE CONCRETE BARRIER, RSD 1101.02 SHEET 1 OF 14, RSD 1101.03 SHEET 9 OF 9, AND RSD 1101.04 SHEET 1 OF 1,USING THE OFF-SITE DETOUR AS SHOWN ON TMP-13, AND LANE CLOSURE SIGNING AS SHOWN ON TMP-15. BEGIN CONSTRUCTION AS SHOWN ON TMP-4-6 UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE.

NOTE: COMPLETE STRUCTURE 501 TO 503 AND STRUCTURE 515 TO 517 PIPE WORK UNDER RAMP CD DURING THESE CLOSURES.

NOTE: THE CONTRACTOR IS TO, OVER THE COURSE OF ONE NIGHT FOR EACH PIPE INSTALL, MOVE THE DEVICES NEEDED FOR THE INDIVIDUAL PIPE INSTALL TO THE LOCATIONS AS SHOWN ON TMP-4A AND 15, COMPLETE THE PIPE INSTALL, AND MOVE THE DEVICES BACK TO THE LOCATIONS AS SHOWN ON TMP-4. REMOVE DEVICES AS SHOWN ON TMP-15 WHEN THE TEMPORARY LANE CLOSURE IS NOT IN EFFECT.

STEP 3: USING RSD 1101.02 SHEET 12 OF 14 AND RSD 1101.03 SHEET 9 OF 9, ONCE CONSTRUCTION AS SHOWN ON TMP 4-6 IS COMPLETE. PERFORM THE FOLLOWING IN A CONTINUOUS MANNER:
- PLACE TRAFFIC CONTROL DEVICES AS SHOWN ON TMP-7, 8, 9, 16, AND 17.
- PLACE SPEED LIMIT REDUCTION ZONE AS SHOWN ON TMP-1B.
- MILL AND FILL RUMBLE STRIPS AS SHOWN ON THE ROADWAY PLANS.
- PLACE TEMPORARY MARKINGS AS SHOWN ON TMP-7, 8, AND 9.
- INSTALL DYNAMIC ZIPPER MERGE AS SHOWN ON TMP-1E, AND TMP-16-17.
- SHIFT TRAFFIC INTO THE PHASE II PATTERN.

PHASE II

STEP 1: USING RSD 1101.02 SHEET 3 OF 14 AND RSD 1101.03 SHEETS 2, 7 AND 9 OF 9, AND OFF-SITE DETOUR. BEGIN CONSTRUCTION, UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE, AS SHOWN ON TMP-7-9A.

NOTE: COMPLETE STRUCTURE 501 TO 503 AND STRUCTURE 515 TO 517 PIPE WORK UNDER I-40 WHILE ON-SITE RAMP DETOUR IN EFFECT.

NOTE: THE CONTRACTOR IS TO, OVER THE COURSE OF ONE NIGHT FOR EACH PIPE INSTALL, MOVE THE DEVICES NEEDED FOR THE INDIVIDUAL PIPE INSTALL TO THE LOCATIONS AS SHOWN ON TMP-7A OR 9A, COMPLETE THE PIPE INSTALL, AND MOVE THE DEVICES BACK TO THE LOCATIONS AS SHOWN ON TMP-7 AND 9.

STEP 3: USING RSD 1101.02 SHEETS 3 AND 12 OF 14, RSD 1101.03 SHEET 9 OF 9, AND RSD 1101.04 SHEET 1 OF 1, COMPLETE THE FOLLOWING IN ORDER:
- COMPLETE CONSTRUCTION, UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE, AS SHOWN ON TMP-7-9A.
- PLACE TRAFFIC CONTROL DEVICES AS SHOWN ON TMP-10, 11, 12, AND 18.
- PLACE TEMPORARY MARKINGS IN THEIR FINAL LOCATION.
- REMOVE DYNAMIC ZIPPER MERGE.
- SHIFT TRAFFIC INTO THE FINAL PATTERN.

PHASE III

STEP 1: USING RSD 1101.02 SHEET 3 AND 12 OF 14, AND RSD 1101.03 SHEET 9 OF 9, AND OFF-SITE DETOUR AS SHOWN ON TMP-14. BEGIN CONSTRUCTION, UP TO BUT NOT INCLUDING THE FINAL LAYER OF SURFACE COURSE, AS SHOWN ON TMP-10-12A.

NOTE: COMPLETE STRUCTURE 501 TO 503 AND STRUCTURE 515 TO 517 PIPE WORK UNDER RAMP BA DURING CLOSURE TO INSTALL WILDLIFE GRATE.

NOTE: THE CONTRACTOR IS TO, OVER THE COURSE OF ONE NIGHT FOR EACH PIPE INSTALL, MOVE THE DEVICES NEEDED FOR THE INDIVIDUAL PIPE INSTALL TO THE LOCATIONS AS SHOWN ON TMP-10A OR 12A, COMPLETE THE PIPE INSTALL, AND MOVE THE DEVICES BACK TO THE LOCATIONS AS SHOWN ON TMP-10 AND 12.

NOTE: INSTALL WILDLIFE GRATES ON RAMP CD ONLY AFTER RAMP BA IS RE-OPENED TO TRAFFIC.

STEP 2: ONCE CONSTRUCTION AS SHOWN ON TMP-10-12A IS COMPLETE, THEN USING RSD 1101.02 SHEET 3 AND 12 OF 14, AND RSD 1101.03 SHEET 9 OF 9, BEGIN AND COMPLETE THE MILL AND FILL OPERATION. PLACE THE FINAL LAYER OF SURFACE COURSE AND FINAL PAVEMENT MARKINGS ACCORDING TO THE PAVEMENT MARKING PLAN AND REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES AND OFF-SITE DETOUR.

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

APPROVED: Steven Miller
DATE: 9/28/2021
SEAL

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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PHASING

9/28/2021
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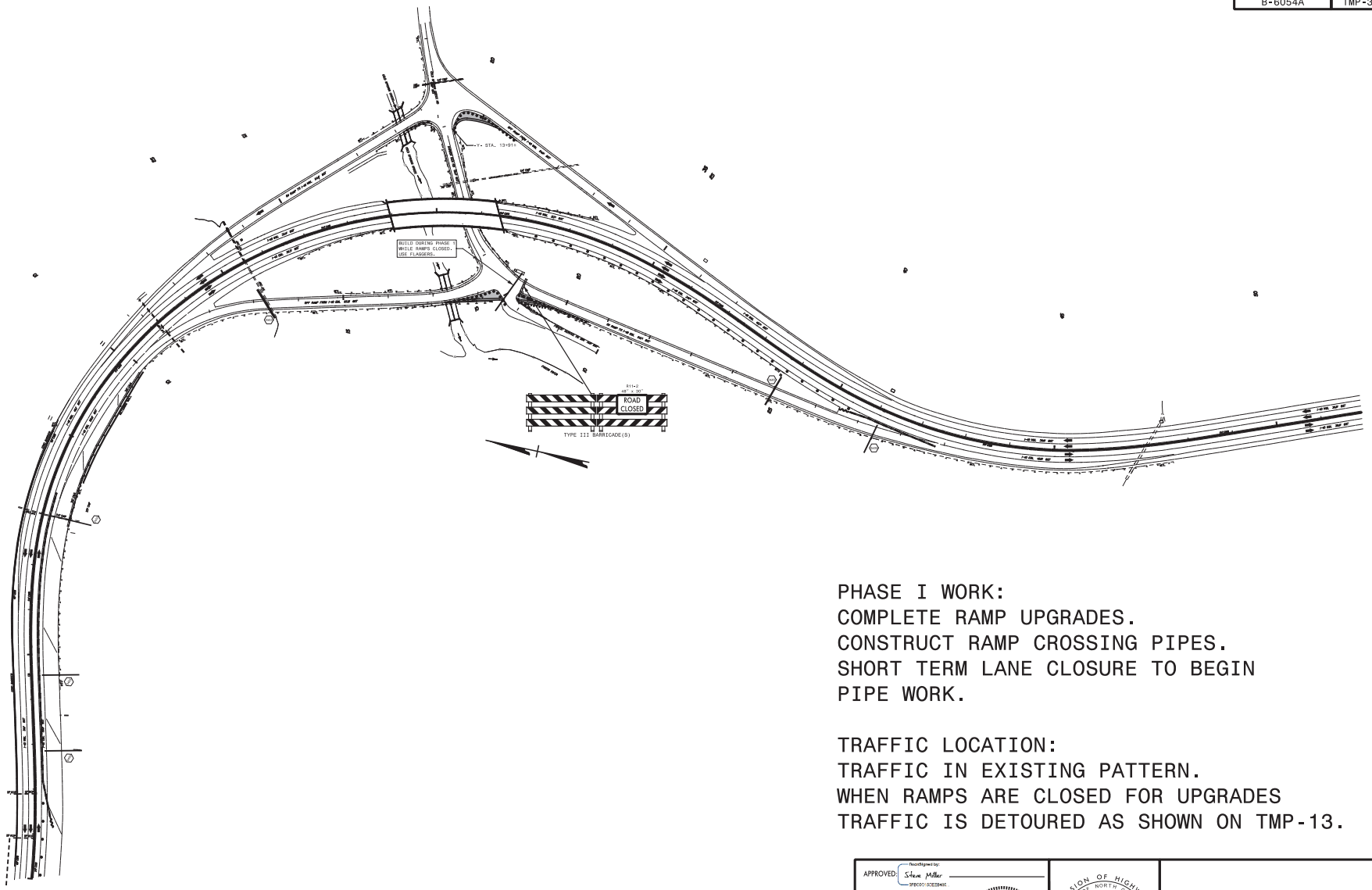

PHASE I WORK:
COMPLETE RAMP UPGRADES.
CONSTRUCT RAMP CROSSING PIPES.
SHORT TERM LANE CLOSURE TO BEGIN PIPE WORK.

TRAFFIC LOCATION:
TRAFFIC IN EXISTING PATTERN.
WHEN RAMPS ARE CLOSED FOR UPGRADES TRAFFIC IS DETOURED AS SHOWN ON TMP-13.

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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PHASE I OVERVIEW

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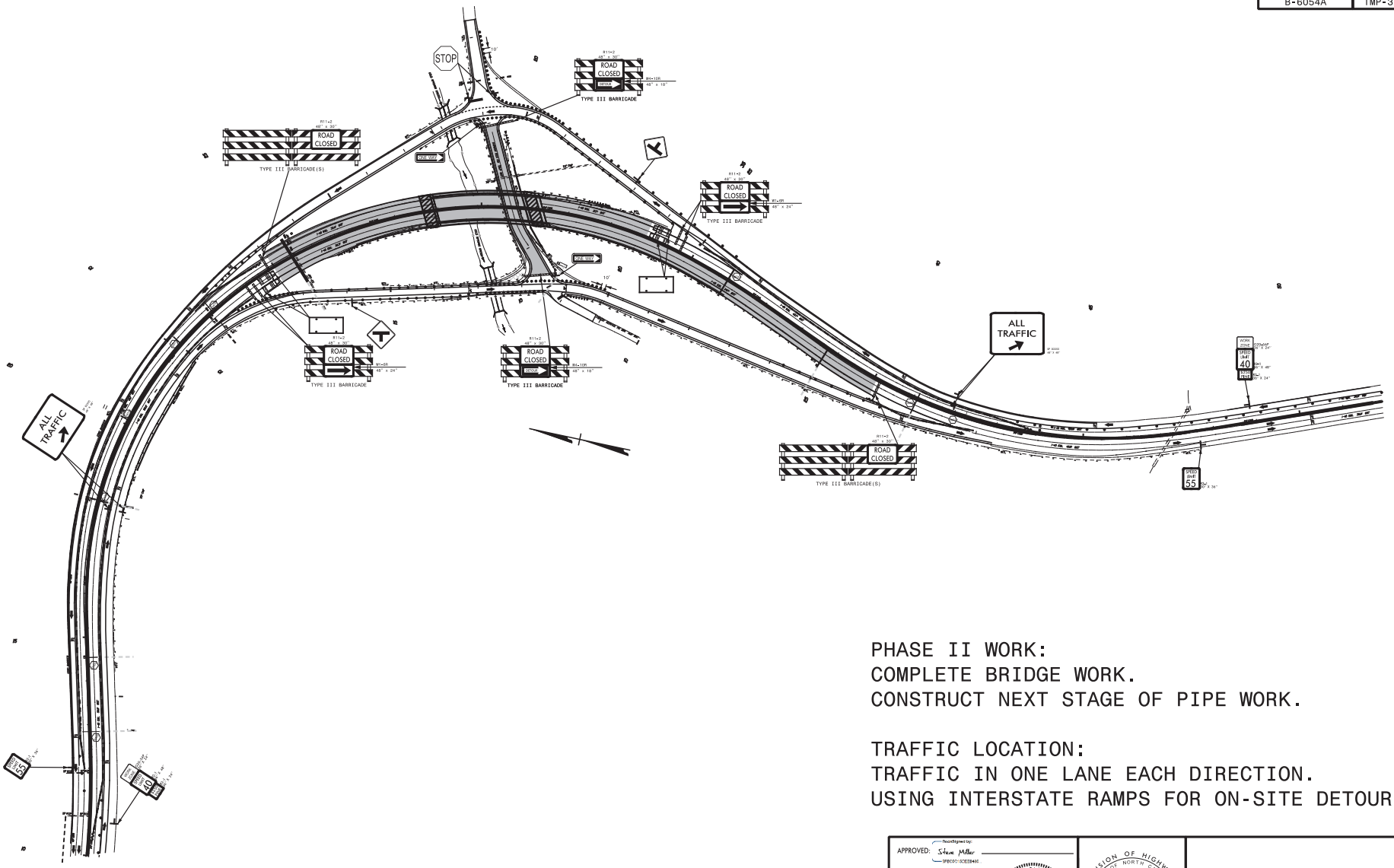

PHASE II WORK:
COMPLETE BRIDGE WORK.
CONSTRUCT NEXT STAGE OF PIPE WORK.

TRAFFIC LOCATION:
TRAFFIC IN ONE LANE EACH DIRECTION.
USING INTERSTATE RAMPS FOR ON-SITE DETOUR.

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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PHASE II OVERVIEW

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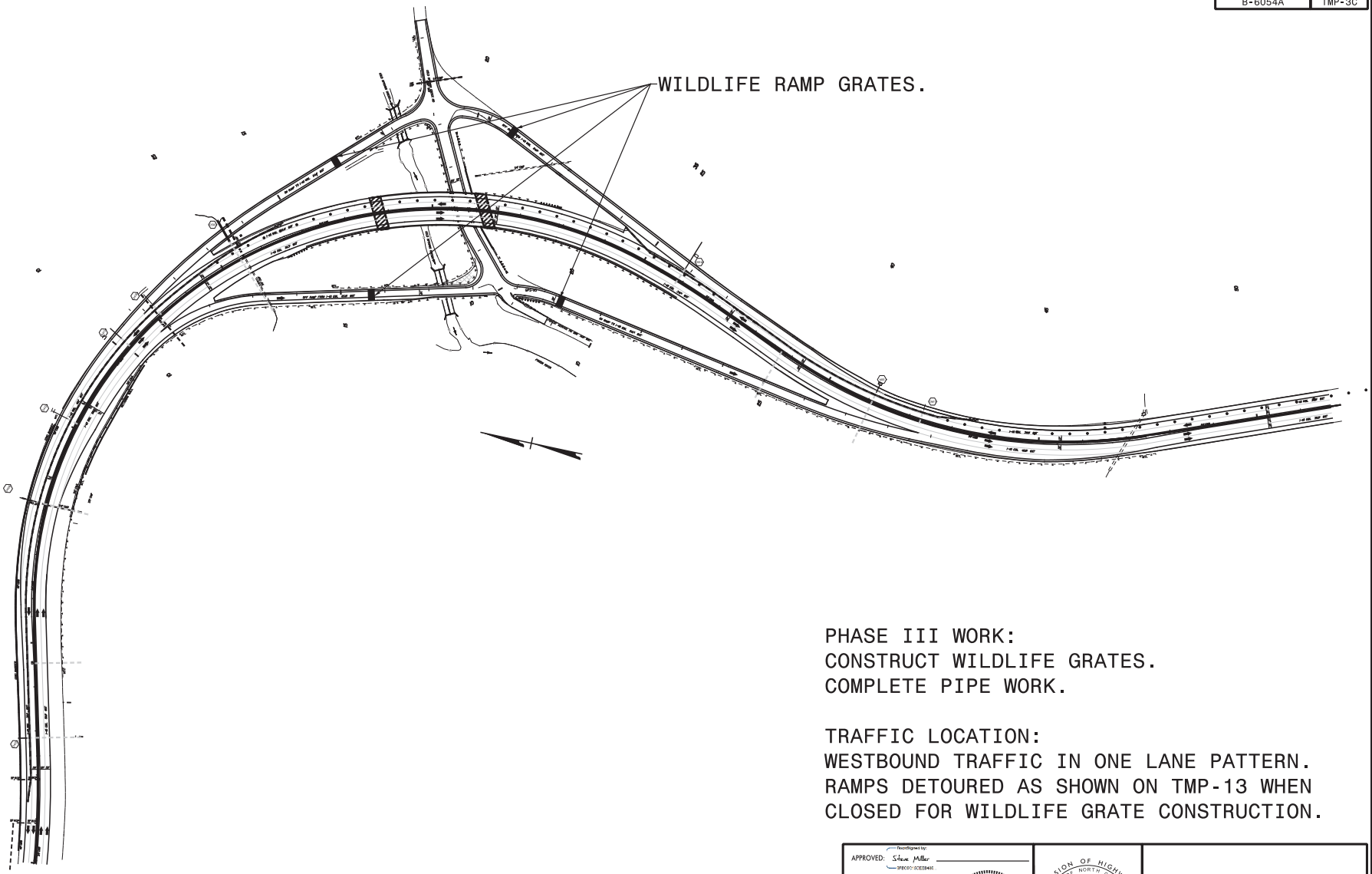

PHASE III WORK:
CONSTRUCT WILDLIFE GRATES.
COMPLETE PIPE WORK.

TRAFFIC LOCATION:
WESTBOUND TRAFFIC IN ONE LANE PATTERN.
RAMPS DETOURED AS SHOWN ON TMP-13 WHEN CLOSED FOR WILDLIFE GRATE CONSTRUCTION.

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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DATE: 9/10/2021
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PHASE III OVERVIEW

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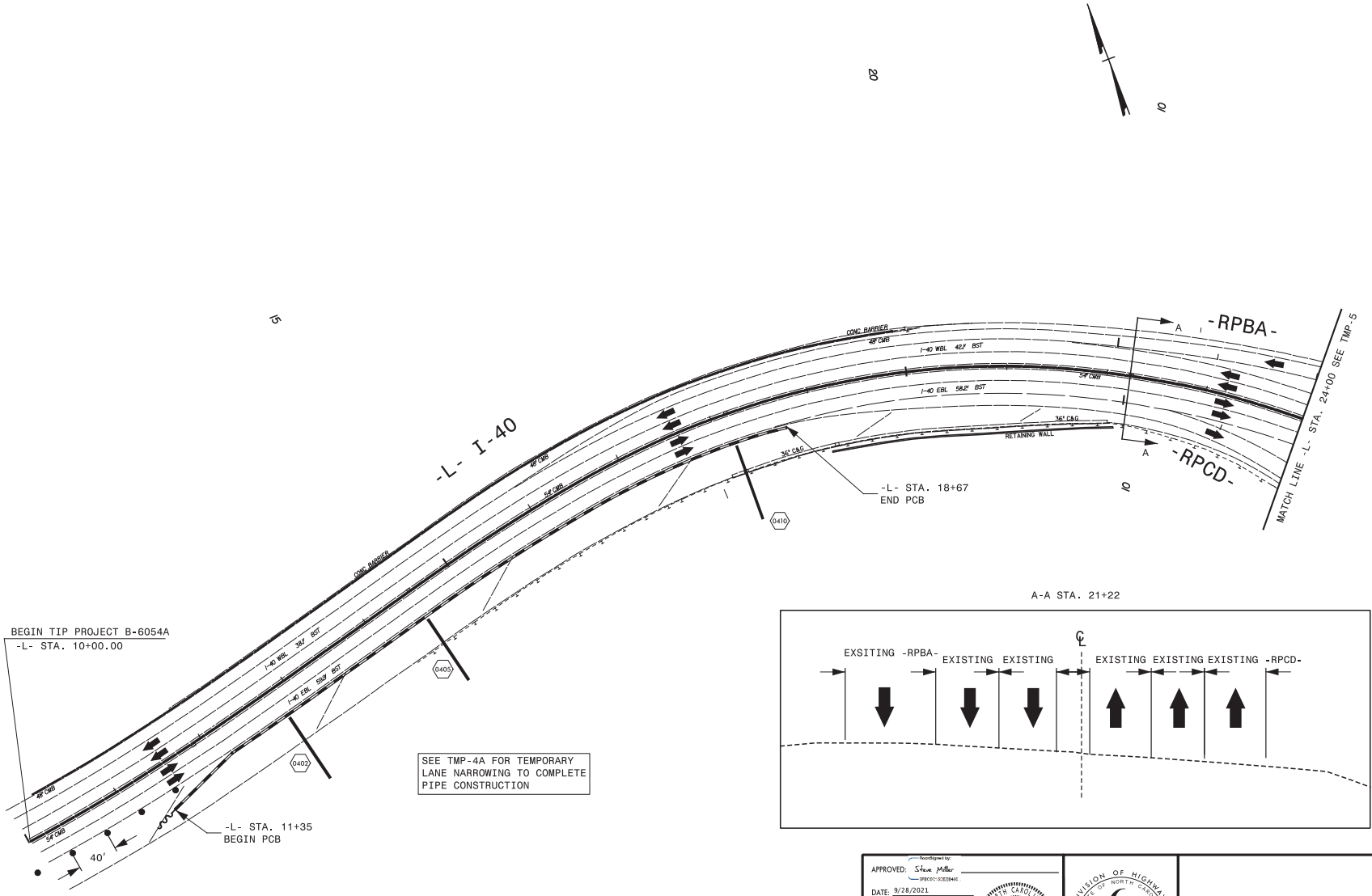
B-6054A	TMP-4



A-A STA. 21+22

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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PHASE I

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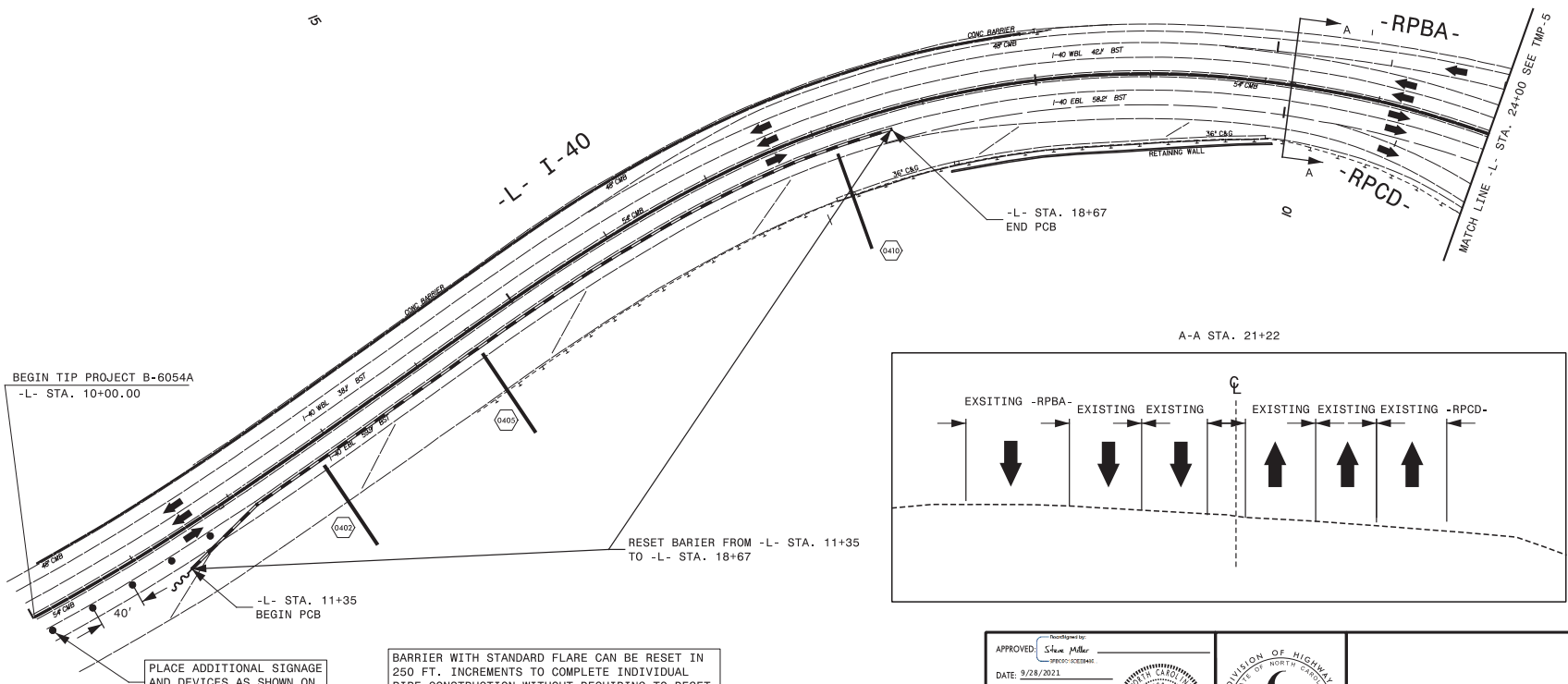

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SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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PHASE I TEMPORARY LANE NARROWING

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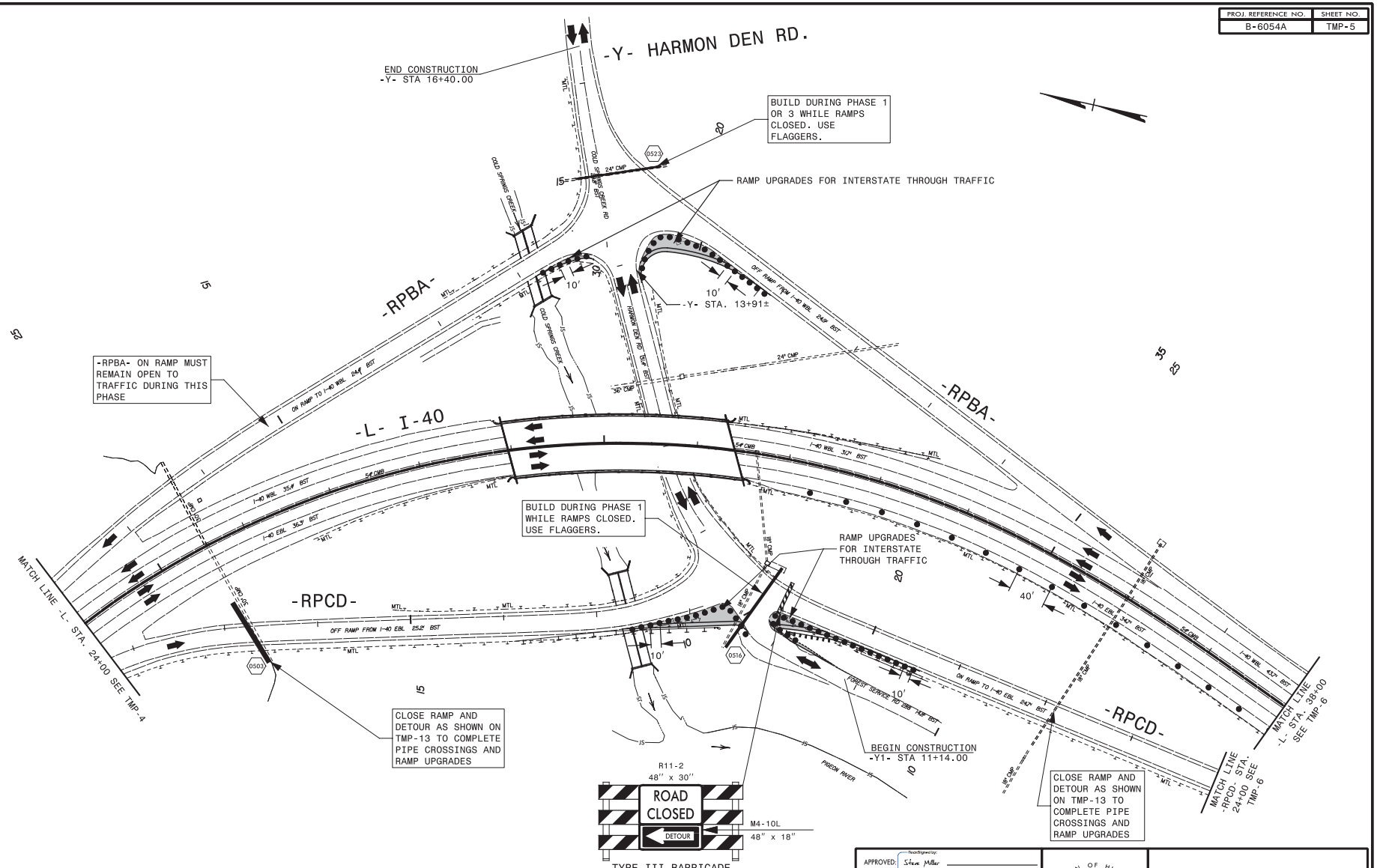

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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PHASE I

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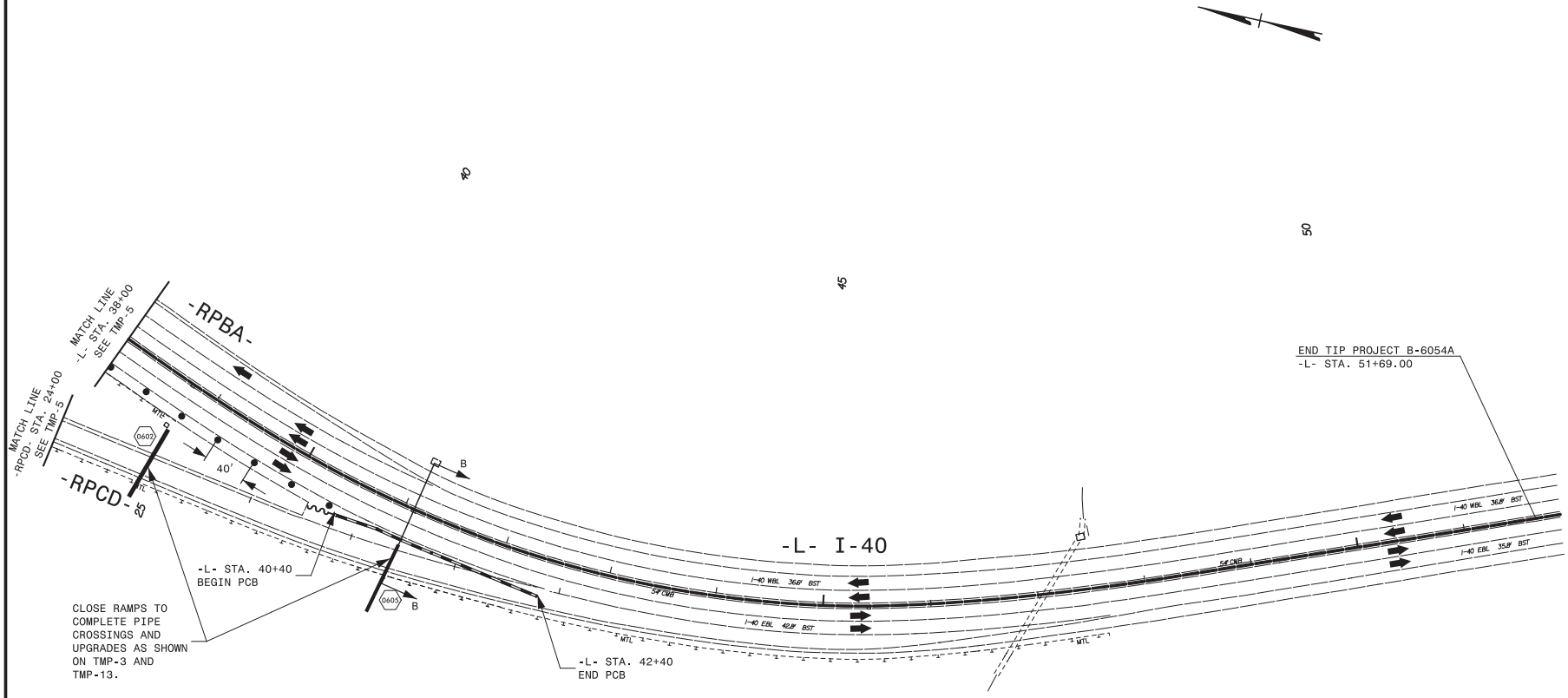
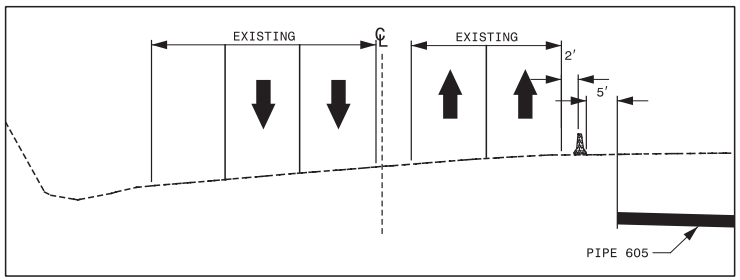


B-B STA. 41+09



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PHASE I

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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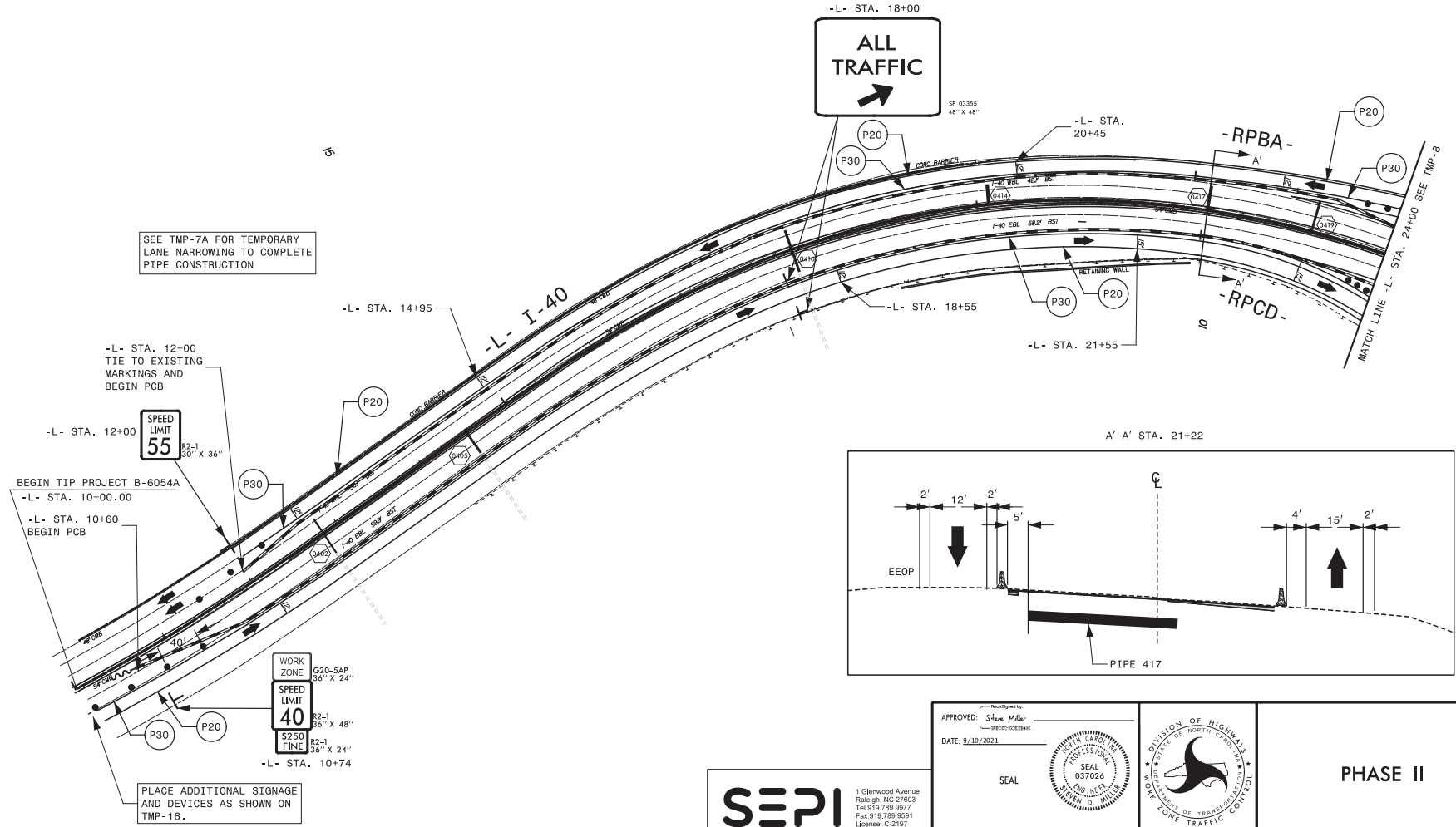

SEPI
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: C-2197

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PHASE II

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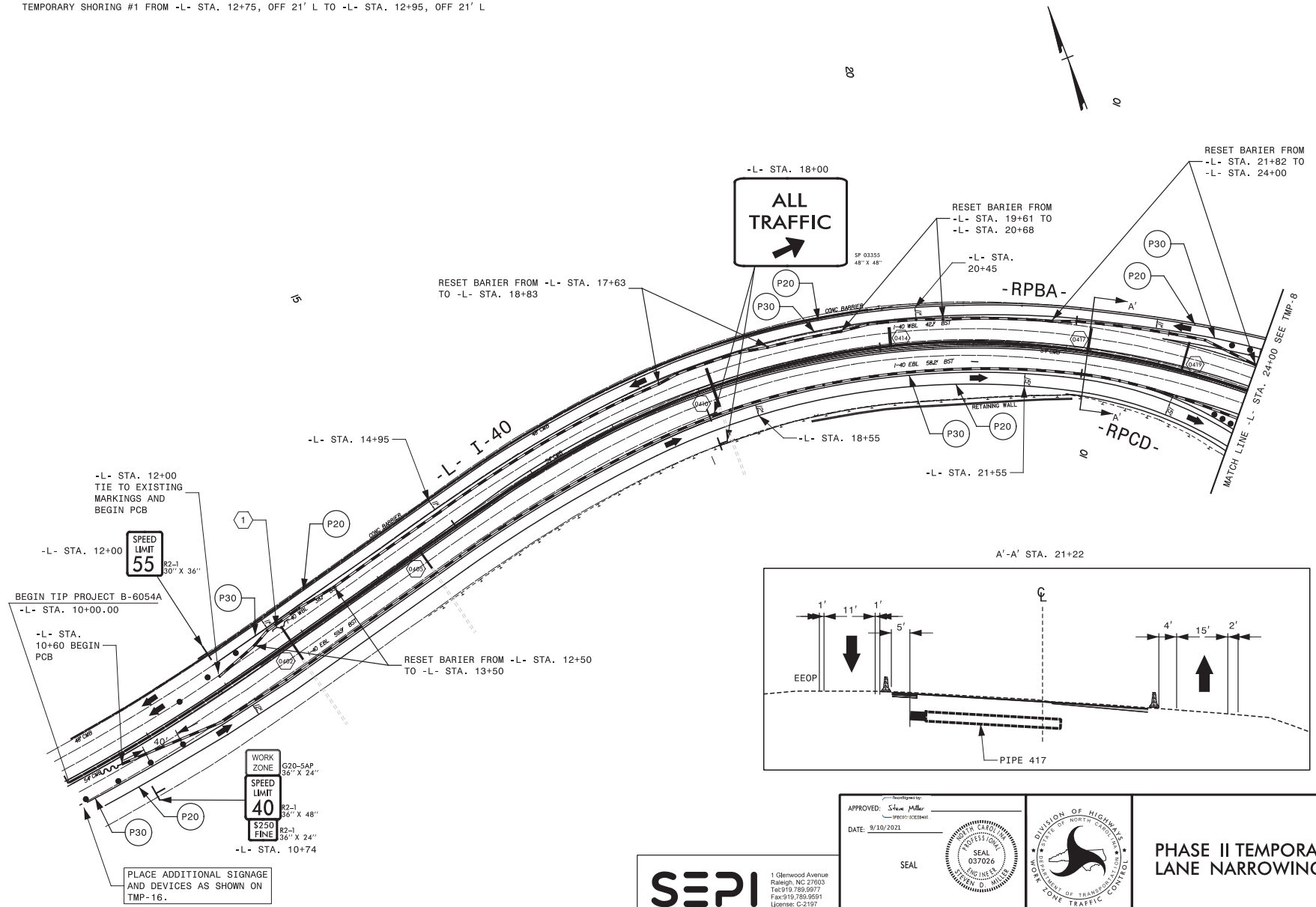
B-6054A	TMP-7A

TEMPORARY SHORING #1 FROM -L- STA. 12+75, OFF 21' L TO -L- STA. 12+95, OFF 21' L



A'-A' STA. 21+22

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License: C-2197

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DATE: 9/10/2021
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PHASE II TEMPORARY LANE NARROWING

9/10/2021
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jbaumann

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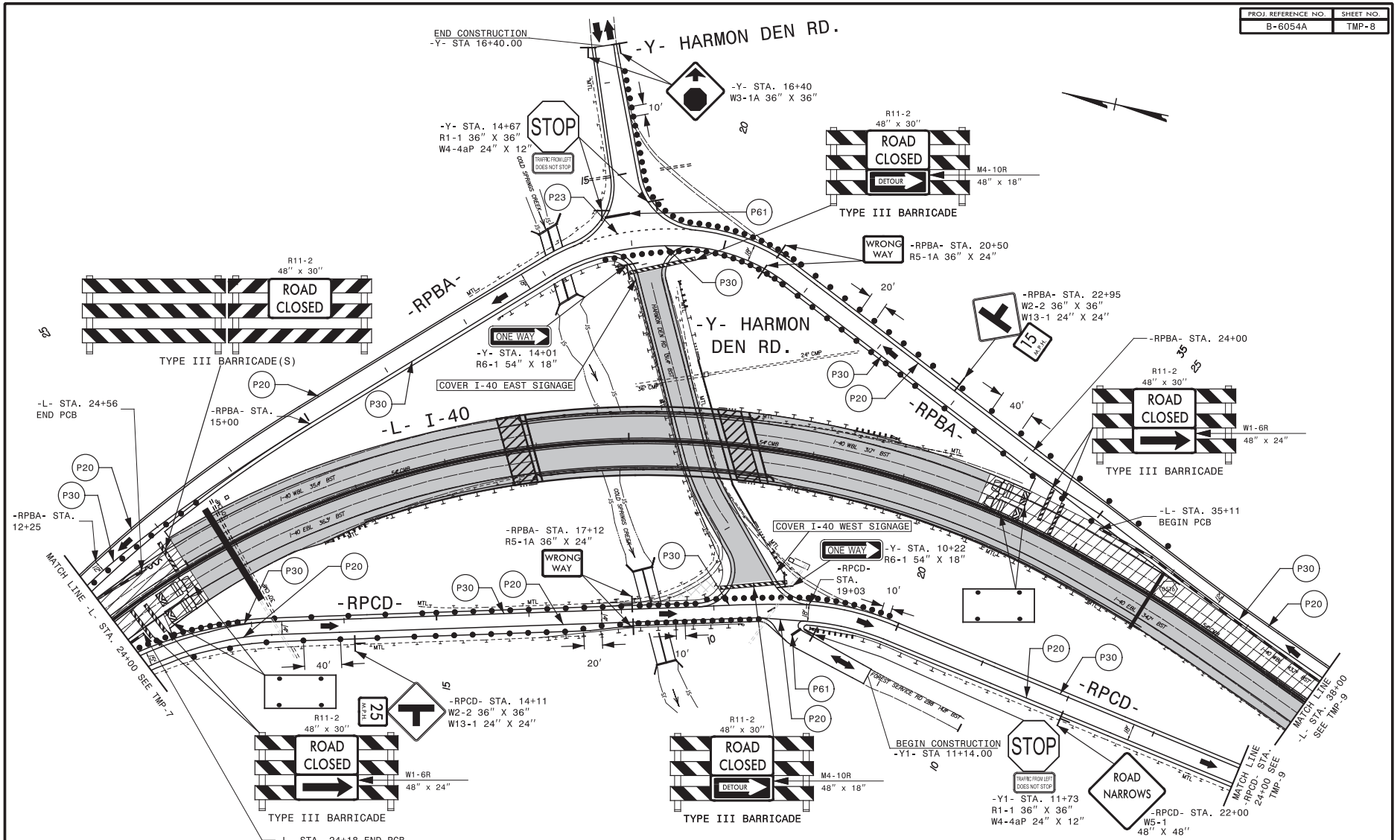
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-8



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DocuSigned by:
DATE: 9/10/2021

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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

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Tel:919.789.9977
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PHASE II

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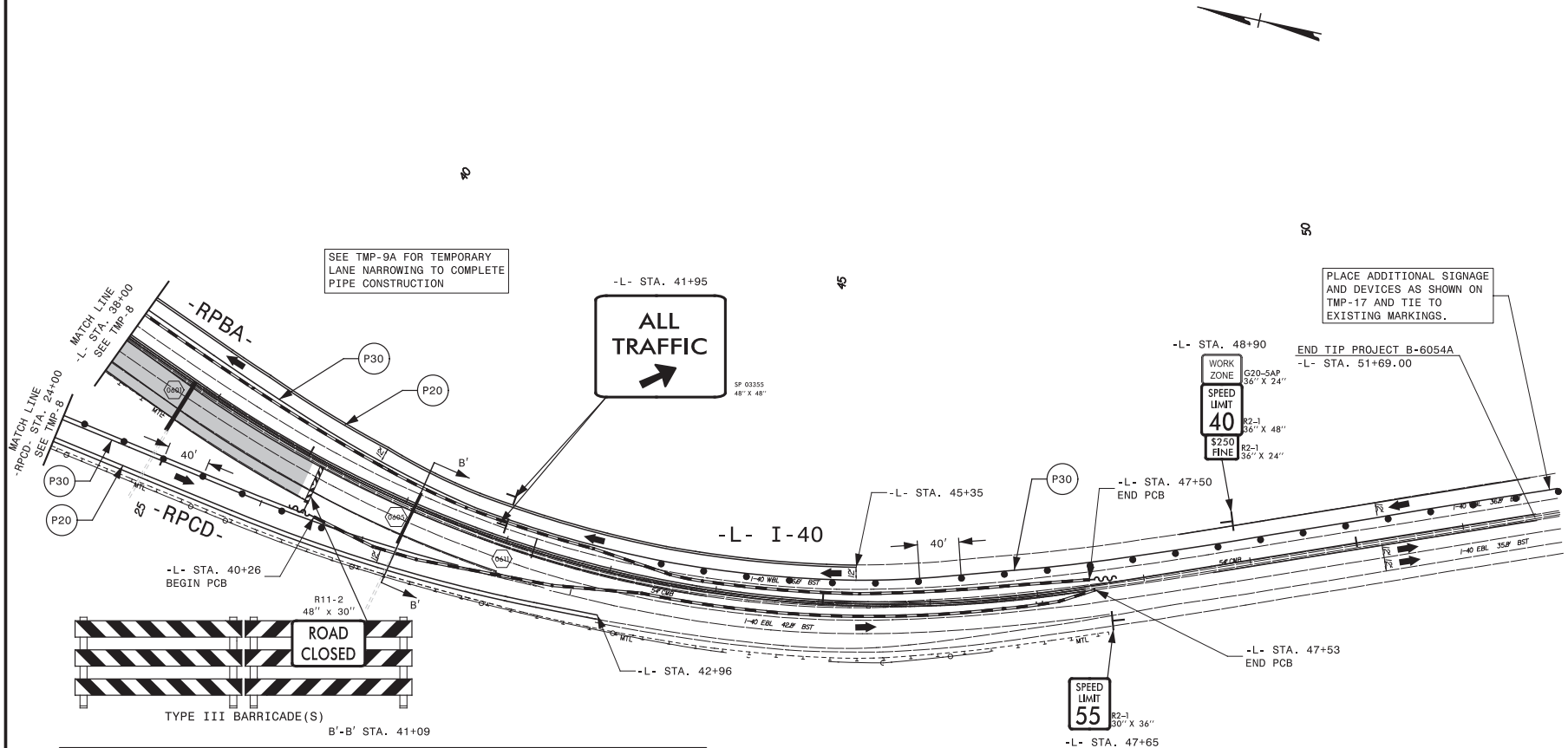
B-6054A	TMP-9



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1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
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PHASE II

9/28/2021
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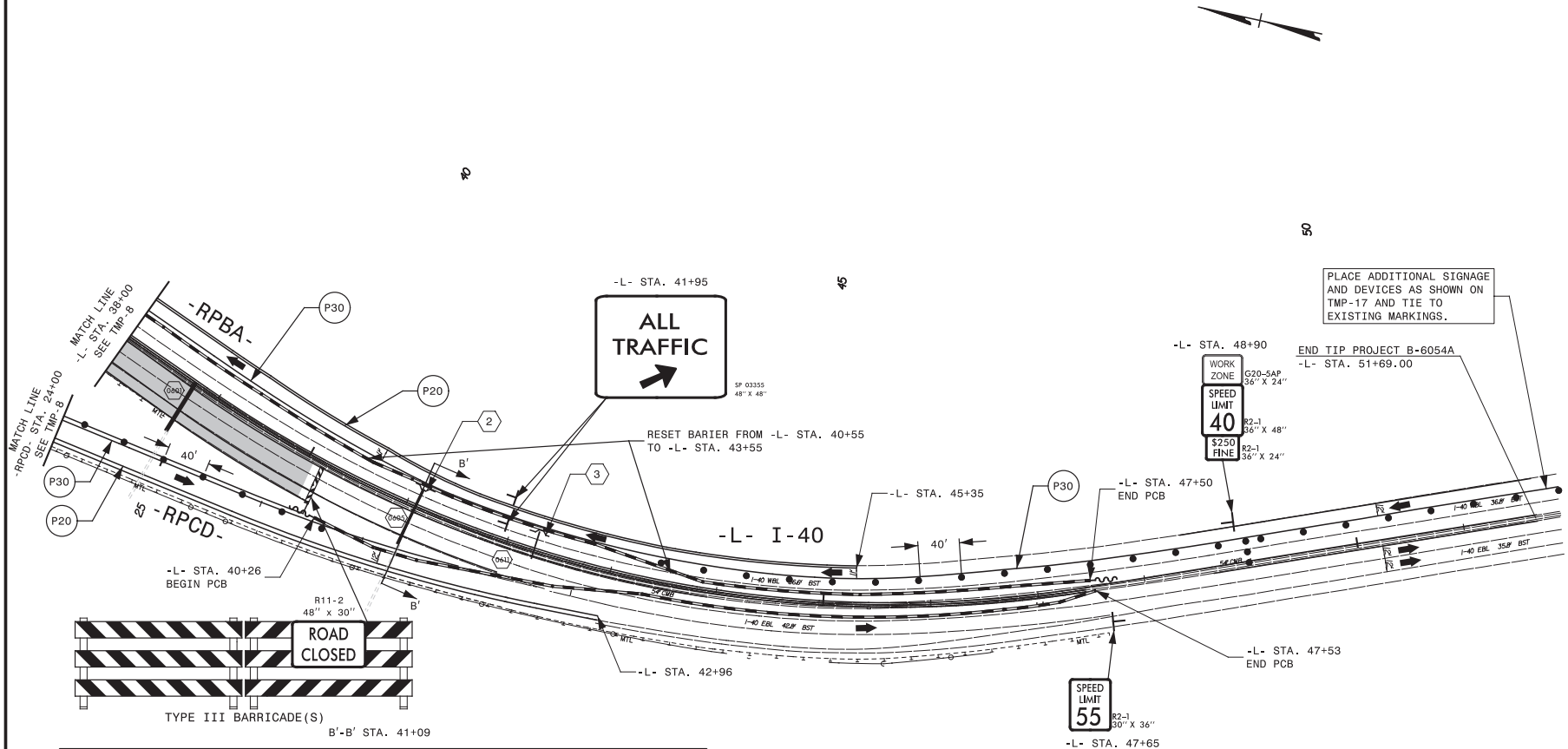
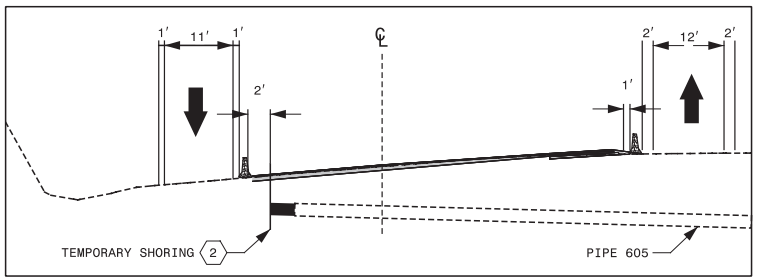
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-9A

TEMPORARY SHORING #2 FROM -L- STA. 41+00, OFF 19′ L TO -L- STA. 41+20, OFF 19′ L
TEMPORARY SHORING #3 FROM -L- STA. 42+17, OFF 19′ L TO -L- STA. 42+36, OFF 19′ L





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PHASE II TEMPORARY LANE NARROWING

9/28/2021
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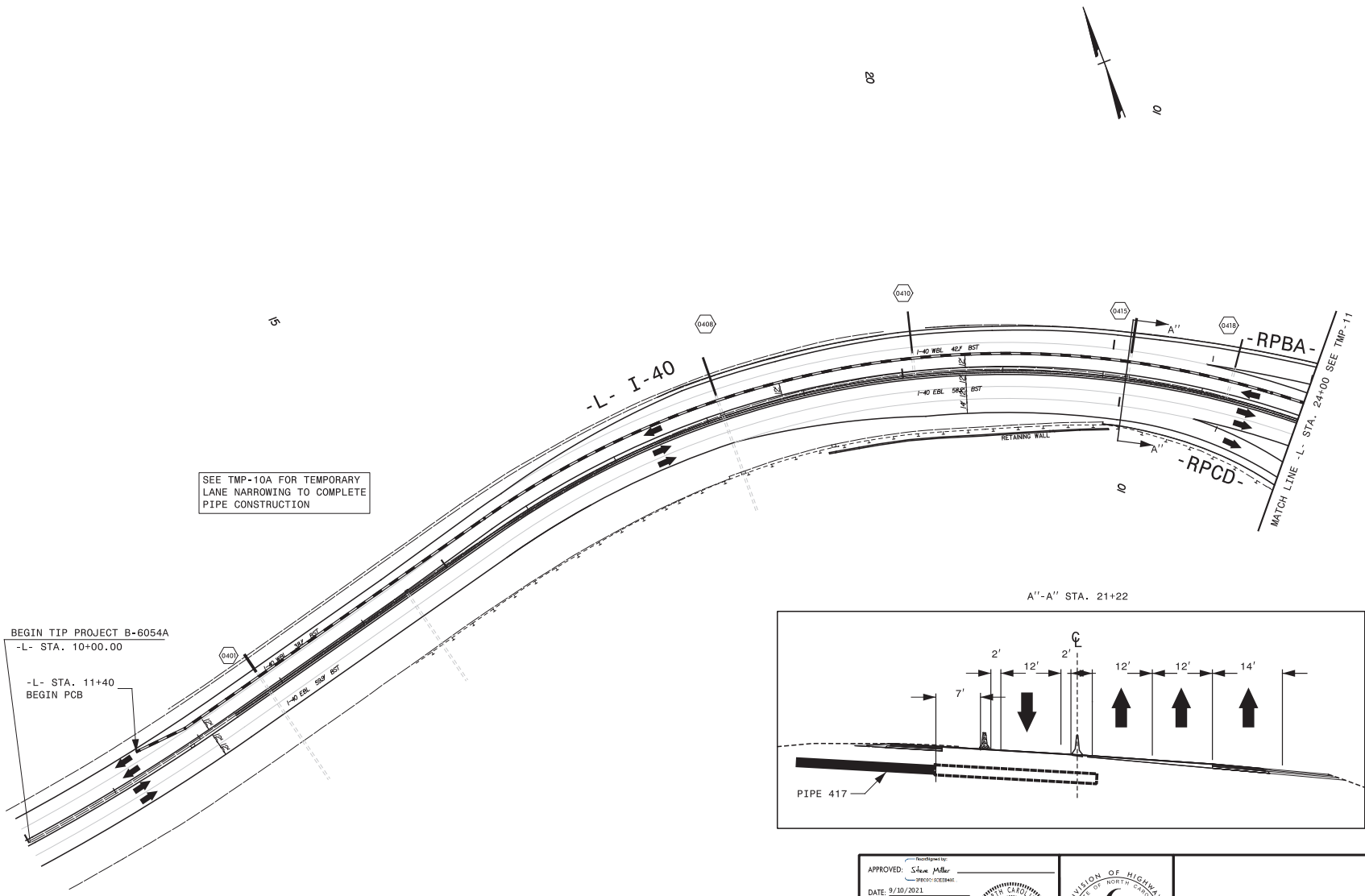
B-6054A	TMP-10



A''-A'' STA. 21+22

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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PHASE III

9/10/2021
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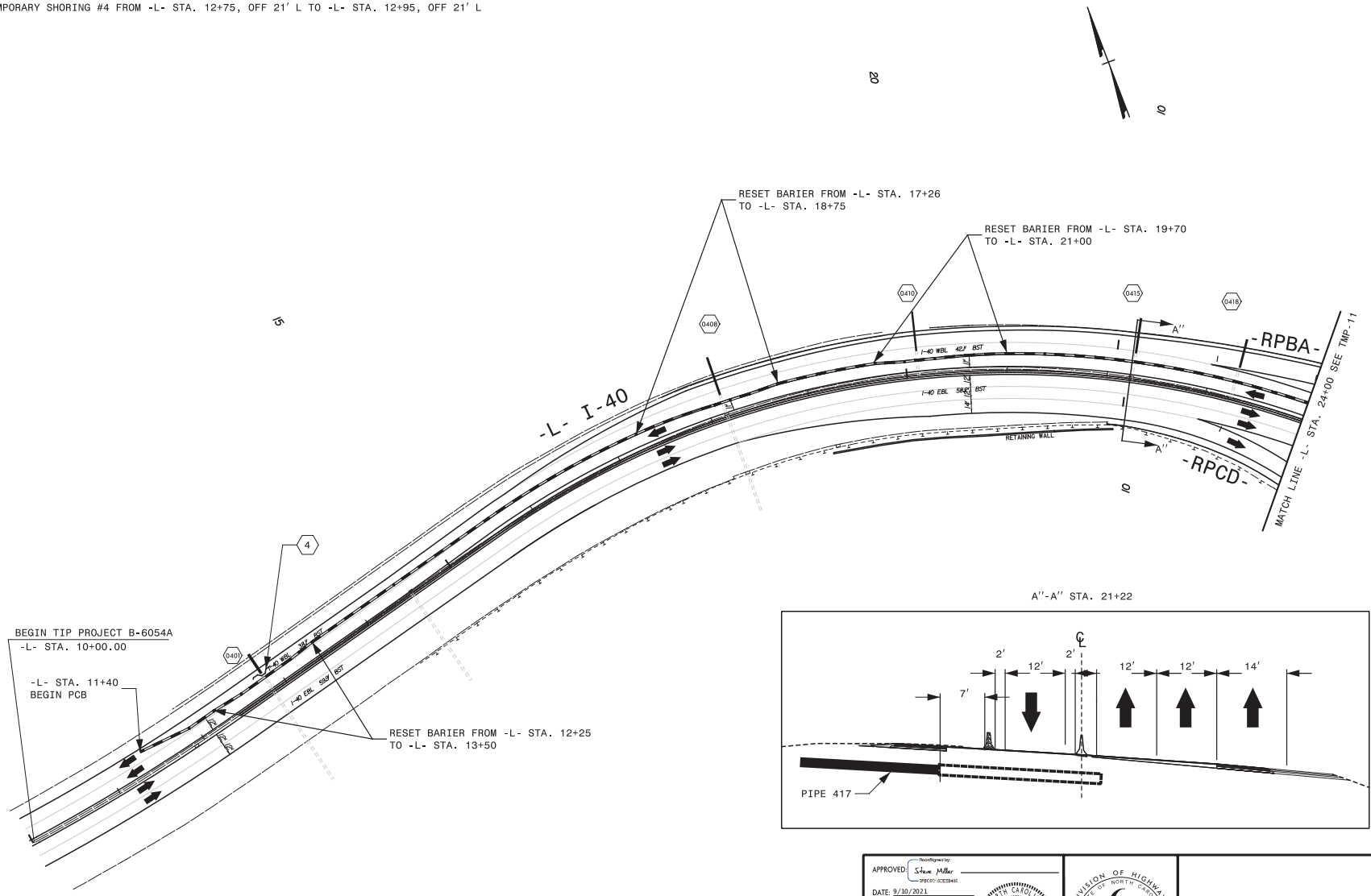
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-10A

TEMPORARY SHORING #4 FROM -L- STA. 12+75, OFF 21' L TO -L- STA. 12+95, OFF 21' L



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1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
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PHASE III TEMPORARY LANE NARROWING

9/10/2021
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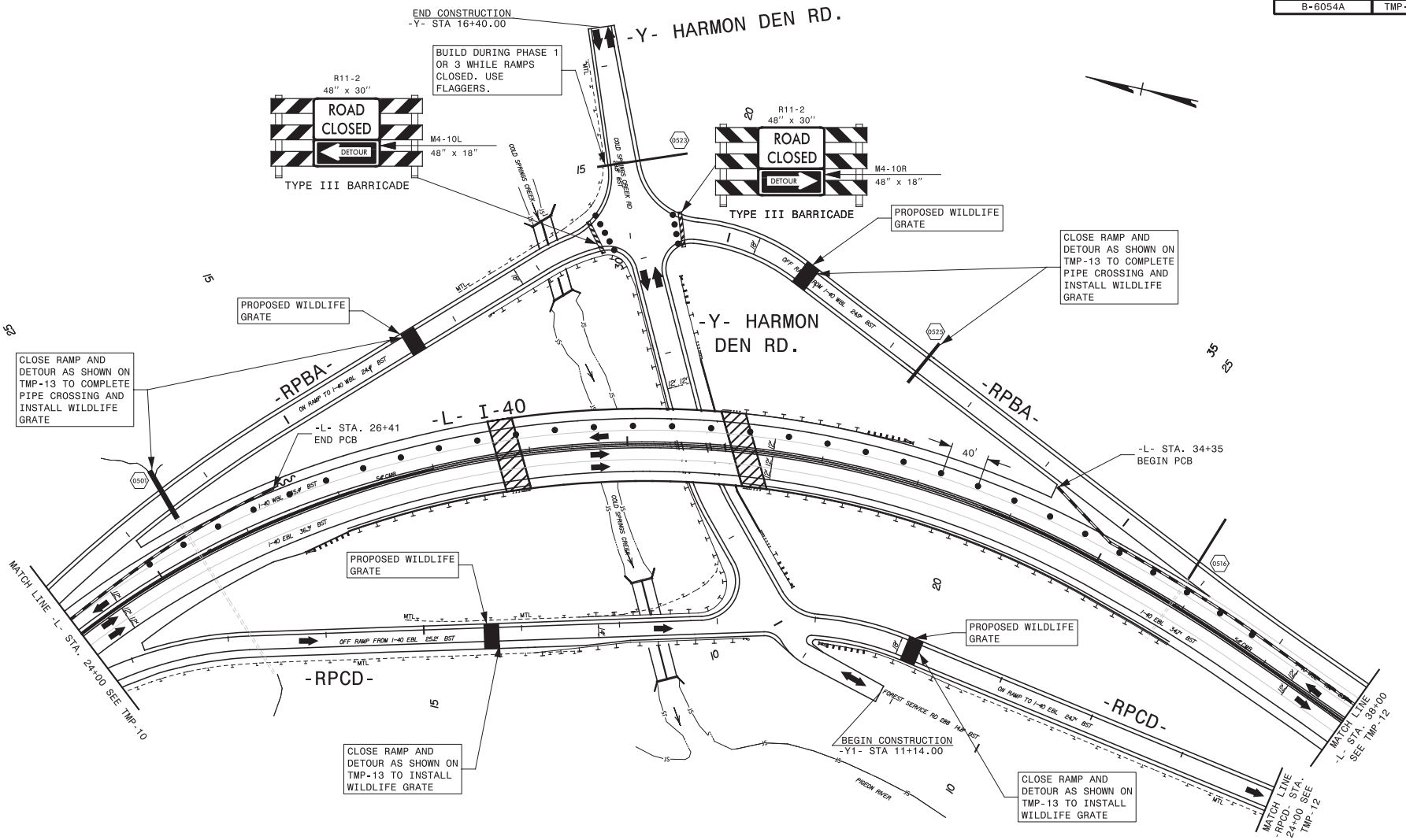
B-6054A	TMP-11



NOTE: COMPLETE ALL WORK ON -RPBA- UNDER THE PHASE III RAMP CLOSURE BEFORE OPENING BACK UP TO TRAFFIC.

NOTE: INSTALL WILDLIFE GRATES ON -RPCD- ONLY AFTER -RPBA- RAMPS ARE RE-OPENED TO TRAFFIC.

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PHASE III

9/10/2021
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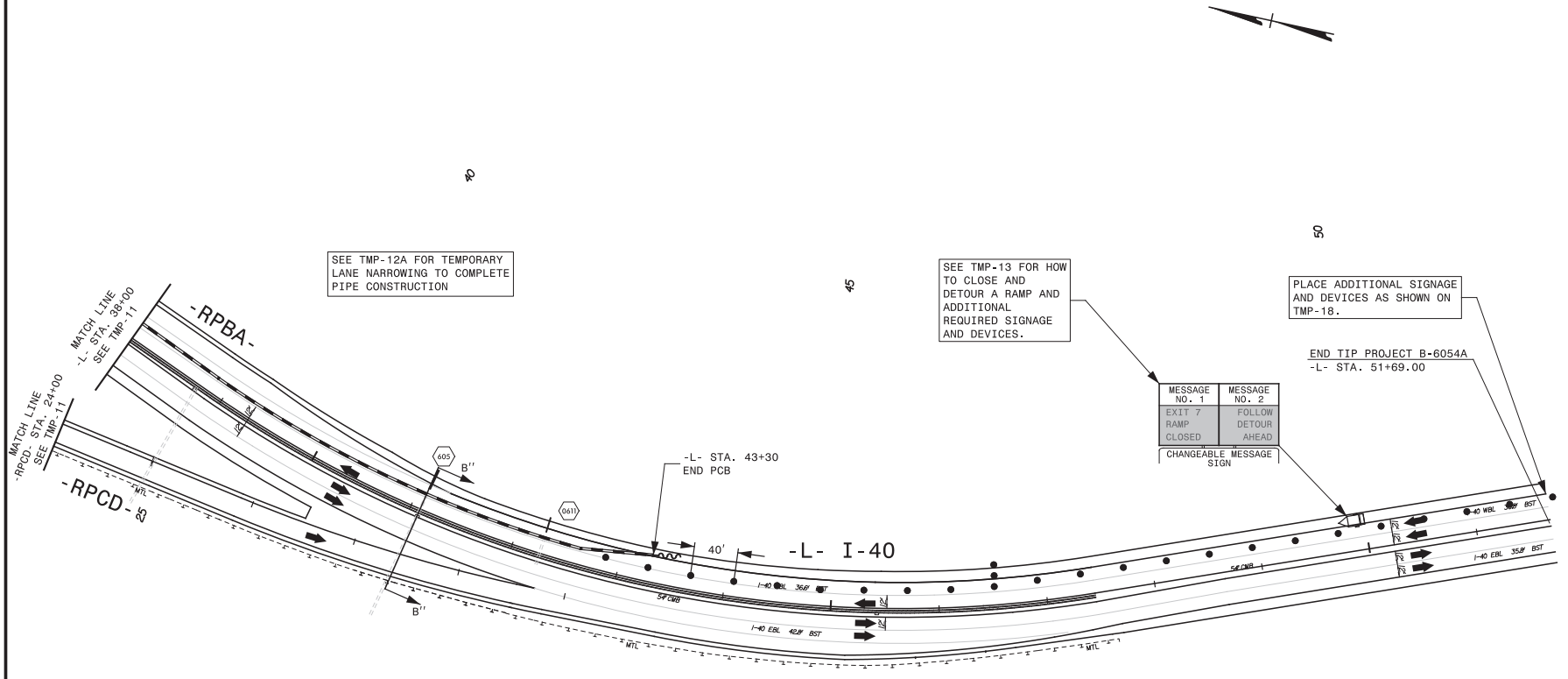
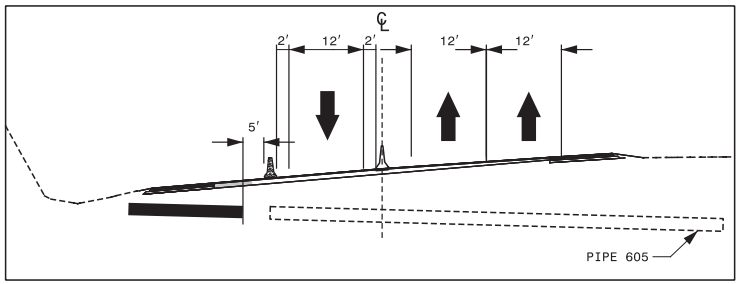
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-12



B''-B'' STA. 41+09



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PHASE III

9/10/2021
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JBOUMAN

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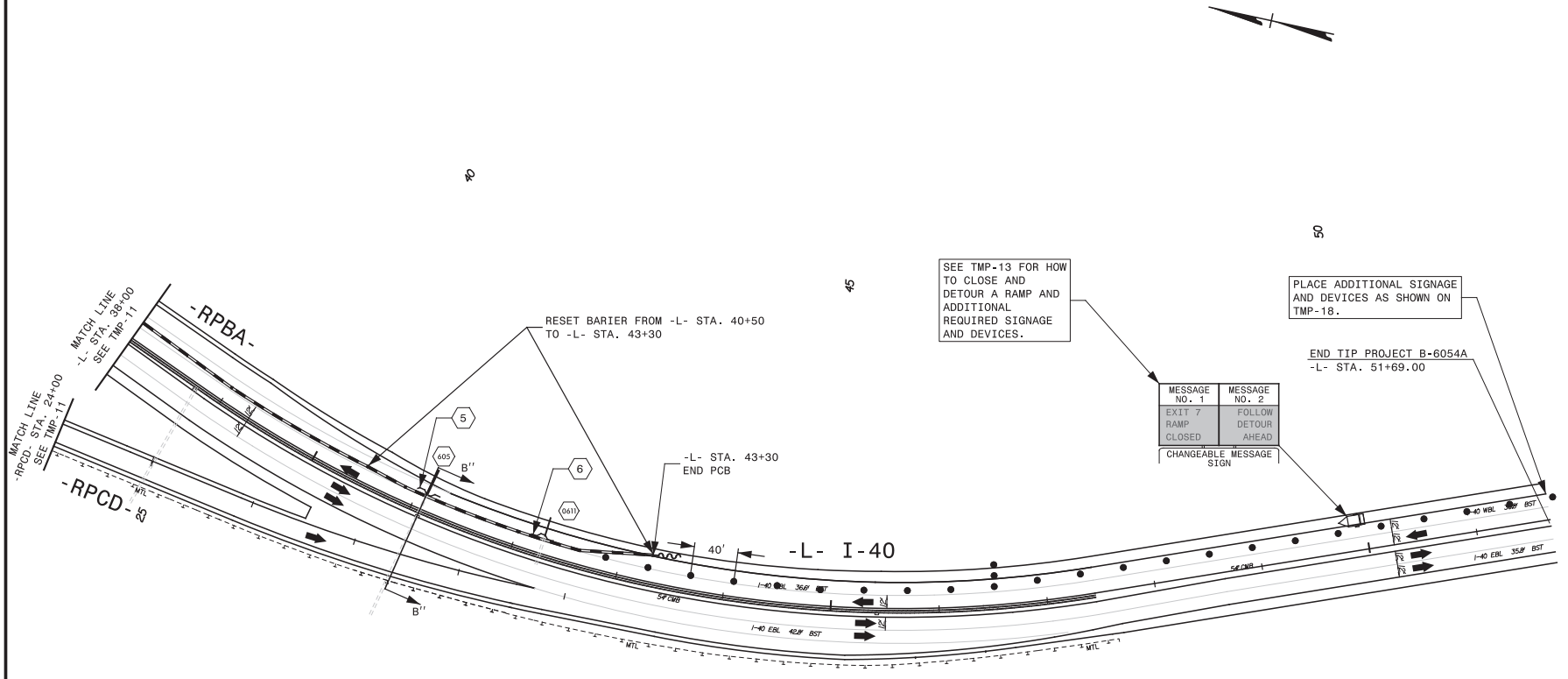
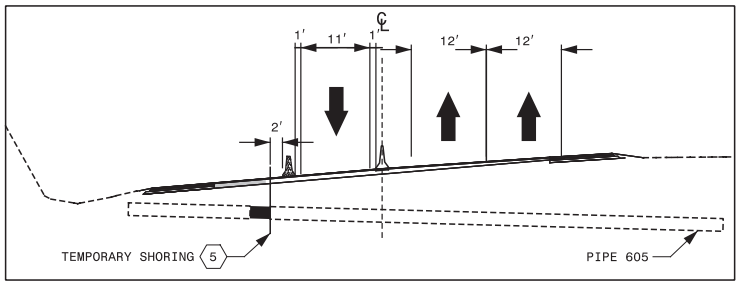
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-12A

TEMPORARY SHORING #5 FROM -L- STA. 41+00, OFF 19′ L TO -L- STA. 41+20, OFF 19′ L
TEMPORARY SHORING #6 FROM -L- STA. 42+17, OFF 19′ L TO -L- STA. 42+36, OFF 19′ L



B″-B″ STA. 41+09



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PHASE III TEMPORARY LANE NARROWING

9/10/2021
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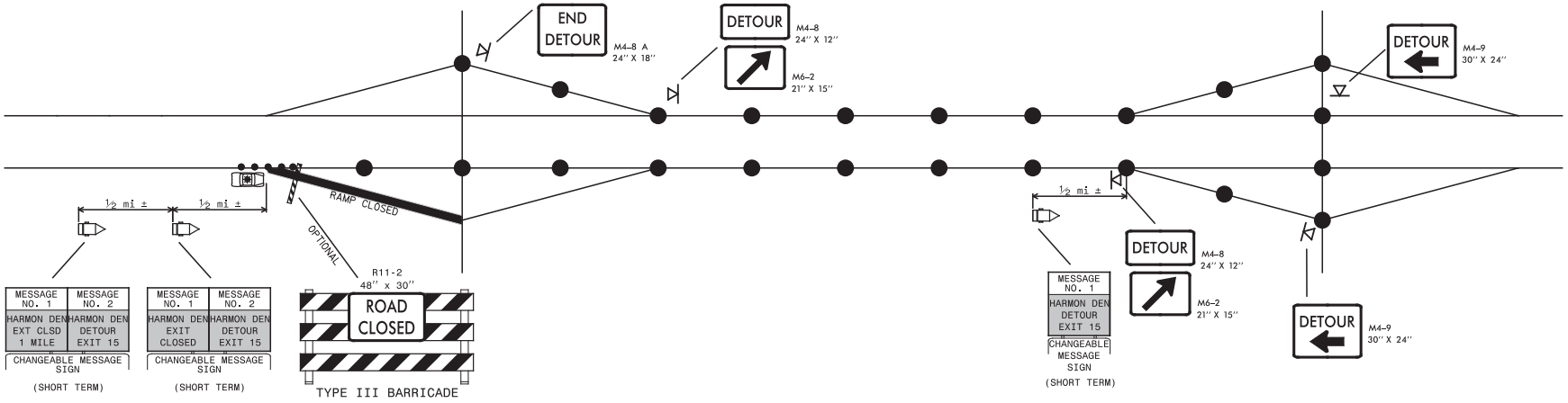
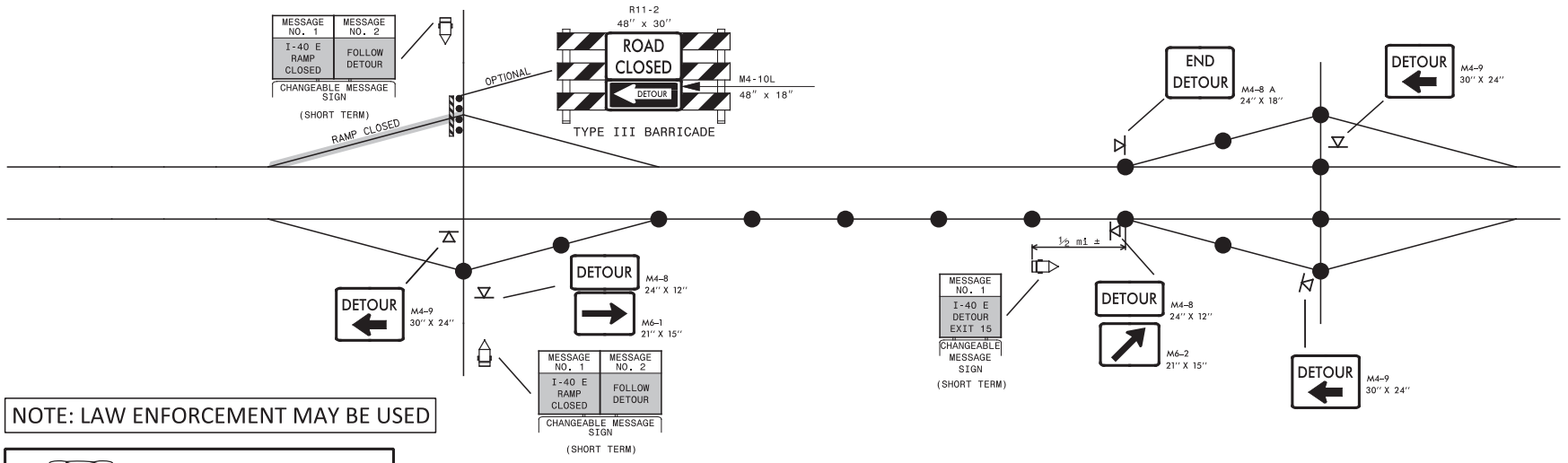
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-13

CLOSURE AND DETOUR OF OFF-RAMP TO ADJACENT INTERCHANGE



CLOSURE AND DETOUR OF ON-RAMP TO ADJACENT INTERCHANGE



NOTE: LAW ENFORCEMENT MAY BE USED

LAW ENFORCEMENT

OFF–SITE DETOUR ROUTES

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CLOSURE AND DETOUR OF INTERSTATE/FREEWAY RAMPS

9/10/2021
K:\2020\SE20.04.00 B-6054 I-40 CMGC Haywood Co\B-6054A HAYWOOD BRIDGE 57\TP\TMP\B-6054A_TCP_13.dgn
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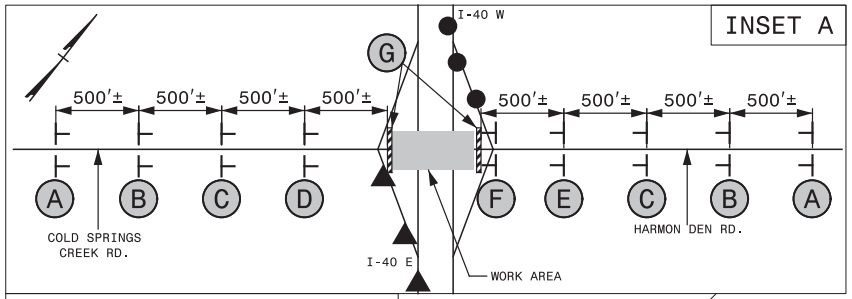
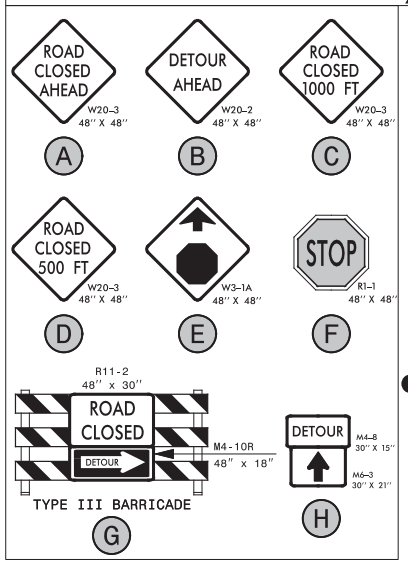
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-14

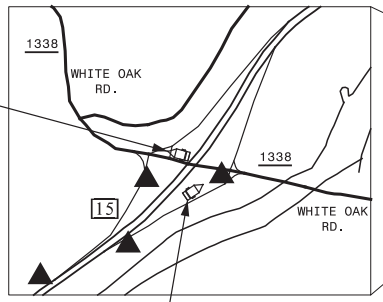
INSET A





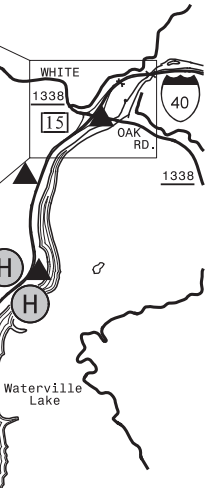
MESSAGE NO. 1	MESSAGE NO. 2
HARMON DEN RD. DETOUR	TURN LEFT

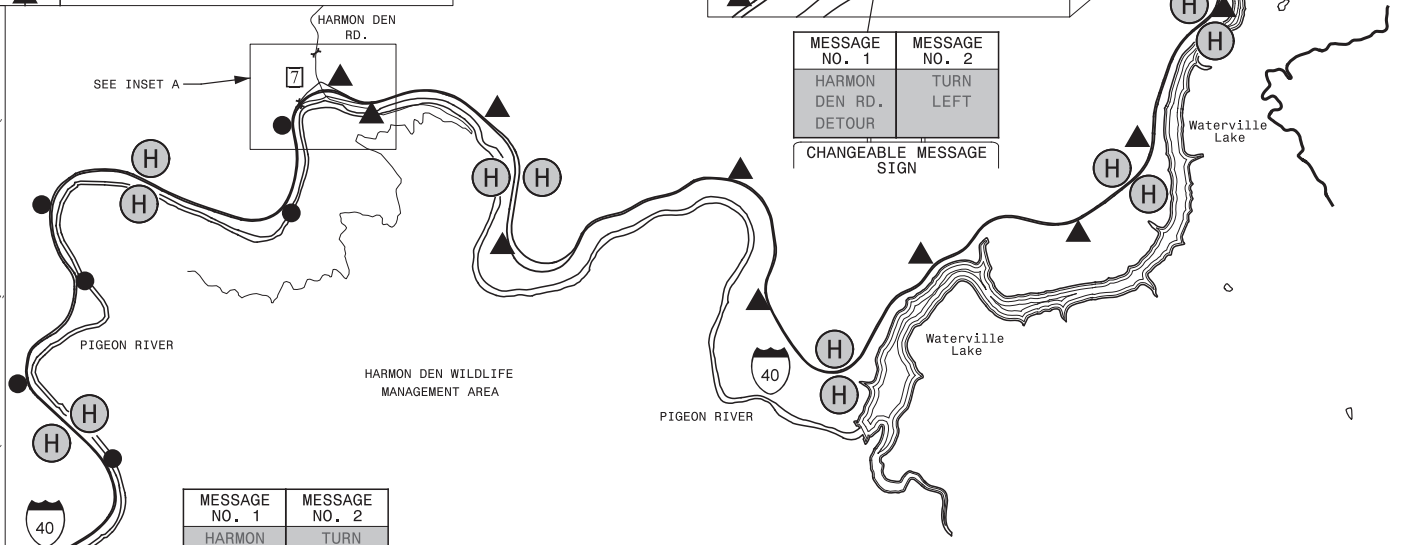
CHANGEABLE MESSAGE SIGN



MESSAGE NO. 1	MESSAGE NO. 2
HARMON DEN RD. DETOUR	TURN LEFT

CHANGEABLE MESSAGE SIGN





MESSAGE NO. 1	MESSAGE NO. 2
HARMON DEN RD. DETOUR	TURN LEFT

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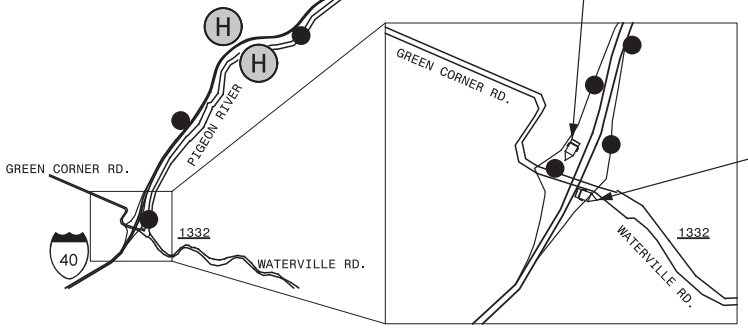

MESSAGE NO. 1	MESSAGE NO. 2
HARMON DEN RD. DETOUR	TURN LEFT

CHANGEABLE MESSAGE SIGN

OFF–SITE DETOUR ROUTES

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D. MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

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OFF–SITE DETOUR

9/10/2021
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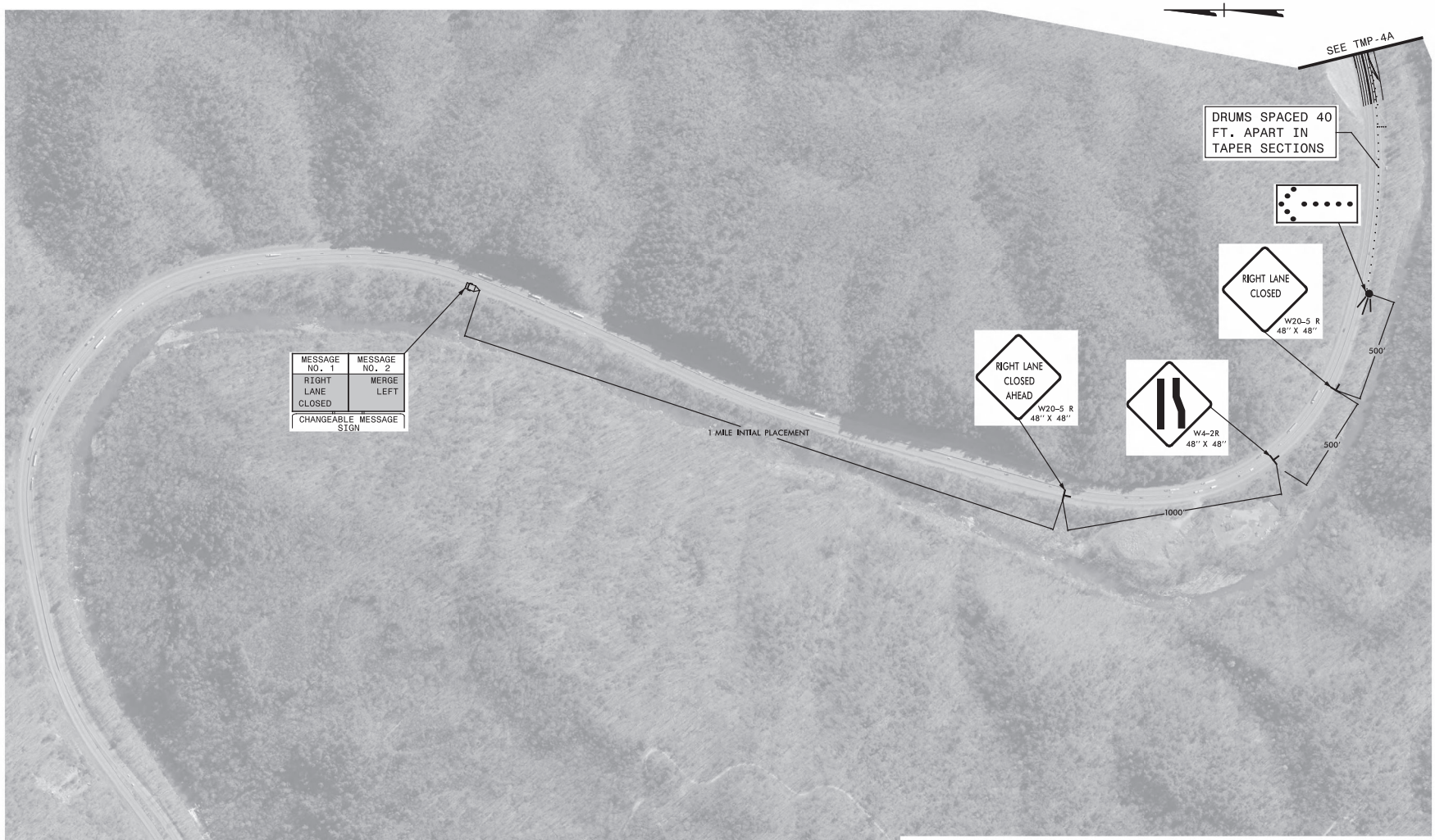
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-15



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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037026 STEVEN D MILLER

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PHASE I TEMPORARY LANE CLOSURE SIGNING

9/28/2021
X:\2020\SE20.04\00 B-6054 I-40 CMGC Haywood Co\B-6054A HAYWOD BRIDGE 57\TP\TMP\B-6054A_TCP_I5.dgn
JBOUMAN

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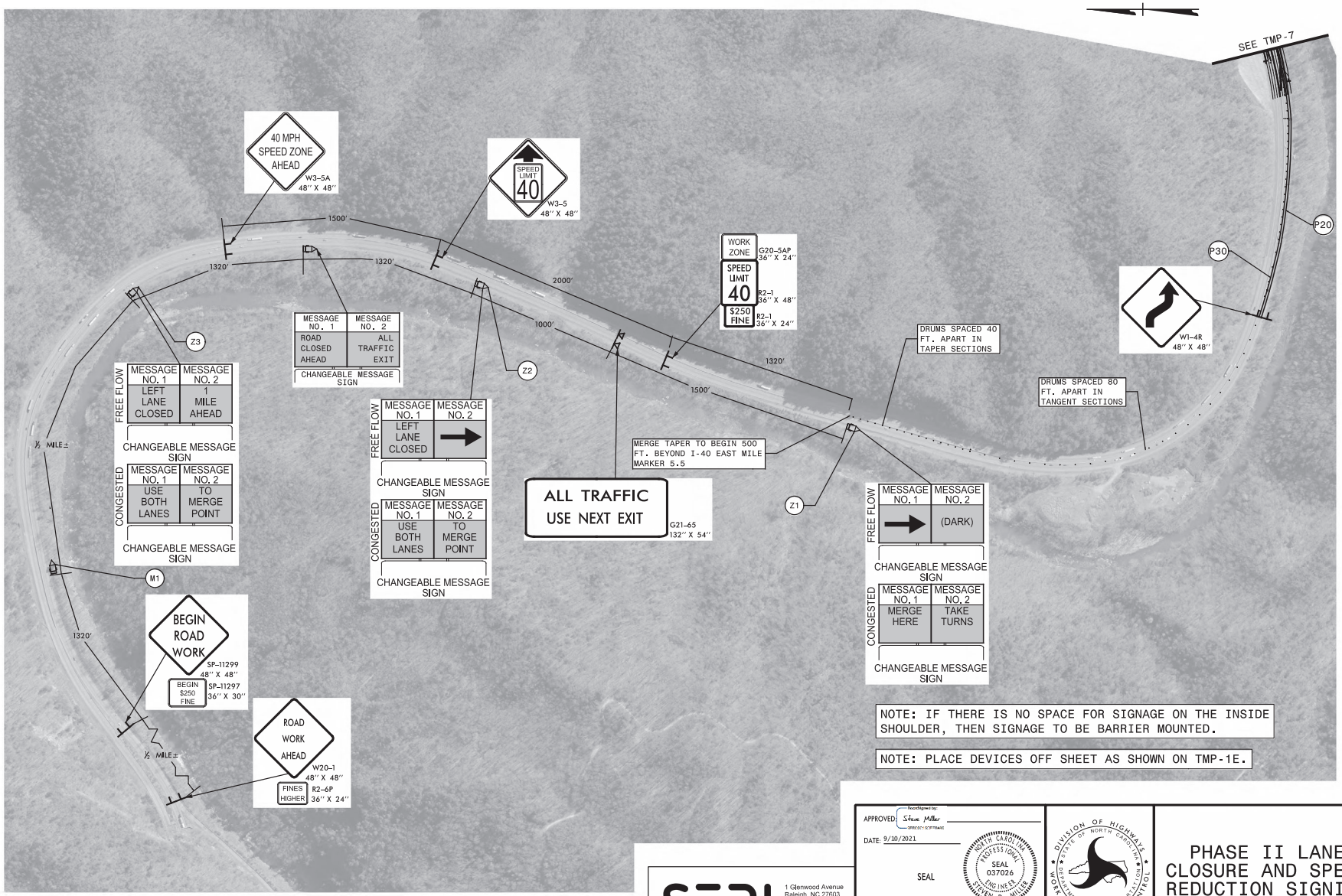
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-16



NOTE: IF THERE IS NO SPACE FOR SIGNAGE ON THE INSIDE SHOULDER, THEN SIGNAGE TO BE BARRIER MOUNTED.

NOTE: PLACE DEVICES OFF SHEET AS SHOWN ON TMP-1E.

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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PHASE II LANE CLOSURE AND SPEED REDUCTION SIGNING

9/9/2021
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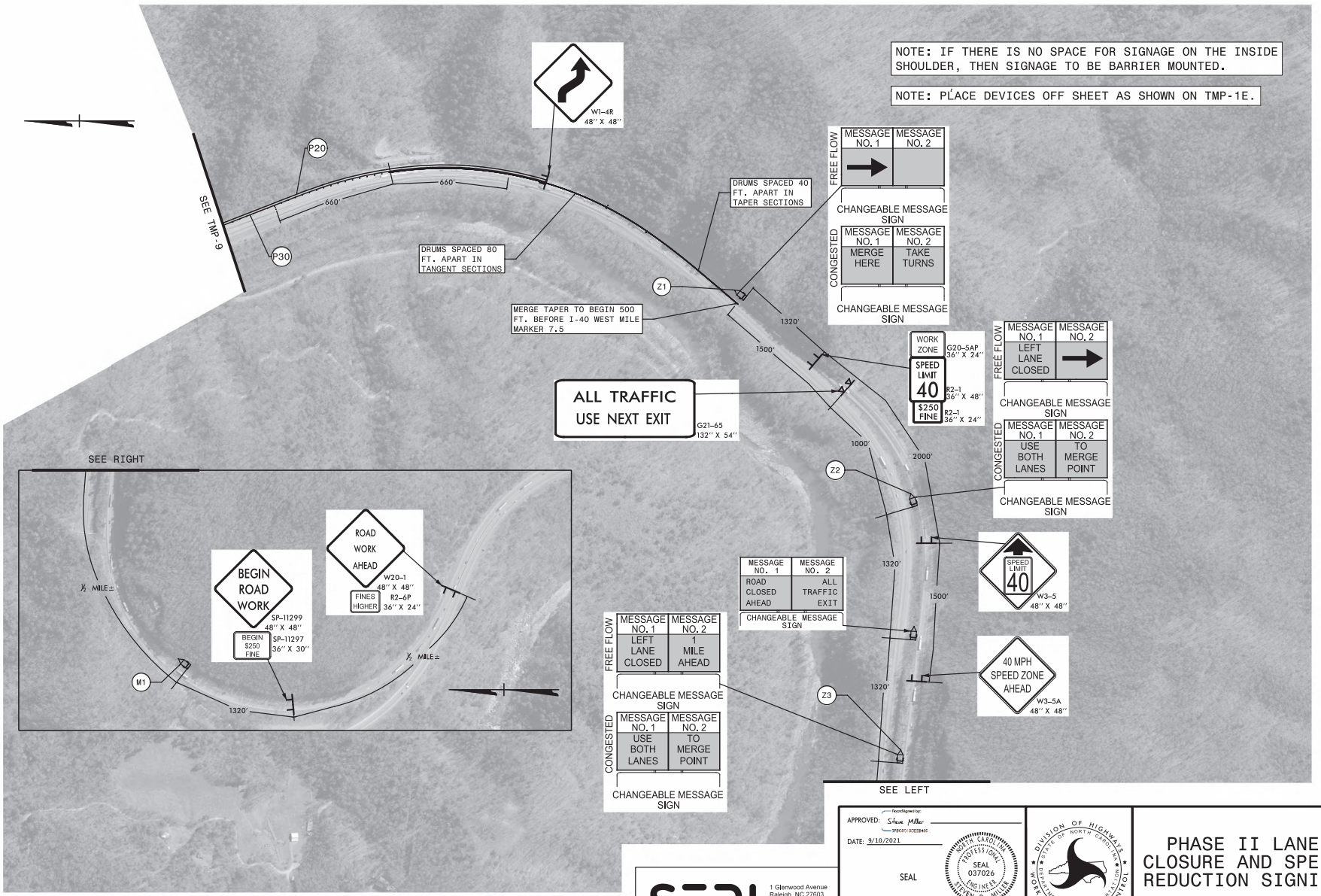
PROJ. REFERENCE NO.	SHEET NO.
B-6054A	TMP-17



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DocuSigned by: SPEC0C1 6CE5B49E...
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DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PHASE II LANE CLOSURE AND SPEED REDUCTION SIGNING

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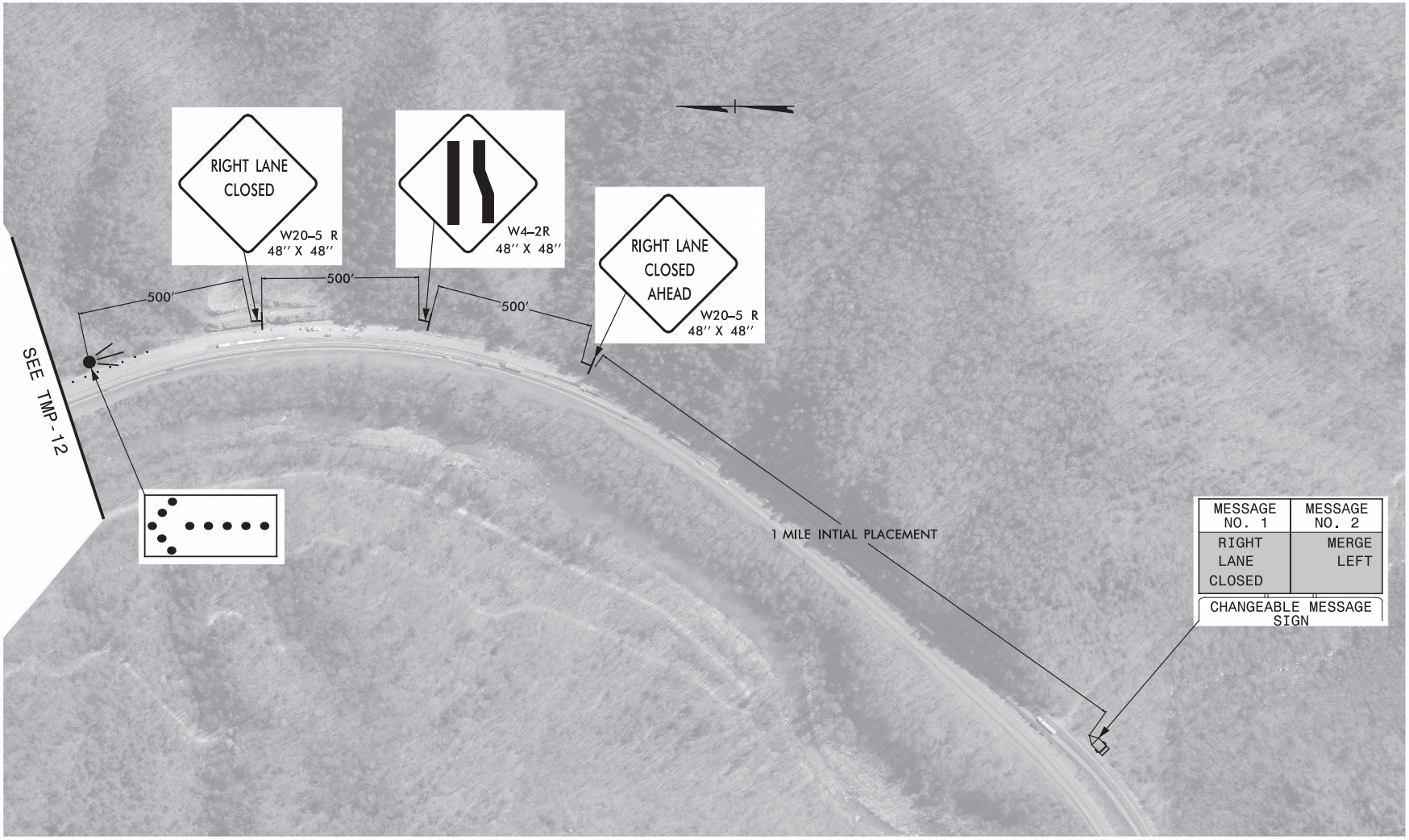

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PHASE III LANE CLOSURE SIGNING

9/9/2021
X:\2020\SE20.04\00 B-6054 I-40 CMGC Haywood Co\B-6054A HAYWOD BRIDGE 57\TP\TMP\B-6054A_TCP_18.dgn
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TIP NO.	SHEET NO.
B-6054A	PMP-1

APPROVED: Laura C. Fisher

DATE: 9/10/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030877 ENGINEER LAURA C. FISHER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

TIP PROJECT: B-6054A

CONTRACT: C204654

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKING PLAN

HAYWOOD COUNTY

LOCATION: BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK

INDEX

STD. NO.	DESCRIPTION
PMP-1	INDEX, ROADWAY STANDARD DRAWINGS, PAVEMENT MARKING SCHEDULE, PAVEMENT MARKER SCHEDULE, GENERAL NOTES
PMP-2 THRU PMP-4	PAVEMENT MARKING DETAILS

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.03	PAVEMENT MARKINGS - EXIT AND ENTRANCE RAMPS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1253.01	RAISED PAVEMENT MARKERS - SNOWPLOWABLE
1261.01	GUARDRAIL AND BARRIER DELINEATORS
1261.02	GURADRAIL & BARRIER DELINEATORS

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
THERMOPLASTIC (4", 90 MILS)	
T1	WHITE EDGELINE
T13	YELLOW DOUBLE CENTER
THERMOPLASTIC (6", 90 MILS)	
T20	WHITE EDGELINE
T22	10 FT. WHITE SKIP
T30	YELLOW EDGELINE
T33	YELLOW DOUBLE CENTER
THERMOPLASTIC (12", 90 MILS)	
T50	WHITE GORELINE
T51	WHITE DIAGONAL
T52	YELLOW DIAGONAL
T54	3 FT. - 9 FT./SP WHITE MINISKIP
THERMOPLASTIC PAVEMENT MARKING SYMBOLS (24", 90 MILS)	
T61	WHITE STOPBAR
THERMOPLASTIC PAVEMENT MARKING SYMBOLS (90 MILS)	
T79	MERGE ARROW
T80	WRONG-WAY RAMP ARROW
COLD APPLIED PLASTIC (6")	
C20	WHITE EDGELINE
C22	10 FT. WHITE SKIP
C30	YELLOW EDGELINE
NON- CAST IRON SNOWPLOWABLE RAISED PAVEMENT MARKERS	
MF	CRYSTAL & RED

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
I-40	THERMOPLASTIC	SNOWPLOWABLE
ALL OTHERS	THERMOPLASTIC	NONE

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.

D) STOP BAR LOCATION AT NON-SIGNALIZED INTERSECTIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

GREG STEWART, PE — PROJECT ENGINEER

LAURA C. FISHER, PE — PROJECT DESIGN ENGINEER

$$$$$$SYSTIME$$$$$$
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TIP NO.	SHEET NO.
B-6054A	PMP-2

APPROVED: Laura C. Fisher
DATE: 9/10/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030877 ENGINEER LAURA C. FISHER

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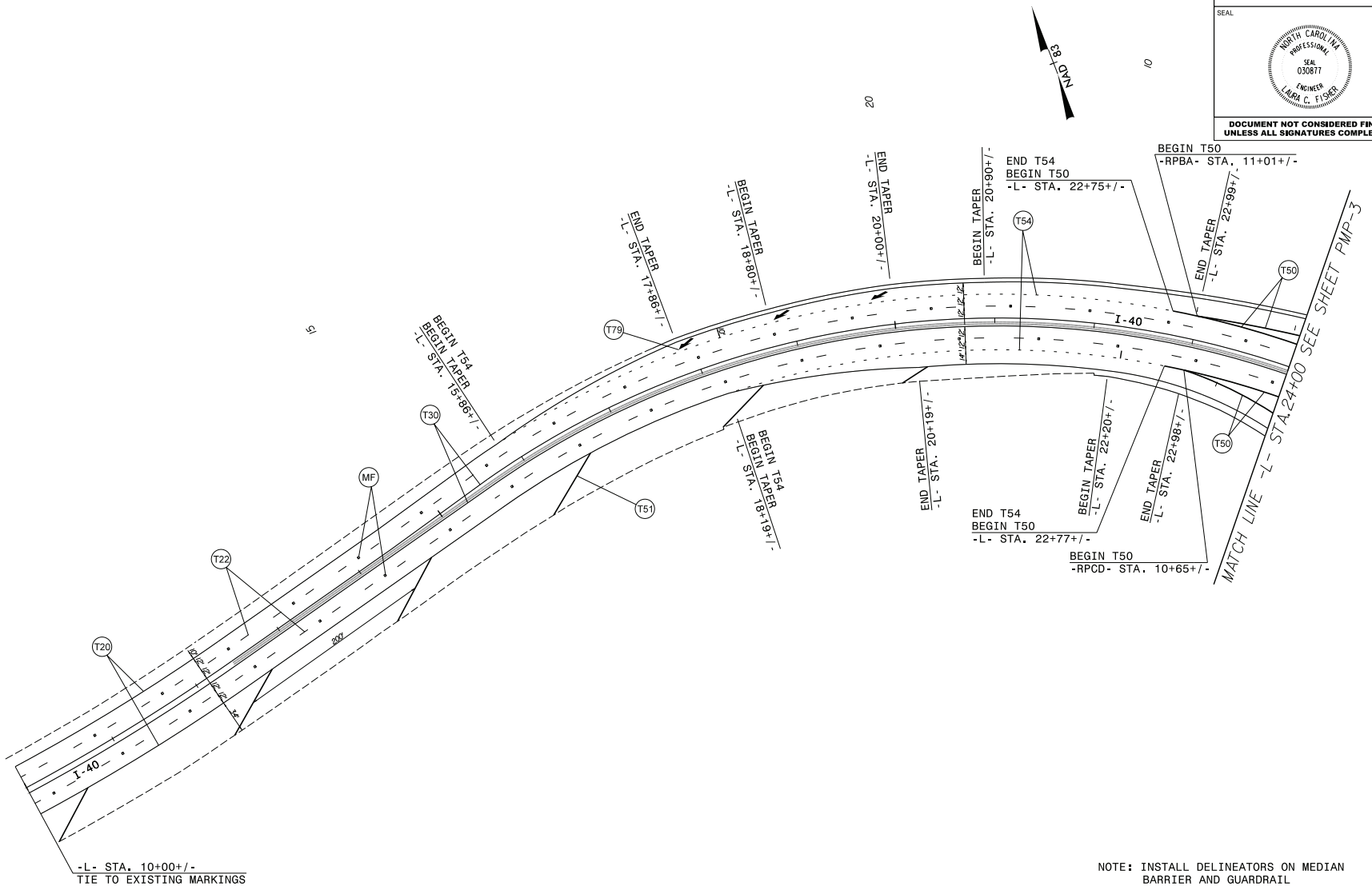
REVISIONS



NOTE: INSTALL DELINEATORS ON MEDIAN BARRIER AND GUARDRAIL

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
9000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

PAVEMENT MARKING PLANS

$$$$$$SYSTIME$$$$$$
$$$$$$

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TIP NO.	SHEET NO.
B-6054A	PMP-3

APPROVED: Laura C. Fisher
DATE: 9/10/2021

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030877 ENGINEER LAURA C. FISHER

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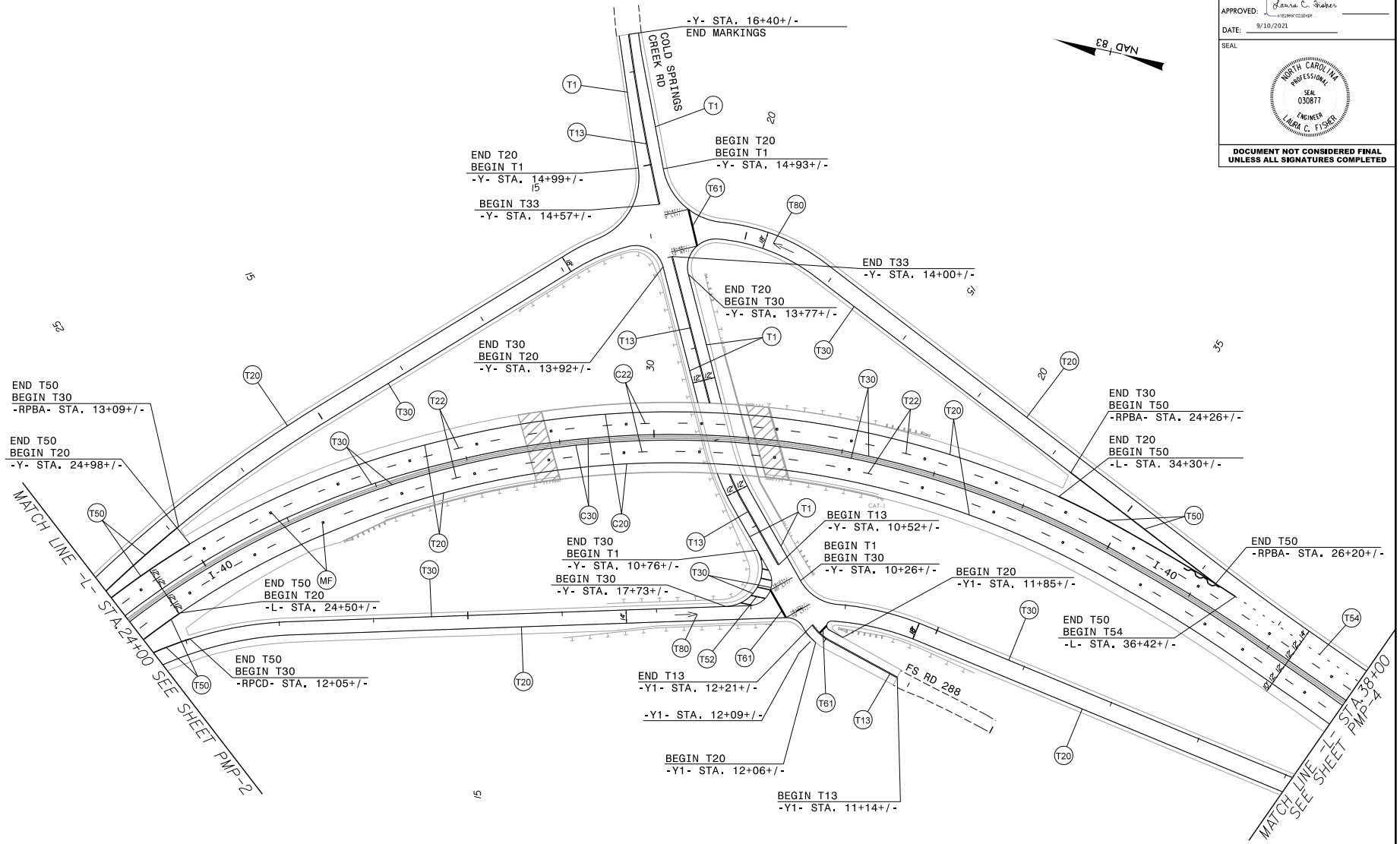
REVISIONS



NOTE: INSTALL DELINEATORS ON MEDIAN BARRIER AND GUARDRAIL

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
9000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

PAVEMENT MARKING PLANS

$$$$$$SYSTIME$$$$$$
$$$$$$$USERNAME$$$$$$$
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TIP NO.	SHEET NO.
B-6054A	PMP-4

APPROVED: Laura C. Fisher
DATE: 9/10/2021

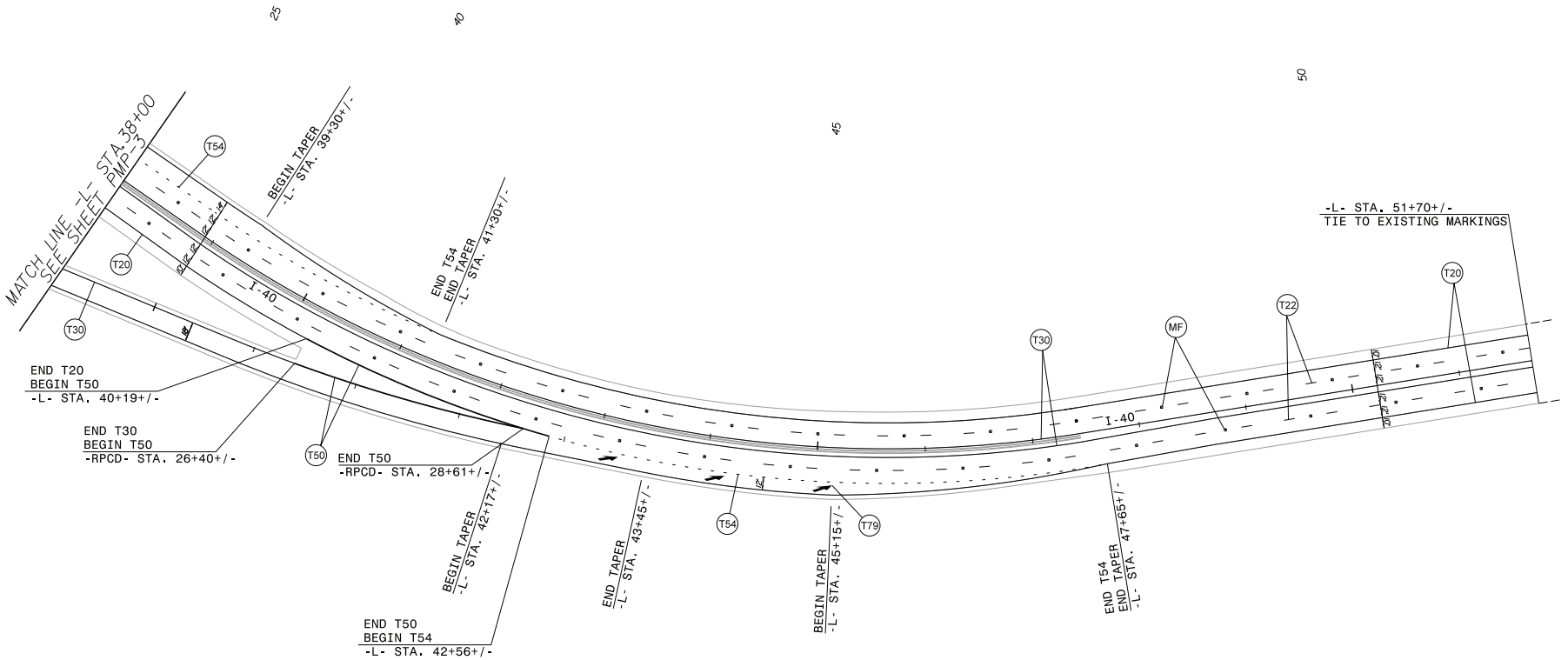
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030877 ENGINEER LAURA C. FISHER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

NAD 83



NOTE: INSTALL DELINEATORS ON MEDIAN BARRIER AND GUARDRAIL

PAVEMENT MARKING PLANS

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
9000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

$$$$$SYSTIME$$$$$
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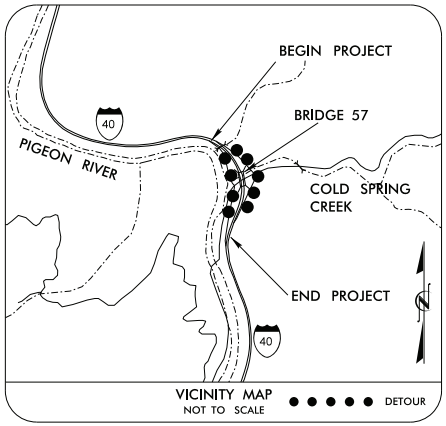
TIP PROJECT: B-6054A



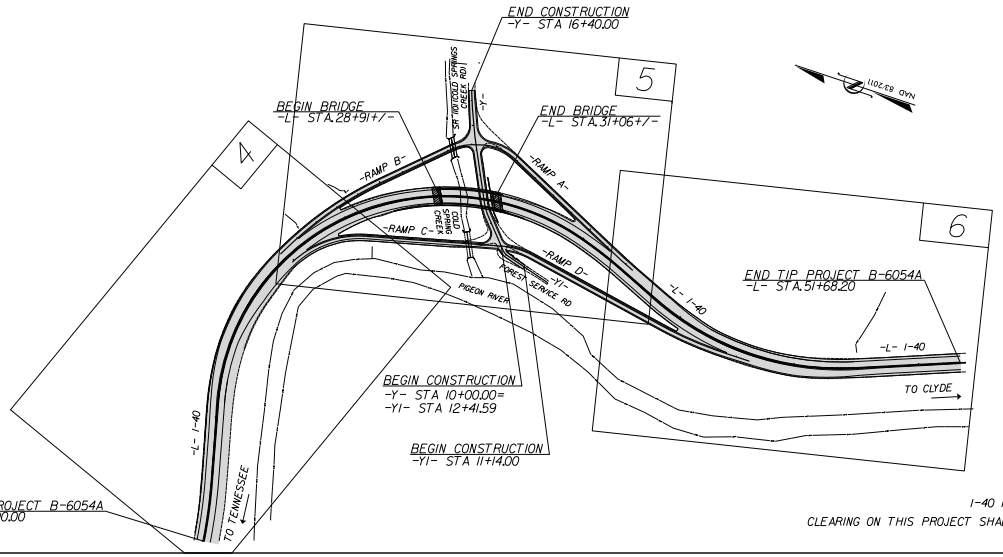
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

HAYWOOD COUNTY

LOCATION: BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK

TYPE OF WORK: GRADING, RETAINING WALL, DRAINAGE, PAVING, AND STRUCTURE



I-40 IS A CONTROLLED ACCESS FACILITY WITHIN THE PROJECT LIMITS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6054A	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	SW SW2
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALE

50 25 0 50 100

PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE APPLICABLE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.

benesch

Prepared In the Office of:

BENESCH

NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

Designed by:

SARA LOUKILI, EI ***4150***

NAME *LEVEL III CERTIFICATION NO.*

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2018 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

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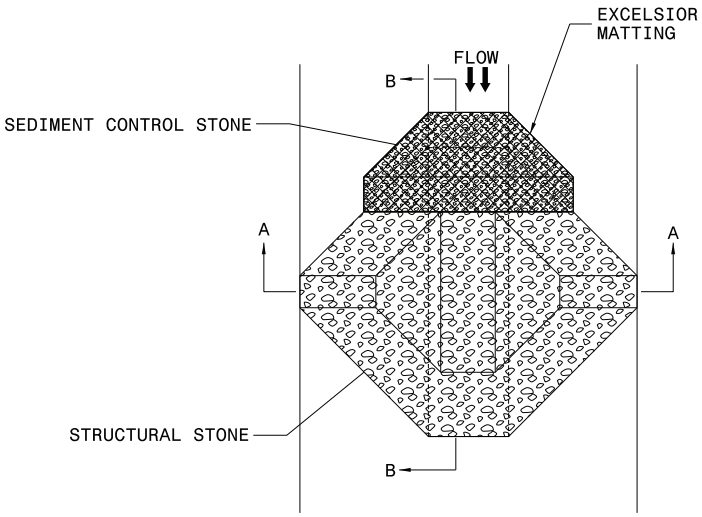
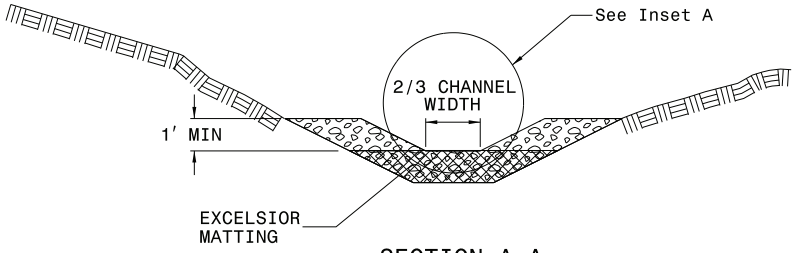
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	EC-02
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN



SECTION A-A

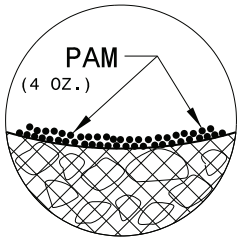
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

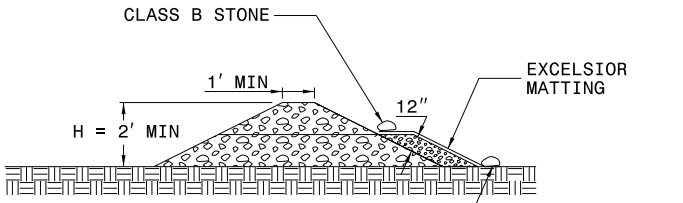
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION B-B

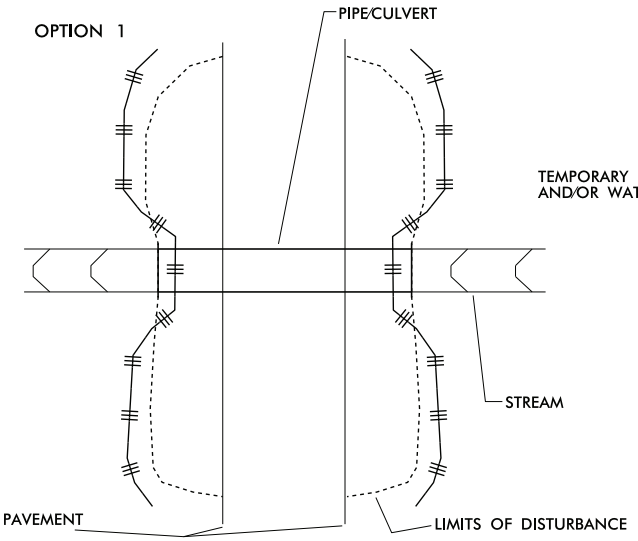
NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	EC-2A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

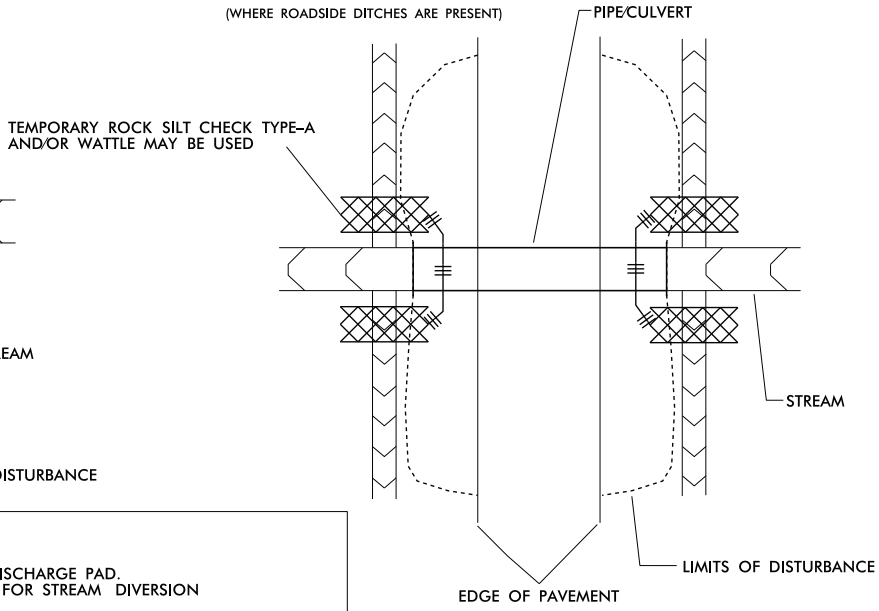
ROADSIDE ENVIRONMENTAL UNIT
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

2018 STANDARD SPECIFICATIONS
DRAWINGS NOT DRAWN TO SCALE

OPTION 1



OPTION 2
(WHERE ROADSIDE DITCHES ARE PRESENT)



LEGEND:

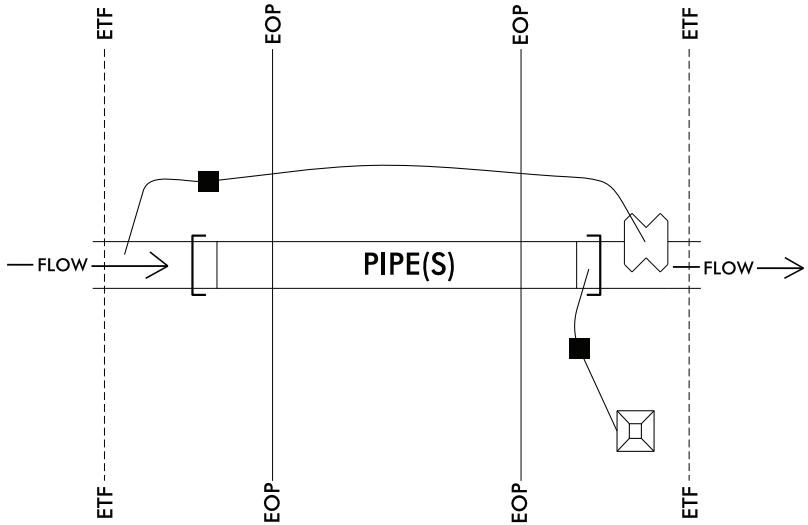
- IMPERVIOUS DIKE
- PUMP
- SPECIAL STILLING BASIN
- STABILIZED DISCHARGE PAD (GEOTEXTILE)
- EOP — EDGE OF PAVEMENT
- ETF — EXISTING TRANSPORTATION FACILITY (ROW)
- TEMPORARY ROCK SILT CHECK TYPE–A AND/OR WATTLE
- TEMPORARY SILT FENCE

SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA:

1. INSTALL SPECIAL STILLING BASIN.
2. INSTALL UPSTREAM PUMP, TEMPORARY FLEXIBLE HOSE, AND STABILIZED DISCHARGE PAD.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION DISCHARGING ONTO STABILIZED OUTLET PAD.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER WORK ZONE. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. INSTALL PIPE(S), STREAM BED STABILIZATION, AND SLOPE STABILIZATION AS DIRECTED.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, TEMPORARY FLEXIBLE HOSE, AND STABILIZED DISCHARGE PAD. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. REMOVE SPECIAL STILLING BASIN AND RESTORE AREA TO ORIGINAL CONDITIONS.
8. STABILIZE ALL DISTURBED AREAS THROUGHOUT PROJECT WITH SEED AND MATTING FOR EROSION CONTROL.

NOTES:

INSTALL EROSION CONTROL MEASURES PRIOR TO ANY EARTH DISTURBING ACTIVITIES.
INSTALL SPECIAL SEDIMENT CONTROL FENCE BREAKS OR TEMPORARY ROCK SILT CHECKS. TYPE–A AT LOW POINTS IN SILT FENCE.
FOR OPTION 1 INSTALL SILT FENCE SUCH THAT ALL EARTH DISTURBANCE IS CONTAINED.
FOR CULVERT CONSTRUCTION SEQUENCING SEE THE PUMP AROUND DETAIL OR CONSULT "BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES".
ALL EXCAVATION IN JURISDICTIONAL STREAMS SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF THE WORK ZONE.
IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW WHEN NECESSARY.
MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK.
THIS INCLUDES THE DISCHARGE PAD, DIVERSION PIPES, PUMPS, AND HOSES.
PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO MAINTAIN STREAM FLOW AND TO DEWATER THE WORK AREA.
INSTALL SPECIAL STILLING BASIN IN VEGETATED AREA WITHIN RIGHT OF WAY. DISCHARGE SHOULD BE DIRECTED THROUGH VEGETATED BUFFER AWAY FROM WORK SITE.
INSTALL SILT FENCE AS DIRECTED TO CONTAIN DISTURBED AREAS AND/OR EXCAVATED STOCKPILES.
BORROW MATERIAL FROM OR DISPOSAL OF MATERIAL TO ANY UNPERMITTED SITE WILL REQUIRE A RECLAMATION PLAN.
INSTALL PIPE(S) IN JURISDICTIONAL AREAS IN ACCORDANCE WITH NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.



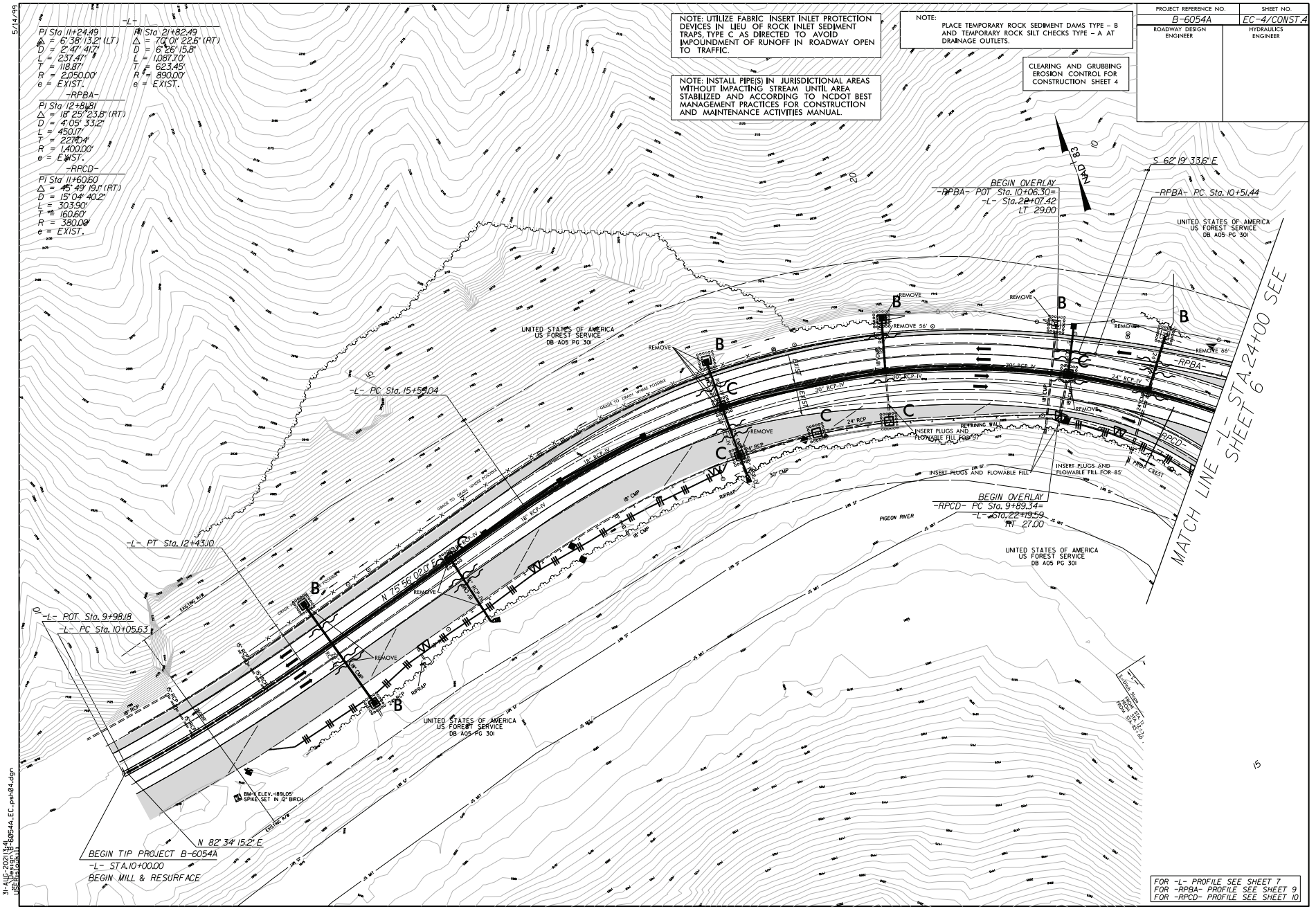
PUMP-AROUND OPERATION FOR PIPE REPLACEMENT IN JURISDICTIONAL STREAMS EROSION CONTROL DETAIL

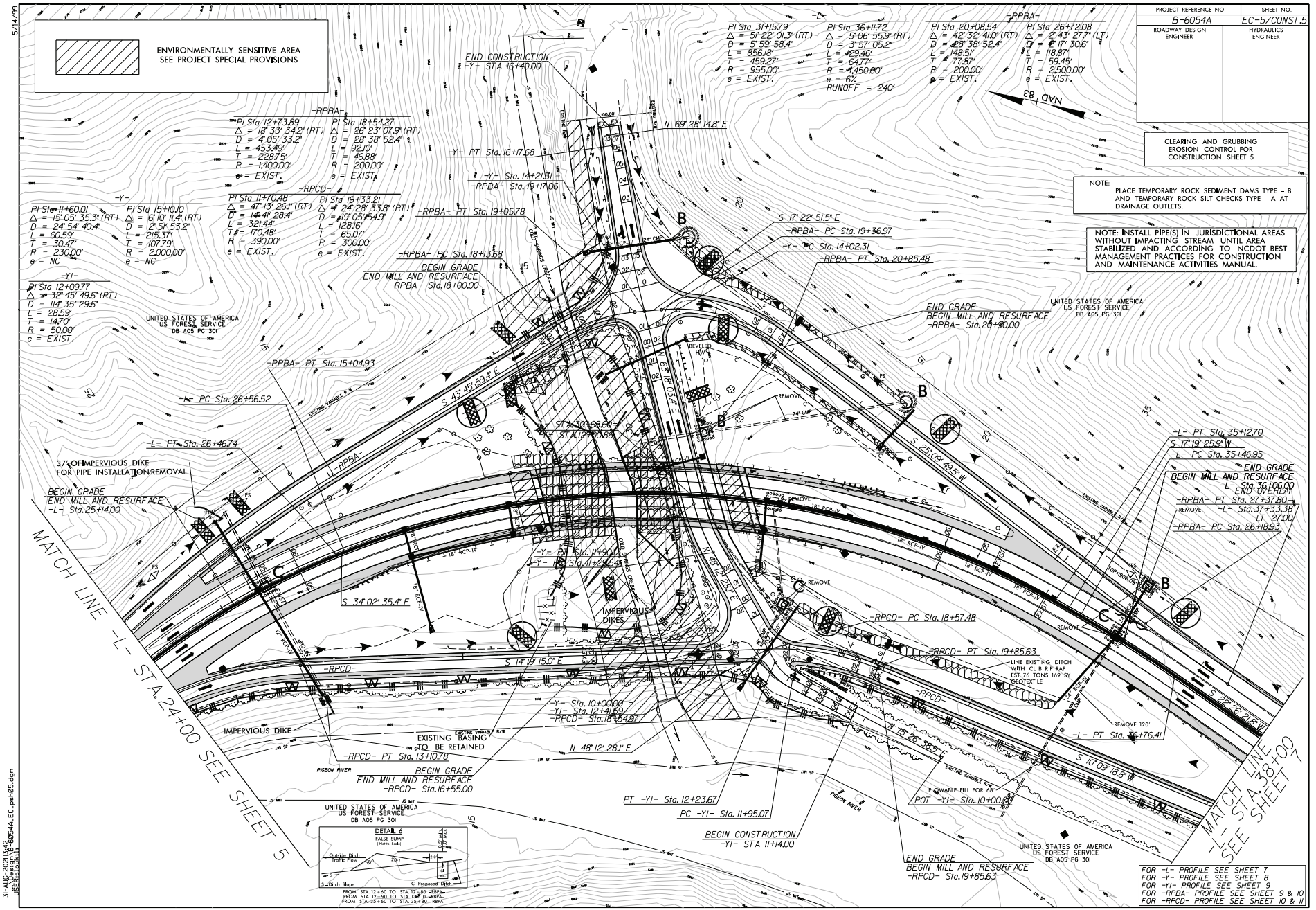
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.


-L-
PI Sta 111+24.49
Δ = 6° 38' 13.2" (LT)
D = 2° 47' 41.7"
L = 237.47'
T = 118.87'
R = 2,050.00'
e = EXIST.
PI Sta 21+82.49
Δ = 7° 01' 22.6" (RT)
D = 6° 26' 15.8"
L = 1,087.70'
T = 623.45'
R = 890.00'
e = EXIST.
-RPBA-
PI Sta 12+86.81
Δ = 18° 25' 23.8" (RT)
D = 4° 05' 33.2"
L = 450.17'
T = 227.04'
R = 1,400.00'
e = EXIST.
-RPCD-
PI Sta 11+60.60
Δ = 45° 49' 19.1" (RT)
D = 15° 04' 40.2"
L = 303.90'
T = 160.60'
R = 380.00'
e = EXIST.
NOTE: UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN LIEU OF ROCK INLET SEDIMENT TRAPS, TYPE C AS DIRECTED TO AVOID IMPOUNDMENT OF RUNOFF IN ROADWAY OPEN TO TRAFFIC.
NOTE: INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.
NOTE: PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.
CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 4
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
EC-4/CONST.4
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NAD 83
S 62° 19' 33.6" E
-RPBA- PC Sta. 10+51.44
BEGIN OVERLAY
-RPBA- POT Sta. 10+06.30=
-L- Sta. 22+07.42
LT 29.00
UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301
-L- PC Sta. 15+59.04
-L- PT Sta. 12+43.10
-L- POT Sta. 9+98.18
-L- PC Sta. 10+05.63
N 75° 56' 02.0" E
N 82° 34' 15.2" E
BEGIN TIP PROJECT B-6054A
-L- STA.10+00.00
BEGIN MILL & RESURFACE
BEGIN OVERLAY
-RPCD- PC Sta. 9+89.34=
-L- Sta. 22+19.59
RT 27.00
PIGEON RIVER
INSERT PLUGS AND FLOWABLE FILL FOR 85'
INSERT PLUGS AND FLOWABLE FILL FOR 97'
RETAINING WALL
REMOVE
REMOVE 56'
REMOVE 66'
GRADE TO DRAIN WHERE POSSIBLE
EXISTING R/W
RIPRAP
BM-A ELEV.=189.05' SPIKE SET IN 12" BIRCH
MATCH LINE -L- STA. 24+00 SEE SHEET 6
FOR -L- PROFILE SEE SHEET 7
FOR -RPBA- PROFILE SEE SHEET 9
FOR -RPCD- PROFILE SEE SHEET 10
5/14/99
31-AUG-2001 13:41
USER:rbaskin
15


ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
EC-5/CONST.5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 5
NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.
NOTE: INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.
NAD 83
END CONSTRUCTION
-Y- STA 16+40.00
PI Sta 31+15.79
Δ = 51° 22' 01.3" (RT)
D = 5° 59' 58.4"
L = 856.18'
T = 459.27'
R = 955.00'
e = EXIST.
PI Sta 36+11.72
Δ = 5° 06' 55.9" (RT)
D = 3° 57' 05.2"
L = 429.46'
T = 64.77'
R = 1,450.00'
e = 6%
RUNOFF = 240'
PI Sta 20+08.54
Δ = 42° 32' 41.0" (RT)
D = 28° 38' 52.4"
L = 148.51'
T = 77.87'
R = 200.00'
e = EXIST.
PI Sta 26+72.08
Δ = 2° 43' 27.7" (LT)
D = 1° 17' 30.6"
L = 118.87'
T = 59.45'
R = 2,500.00'
e = EXIST.
PI Sta 12+73.89
Δ = 18° 33' 34.2" (RT)
D = 4° 05' 33.2"
L = 453.49'
T = 228.75'
R = 1,400.00'
e = EXIST.
PI Sta 18+54.27
Δ = 26° 23' 07.9" (RT)
D = 28° 38' 52.4"
L = 92.10'
T = 46.88'
R = 200.00'
e = EXIST.
PI Sta 11+60.01
Δ = 15° 05' 35.3" (RT)
D = 24° 54' 40.4"
L = 60.59'
T = 30.47'
R = 230.00'
e = NC
PI Sta 15+10.10
Δ = 6° 10' 11.4" (RT)
D = 2° 51' 53.2"
L = 215.37'
T = 107.79'
R = 2,000.00'
e = NC
PI Sta 12+09.77
Δ = 32° 45' 49.6" (RT)
D = 114° 35' 29.6"
L = 28.59'
T = 14.70'
R = 50.00'
e = EXIST.
PI Sta 11+70.48
Δ = 41° 13' 26.1" (RT)
D = 14° 41' 28.4"
L = 321.44'
T = 170.48'
R = 390.00'
e = EXIST.
PI Sta 19+33.21
Δ = 24° 28' 33.8" (RT)
D = 19° 05' 54.9"
L = 128.16'
T = 65.07'
R = 300.00'
e = EXIST.
-Y- PT Sta. 16+17.68
-Y- Sta. 14+21.31 =
-RPBA- Sta. 19+17.06
-RPBA- PT Sta. 19+05.78
-RPBA- PC Sta. 18+13.68
BEGIN GRADE
END MILL AND RESURFACE
-RPBA- Sta.18+00.00
S 17° 22' 51.5" E
-RPBA- PC Sta. 19+36.97
-Y- PC Sta. 14+02.31
-RPBA- PT Sta. 20+85.48
END GRADE
BEGIN MILL AND RESURFACE
-RPBA- Sta.20+90.00
UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301
-RPBA- PT Sta. 15+04.93
-L- PC Sta. 26+56.52
-L- PT Sta. 26+46.74
37' OF IMPERVIOUS DIKE
FOR PIPE INSTALLATION/REMOVAL
BEGIN GRADE
END MILL AND RESURFACE
-L- Sta.25+14.00
S 43° 45' 59.4" E
ST A 30+58.68 =
ST A 12+90.86
S 34° 02' 35.4" E
S 14° 19' 15.0" E
-Y- PI Sta. 11+90.00 =
-Y- PC Sta. 11+26.48
-Y- Sta. 10+00.00 =
-Y1- Sta. 12+41.69
-RPCD- Sta.18+54.81
-RPCD- PT Sta. 13+10.78
BEGIN GRADE
END MILL AND RESURFACE
-RPCD- Sta.16+55.00
N 48° 12' 28.1" E
PT -Y1- Sta. 12+23.67
PC -Y1- Sta. 11+95.07
BEGIN CONSTRUCTION
-Y1- STA 11+14.00
N 69° 28' 14.8" E
S 03° 18' 03.4" E
S 25° 09' 49.5" W
-L- PT Sta. 35+12.70
S 17° 19' 25.9" W
-L- PC Sta. 35+46.95
END GRADE
BEGIN MILL AND RESURFACE
-L- Sta.36+06.00
-RPBA- PT Sta. 27+37.80=
-L- Sta. 37+33.38
LT 27.00
-RPBA- PC Sta. 26+18.93
-RPCD- PC Sta. 18+57.48
-RPCD- PT Sta. 19+85.63
LINE EXISTING DITCH WITH CL B RIP RAP EST. 76 TONS 169 SY GEOTEXTILE
S 27° 26' 21.5" W
-L- PT Sta. 36+76.41
S 10° 09' 18.8" W
S 15° 26' 36.5" E
FLOWABLE FILL FOR 68
POT -Y1- Sta. 10+00.00
END GRADE
BEGIN MILL AND RESURFACE
-RPCD- Sta.19+85.63
IMPERVIOUS DIKE
EXISTING BASING
TO BE RETAINED
IMPERVIOUS DIKES
MATCH LINE -L- STA. 24+00 SEE SHEET 5
MATCH LINE -L- STA. 38+00 SEE SHEET 7
DETAIL 6
FALSE SUMP
(Not to Scale)
Outside Ditch
Traffic Flow
10'
20'
2'
4'
S=Ditch Slope
℄ Proposed Ditch
FROM STA. 12+60 TO STA. 12+80 -RBPA-
FROM STA. 12+90 TO STA. 13+10 -RBPA-
FROM STA. 35+60 TO STA. 35+80 -RBPA-
FOR -L- PROFILE SEE SHEET 7
FOR -Y- PROFILE SEE SHEET 8
FOR -Y1- PROFILE SEE SHEET 9
FOR -RPBA- PROFILE SEE SHEET 9 & 10
FOR -RPCD- PROFILE SEE SHEET 10 & 11
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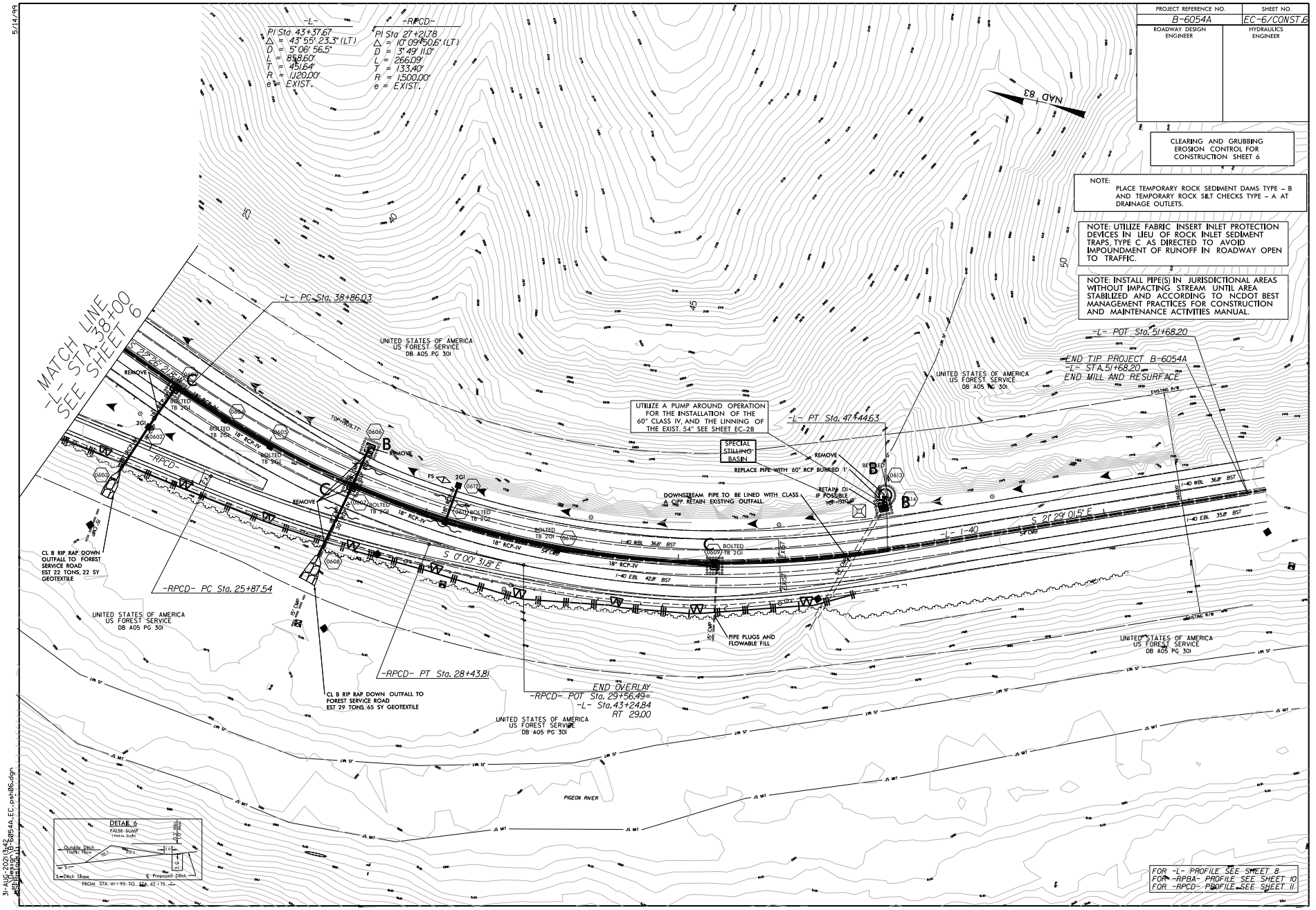
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
EC-6/CONST.6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
-L-
PI Sta. 43+37.67
Δ = 43° 55' 23.3" (LT)
D = 5° 06' 56.5"
L = 858.60'
T = 451.64'
R = 1,120.00'
e = EXIST.
-RPCD-
PI Sta 27+21.78
Δ = 10° 09' 50.6" (LT)
D = 3° 49' 11.0"
L = 266.09'
T = 133.40'
R = 1,500.00'
e = EXIST.
NAD 83
CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 6
NOTE: PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE – B AND TEMPORARY ROCK SILT CHECKS TYPE – A AT DRAINAGE OUTLETS.
NOTE: UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN LIEU OF ROCK INLET SEDIMENT TRAPS, TYPE C AS DIRECTED TO AVOID IMPOUNDMENT OF RUNOFF IN ROADWAY OPEN TO TRAFFIC.
NOTE: INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.
MATCH LINE -L- STA. 38+00 SEE SHEET 6
-L- PC Sta. 38+86.03
-L- POT Sta. 51+68.20
END TIP PROJECT B-6054A
-L- STA. 51+68.20
END MILL AND RESURFACE
-L- PT Sta. 47+44.63
UTILIZE A PUMP AROUND OPERATION FOR THE INSTALLATION OF THE 60" CLASS IV, AND THE LINNING OF THE EXIST. 54" SEE SHEET EC-2B
SPECIAL STILLING BASIN
REPLACE PIPE WITH 60" RCP BURRIED 1'
DOWNSTREAM PIPE TO BE LINED WITH CLASS A CIPP. RETAIN EXISTING OUTFALL
RETAIN DI IF POSSIBLE
REMOVE
BOLTED TB 2GI
18" RCP-IV
54" CMP
I-40 WBL 36.6' BST
I-40 EBL 42.8' BST
I-40 WBL 36.8' BST
I-40 EBL 35.8' BST
S 2° 29' 01.5" E
S 0° 00' 31.8" E
-L- I-40
EXIST. R/W
UNITED STATES OF AMERICA US FOREST SERVICE DB A05 PG 301
CL B RIP RAP DOWN OUTFALL TO FOREST SERVICE ROAD EST 22 TONS, 22 SY GEOTEXTILE
-RPCD- PC Sta. 25+87.54
-RPCD- PT Sta. 28+43.81
CL B RIP RAP DOWN OUTFALL TO FOREST SERVICE ROAD EST 29 TONS, 65 SY GEOTEXTILE
END OVERLAY
-RPCD- POT Sta. 29+56.49=
-L- Sta. 43+24.84
RT 29.00
PIPE PLUGS AND FLOWABLE FILL
PIGEON RIVER
DETAIL 6
FALSE SLUMP
Outside Ditch Traffic Flow
Proposed Ditch
FROM STA. 41+95 TO STA. 42+15 -L-
FOR -L- PROFILE SEE SHEET 8
FOR -RPBA- PROFILE SEE SHEET 10
FOR -RPCD- PROFILE SEE SHEET 11
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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	EC-7/CONST.4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

-L-

PI Sta. 11+24.49
△ = 6° 38' 13.2" (LT)
D = 2° 47' 41.7"
L = 237.47'
T = 118.87'
R = 2,050.00'
e = EXIST.

PI Sta. 21+82.49
△ = 7° 01' 22.6" (RT)
D = 6° 26' 15.8"
L = 1,087.70'
T = 623.45'
R = 890.00'
e = EXIST.

-RPBA-

PI Sta. 12+81.81
△ = 18° 25' 23.8" (RT)
D = 4° 05' 33.2"
L = 450.17'
T = 227.04'
R = 1,400.00'
e = EXIST.

-RPCD-

PI Sta. 11+60.60
△ = 45° 49' 19.1" (RT)
D = 15° 04' 40.2"
L = 303.90'
T = 160.60'
R = 380.00'
e = EXIST.

NOTE: UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN LIEU OF ROCK INLET SEDIMENT TRAPS, TYPE C AS DIRECTED TO AVOID IMPOUNDMENT OF RUNOFF IN ROADWAY OPEN TO TRAFFIC.

NOTE: INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.

NAD 83

BEGIN TIP PROJECT B-6054A
-L- STA.10+00.00
BEGIN MILL & RESURFACE

-L- POT Sta. 9+98.18
-L- PC Sta. 10+05.63

-L- PT Sta. 12+43.10

BEG.NEW CONC.BARRIER
-L- 143.10

-L- PC Sta. 15+59.04

BEGIN OVERLAY
-RPBA- POT Sta. 10+06.30=
-L- Sta. 22+07.42
LT 29.00

BEGIN OVERLAY
-RPCD- PC Sta. 9+89.34=
-L- Sta. 22+19.59
RT 27.00

-RPBA- PC Sta. 10+51.44

MATCH LINE -L- STA. 24+00 SEE SHEET 9

S 62° 19' 33.6" E

N 75° 56' 02.0" E

N 82° 34' 15.2" E

UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301

2' DOUBLE FACED CONC. MEDIAN BARRIER

120' TAPER TO MAINTAINING EXIST. EOP

TIE TO ROCK FACE
BEG. FENCE
-L- 16.54

BEG. FENCE
TIE TO EXIST. RETAINING WALL
-L- 105.18

RETAINING WALL

INSERT PLUGS AND FLOWABLE FILL FOR 37'

INSERT PLUGS AND FLOWABLE FILL FOR 85'

INSERT PLUGS AND FLOWABLE FILL

200' TAPER

120' TAPER 2' TO 4' MEDIAN PAVED SHOULDER

G/R TO BE RETAINED

PIGEON RIVER

FOR -L- PROFILE SEE SHEET 7
FOR -RPBA- PROFILE SEE SHEET 9
FOR -RPCD- PROFILE SEE SHEET 10

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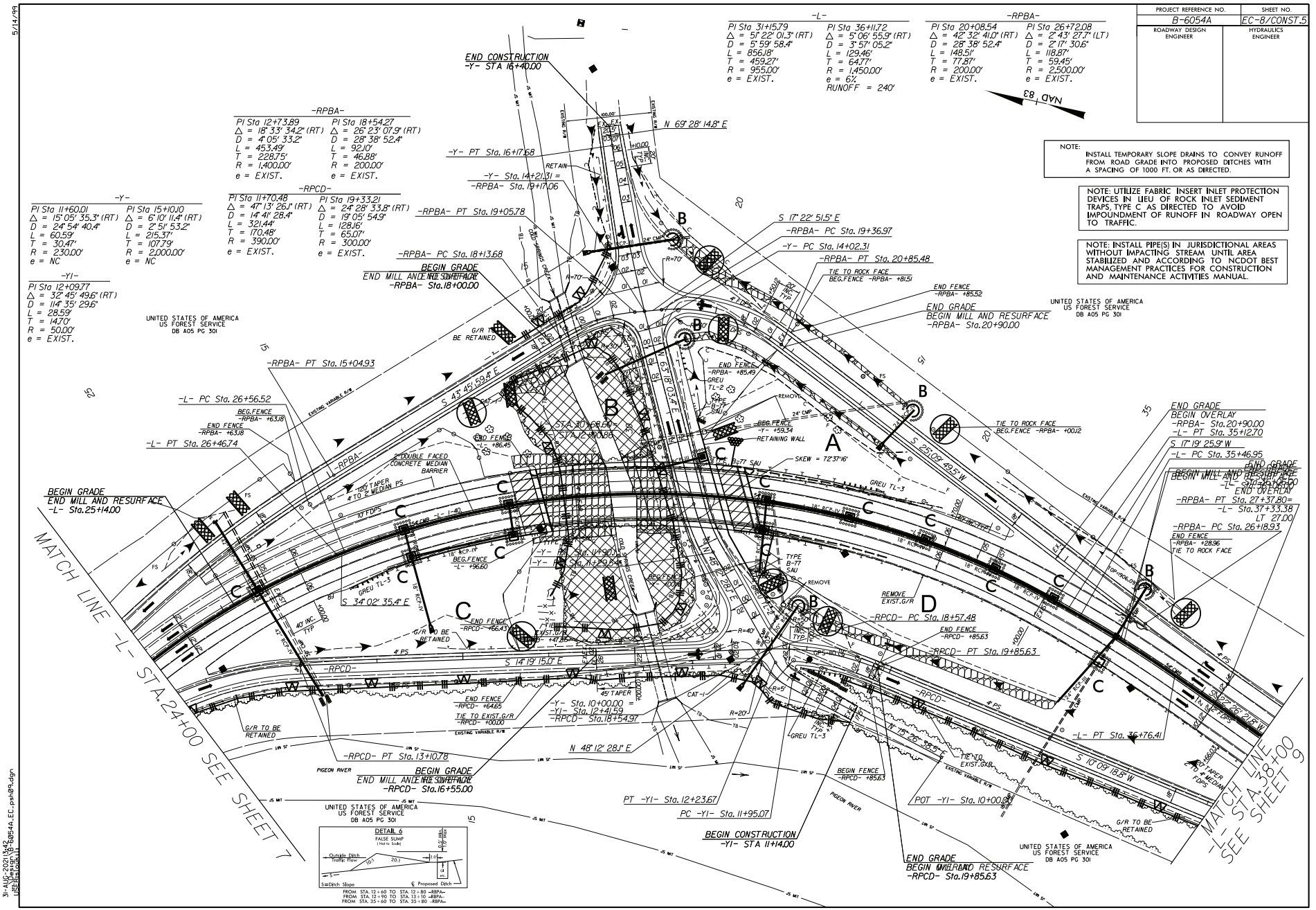
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
EC-8/CONST.5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
-L-
PI Sta 31+15.79
Δ = 51° 22' 01.3" (RT)
D = 5° 59' 58.4"
L = 856.18'
T = 459.27'
R = 955.00'
e = EXIST.
PI Sta 36+11.72
Δ = 5° 06' 55.9" (RT)
D = 3° 57' 05.2"
L = 129.46'
T = 64.77'
R = 1,450.00'
e = 6%
RUNOFF = 240'
-RPBA-
PI Sta 20+08.54
Δ = 42° 32' 41.0" (RT)
D = 28° 38' 52.4"
L = 148.51'
T = 77.87'
R = 200.00'
e = EXIST.
PI Sta 26+72.08
Δ = 2° 43' 27.7" (LT)
D = 2° 17' 30.6"
L = 118.87'
T = 59.45'
R = 2,500.00'
e = EXIST.
NAD 83
NOTE:
INSTALL TEMPORARY SLOPE DRAINS TO CONVEY RUNOFF FROM ROAD GRADE INTO PROPOSED DITCHES WITH A SPACING OF 1000 FT. OR AS DIRECTED.
NOTE: UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN LIEU OF ROCK INLET SEDIMENT TRAPS, TYPE C AS DIRECTED TO AVOID IMPOUNDMENT OF RUNOFF IN ROADWAY OPEN TO TRAFFIC.
NOTE: INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.
END CONSTRUCTION
-Y- STA 16+40.00
-RPBA-
PI Sta 12+73.89
Δ = 18° 33' 34.2" (RT)
D = 4° 05' 33.2"
L = 453.49'
T = 228.75'
R = 1,400.00'
e = EXIST.
PI Sta 18+54.27
Δ = 26° 23' 07.9" (RT)
D = 28° 38' 52.4"
L = 92.10'
T = 46.88'
R = 200.00'
e = EXIST.
-Y-
PI Sta 11+60.01
Δ = 15° 05' 35.3" (RT)
D = 24° 54' 40.4"
L = 60.59'
T = 30.47'
R = 230.00'
e = NC
PI Sta 15+10.10
Δ = 6° 10' 11.4" (RT)
D = 2° 51' 53.2"
L = 215.37'
T = 107.79'
R = 2,000.00'
e = NC
-Y1-
PI Sta 12+09.77
Δ = 32° 45' 49.6" (RT)
D = 114° 35' 29.6"
L = 28.59'
T = 14.70'
R = 50.00'
e = EXIST.
-RPCD-
PI Sta 11+70.48
Δ = 47° 13' 26.1" (RT)
D = 14° 41' 28.4"
L = 321.44'
T = 170.48'
R = 390.00'
e = EXIST.
PI Sta 19+33.21
Δ = 24° 28' 33.8" (RT)
D = 19° 05' 54.9"
L = 128.16'
T = 65.07'
R = 300.00'
e = EXIST.
N 69° 28' 14.8" E
-Y- PT Sta. 16+17.68
-Y- Sta. 14+21.31 =
-RPBA- Sta. 19+17.06
-RPBA- PT Sta. 19+05.78
-RPBA- PC Sta. 18+13.68
BEGIN GRADE
END MILL AND RESURFACE
-RPBA- Sta.18+00.00
UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301
-RPBA- PT Sta. 15+04.93
S 43° 45' 59.4" E
-L- PC Sta. 26+56.52
BEG.FENCE
-RPBA- +63.18
END FENCE
-RPBA- +63.18
-L- PT Sta. 26+46.74
BEGIN GRADE
END MILL AND RESURFACE
-L- Sta.25+14.00
MATCH LINE -L- STA. 24+00 SEE SHEET 7
2' DOUBLE FACED CONCRETE MEDIAN BARRIER
120' TAPER
4' TO 2' MEDIAN
10' FDPS
4' PS
S 34° 02' 35.4" E
-RPCD-
-RPCD- PT Sta. 13+10.78
BEGIN GRADE
END MILL AND RESURFACE
-RPCD- Sta.16+55.00
PIGEON RIVER
DETAIL 6
FALSE SUMP
(Not to Scale)
Outside Ditch
Traffic Flow
10:1
20:1
2.0'
0.5' Min.
1.0' Max.
S=Ditch Slope
℄ Proposed Ditch
FROM STA. 12+60 TO STA. 12+80 -RBPA-
FROM STA. 12+90 TO STA. 13+10 -RBPA-
FROM STA. 35+60 TO STA. 35+80 -RBPA-
STA. 30+68.64 =
STA. 12+80.86
-Y- PT Sta. 14+90.00
-Y- PC Sta. 14+95.45
S 62° 28' 28.1" E
N 48° 12' 28.1" E
-RPCD- PT Sta. 13+10.78
PT -Y1- Sta. 12+23.67
PC -Y1- Sta. 11+95.07
BEGIN CONSTRUCTION
-Y1- STA 11+14.00
-Y- Sta. 10+00.00 =
-Y1- Sta. 12+41.59
-RPCD- Sta.18+54.97
S 14° 19' 15.0" E
-RPBA- PT Sta. 20+85.48
TIE TO ROCK FACE
BEG.FENCE -RPBA- +81.51
-Y- PC Sta. 14+02.31
-RPBA- PC Sta. 19+36.97
S 17° 22' 51.5" E
END FENCE
-RPBA- +85.52
END GRADE
BEGIN MILL AND RESURFACE
-RPBA- Sta.20+90.00
UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301
END FENCE
-RPBA- +85.49
GREU TL-2
TYPE B-77 SAU
REMOVE
-Y- +59.34
RETAINING WALL
BEG.FENCE
-RPBA- +00.12
TIE TO ROCK FACE
BEG.FENCE -RPBA- +00.12
SKEW = 72°37'16"
TYPE B-77 SAU
GREU TL-3
REMOVE EXIST.G/R
-RPCD- PC Sta. 18+57.48
END FENCE
-RPCD- +85.63
-RPCD- PT Sta. 19+85.63
BEGIN FENCE
-RPCD- +85.63
END GRADE
BEGIN OVERLAY
-RPBA- Sta.20+90.00
-L- PT Sta. 35+12.70
S 17° 19' 25.9" W
-L- PC Sta. 35+46.95
END GRADE
BEGIN MILL AND RESURFACE
-L- Sta.36+00.00
-L- END OVERLAY
-RPBA- PT Sta. 27+37.80=
-L- Sta. 37+33.38
LT 27.00
-RPBA- PC Sta. 26+18.93
END FENCE
-RPBA- +28.96
TIE TO ROCK FACE
-L- PT Sta. 36+76.41
S 10° 09' 18.8" W
POT -Y1- Sta. 10+00.00
END GRADE
BEGIN OVERLAY AND RESURFACE
-RPCD- Sta.19+85.63
UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301
MATCH LINE -L- STA. 38+00 SEE SHEET 9
5/14/99
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PROJECT REFERENCE NO.	SHEET NO.
B-6054A	EC-9/CONST.6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

-L-
PI Sta 43+37.67
△ = 43° 55' 23.3" (LT)
D = 5° 06' 56.5"
L = 858.60'
T = 451.64'
R = 1,120.00'
e = EXIST.

-RPCD-
PI Sta 27+21.78
△ = 10° 09' 50.6" (LT)
D = 3° 49' 11.0"
L = 266.09'
T = 133.40'
R = 1,500.00'
e = EXIST.

NAD '83

NOTE: UTILIZE FABRIC INSERT INLET PROTECTION DEVICES IN LIEU OF ROCK INLET SEDIMENT TRAPS, TYPE C AS DIRECTED TO AVOID IMPOUNDMENT OF RUNOFF IN ROADWAY OPEN TO TRAFFIC.

NOTE: INSTALL PIPE(S) IN JURISDICTIONAL AREAS WITHOUT IMPACTING STREAM UNTIL AREA STABILIZED AND ACCORDING TO NCDOT BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL.

MATCH LINE -L- STA. 38+00 SEE SHEET 9

-L- PC Sta. 38+86.03

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DB A05 PG 301

200' TAPER

120' TAPER 2 TO 4 MEDIAN FDPS

18" RCP-IV

4' FDPS

2' DOUBLE FACED CONC. MEDIAN BARRIER

MAINTAIN EXIST. EOP

UTILIZE A PUMP AROUND OPERATION FOR THE INSTALLATION OF THE 60" CLASS IV, AND THE LINING OF THE EXIST. 54" SEE SHEET EC-2B

SPECIAL STILLING BASIN

REPLACE PIPE WITH 60" RCP BURRIED 1'

DOWNSTREAM PIPE TO BE LINED WITH CLASS A CIPP. RETAIN EXISTING OUTFALL.

-L- PT Sta. 47+44.63

END NEW CONC. BARRIER
-L- +44.63
TIE TO EXIST.

-L- POT Sta. 51+68.20

END TIP PROJECT B-6054A
-L- STA. 51+68.20
END MILL AND RESURFACE

UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301

EXISTING R/W

I-40 WBL 36.8' BST

I-40 EBL 35.8' BST

10' PS

S 21° 29' 01.5" E

-L- I-40

2' PS

2' PS 54" CMP

4' FDPS

S 0° 00' 31.5" E

I-40 WBL 36.6' BST

I-40 EBL 42.8' BST

4' PS

CL B RIP RAP DOWN OUTFALL TO FOREST SERVICE ROAD EST 22 TONS, 22 SY GEOTEXTILE

-RPCD- PC Sta. 25+87.54

-RPCD- PT Sta. 28+43.81

CL B RIP RAP DOWN OUTFALL TO FOREST SERVICE ROAD EST 29 TONS 65 SY GEOTEXTILE

G/R TO BE RETAINED

+46.00 BEGIN 15" CMP

PIPE PLUGS AND FLOWABLE FILL

END FENCE
TIE TO RIP-RAP PAD
-L- +27.97

+46.00 END TAPER

120' TAPER 4 TO 2 MEDIAN FDPS

END OVERLAY
-RPCD- POT Sta. 29+56.49=
-L- Sta. 43+24.84
RT 29.00

PIGEON RIVER

FOR -L- PROFILE SEE SHEET 8
FOR -RPBA- PROFILE SEE SHEET 10
FOR -RPCD- PROFILE SEE SHEET 11

5/14/99

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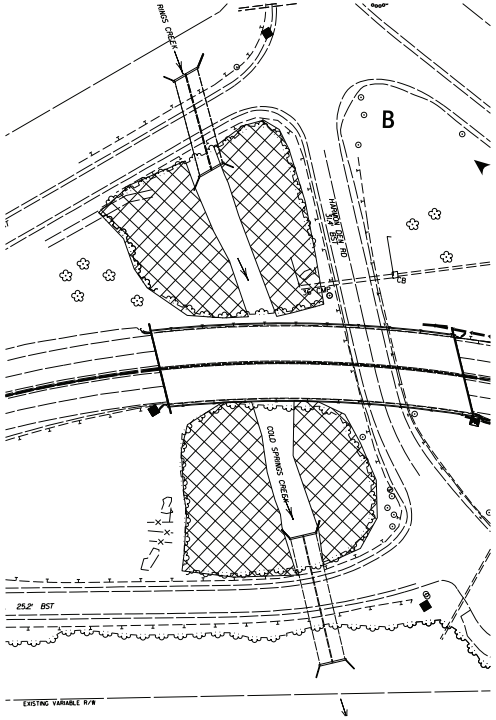
User:

1.0 ACRE STREAMBANK REFORESTATION

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	EC-9A/CONST.05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SEE RF–2, RF–3 AND PROJECT SPECIAL PROVISIONS

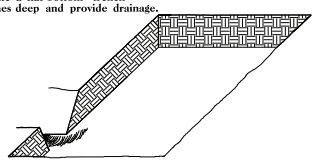
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6054A	RF-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

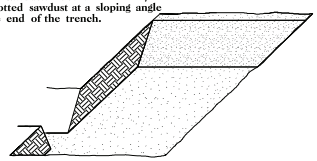
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

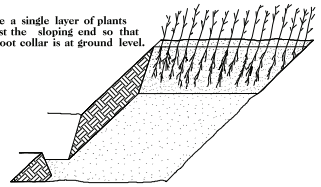
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



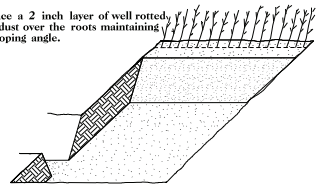
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

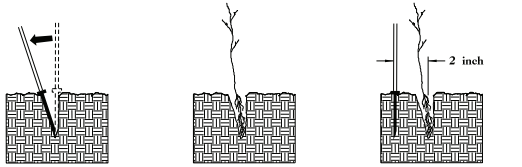


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

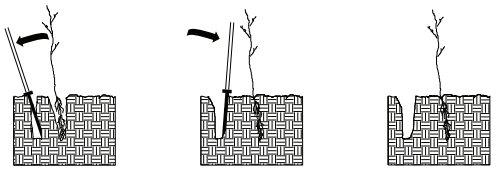


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in – 18 in BR
25%	NYSSA SYLVATICA	BLACK GUM	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

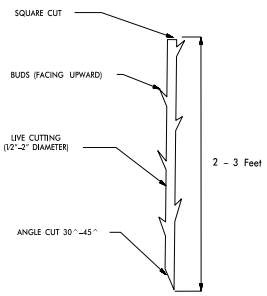
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

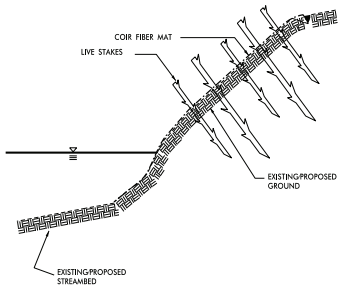
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RF-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PLANTING DETAILS

LIVE STAKES PLANTING DETAIL

LIVE STAKE

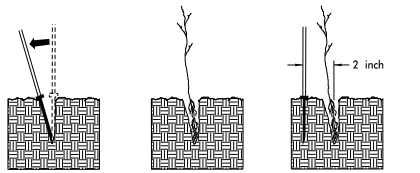




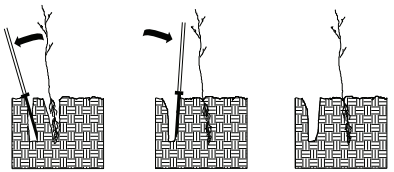
BANK STABILIZATION WITH LIVE STAKES

NOTE:
LIVE STAKES SHALL BE SPACED APPROXIMATELY 4 FEET ON CENTER
LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY 3/4 OF LIVE STAKE IS WITHIN GROUND

BAREROOT PLANTING DETAIL
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

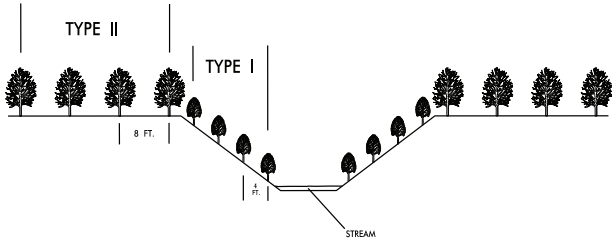
ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.

☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

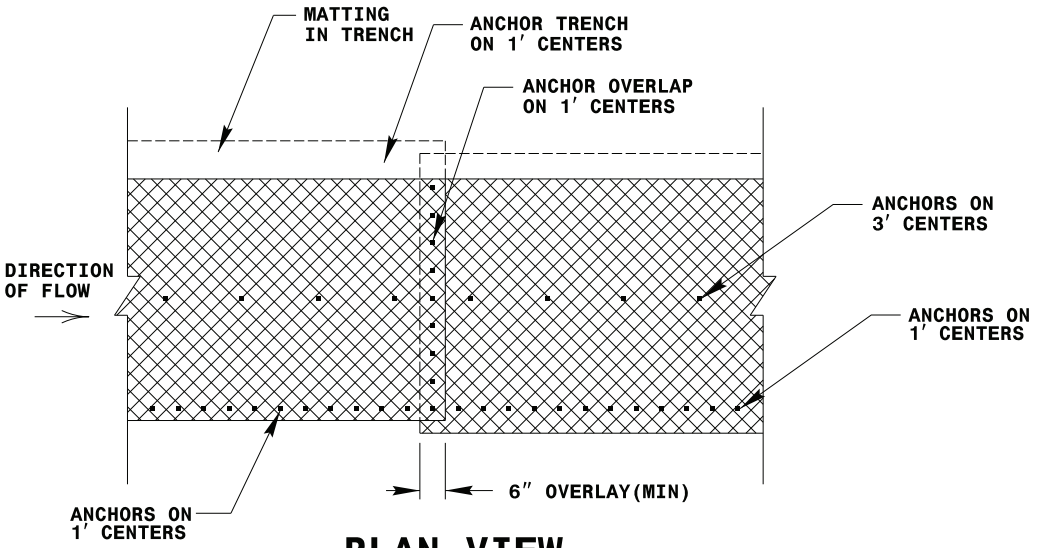
MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1			
50%	SALIX NIGRA	BLACK WILLOW	2 ft – 3 ft LIVE STAKES
50%	CORNUS AMOMUM	SILKY DOGWOOD	2 ft – 3 ft LIVE STAKES
TYPE 2			
25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in – 18 in BR
25%	PRUNUS SEROTINA	BLACK CHERRY	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

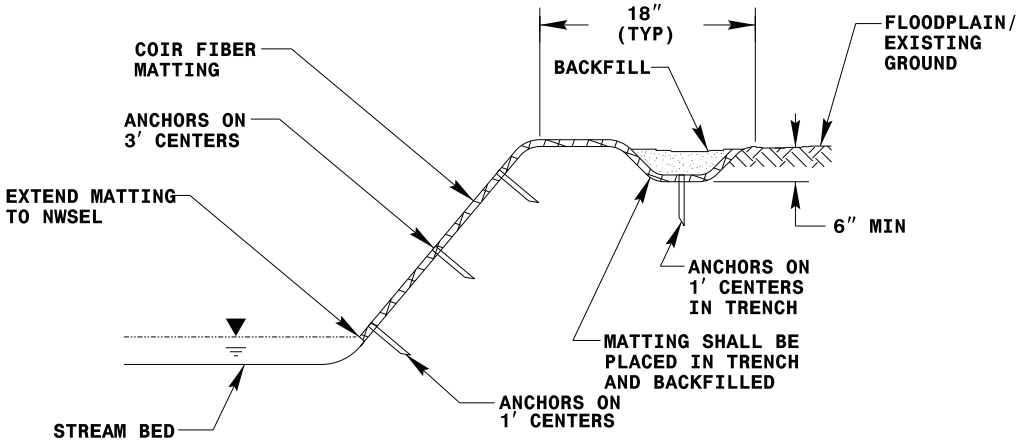
☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

STREAMBANK REFORESTATION
DETAIL SHEET 1 OF 2
N.C.D.O.T. – ROADSIDE ENVIRONMENTAL UNIT

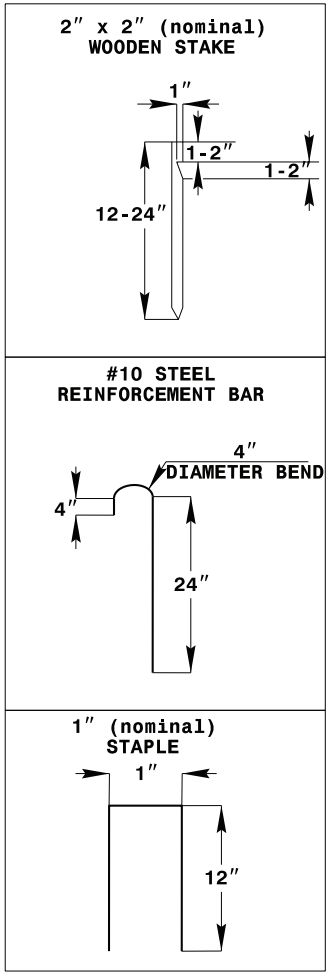
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	RF-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PLAN VIEW



TYPICAL CROSS SECTION



ANCHOR OPTIONS

COIR FIBER MATTING DETAIL

NOT TO SCALE

STREAMBANK REFORESTATION

DETAIL SHEET 2 OF 2

N.C.D.O.T.- ROADSIDE ENVIRONMENTAL UNIT

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REVISIONS

TIP PROJECT: B-6054A

CONTRACT: C204654

$$$$$$$SYSTIME$$$$$$
B-6054A_SGN_TSH.dgn
USER:tsouth

TIP NO.	SHEET NO.
B-6054A	SIGN-1

APPROVED: Steven Cox (DocuSigned by: 320C22EA8AF14D...)

DATE: 9/29/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN

HAYWOOD COUNTY

LOCATION: BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK

INDEX

STD. NO.	DESCRIPTION
SIGN-1	INDEX, ROADWAY STANDARD DRAWINGS, GENERAL NOTES
SIGN-2 THRU SIGN-7	SIGNING PLANS

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
901.10	TYPE 'A' SIGNS & DETAIL 901D10
901.20	TYPE 'B' SIGNS & DETAIL 901D20
901.50	ARROWS AND SHIELDS
901.70	SIGN STRINGERS AND SUPPORT SPACING
901.80	SIGN MOUNTING DETAILS - TYPE A AND TYPE B SIGNS
903.10	GROUND MOUNTED SIGN SUPPORTS & DETAIL 903D10
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.20	SECONDARY SIGN MOUNTING
904.50	MOUNTING OF TYPE 'D','E' AND 'F' SIGNS ON 'U' CHANNEL POSTS & DETAIL 904D50

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATION	2	CY
4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	1447	LBS
4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	560	LF
4096000000-E	904	SIGN ERECTION, TYPE D	5	EA
4102000000-N	904	SIGN ERECTION, TYPE E	25	EA
4108000000-N	904	SIGN ERECTION, TYPE F	6	EA
4110000000-N	904	SIGN ERECTION, TYPE A (GROUND MOUNTED)	2	EA
4110000000-N	904	SIGN ERECTION, TYPE B (GROUND MOUNTED)	2	EA
4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	29	EA
4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	3	EA

PAY ITEMS

1. DISPOSAL OF SIGN SYSTEM, U-CHANNEL
2. DISPOSAL OF SIGN SYSTEM, STEEL BEAM
3. SIGN ERECTION, TYPE A (GROUND MOUNTED)
4. SIGN ERECTION, TYPE B (GROUND MOUNTED)
5. SIGN ERECTION, TYPE D, E, AND F

PROJECT NOTES

1. DISPOSAL OF SIGN SYSTEM, U-CHANNEL
2. DISPOSAL OF SIGN SYSTEM, STEEL BEAM

GENERAL NOTES

SIGNS FURNISHED BY STATE.

CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.

ALL TYPE 'D' SIGNS SHALL BE MOUNTED ON TWO U-CHANNEL POSTS UNLESS OTHERWISE INDICATED ON THE PLANS.

IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.

WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER.

THE BACKGROUND FOR TYPE 'E' AND 'F' SIGNS SHALL BE GRADE C REFLECTIVE SHEETING UNLESS OTHERWISE NOTED.

DO NOT BEGIN FABRICATION FOR TYPES A & B SIGNS MOUNTED ON STEEL SUPPORTS UNTIL "S" DIMENSIONS HAVE BEEN VERIFIED.

SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

GREG STEWART, PE — PROJECT ENGINEER

STEVEN W. COX, PE — PROJECT DESIGN ENGINEER

DocuSign Envelope ID: C9B56E38-D531-430E-8735-80A0A8233B6B

TIP NO.	SHEET NO.
B-6054A	SIGN-2

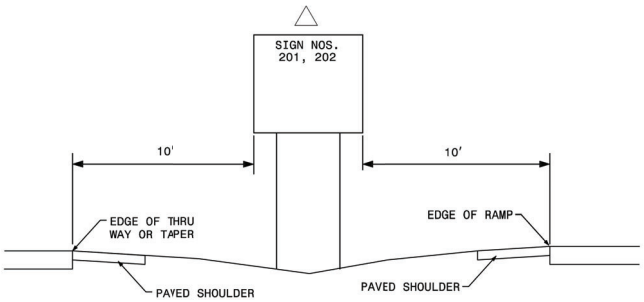
APPROVED: DocuSigned by: Steven Cox — DATE: 9/29/2021

SEAL

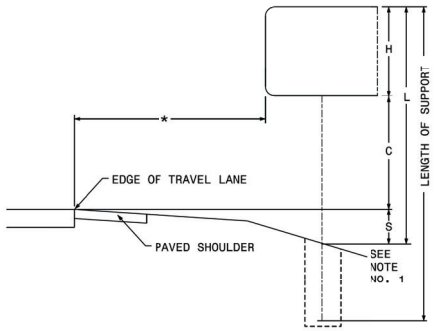
NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIGN					ROADWAY STATION	NUMBER OF SUPPORTS	BEAM SECTION	SUPPORT TYPE BA or S	OMNI COUPLER	ATTACHMENT METHOD	MOUNTING METHOD	HORIZONTAL CLEARANCE* (ft.)	SUPPORT SPACING	LENGTH (ft)			LEFT SUPPORT (ft)			CENTER SUPPORT (ft)			RIGHT SUPPORT (ft)			SUPPORT WEIGHTS		FOOTINGS				FIELD VERIFIED SEE NOTE 2 (mm/dd/yy)
NUMBER	TYPE	SIZE (n.) w	x	h										SNS HT "H"	MTG HT "C"	EMBED-MENT	S	L	LENGTH	S	L	LENGTH	S	L	LENGTH	B/A (lbs.)	SIMPLE (lbs.)	DIAMETER (ft.)	DEPTH (ft.)	REINFORCED (c.y.)	PLAIN (c.y.)	
101A	A	192	x	96	47+63	2	W6x16	BA	N/A	N/A	N/A	11.00	9.38	10.50	8.14	4.5	1.64	20.28	24.78	0.00	0.00	0.00	-1.14	17.50	22.00	842.48	0	1.5	5	0.65	0.00	
101B	B	114	x	30						N/A	I																					
201	A	78	x	60	24+63	1	W6x16	BA	N/A	N/A	N/A	Δ	0.00	5.00	7.00	3.0	0.00	0.00	0.00	1.48	13.48	16.48	0.00	0.00	0.00	310.68	0	1.5	3.5	0.23	0.00	
202	A	78	x	60	34+10	1	W6x16	BA	N/A	N/A	N/A	Δ	0.00	5.00	7.00	2.5	0.00	0.00	0.00	0.92	12.92	15.42	0.00	0.00	0.00	293.72	0	1.5	3	0.20	0.00	
																										TOTAL 1446.88	TOTAL 0.00			TOTAL 1.08	TOTAL 0.00	
																										USE: 1447.00	0.00			2.00	0.00	



TYPICAL ELEVATION GORE MOUNTED SIGNS



TYPICAL ELEVATION GROUND MOUNTED SIGNS

NOTES

1. DIMENSION "S" REPRESENTS AN INCREASE (+), OR A DECREASE (–) IN POLE LENGTH, RELATIVE TO THE ELEVATION OF THE EDGE OF PAVEMENT.
2. FIELD VERIFICATIONS SHALL BE REQUIRED FOR ALL SUPPORTS, SEE (*) ARTICLE 903-3. FABRICATORS SHALL BE AISC CERTIFIED IN CATEGORY 1, SEE (*) ARTICLE 1072-1. (*) = N.C.D.O.T. STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
3. PLAN LOCATIONS FOR EXISTING UTILITIES ARE BASED ON THE BEST AVAILABLE INFORMATION AND, THEREFORE MAY NOT BE PRECISELY ACCURATE. THEREFORE, IT IS INCUMBENT UPON THE CONTRACTOR TO DETERMINE THE EXACT LOCATION OF UTILITIES BEFORE BEGINNING WORK IN A LOCATION.

REVISIONS

Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

$$$$SETTINGS$$$$
$$$$Date$$$$ 9/29/2021
$$$$File$$$$ B-6054_SIGN-2_01.dgn
$$$$User$$$$ rlouk11

TYPE "A" AND TYPE "B" GROUND MOUINTED SIGNS

TIP NO.	SHEET NO.
B-6054A	DocuSigned by: 1-2A

APPROVED: DocuSigned by: 3/27/2019

DATE: 6C0F9E8EE44D3...

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V. SPRINGER

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

2-19

ENGLISH DETAIL DRAWING FOR

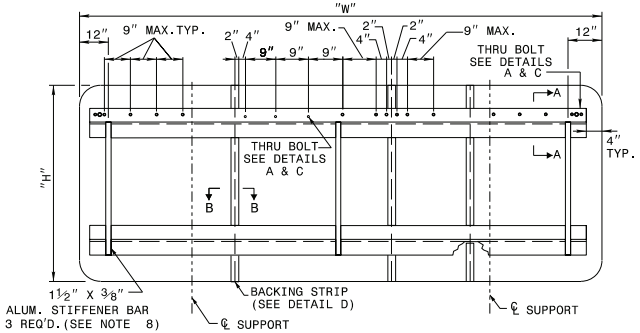
TYPE 'A' SIGNS

WELDED STUD CONSTRUCTION

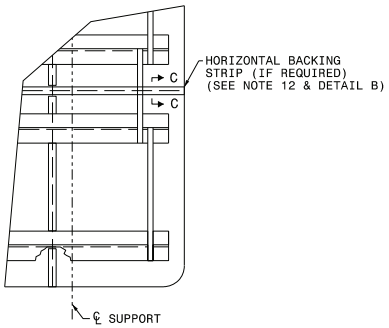
SHEET 1 OF 2

901D10

TYPICAL STUD PLACEMENT



HORIZONTAL BACKING STRIP



NOTES:

1. USE THE NUMBER AND SIZE OF SUPPORTS SHOWN ON THE SUPPORT CHART IN PROJECT PLANS.
2. FABRICATE SIGN PANEL SECTIONS WITH SHEETS 4′-0″ WIDE. WHEN FABRICATING SIGNS WHICH ARE NOT MULTIPLES OF 4′-0″ IN WIDTH, DO NOT CUT MORE THAN TWO SHEETS TO LESS THAN 4′-0″ IN WIDTH. THESE PANELS SHALL NOT BE LESS THAN 1′-0″ IN WIDTH.
3. SEE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, FOR TYPE OF MATERIAL TO BE USED FOR SIGN PANELS, HANGER ASSEMBLIES, AND SUPPORTS.
4. USE GALVANIZED STEEL FOR BACKING PLATES AND MOUNTING BOLTS.
5. SEE ROADWAY STANDARD 904.20 WHEN TYPE "B" SECONDARY SIGN MOUNTING IS REQUIRED.
6. DETAILS FOR TYPE "A" SECONDARY SIGNS SHALL BE THE SAME AS FOR TYPE "A" SIGNS.
7. THE VERTICAL DIMENSION BETWEEN PRIMARY AND SECONDARY SIGNS IS TWO (2) INCHES.
8. ADJUST STIFFENERS TO AVOID CONFLICT WITH SUPPORTS.
9. SEE ROADWAY STANDARD 901.70 FOR SUPPORT AND "Z" BAR SPACING.
10. FABRICATE SIGNS TALLER THAN 12′-0″ AS TWO SEPARATE SIGNS WITH A HORIZONTAL SPLICE. LOCATE STRINGERS ON EACH SECTION OF THE SIGN BY THE SIGN STRINGER CHART. (SEE ROADWAY STANDARD 901.70)
11. FABRICATE SIGNS TALLER THAN 12′-0″ BUT SHORTER THAN 14′-6″ WITH A HORIZONTAL SPLICE LOCATED 7′-0″ FROM BOTTOM OF SIGN.
12. FABRICATE SIGNS 14′-6″ TALL AND TALLER WITH A HORIZONTAL SPLICE. LOCATE THE SPLICE AT LEAST HALF OF THE SIGN HEIGHT FROM THE BOTTOM AND AT LEAST 7′-0″ FROM THE TOP.
13. THERE SHALL ONLY BE A ⅛″ GAP BETWEEN THE VERTICAL BACKING STRIP AND THE "Z" BAR.
14. SEE ROADWAY STANDARD 901.80 FOR DETAILS SHOWING SIGN MOUNTING TO SUPPORTS.
15. PLACE NYLON WASHER UNDER HEAD OF ⅜″ THRU BOLTS.
16. FABRICATE EACH SIGN WITH ⅜″ DIA. THRU BOLT, 4″ FROM EACH END OF EACH "Z" BAR THRU SIGN PANEL AND "Z" BAR. SEE DETAILS A & C.
17. FABRICATE EACH SIGN WITH ⅜″ DIA.THRU BOLT CENTERED IN EACH PANEL THRU THE TOP AND BOTTOM "Z" BAR. CENTERED THRU BOLT REQUIRED IN END PANELS GREATER THAN 2′-0″ WIDE. SEE DETAILS A & C.
18. THRU BOLTS WILL HAVE A MINIMUM 1/16″ TO MAXIMUM ⅛″ GAP

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

2-19

ENGLISH DETAIL DRAWING FOR

TYPE 'A' SIGNS

WELDED STUD CONSTRUCTION

SHEET 1 OF 2

901D10

REVISED SIGNING
ROADWAY STANDARD DRAWING

03/20/19
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Userdstokes

TIP NO.	SHEET NO.
B-6054A	Document Not Considered Signed Until All Required Signatures Have Been Obtained. 2B

APPROVED: Matthew V. Springer 3/21/2019

DATE:

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042546 MATTHEW V. SPRINGER

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

2-19

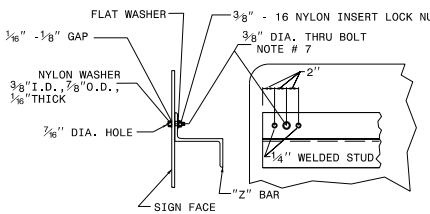
ENGLISH DETAIL DRAWING FOR

TYPE 'B' SIGNS

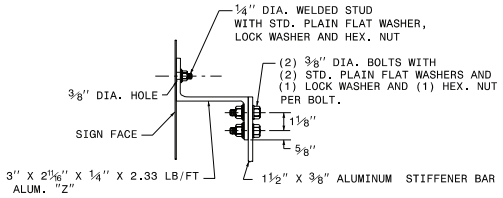
WELDED STUD CONSTRUCTION

SHEET 1 OF 1

901D20

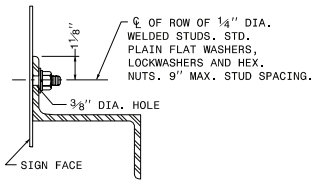


DETAIL "A"

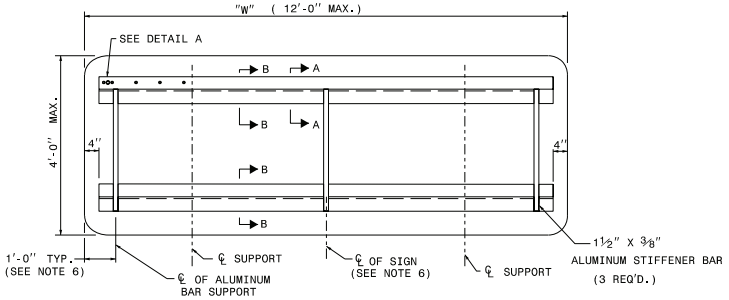


SECTION A-A

STIFFENER DETAIL



SECTION B-B



NOTES:

1. USE NUMBER AND SIZE OF SUPPORTS SHOWN ON SUPPORT CHART IN PROJECT PLAN SHEETS.
2. SEE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR THE TYPE OF MATERIAL TO BE USED FOR SIGN PANELS, HANGER ASSEMBLIES AND SUPPORTS.
3. FURNISH ALL MOUNTING HARDWARE.
4. USE GALVANIZED STEEL FOR BACKING PLATES AND MOUNTING BOLTS.
5. THE VERTICAL DIMENSION BETWEEN PRIMARY AND SECONDARY SIGNS IS TWO (2) INCHES.
6. ADJUST STIFFENERS TO AVOID CONFLICT WITH SUPPORTS.
7. FABRICATE EACH SIGN WITH A 3/8" DIA. BOLT 4" FROM EACH END OF EACH "Z" BAR THRU SIGN PANEL AND "Z" BAR.
8. SEE ROADWAY STANDARD 901.70 FOR SUPPORT AND "Z" BAR SPACING.
9. SEE ROADWAY STANDARD 901.80 FOR DETAILS SHOWING SIGN MOUNTING TO SUPPORTS.
10. PLACE NYLON WASHER UNDER HEAD OF 3/8" THRU BOLT.
11. THRU BOLTS WILL HAVE A MINIMUM 1/16" TO MAXIMUM 1/8" GAP.

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

2-19

ENGLISH DETAIL DRAWING FOR

TYPE 'B' SIGNS

WELDED STUD CONSTRUCTION

SHEET 1 OF 1

901D20

REVISED SIGNING
ROADWAY STANDARD DRAWING

03/20/19
C:\SCDOT\Standards Group\Standards and Drawings\Drawings\2018 Standard Dwgs\Division 9 Final\090i20.sgn.type b sign_2-19.dgn
USER:cdstokes

TIP NO.	SHEET NO.
B-6054A	DESIGN-2C

APPROVED: DocuSigned by: Matthew V. Springer 5/26/2020

DATE: BC80CF8E3884403...

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 042546 ENGINEER MATTHEW V. SPRINGER

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-20

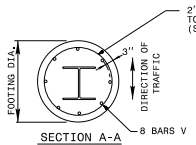
ENGLISH DETAIL DRAWING FOR

GROUND MOUNTED SIGN SUPPORTS

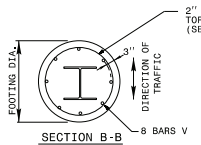
SHEET 2 OF 3

903D10

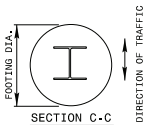
	SLIP BASE PLATE DATA								KEEPER PLATE DATA							HINGE CONNECTION DATA											BREAK AWAY SUPPORT WEIGHT CONSTANT LBS.
BEAM SHAPE	BOLT SIZE	A_1	B_1	C_1	D_1	E_1	T_1	R_1	A_2	B_2	C_2	D_2	E_2	R_2	T_2	BOLT SIZE	F	G	H	I	J	K	L	R_3	T_3	
S3X5.7	½"DIA.X 3¼"	7"	4"	1"	¾"	2½"	1"	8/32"	7"	4"	1"	¾"	2½"	8/32"	28 GAUGE	½"DIA.X1¾"	2¼"	3½"	4"	½"	1"	½"	2"	8/32"	⅜"	18
S4X7.7	½"DIA.X 3¼"	8"	4"	1"	¾"	2½"	1"	8/32"	8"	4"	1"	¾"	2½"	8/32"	28 GAUGE	½"DIA.X1¾"	2⅝"	3½"	4"	½"	1"	½"	2"	8/32"	⅜"	20
W6X9	½"DIA.X 3¼	10"	5"	1"	¾"	3½"	1"	8/32"	10"	5"	1"	¾"	3½"	8/32"	28 GAUGE	½"DIA.X1¾"	4"	3½"	4"	¾"	1"	½"	2"	8/32"	⅜"	32
W6X12	⅝"DIA.X 4"	11"	5"	1¼"	⅞"	3¼"	1¼"	11/32"	11"	5"	1¼"	⅞"	3¼"	12/32"	28 GAUGE	⅝"DIA.X 2"	4"	4"	4½"	¾"	1⅛"	⅝"	2¼"	11/32"	⅜"	39
W6X16	⅝"DIA.X 4½"	12"	6"	1¼"	⅞"	4¼"	1½"	½/32"	12"	6"	1¼"	⅞"	4¼"	½/32"	28 GAUGE	⅝"DIA.X2¼"	4"	4"	4½"	¾"	1⅛"	⅝"	2¼"	½/32"	½"	47
W8X18	⅝"DIA.X 4½"	13½"	6½"	1¼"	⅞"	4¾"	1½"	11/32"	13½"	6½"	1¼"	⅞"	4¾"	11/32"	28 GAUGE	⅝"DIA.X2¼"	5¼"	4"	4½"	1"	1⅛"	⅝"	2¼"	11/32"	½"	70
W8X21	¾"DIA.X 4½"	14"	7"	1½"	1"	5"	1½"	13/32"	14"	7"	1½"	1"	5"	13/32"	28 GAUGE	¾"DIA.X2½"	5¼"	6"	7"	1"	1¾"	¾"	3½"	13/32"	½"	73
W10X22	¾"DIA.X 4½"	16"	8"	1½"	1"	6"	1½"	13/32"	16"	8"	1½"	1"	6"	13/32"	28 GAUGE	¾"DIA.X2½"	5¾"	6"	7"	1"	1¾"	¾"	3½"	13/32"	½"	119
W10X26	¾"DIA.X 5½"	16½"	8"	1½"	1"	6"	1¾"	13/32"	16½"	8"	1½"	1"	6"	13/32"	28 GAUGE	¾"DIA.X2¾"	5¾"	6"	7"	1"	1¾"	¾"	3½"	13/32"	⅝"	140
W12X26	¾"DIA.X 5½"	18½"	9"	1½"	1"	7"	1¾"	13/32"	18½"	9"	1½"	1"	7"	13/32"	28 GAUGE	¾"DIA.X2¾"	6½"	6"	7"	1"	1¾"	¾"	3½"	13/32"	⅝"	176
W14X30	1"DIA.X 6"	22"	9"	2"	1½"	6"	2"	12/32"	22"	9"	2"	1½"	6"	12/32"	28 GAUGE	1"DIA.X 3"	6¾"	7"	8"	1¼"	2"	1"	4"	12/32"	⅝"	205
W16X31	1"DIA.X 6"	24"	9"	2"	1½"	6"	2"	12/32"	24"	9"	2"	1½"	6"	12/32"	28 GAUGE	1"DIA.X 3"	5½"	7"	8"	1¼"	2"	1"	4"	12/32"	¾"	223
W18X35	1"DIA.X 6"	25"	9"	2"	1½"	6"	2"	12/32"	25"	9"	2"	1½"	6"	12/32"	28 GAUGE	1"DIA.X 3"	6"	7"	8"	1¼"	2"	1"	4"	12/32"	¾"	243
W18X40	1"DIA.X 6½"	26"	9"	2"	1½"	6"	2¼"	12/32"	26"	9"	2"	1½"	6"	12/32"	28 GAUGE	1"DIA.X3½"	6"	7"	8"	1¼"	2"	1"	4"	12/32"	⅞"	278
W21X44	1"DIA.X 7"	29"	9"	2"	1½"	6"	2½"	12/32"	29"	9"	2"	1½"	6"	12/32"	28 GAUGE	1"DIA.X3½"	6½"	7"	8"	1¼"	2"	1"	4"	12/32"	⅞"	310



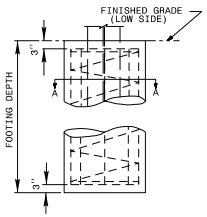
SECTION A-A



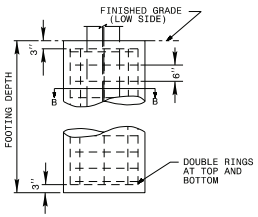
SECTION B-B



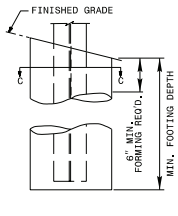
SECTION C-C



SPIRAL RING FOOTING DETAIL



SPACED RING FOOTING DETAIL



FOOTING DETAIL

FOUNDATION DATA *			
FOOTING DIAMETER	REINFORCEMENT	SPIRAL BAR	SPACED BAR
1'-6"	8 # 6 BARS	#3 BAR, 6" PITCH	#3 BAR, 6" SPACE
2'	8 # 7 BARS	#3 BAR, 6" PITCH	#3 BAR, 6" SPACE
2'-6"	8 # 9 BARS	#3 BAR, 6" PITCH	#3 BAR, 6" SPACE
3'	8 # 11 BARS	#3 BAR, 6" PITCH	#3 BAR, 6" SPACE
3'-6"	8 # 12 BARS	#3 BAR, 6" PITCH	#3 BAR, 6" SPACE
4'	8 # 14 BARS	#3 BAR, 6" PITCH	#3 BAR, 6" SPACE

* FOUNDATION DIMENSIONS ARE SHOWN IN PLANS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

5-20

ENGLISH DETAIL DRAWING FOR

GROUND MOUNTED SIGN SUPPORTS

SHEET 2 OF 3

903D10

REVISED SIGNING
ROADWAY STANDARD DRAWING

05/4/20
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Userdstokes

TIP NO.	SHEET NO.
B-6054A	SIGN-2D

APPROVED: DocuSigned by: Matthew V. Springer 6/23/2021

DATE:

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042546 MATTHEW V. SPRINGER

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

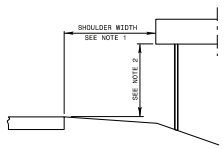
6-21

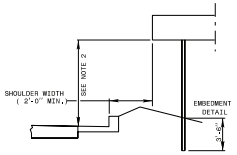
ENGLISH DETAIL DRAWING FOR

MOUNTING OF TYPE 'D','E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

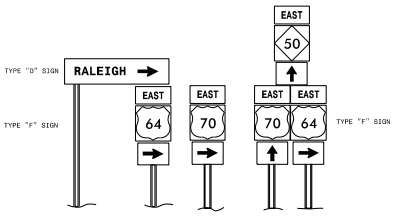
SHEET 1 OF 2

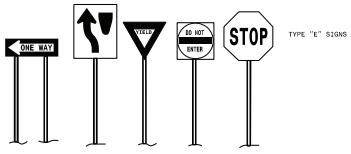
904D50



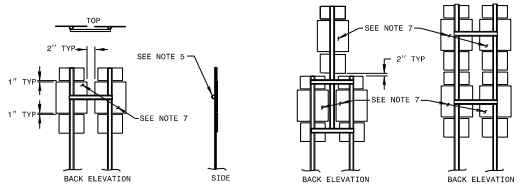


HORIZONTAL AND VERTICAL CLEARANCES

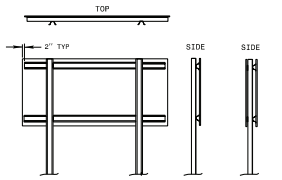




TYPICAL SIGN SHAPES AND COMBINATIONS



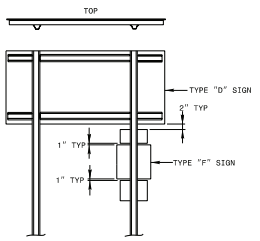
FRAMING AND CROSS-BRACING DETAILS
TYPE "F" SIGNS



TYPE "D" & "E" SIGN CROSS BRACING

BACK-TO-BACK MOUNT

FRAMING AND CROSS BRACE DETAILS
FOR COMBINATION TYPE "D" & "E" SIGNS
WIDE SIDE OF CROSS BRACE GOES TO BACK OF SIGN



FRAMING AND CROSS BRACE DETAILS
FOR COMBINATION TYPE "D" & "F" SIGNS
WIDE SIDE OF FLANGE TO BACK OF "F" SIGN

NOTES:

1. ERECT TYPE "D", "E", AND "F" SIGNS ON FREEWAYS WITH THE NEAR EDGE OF THE SIGN 20 FT. FROM THE TRAVEL LANE. ERECT ALL OTHER "D", 'E", AND "F" SIGNS WITH THE NEAR EDGE OF THE SIGN AT THE EDGE OF THE SHOULDER BREAK (6 FT. MINIMUM CLEARANCE, 12 FT. DESIRABLE, FROM THE EDGE OF TRAVEL LANE), OR AS DIMENSIONED ON PLAN SHEETS.
2. ERECT TYPE "D", "E", AND "F" SIGNS WITH THE BOTTOM OF SIGN ASSEMBLY AT LEAST 7 FT. ABOVE THE EDGE OF THE TRAVEL LANE ON ROADS WITH 2 OR MORE LANES IN THE SAME DIRECTION AND AT LEAST 5 FT. ON OTHER ROUTES. THE VERTICAL CLEARANCE IS 7 FT. WHERE REQUIRED FOR PEDESTRIAN TRAFFIC AND/OR PARKED VEHICLES.
3. THE VERTICAL DIMENSION BETWEEN MOUNTING HOLE CENTERS ON ALL TYPES "D", "E", AND "F" SIGNS IS 30" MAXIMUM. THE VERTICAL AND HORIZONTAL DIMENSIONS BETWEEN MOUNTING HOLES IS TO THE WHOLE INCH. EACH SIGN PANEL HAS A MINIMUM OF 2 BOLTS PER SUPPORT.
4. ATTACH SIGN W/ 5/8" HEX HEAD BOLT, NYLON WASHER, SHIM, FLAT WASHER, LOCK WASHER, HEX NUT
   NO BUCKLING OF THE SIGN WILL BE PERMITTED. SEE ASSEMBLY DETAIL SHEET# 2 OF 904.50.
5. FURNISH AND INSTALL CROSS-BRACING AS SHOWN IN DETAIL. PAINT ENDS OF CROSS BRACES W/ APPROVED. ZINC PAINT
6. INSTALL POST AND CROSS-BRACING WITH THE WIDE SIDE OF THE FLANGE TOWARD THE BACK OF SIGN(S) FOR COMBINATION TYPE "D" AND "F" SIGNS.
7. THE SHIELD HEIGHTS IN THESE ASSEMBLIES CAN NOT BE LARGER THAN 24".
8. IF SIGN ASSEMBLIES REQUIRE MORE THAN TWO U-CHANNEL SUPPORTS, THE SUPPORTS SHALL BE PLACED A MINIMUM OF 4 FT. BETWEEN POSTS. NO MORE THAN TWO POSTS SHALL FALL WITHIN 7 FT. PATH, OR THE SIGN ASSEMBLY MUST BE PLACED BEHIND BARRIER PROTECTION.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

6-21

ENGLISH DETAIL DRAWING FOR

MOUNTING OF TYPE 'D','E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

SHEET 1 OF 2

904D50

REVISED SIGNING
ROADWAY STANDARD DRAWING

6/18/2021
5:15:48 PM
User: cdstokes

C:\Users\Standards Group\Standards and Drawings\Drawings\208 Standard Dwgs\Division 9 Final\0904.50_sgn_sht01_uchannelpost_6-21.dgn

DocuSign Envelope ID: C9B56E38-D531-430E-8735-80A0A8233B6B

REVISIONS

TIP NO.	SHEET NO.
B-6054A	SIGN-2E

APPROVED: Steven Cox (DocuSigned by: 320°228'48NT-MD...)

DATE: 9/29/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

401 QUANTITY REQ'D 5

36 X 36
R1-1

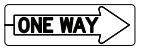
ONE "U" POST PER SIGN

405 QUANTITY REQ'D 2

54 X 18
R6-1L

TWO "U" POST PER SIGN ASSEMBLY

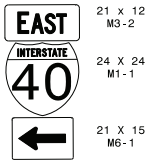
409 QUANTITY REQ'D 2



54 X 18
R6-1R

MOUNT BACK TO BACK WITH 405
IN 2 LOCATIONS

501 QUANTITY REQ'D 1



21 x 12
M3-2

24 X 24
M1-1

21 X 15
M6-1

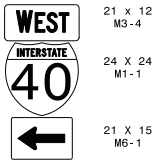
ONE "U" POST PER SIGN ASSEMBLY
MOUNTED BELLOW TYPE D SIGN

406 QUANTITY REQ'D 5

36 X 48
W1-8

TWO "U" POST PER SIGN

502 QUANTITY REQ'D 2



21 x 12
M3-4

24 X 24
M1-1

21 X 15
M6-1

ONE "U" POST PER SIGN ASSEMBLY

403 QUANTITY REQ'D 4

30 X 30
R5-1

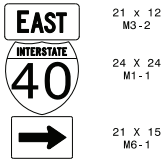
MOUNT TO BACK OF 401
IN 4 LOCATIONS

407 QUANTITY REQ'D 1

30 X 30
W3-1

ONE "U" POST PER SIGN

503 QUANTITY REQ'D 1



21 x 12
M3-2

24 X 24
M1-1

21 X 15
M6-1

ONE "U" POST PER SIGN ASSEMBLY

404 QUANTITY REQ'D 4

36 X 24
R5-1a

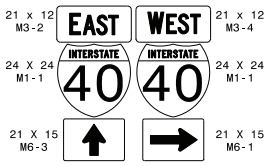
ONE "U" POST PER SIGN

408 QUANTITY REQ'D 2

48 X 48
W4-1

TWO "U" POST PER SIGN

504 QUANTITY REQ'D 1



21 x 12
M3-2

21 x 12
M3-4

24 X 24
M1-1

24 X 24
M1-1

21 X 15
M6-3

21 X 15
M6-1

TWO "U" POST PER SIGN ASSEMBLY

Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

TYPE "D", "E" & "F" SIGNS

$$$$$$$ CST/MES $$$$$$$
$$$$$$$ 9/29/2021 $$$$$$$
USER:rlouk111
I:\6054\...\SIGN-2E1_02.dgn

DocuSign Envelope ID: C9B56E38-D531-430E-8735-80A0A82338B8

TIP NO.	SHEET NO.
B-6054A	SIGN-3

APPROVED: Steven Cox (DocuSigned by: -320 "220"ABFF4D...)

DATE: 9/29/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

SIGN NUMBER: 101A
TYPE: A
QUANTITY: 1

SIGN WIDTH: 16'-0"
HEIGHT: 8'-0"
TOTAL AREA: 128 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 2"
RADII: 12"

NO. Z BARS: 3
LENGTH: 184

BACKG COLOR: Green
COPY COLOR: White

SYMBOL	X	Y	WID	HT
AR_Type A	82.2	20.2	22.3	35

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2,3
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.
3. Type A arrows shall be on 0.032" aluminum and demountable.

DESIGN BY: SWC CHECKED BY: XXX DATE: Sept 2021
PROJECT ID: B-6054A DIV: 14

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	H	a	r	m	o	n		D	e	n																Series/Size Text Length
19.4	17	17	11.8	22.6	15.8	10.6	16	16.3	15.5	10.5	19.4															EM 2000
																										153.1

FILENAME: 230167_TC_SD-1.dgn SIGN DETAIL

SIGN NUMBER: 101B
TYPE: A
QUANTITY: 1

SIGN WIDTH: 9'-6"
HEIGHT: 2'-6"
TOTAL AREA: 23.75 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 2"
RADII: 3"

NO. Z BARS: 2
LENGTH: 106

BACKG COLOR: Green
COPY COLOR: White

SYMBOL	X	Y	WID	HT

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: SWC CHECKED BY: XXX DATE: Sept 2021
PROJECT ID: B-6054A DIV: 14

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	E	X	I	T	7																					Series/Size Text Length
27.6	9.2	11.1	3.8	22.5	12.2	27.6																				E 2000
																										58.8

FILENAME: 230167_TC_SD-1.dgn SIGN DETAIL

SIGN NUMBER: 303
TYPE: D
QUANTITY: 1

SIGN WIDTH: 7'-6"
HEIGHT: 1'-0"
TOTAL AREA: 3.67 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0.5"
RADII: 1.5"

NO. Z BARS: N/A
LENGTH: N/A

BACKG COLOR: Green
COPY COLOR: White

SYMBOL	X	Y	WID	HT
AR_Type D	2.5	2	4	6

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: SWC CHECKED BY: XXX DATE: Sept 2021
PROJECT ID: B-6054A DIV: 14

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	F	o	r	e	s	t		S	e	r	v	i	c	e		R	d		2	2	8					Series/Size Text Length
12.5	2.9	3	1.9	2.7	2	1.6	2	3.2	2.9	1.7	3.3	1.3	2.7	2.3	2	2.4	1.8	1.5	3.5	3.6	2.7	2.5					D 2000
																										51

FILENAME: 230167_TC_SD-1.dgn SIGN DETAIL

SIGN NUMBER: 305
TYPE: D
QUANTITY: 1

SIGN WIDTH: 7'-6"
HEIGHT: 1'-0"
TOTAL AREA: 7.5 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0.5"
RADII: 1.5"

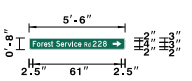
NO. Z BARS: N/A
LENGTH: N/A

BACKG COLOR: Green
COPY COLOR: White

SYMBOL	X	Y	WID	HT
AR_Type D	57.5	2	4	6

MAT'L: 0.125" ALUMINUM

DESIGN BY: SWC CHECKED BY: XXX DATE: Sept 2021
PROJECT ID: B-6054A DIV: 14



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	F	o	r	e	s	t		S	e	r	v	i	c	e		R	d		2	2	8					Series/Size Text Length
2.5	2.9	3	1.9	2.7	2	1.6	2	3.2	2.9	1.7	3.3	1.3	2.7	2.3	2	2.4	1.8	1.5	3.5	3.6	4.1	2.7					D 2000
																										51

FILENAME: 230167_TC_SD-1.dgn SIGN DETAIL

$$$$$$$SYSTIME$$$$$$$
USER:BGOSA
DGN:SIGN_PSH_01.dgn
DSR:B6054A

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

SIGN DESIGNS

DocuSign Envelope ID: C9B56E38-D531-430E-8735-80A0A82338B8

TIP NO.	SHEET NO.
B-6054A	SIGN-4

APPROVED: Steven Cox (DocuSigned by: 3D0F22EFA6BF4AE...)

DATE: 9/29/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

SIGN NUMBER: 302
TYPE: D
QUANTITY: 1

BACKG COLOR: Green
COPY COLOR: White

SIGN WIDTH: 5'
HEIGHT: 1'-6"
TOTAL AREA: 7.5 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0.75"
RADII: 2.25"

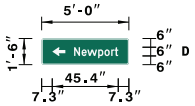
NO. Z BARS: N/A
LENGTH: N/A

SYMBOL	X	Y	WID	HT
AR_Type D	7.3	6	6	9

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: SWC
PROJECT ID: B-6054A
CHECKED BY: XXX
DIV: 14
DATE: Sept 2021



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	N	e	w	p	o	r	t		Series/Size Text Length
22.3	5.2	3.9	7.5	4.3	4.6	2.5	2.4	7.3	D 2000
									30.4

FILENAME: 230167_TC_SD-1.dgn

SIGN DETAIL

SIGN NUMBER: 304
TYPE: D
QUANTITY: 1

BACKG COLOR: Green
COPY COLOR: White

SIGN WIDTH: 4'-6"
HEIGHT: 0'-8"
TOTAL AREA: 3 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 0.5"
RADII: 1.5"

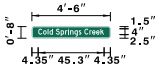
NO. Z BARS: N/A
LENGTH: N/A

SYMBOL	X	Y	WID	HT

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: SWC
PROJECT ID: B-6054A
CHECKED BY: XXX
DIV: 14
DATE: Sept 2021



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	C	o	l	d		S	p	r	f	n	g	s		C	r	e	e	k		Series/Size Text Length
4.3	3.4	3.1	1.3	2.4	2	3.3	3	2	1.5	2.9	3	1.9	2	3.5	1.8	2.8	2.9	2.6	4.3	D 2000
																				45.3

FILENAME: 230167_TC_SD-1.dgn

SIGN DETAIL

SIGN NUMBER: 301
TYPE: D
QUANTITY: 1

BACKG COLOR: Green
COPY COLOR: White

SIGN WIDTH: 6'-0"
HEIGHT: 1'-6"
TOTAL AREA: 9 SF

BORDER TYPE: FLUSH
RECESS: 0.09"
WIDTH: 0.75"
RADII: 2.25"

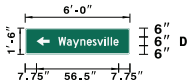
NO. Z BARS: N/A
LENGTH: N/A

SYMBOL	X	Y	WID	HT
AR_Type D	7.5	6	6	9

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: SWC
PROJECT ID: B-6054A
CHECKED BY: XXX
DIV: 14
DATE: Sept 2021



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	W	a	y	n	e	s	v	f	l	l	e		Series/Size Text Length
22.8	5.8	4.1	5.2	4.5	4	3.1	5	2.1	2.2	1.9	3.6	7.8	D 2000
													41.5

FILENAME: 230167_TC_SD-1.dgn

SIGN DETAIL

SIGN NUMBER: 201 & 202
TYPE: B
QUANTITY: 2

BACKG COLOR: Green
COPY COLOR: White

SIGN WIDTH: 6'-6"
HEIGHT: 5'
TOTAL AREA: 32.5 SF

BORDER TYPE: FLUSH
RECESS: 0"
WIDTH: 1.5"
RADII: 8"

NO. Z BARS: 2
LENGTH: 70.0

SYMBOL	X	Y	WID	HT
AR_Type A				

MAT'L: 0.125" ALUMINUM

USE NOTES: 1,2,3
1. Legend and border shall be direct applied Grade C reflective sheeting.
2. Background shall be Grade C reflective sheeting.
3. Type A arrow shall be on 0.032" aluminum and demountable.

DESIGN BY: SWC
PROJECT ID: B-6054A
CHECKED BY: XXX
DIV: 14
DATE: Sept 2021

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

	E	X	I	T			Series/Size Text Length
16.8	12.5	15.9	7.2	8.9	16.8		E 2000
							44.4
	7						E 2000
19.4	14.6	43.2					18

FILENAME: 230167_TC_SD-1.dgn

SIGN DETAIL

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

SIGN DESIGNS

$$$$$$SYSTIME$$$$$$
USER:BGOSS
PLOTSCALE:1.0000
$$$$$$SYSTIME$$$$$$
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DocuSign Envelope ID: C9B56E38-D631-430E-8735-80A0A8233B6B

TIP NO.	SHEET NO.
B-6054A	SIGN-5

APPROVED: Steven Cox (DocuSigned by: 320°228'48INT-MD...)

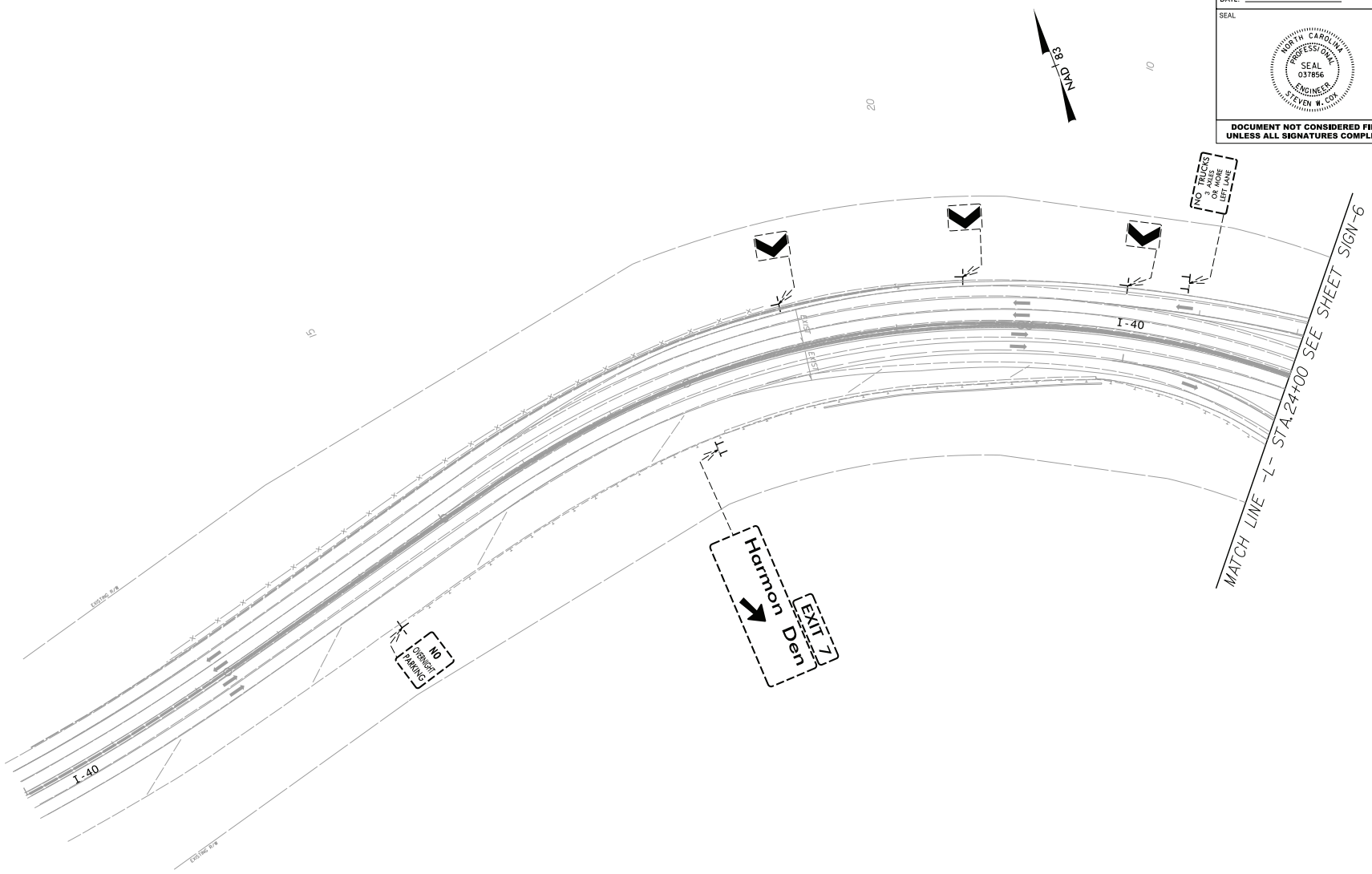
DATE: 9/29/2021

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS



Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

$$$$$$$SYSTIME$$$$$$
B-6054A_SGN_PSH_05.dgn
jsellstoukii

EXISTING AND PROPOSED SIGNING PLANS

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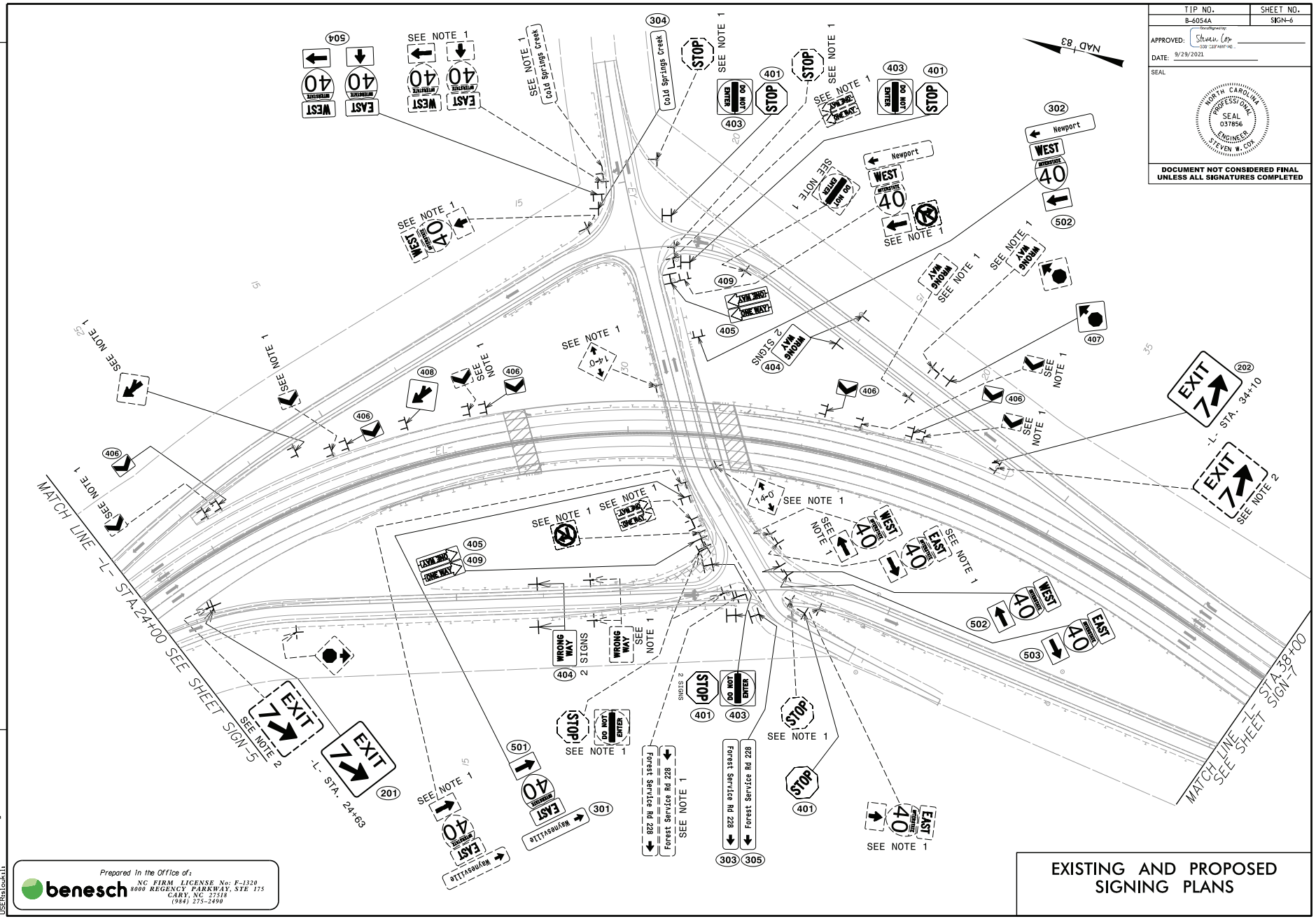


TIP NO.	SHEET NO.
B-6054A	SIGN-6

APPROVED: Steven Cox
DATE: 9/29/2021

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

EXISTING AND PROPOSED SIGNING PLANS

Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

$$$$$$$SYSTIMES$$$$$$
B-6054A_SGN_PSH_06.dgn
jbenshoukii

DocuSign Envelope ID: C9B56E38-D531-430E-8735-80A0A8233B6B

TIP NO.	SHEET NO.
B-6054A	SIGN-7

APPROVED: Steven Cox (DocuSigned by: 3D9722EA8B1F4D...)

DATE: 9/29/2021

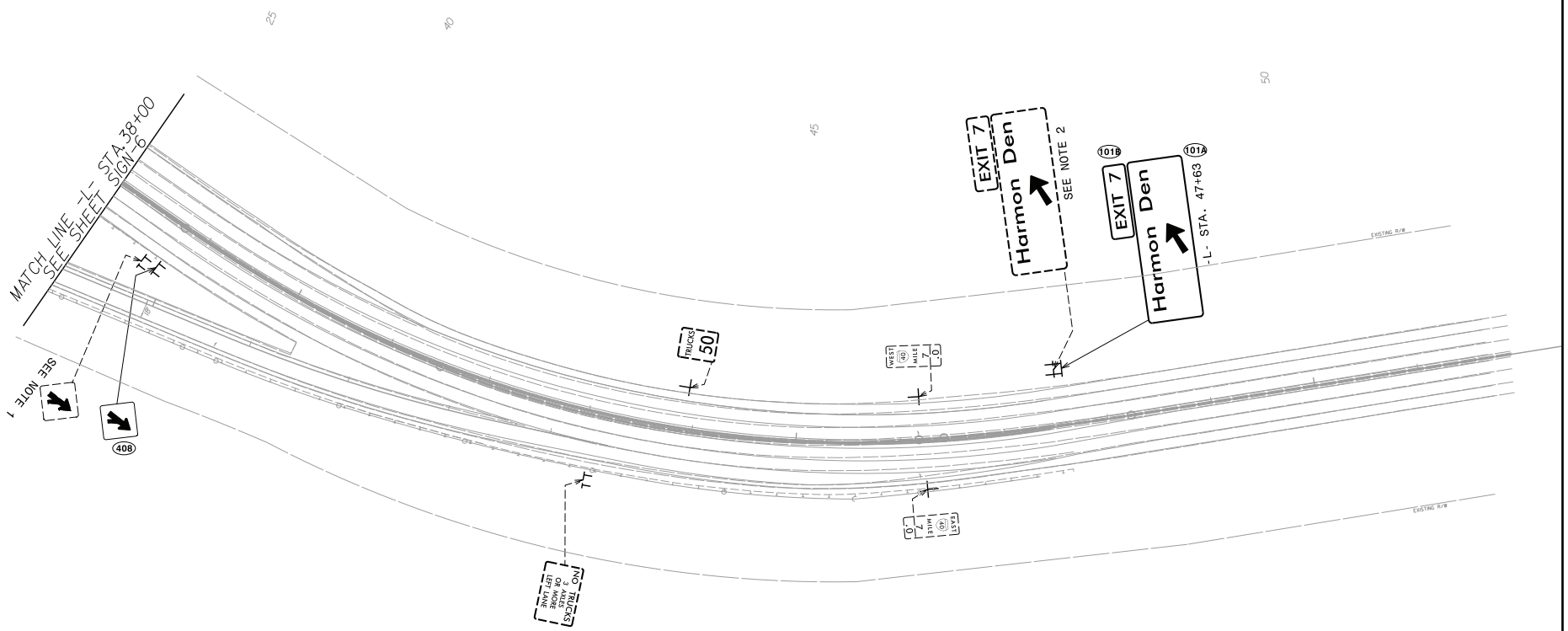
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037856 ENGINEER STEVEN W. COX

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

NAD 83



Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

EXISTING AND PROPOSED SIGNING PLANS

$$$$$$$SYSTIME$$$$$$
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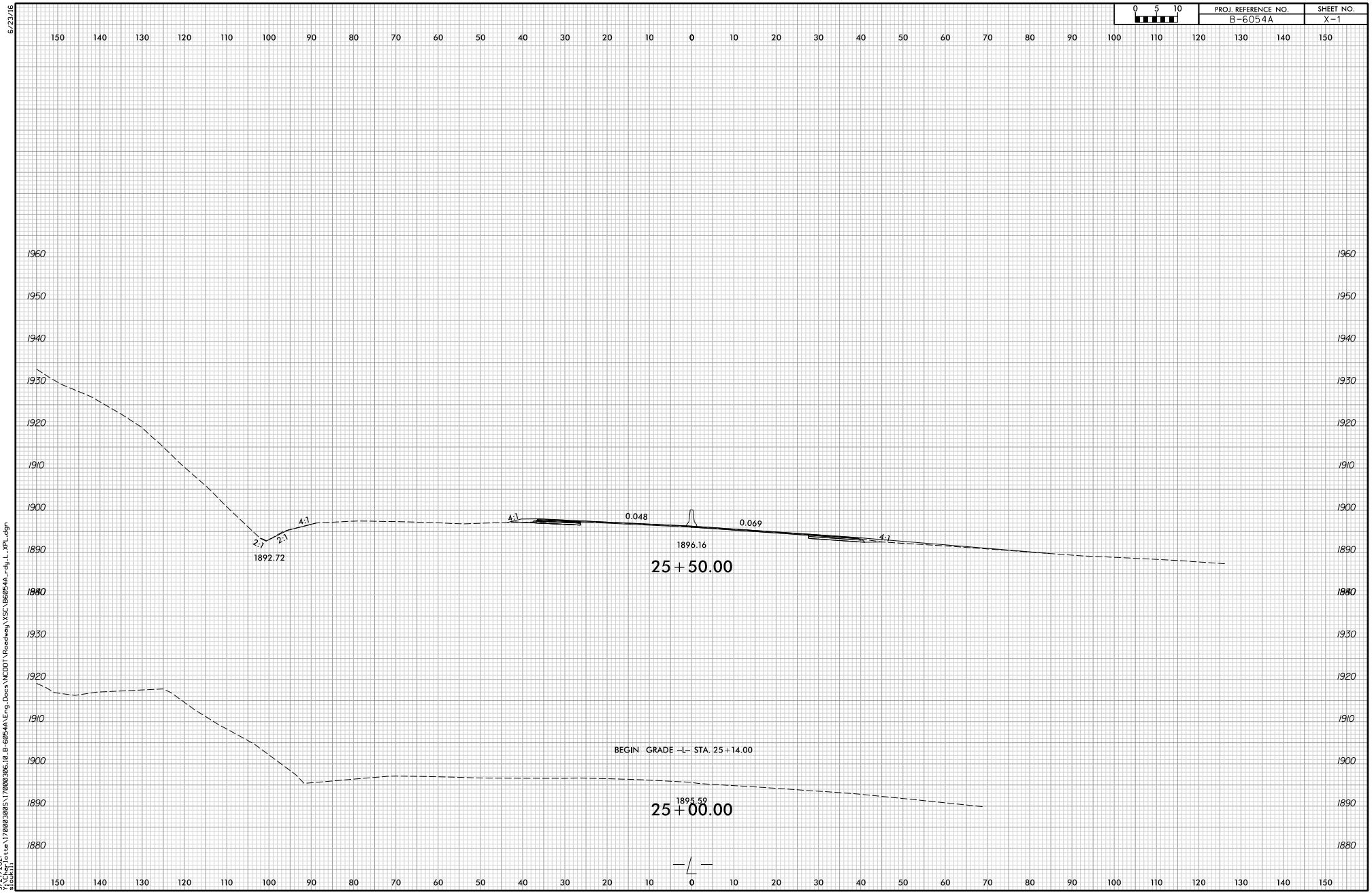
jsellstoukii

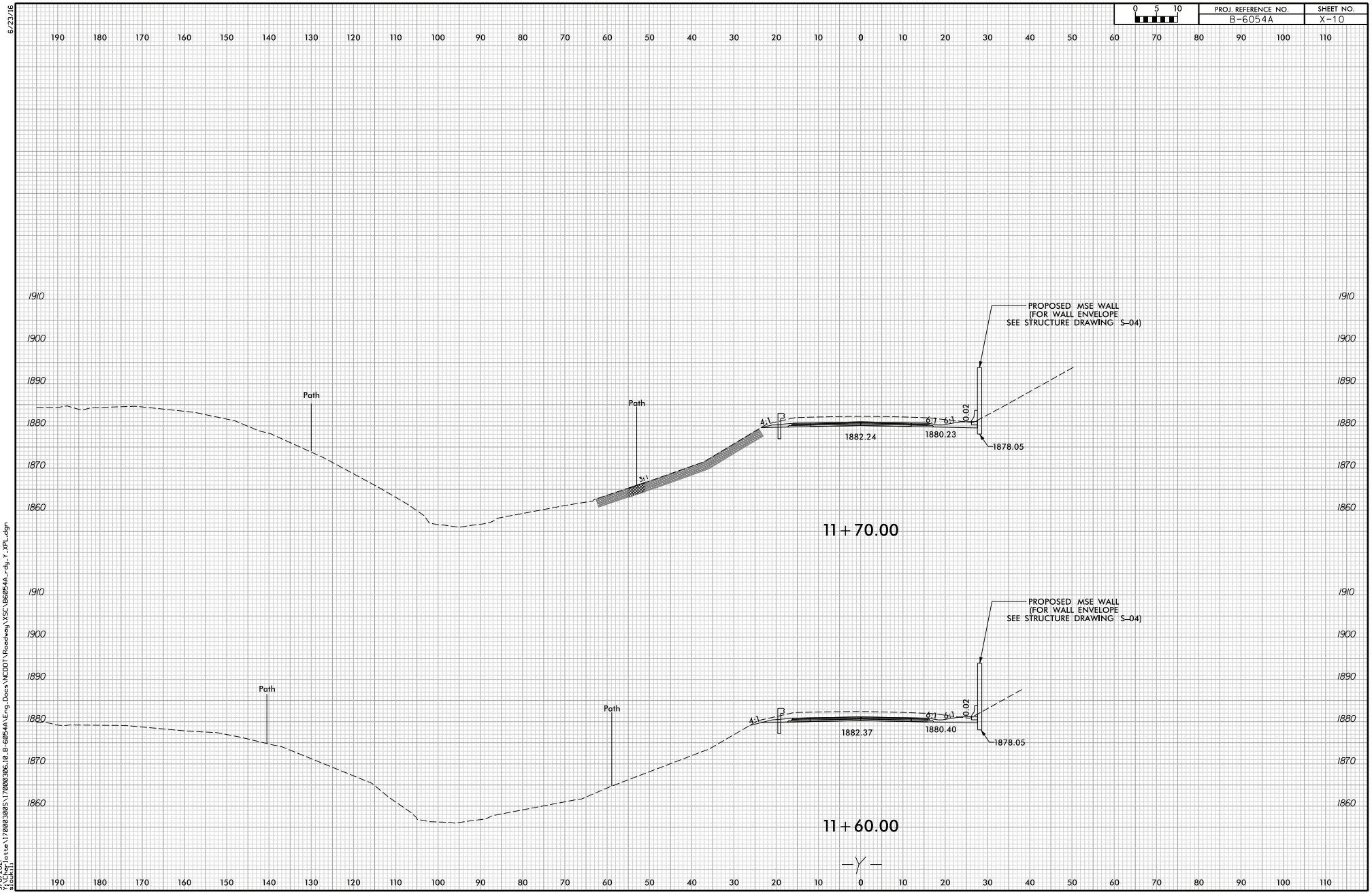


6/23/16

9/27/2021
\\Charlotte\170003300\170003306.10.B-6054A\Eng_Docs\NCDOT\Roadway\XSC\B6054A_rdy_L_XPL.dgn
slouk11

0 5 10

PROJ. REFERENCE NO.	SHEET NO.
B-6054A	X-10



9/8/2021
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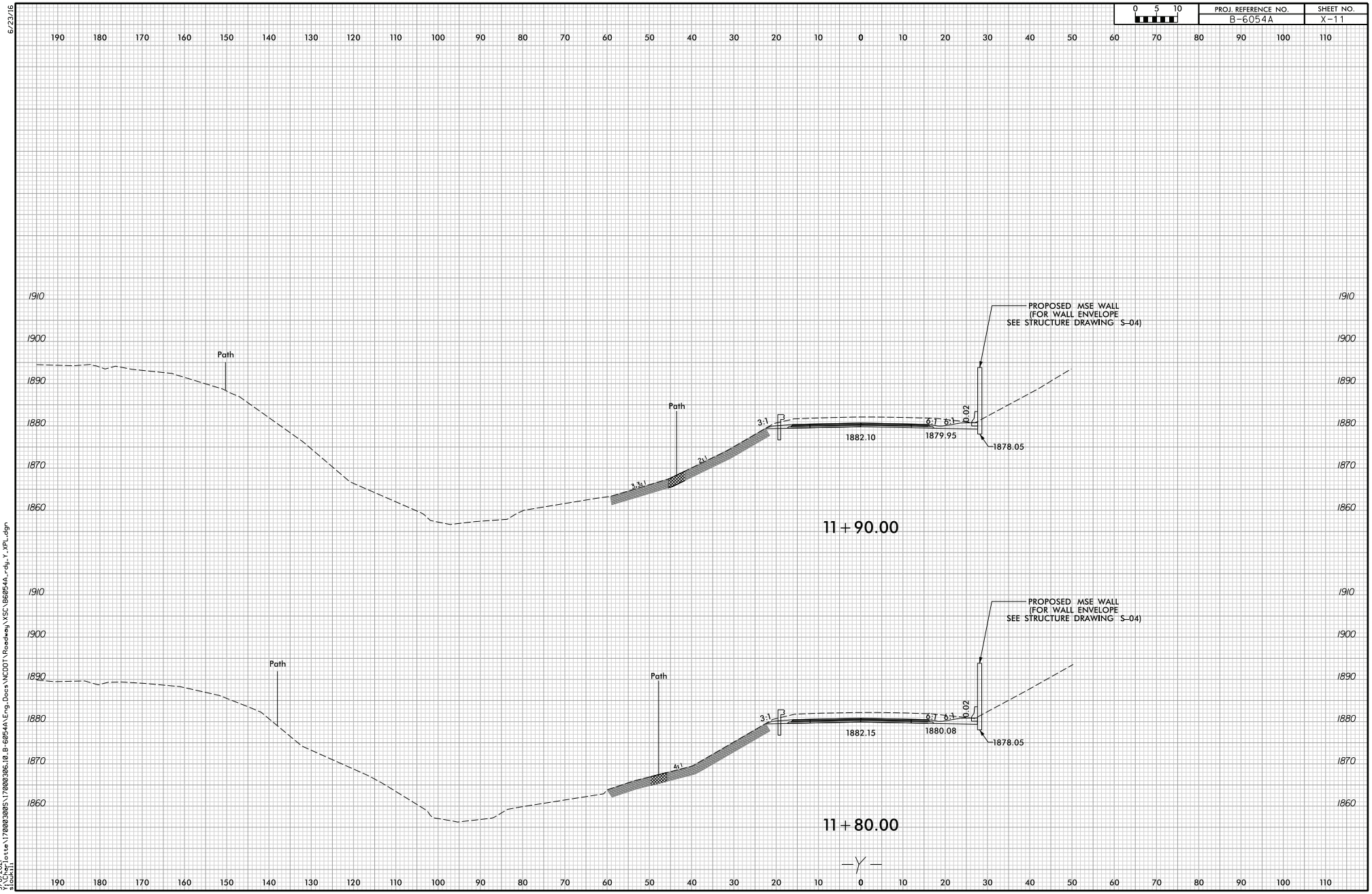

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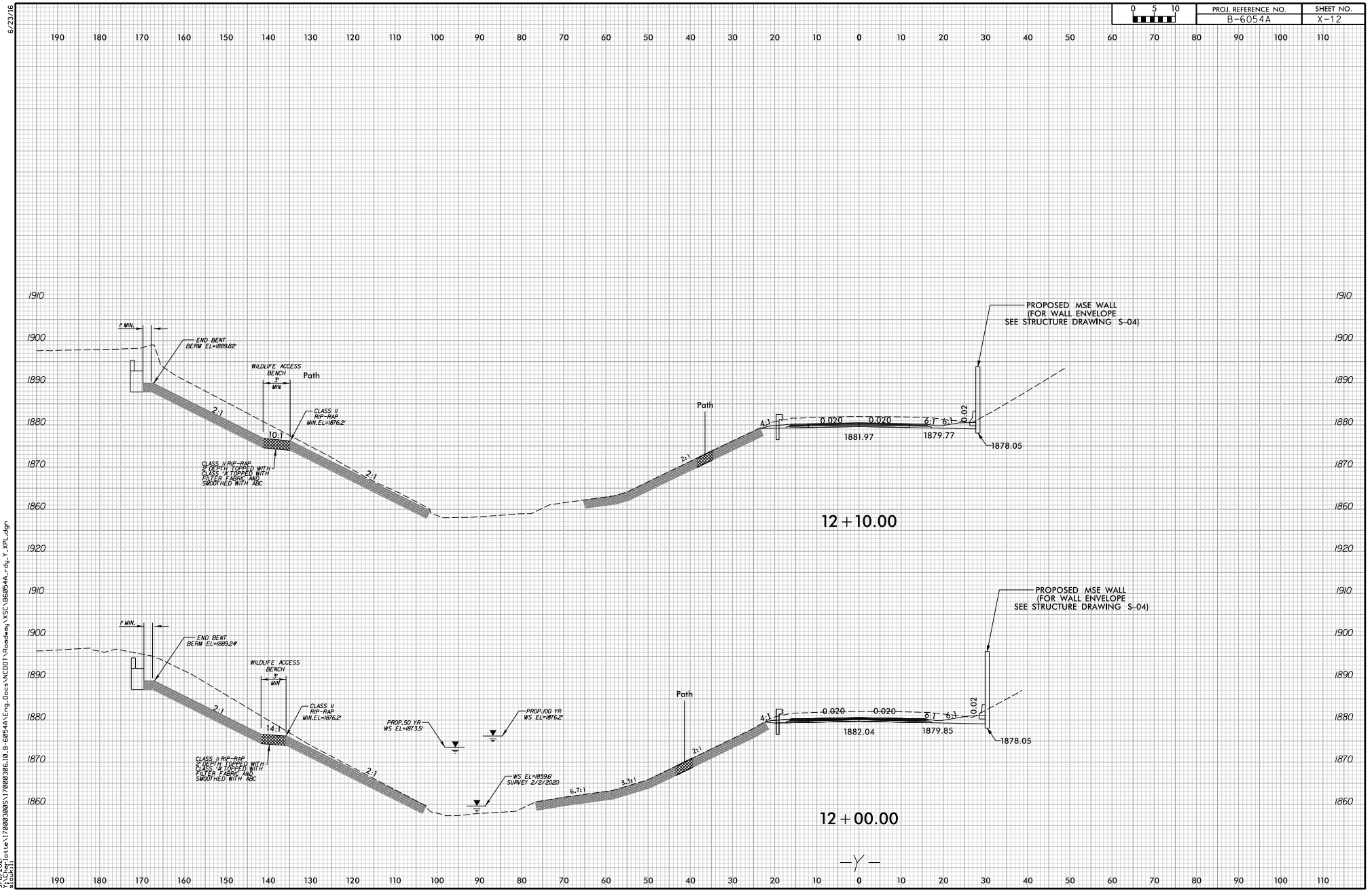

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9/8/2021
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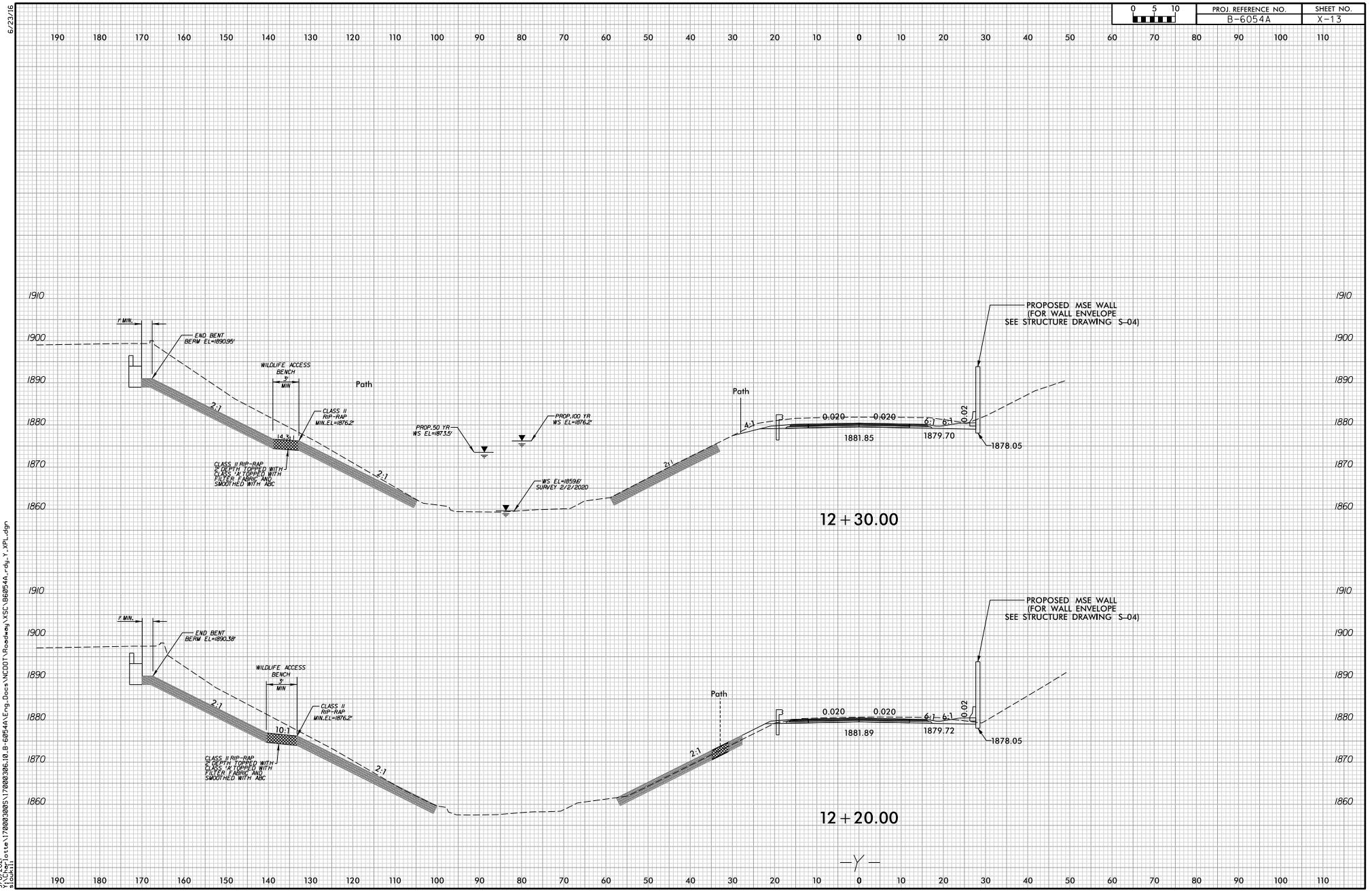

6/23/16
9/8/2021
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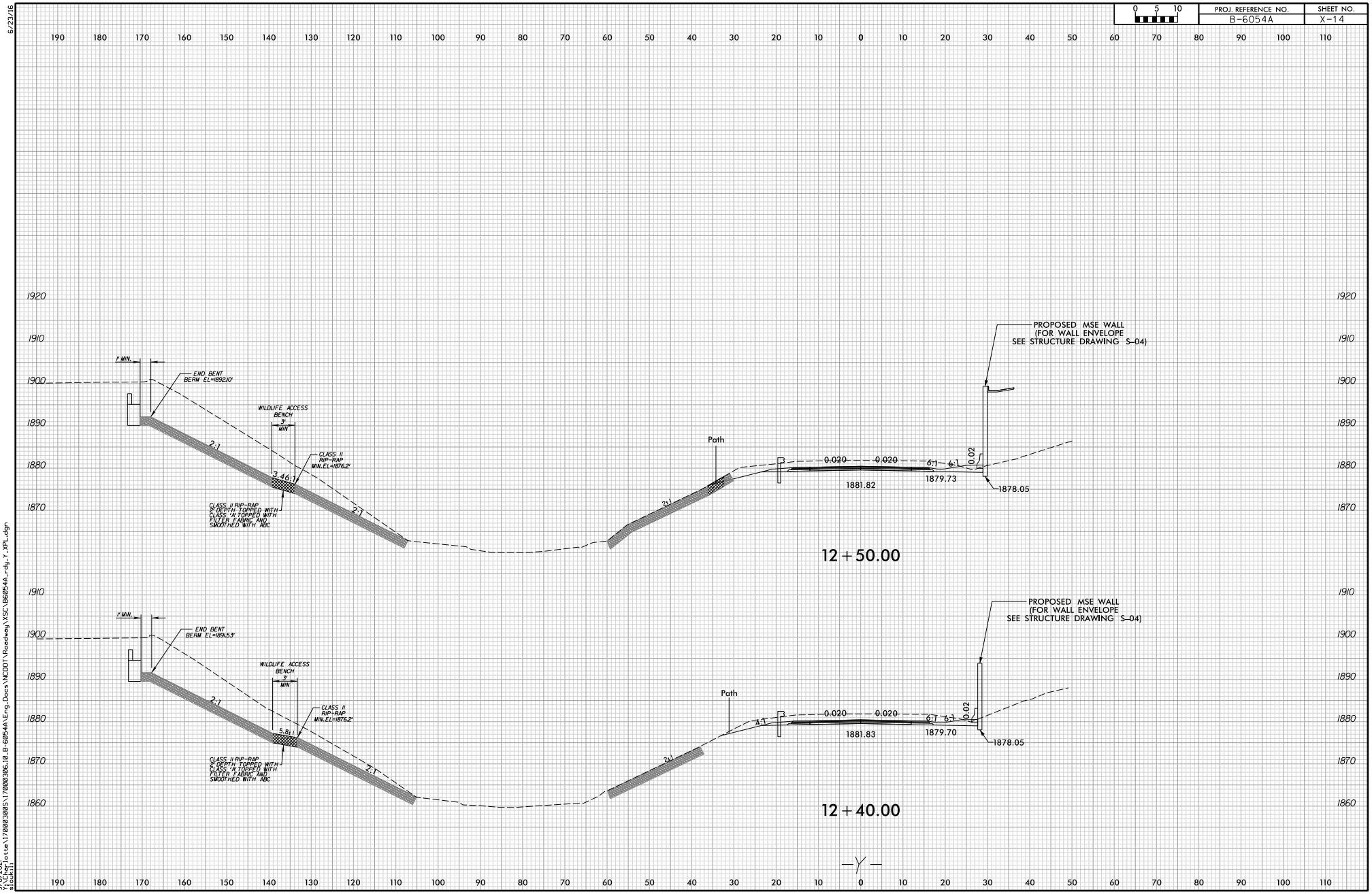

6/23/16
9/8/2021
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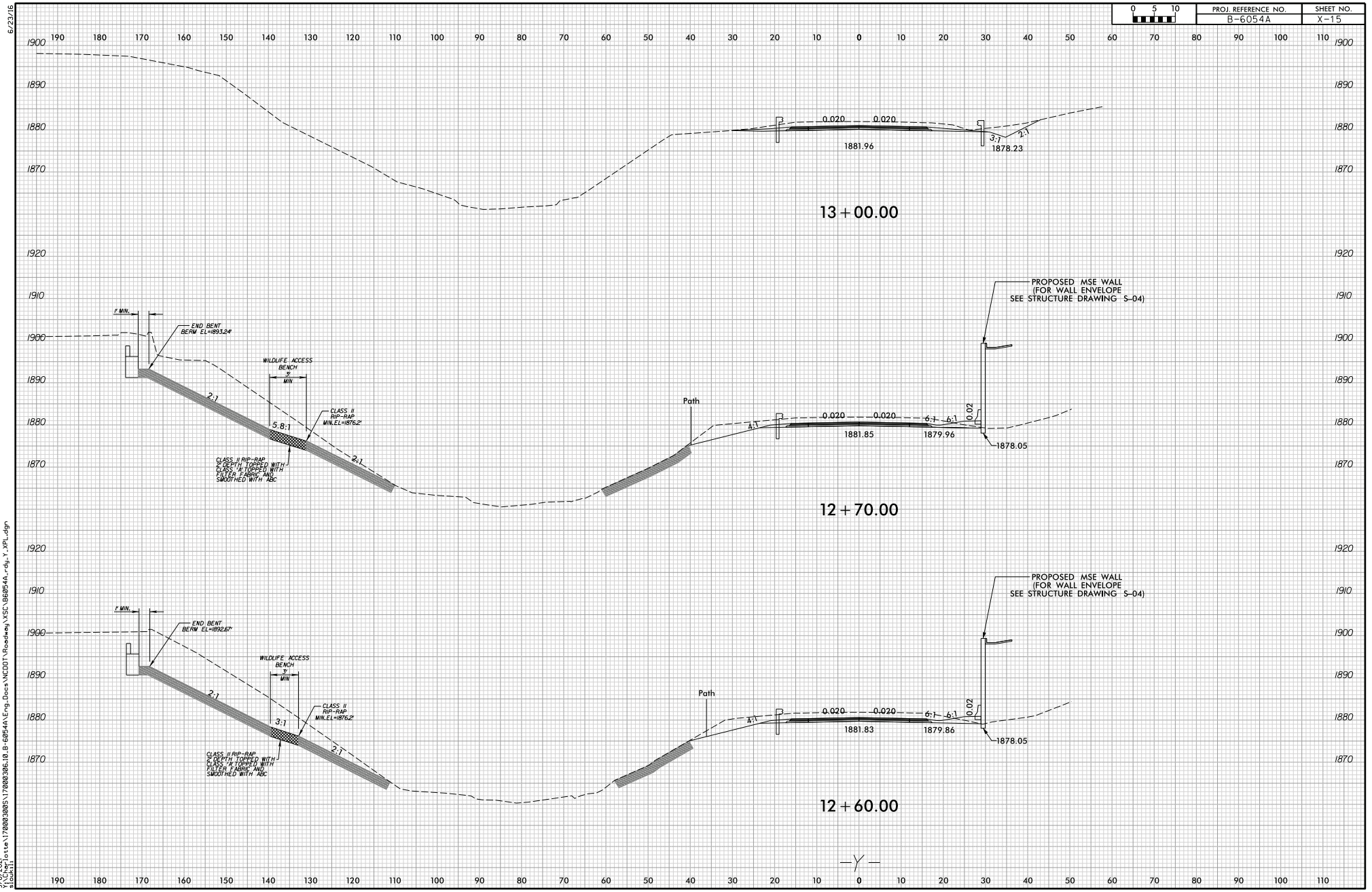

6/23/16
9/8/2021
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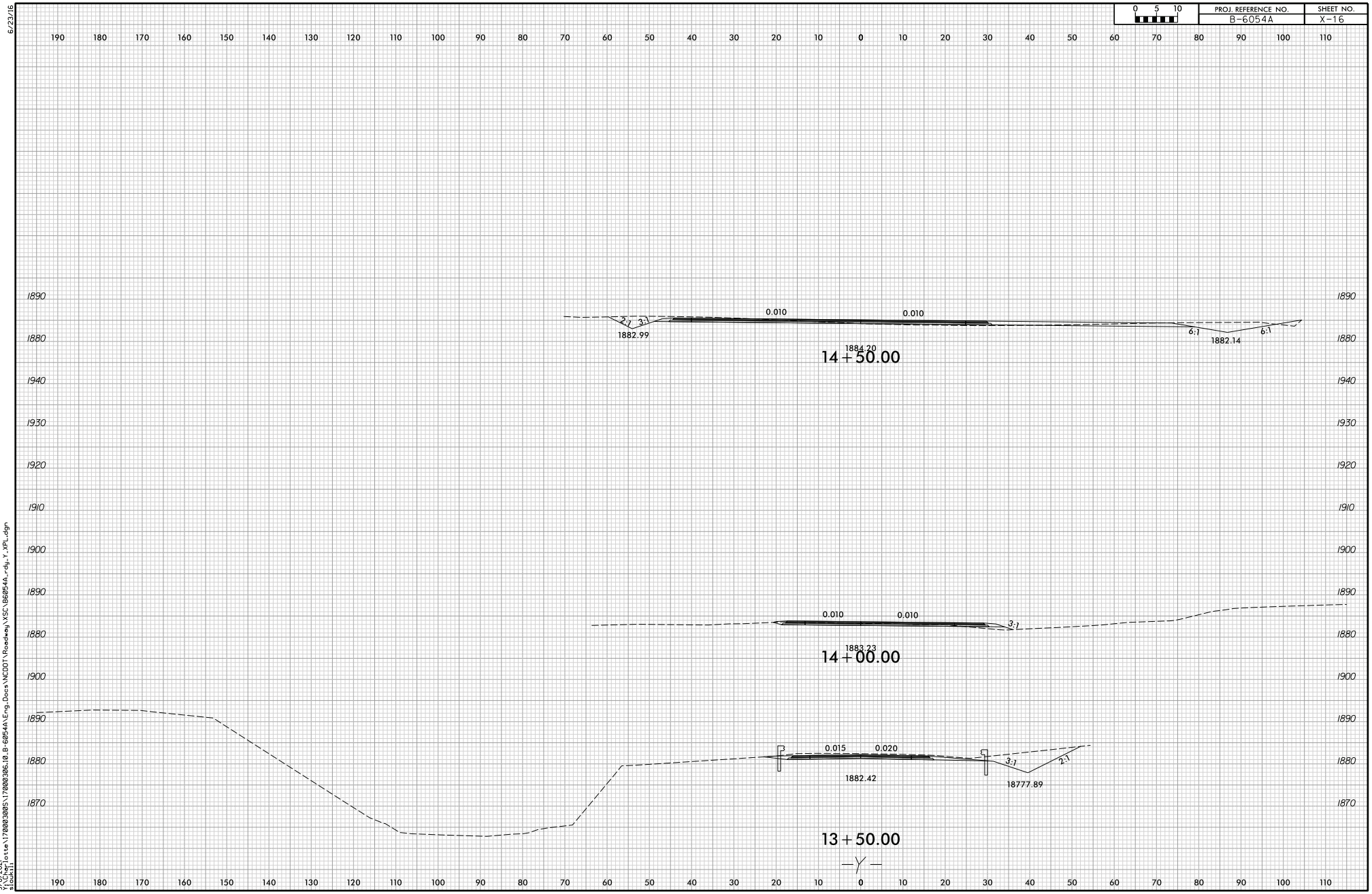

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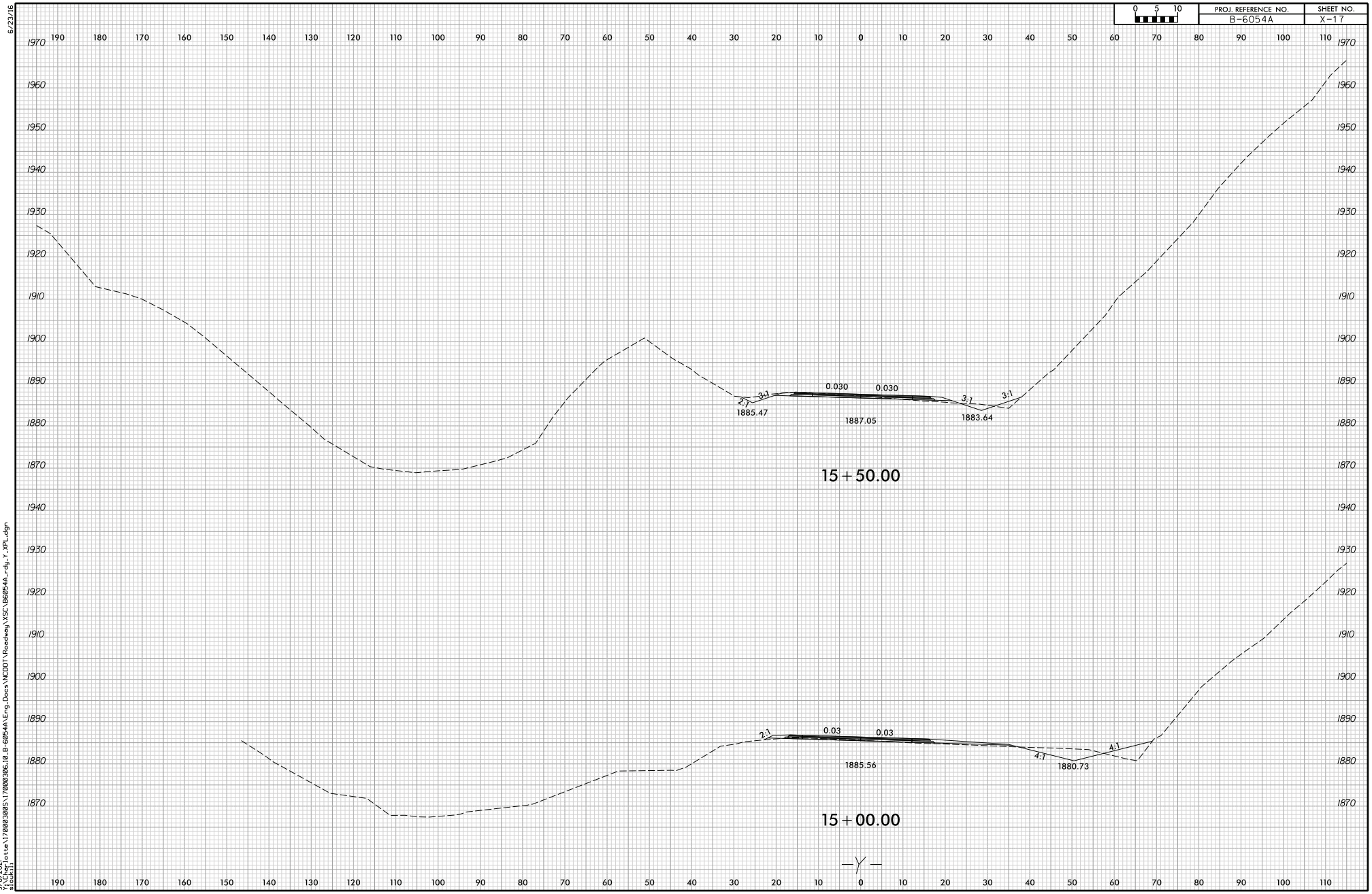
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PROJ. REFERENCE NO.
B-6054A
SHEET NO.
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3:1
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1887.05
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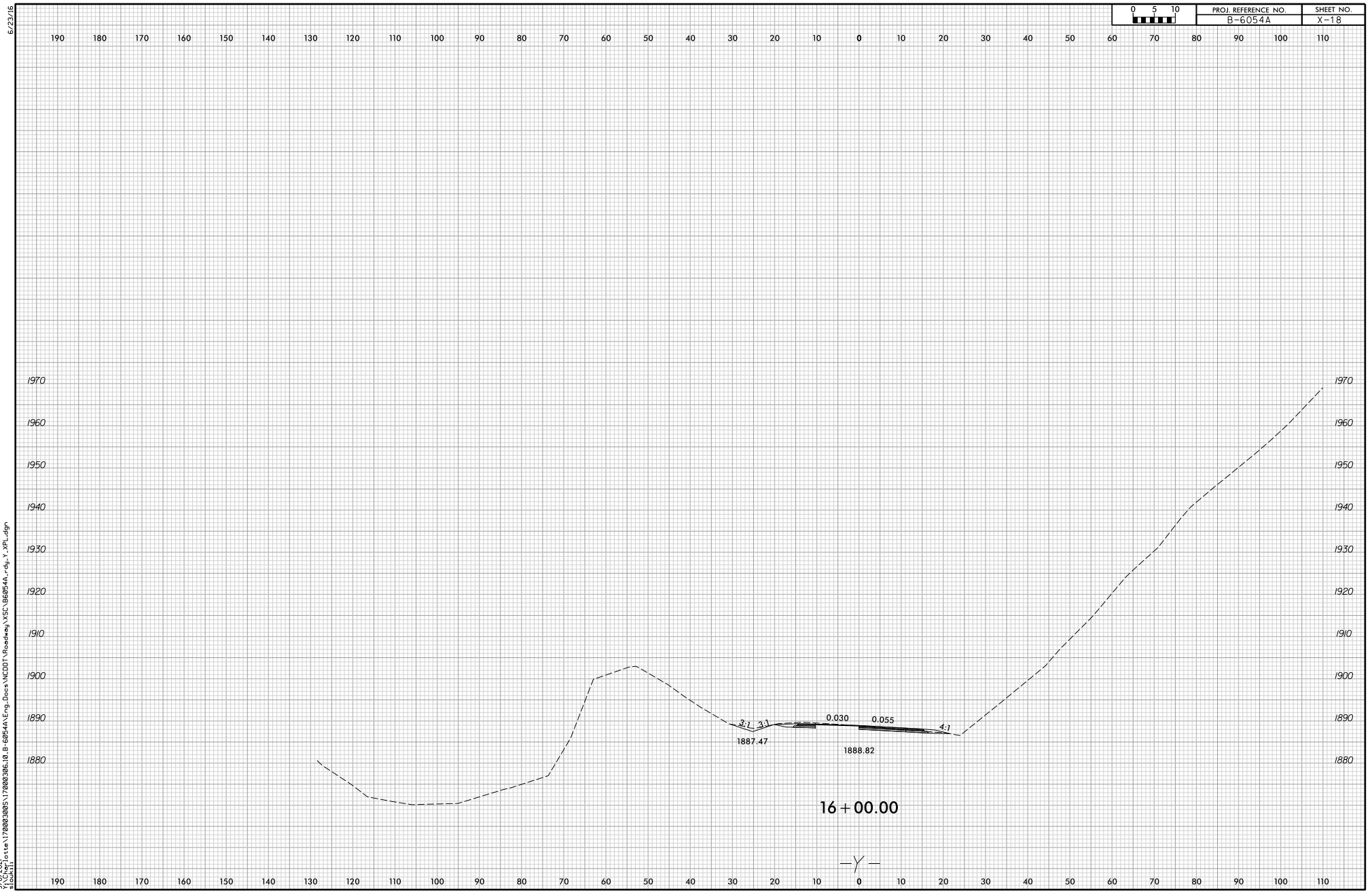
—Y—



6/23/16
9/8/2021
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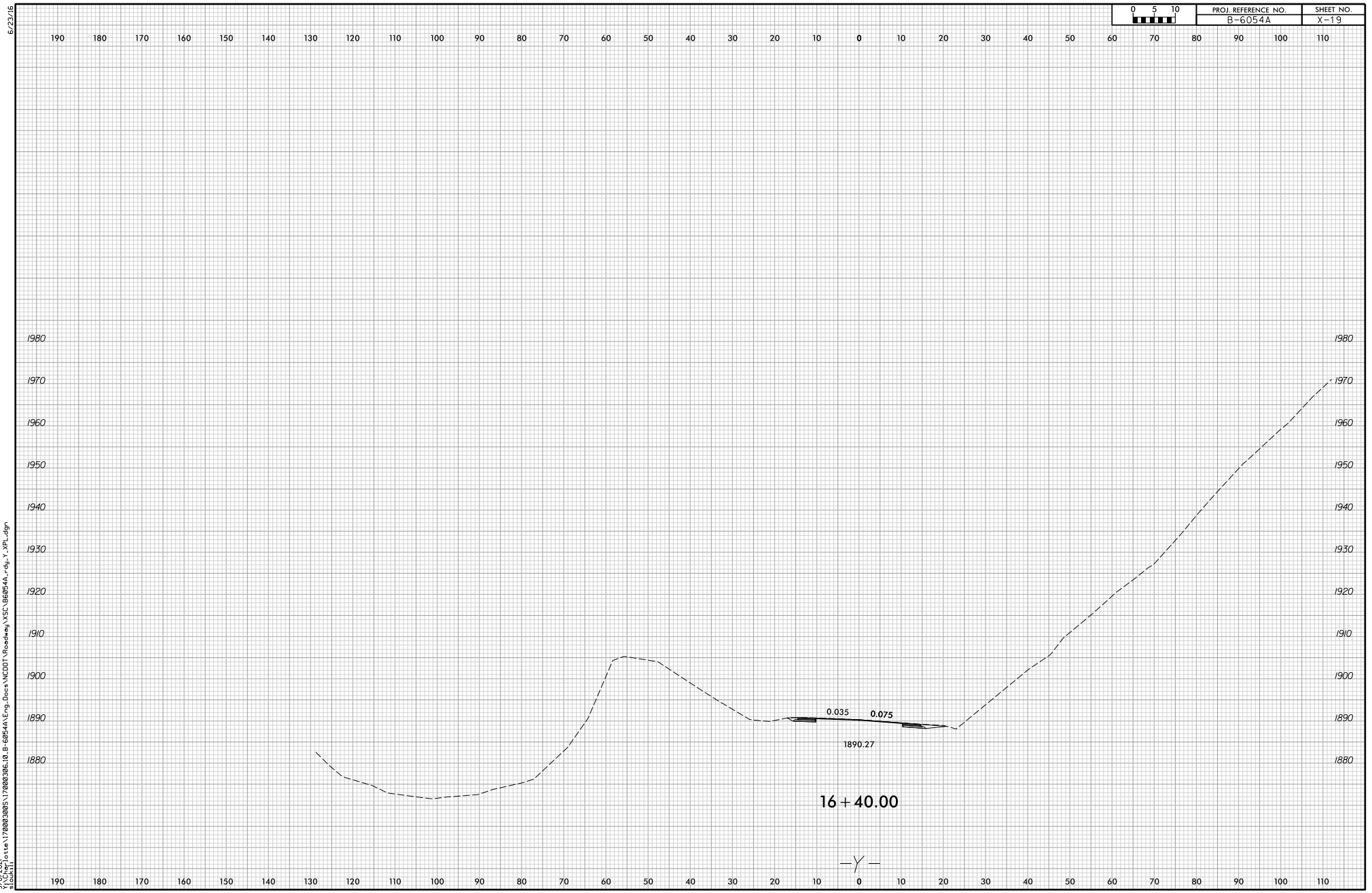

6/23/16

9/8/2021
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slouk11

PROJ. REFERENCE NO.	SHEET NO.
B-6054A	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NOTE: EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT

CROSS-SECTION SUMMARY

Station	Uncl. Exc.	Embt
L	(cu. yd.)	(cu. yd.)
25+50.00	0	0
26+00.00	23	98
26+50.00	11	121
27+00.00	11	69
27+50.00	11	169
28+00.00	10	439
28+50.00	5	865
29+00.00	0	752
31+00.00	0	285
31+50.00	4	1873
32+00.00	9	1385
32+50.00	11	765
33+00.00	14	313
33+50.00	15	60
34+00.00	36	24
34+50.00	41	250
35+00.00	28	445
35+50.00	40	359
36+00.00	34	281

Station	Uncl. Exc.	Embt
Y	(cu. yd.)	(cu. yd.)
10+50.00	0	0
11+00.00	166	25
11+50.00	206	0
11+60.00	37	0
11+70.00	37	0
11+80.00	38	0
11+90.00	39	0
12+10.00	80	0
12+20.00	30	6
12+30.00	31	6
12+40.00	44	0
12+50.00	46	0
12+60.00	48	0
12+70.00	49	0
13+00.00	135	0
13+50.00	205	0
14+00.00	122	5
14+50.00	115	14
15+00.00	127	36
15+50.00	57	35
16+00.00	50	8
16+40.00	29	0

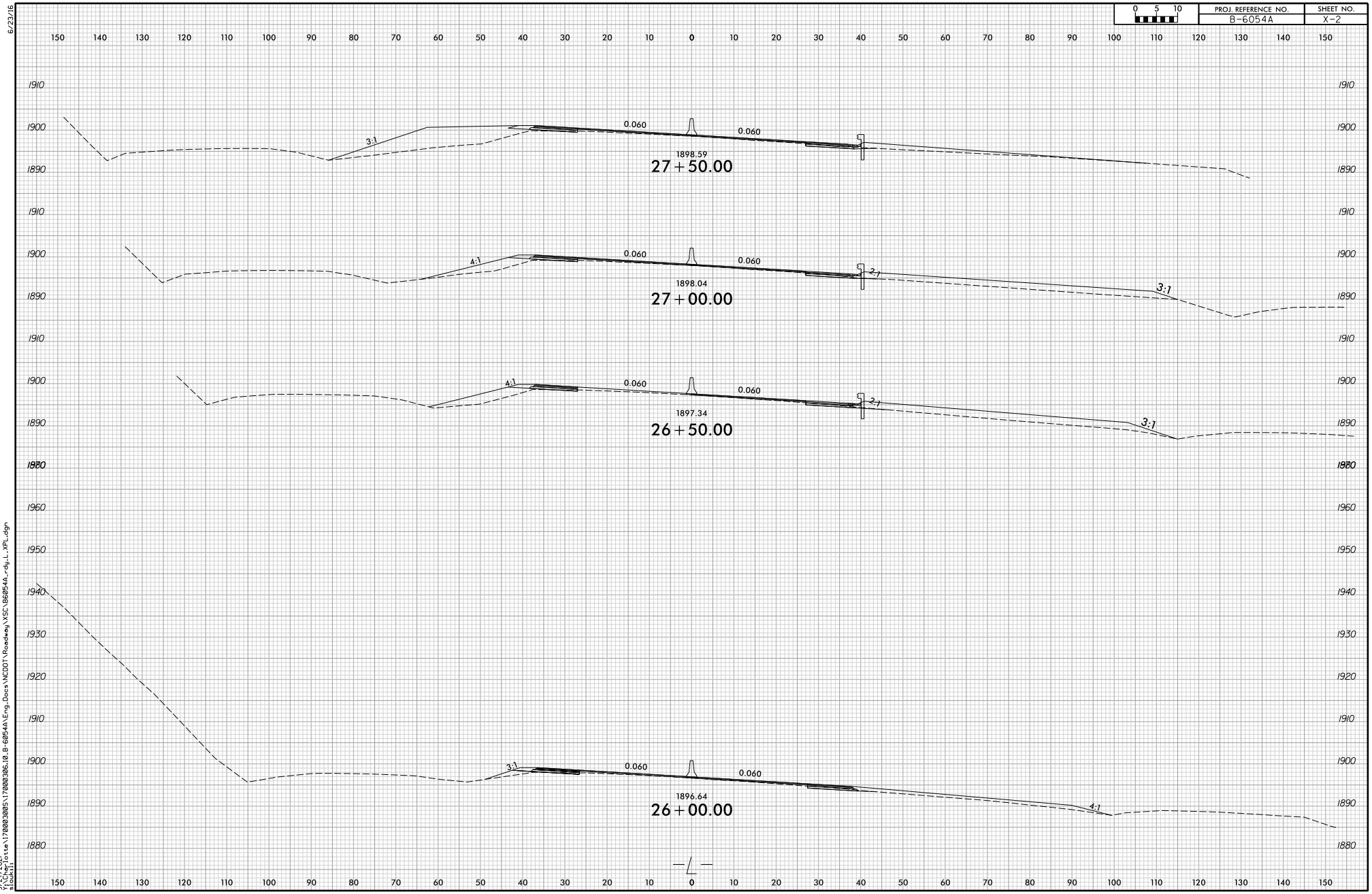
Station	Uncl. Exc.	Embt
Y1	(cu. yd.)	(cu. yd.)
11+50.00	0	0
12+00.00	14	3

Station	Uncl. Exc.	Embt
Rpba	(cu. yd.)	(cu. yd.)
18+00.00	0	0
18+50.00	6	8
19+50.00	7	102
20+00.00	70	85
20+50.00	101	51
21+00.00	51	9
21+50.00	42	0
22+00.00	50	5
22+50.00	50	8
23+00.00	21	4
23+50.00	0	0
24+00.00	0	0

Station	Uncl. Exc.	Embt
Rpcd	(cu. yd.)	(cu. yd.)
19+00.00	0	0
19+50.00	52	30

Quantities are approximate only. The Resident Engineer will recross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid.

Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing



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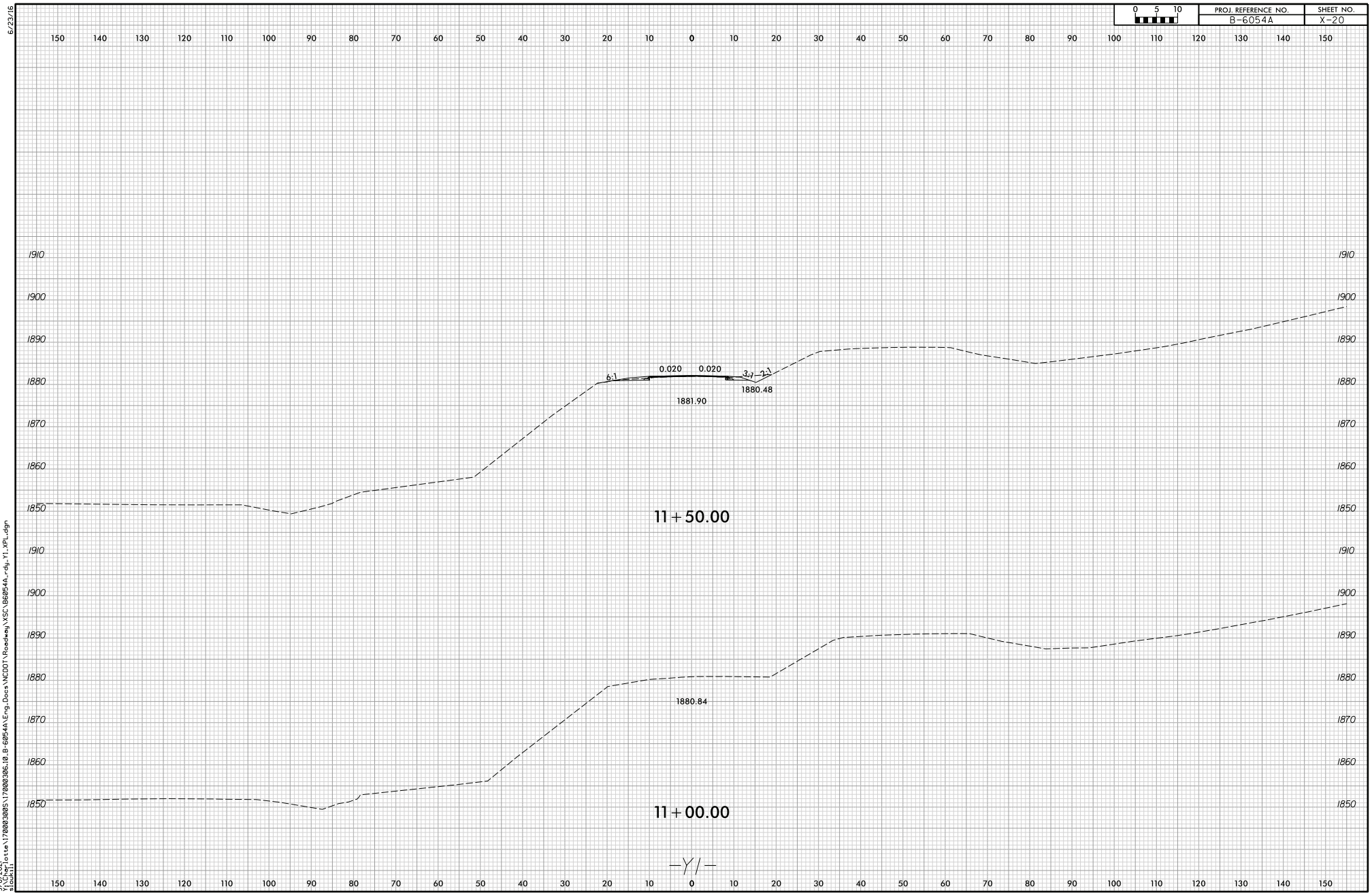

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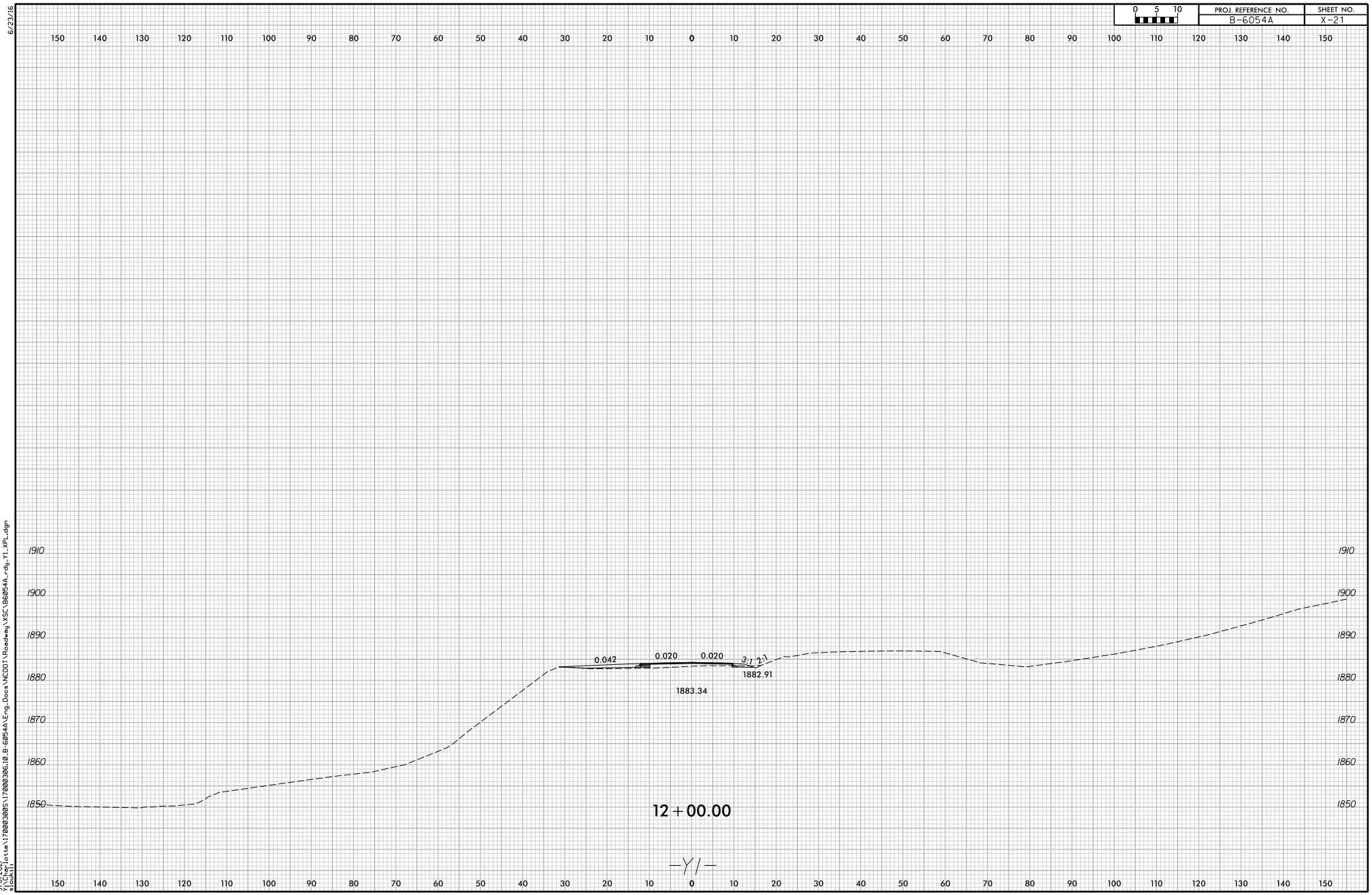

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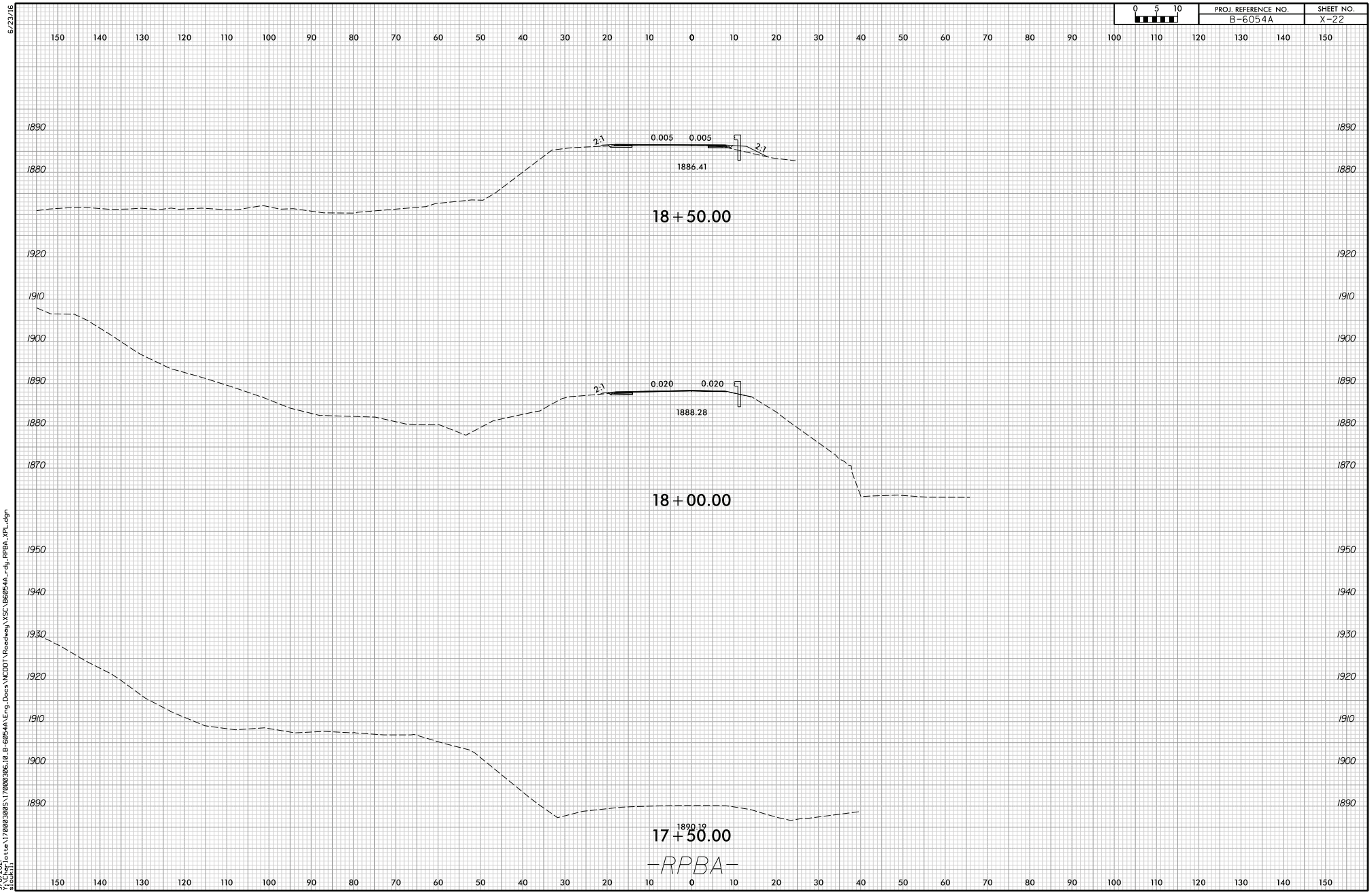

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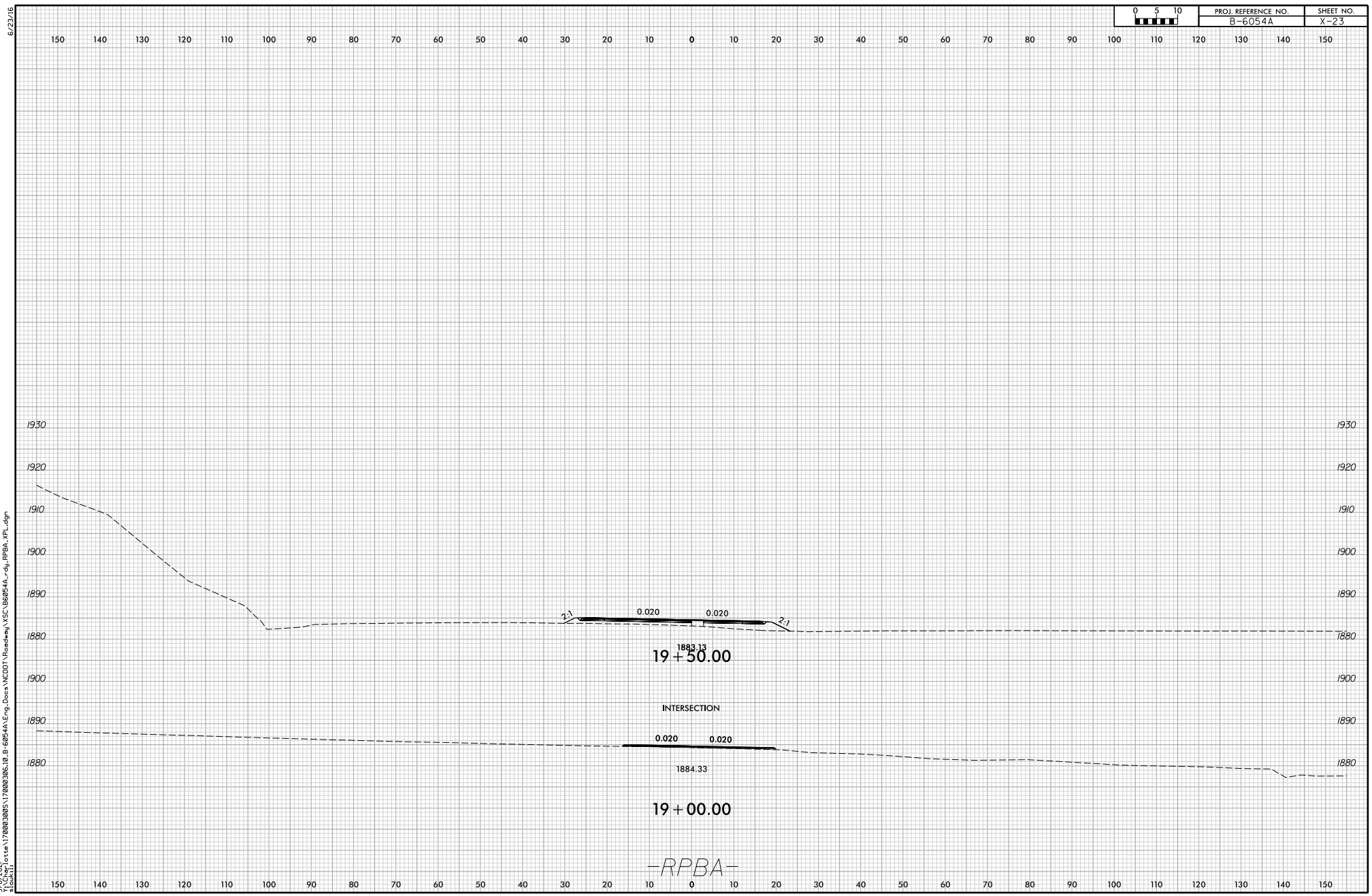

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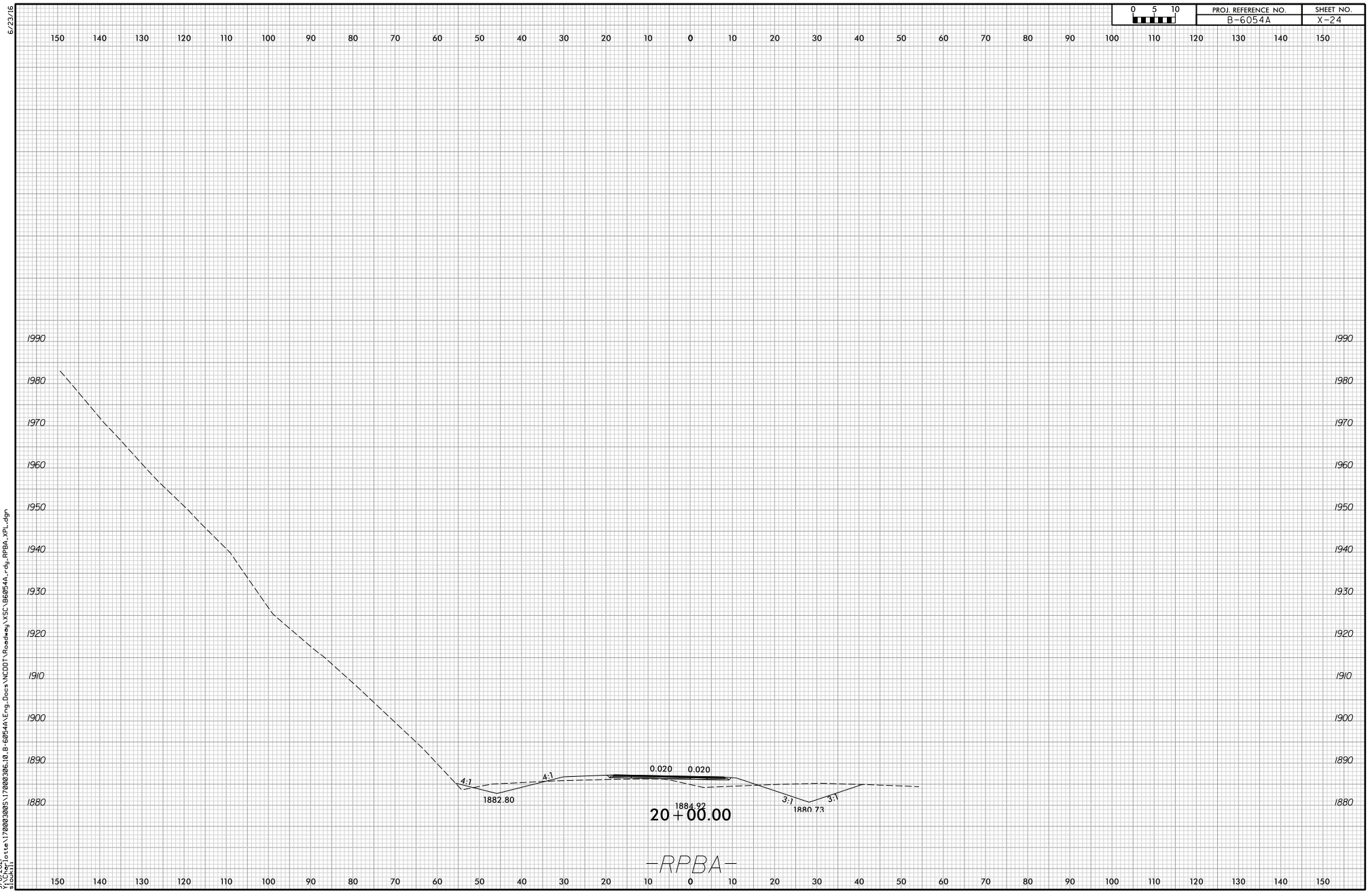

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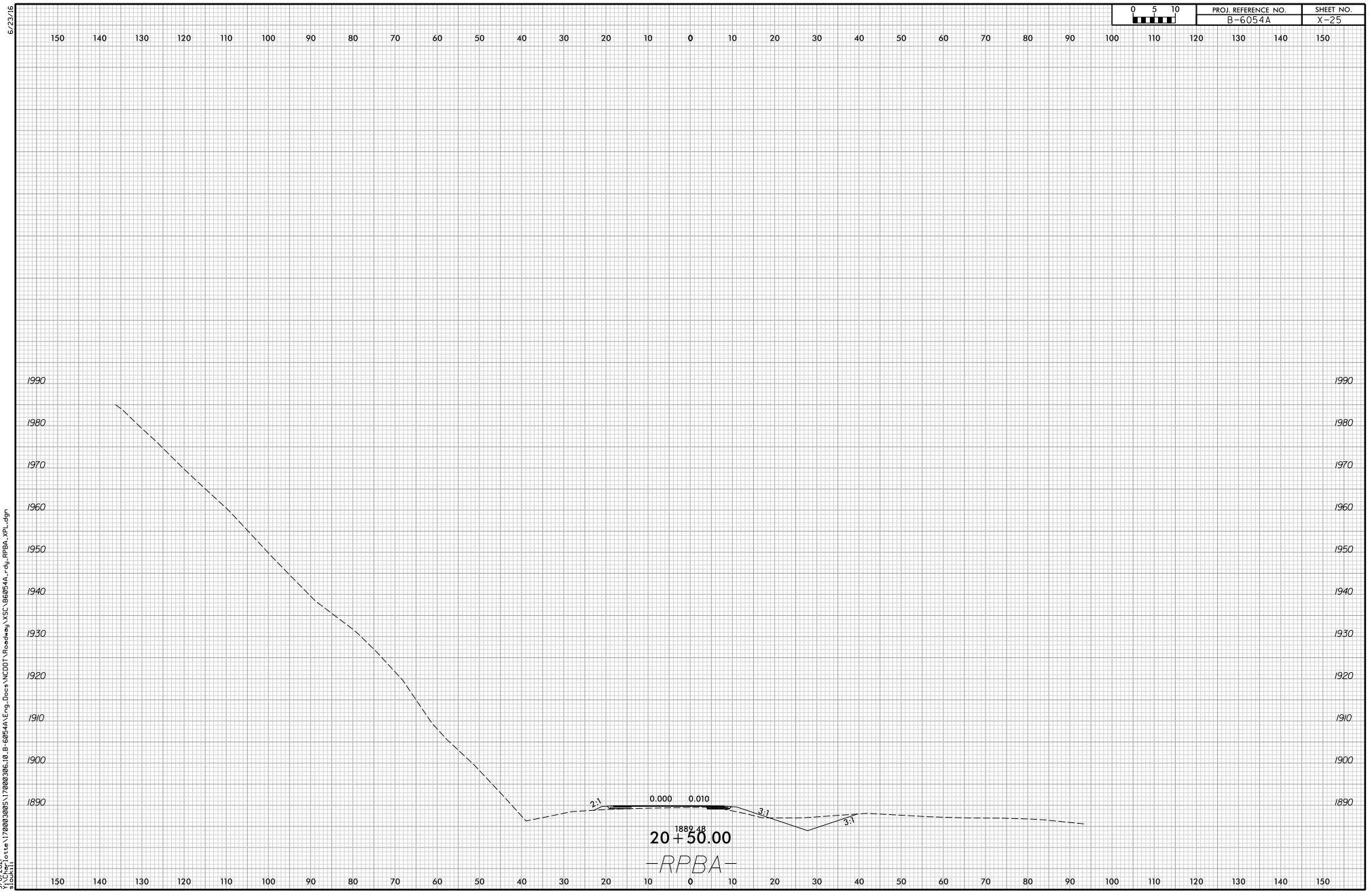

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6/23/16

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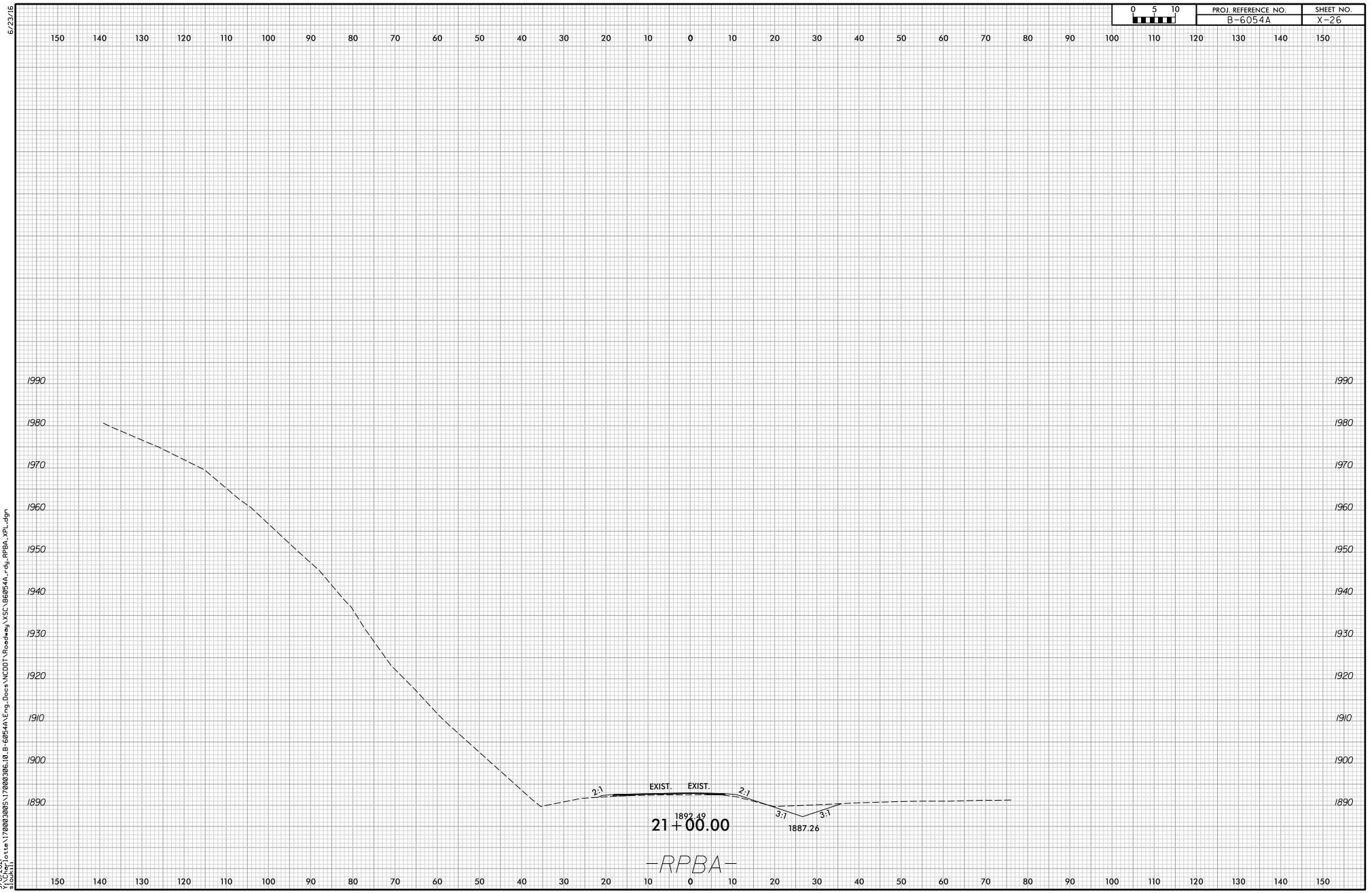

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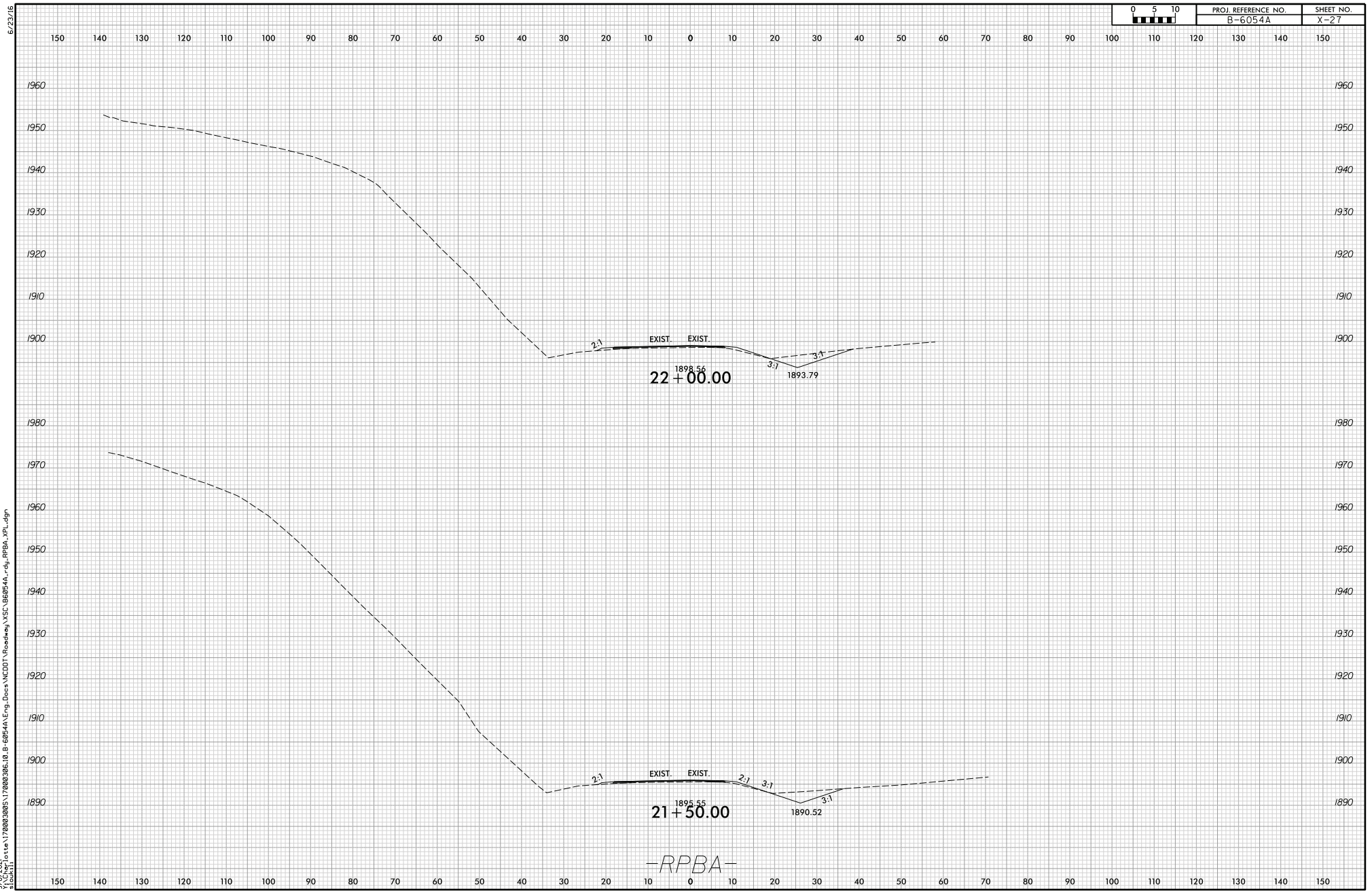

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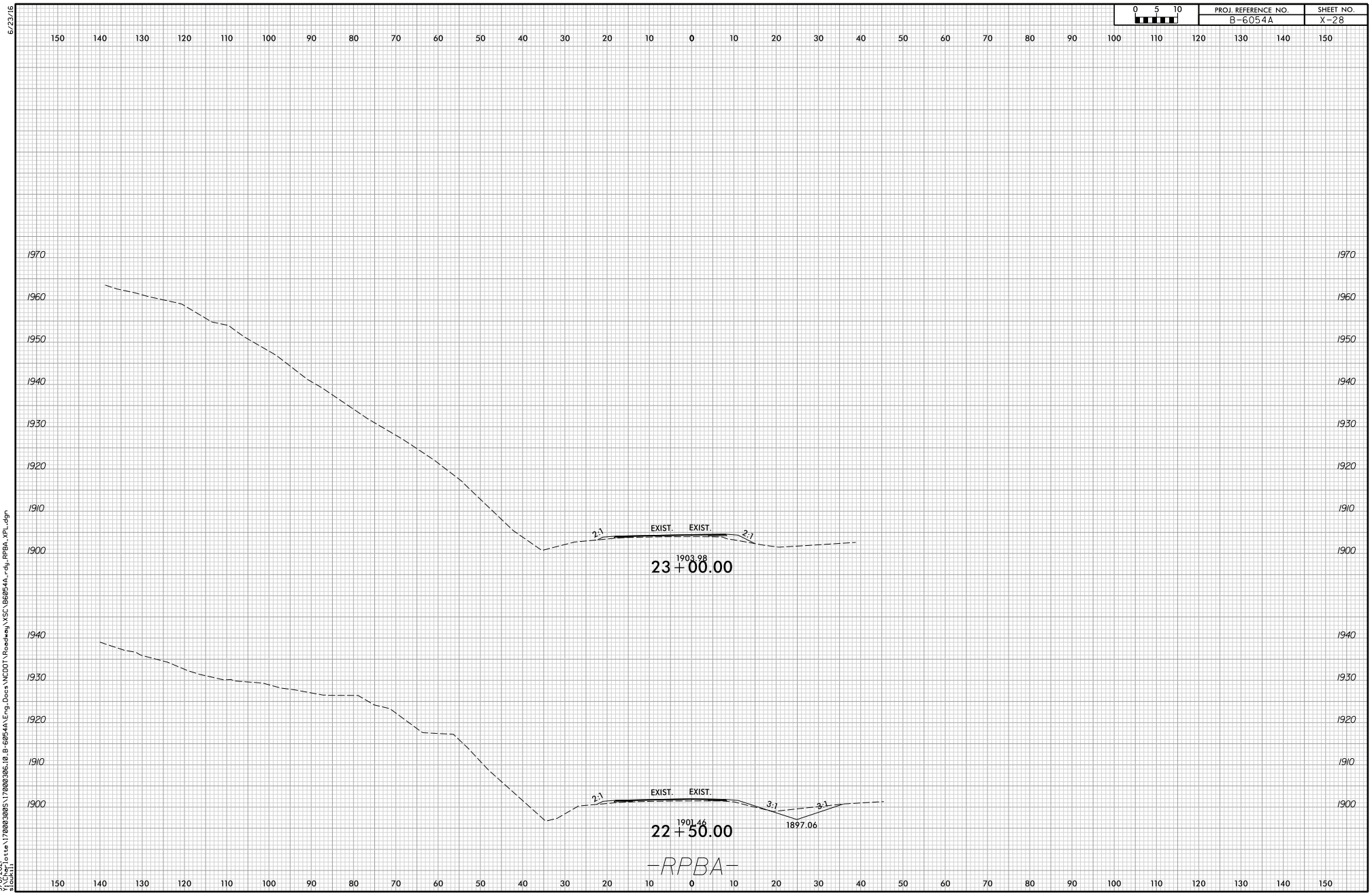

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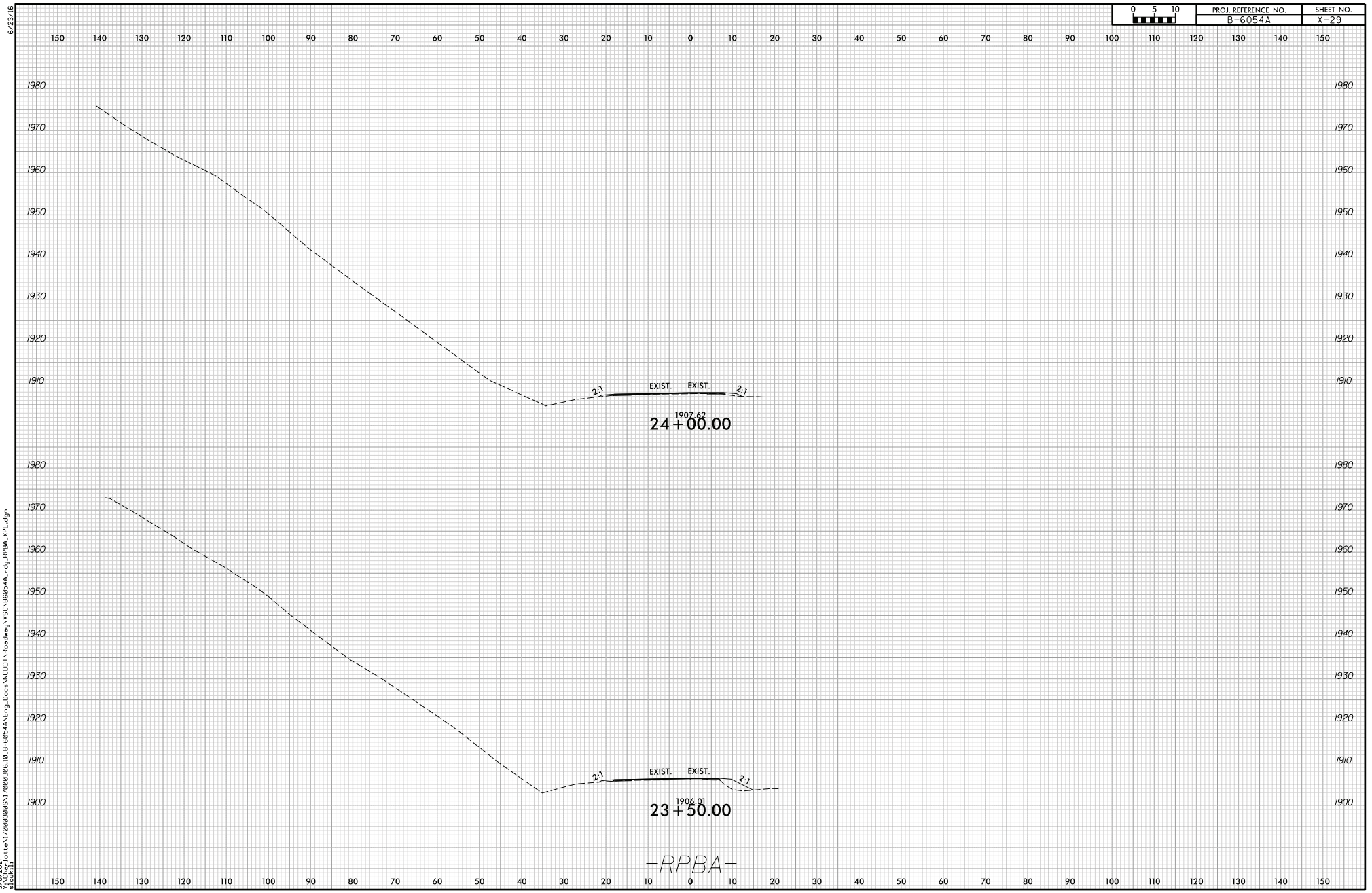

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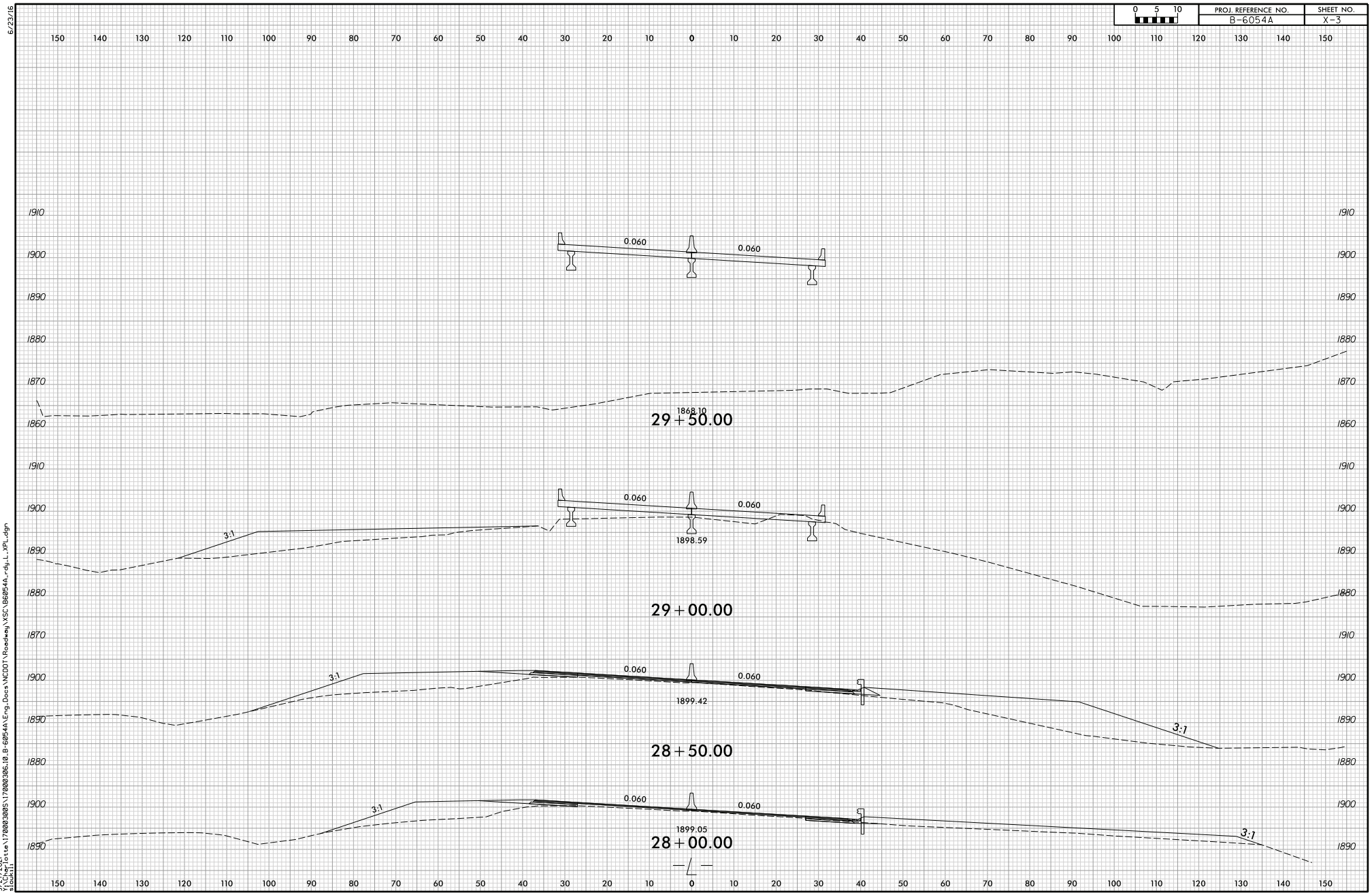

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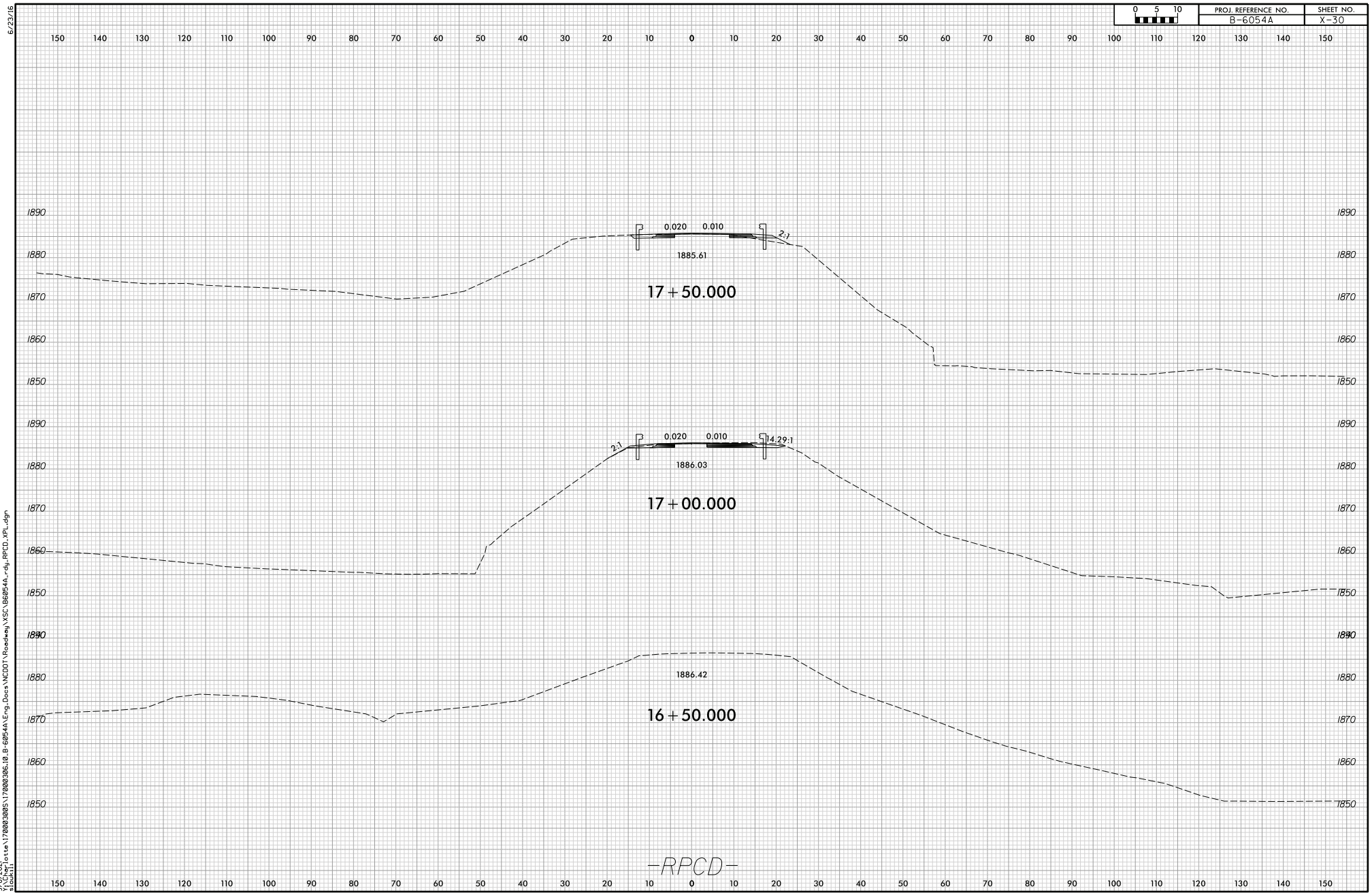
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B-6054A
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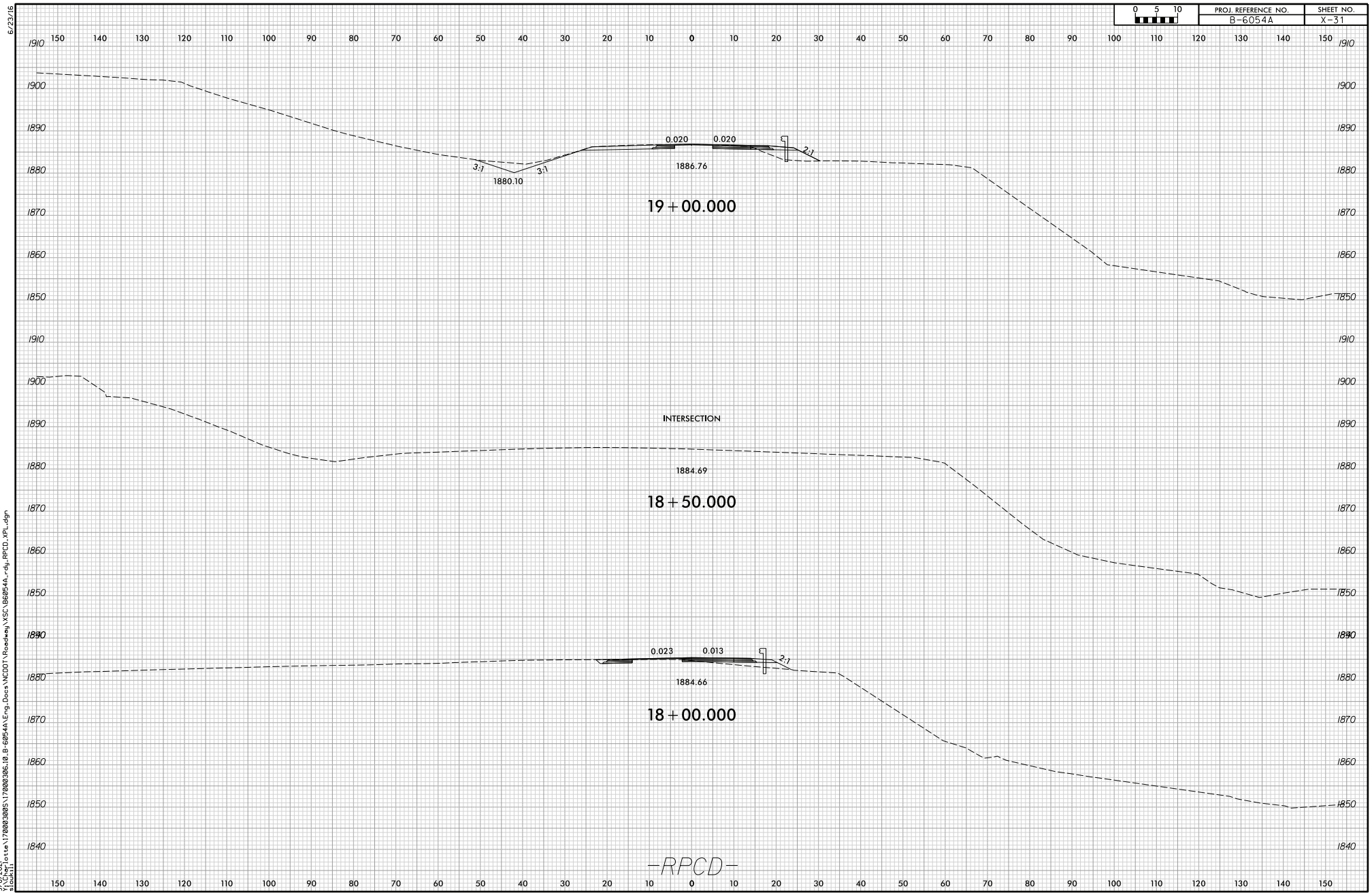
-RPCD-



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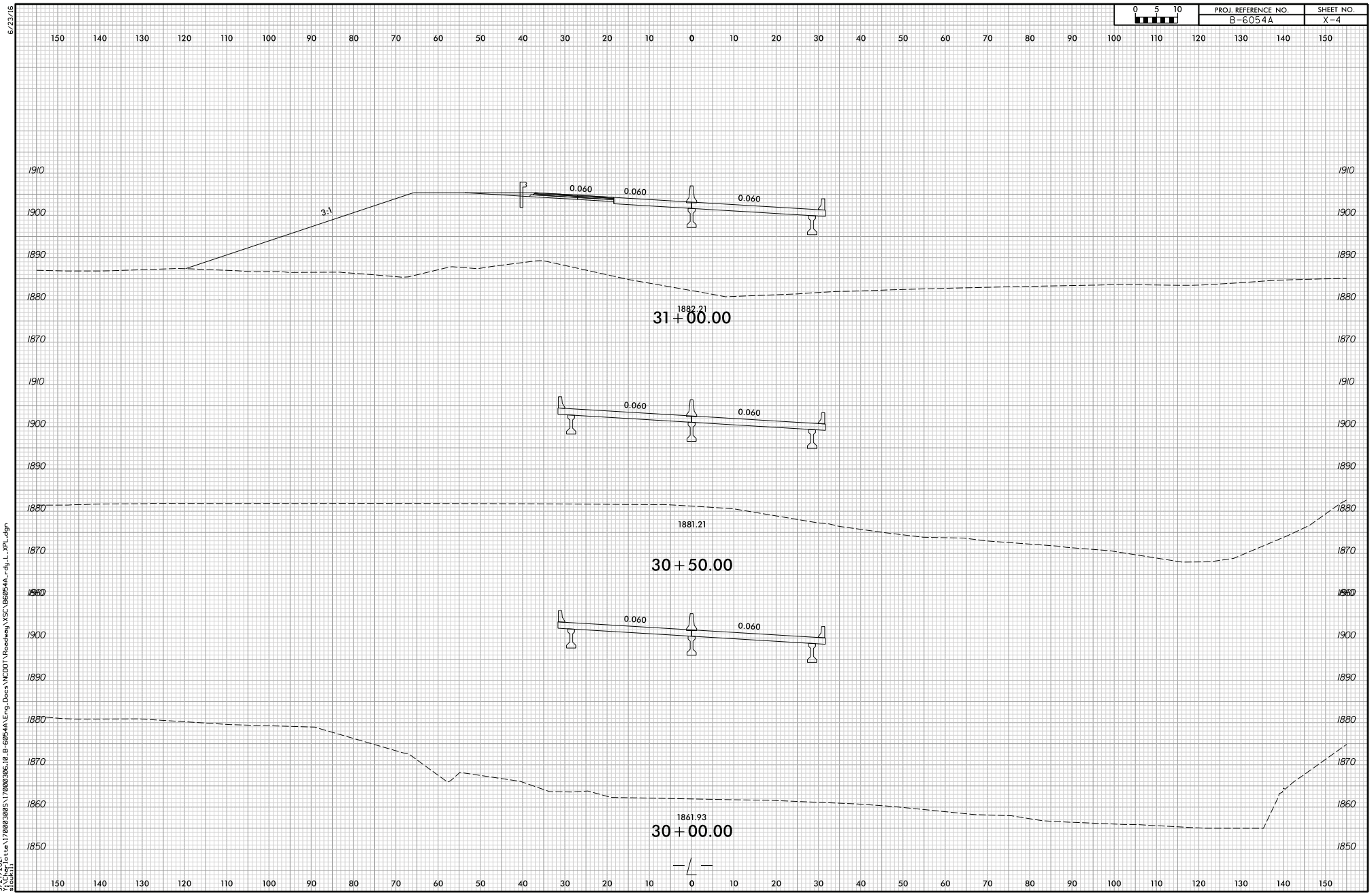

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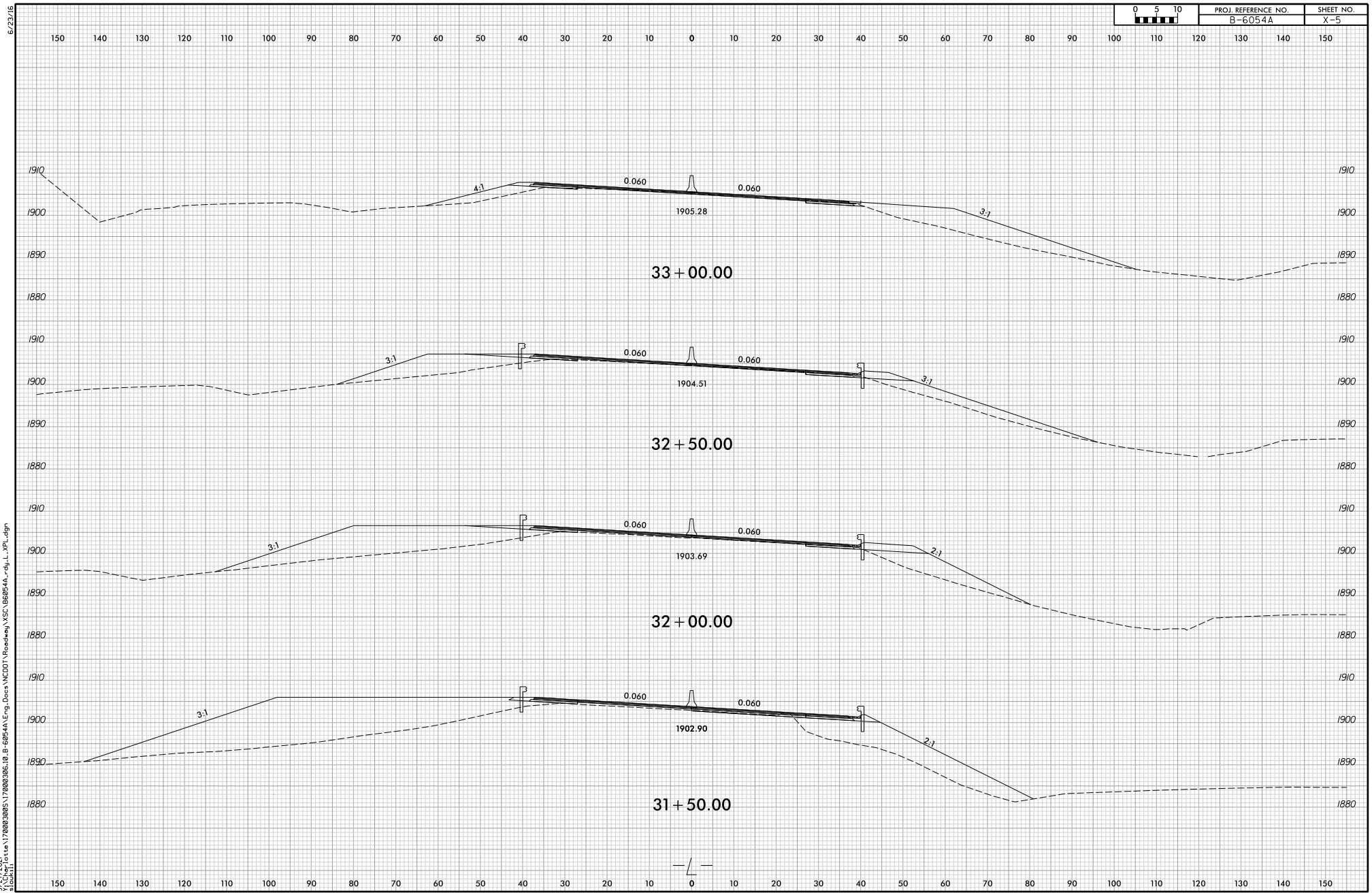

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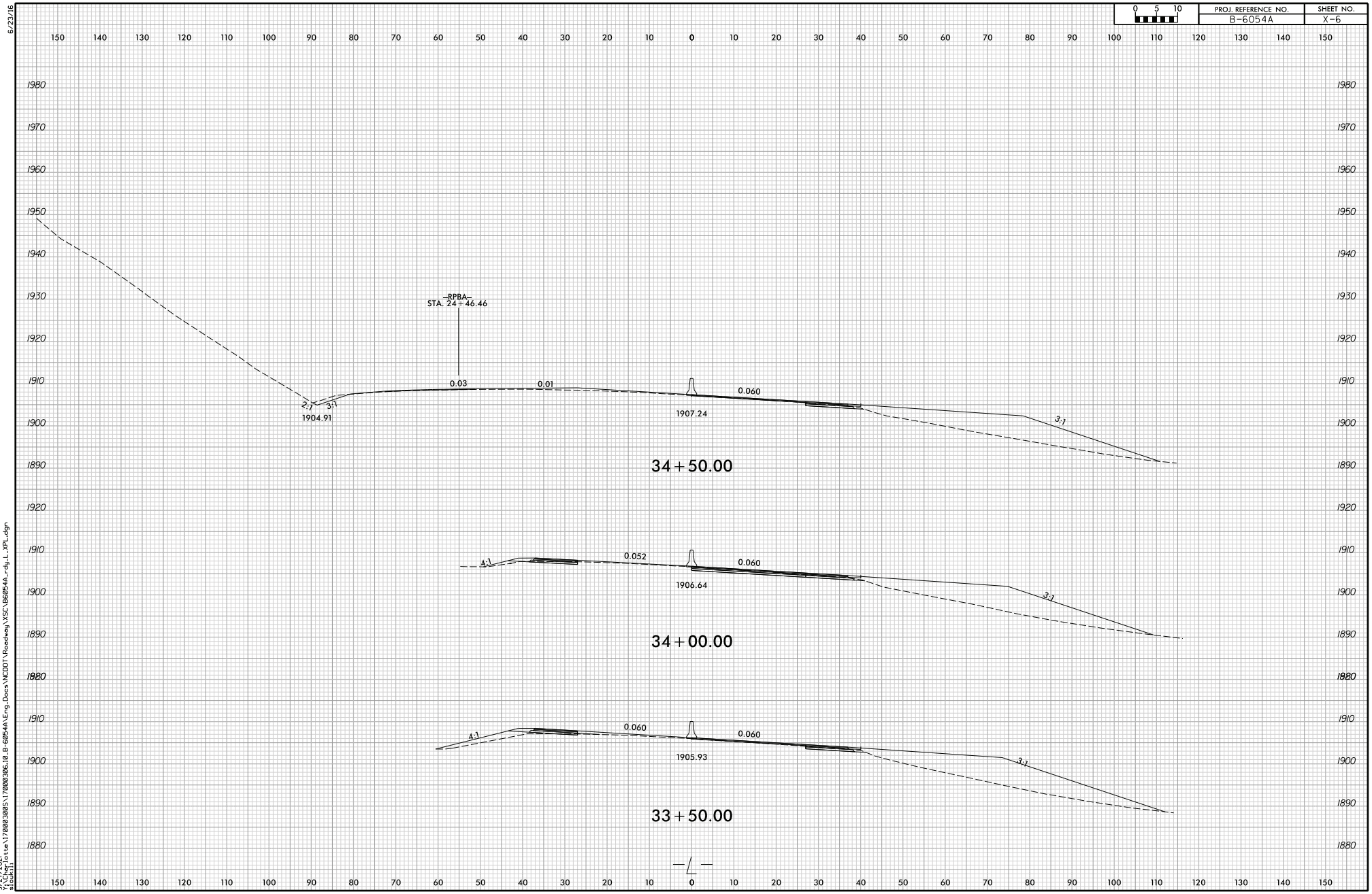

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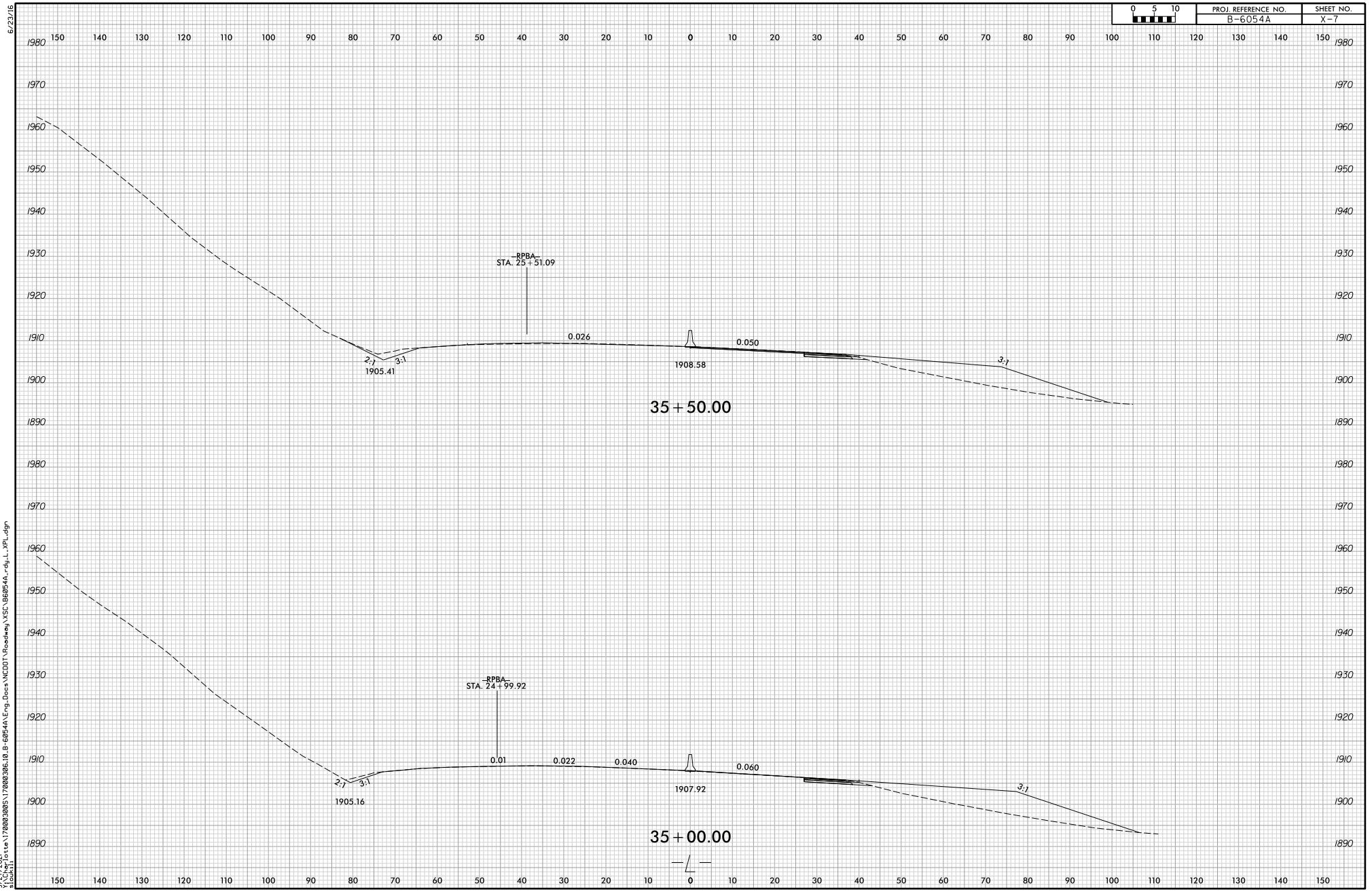

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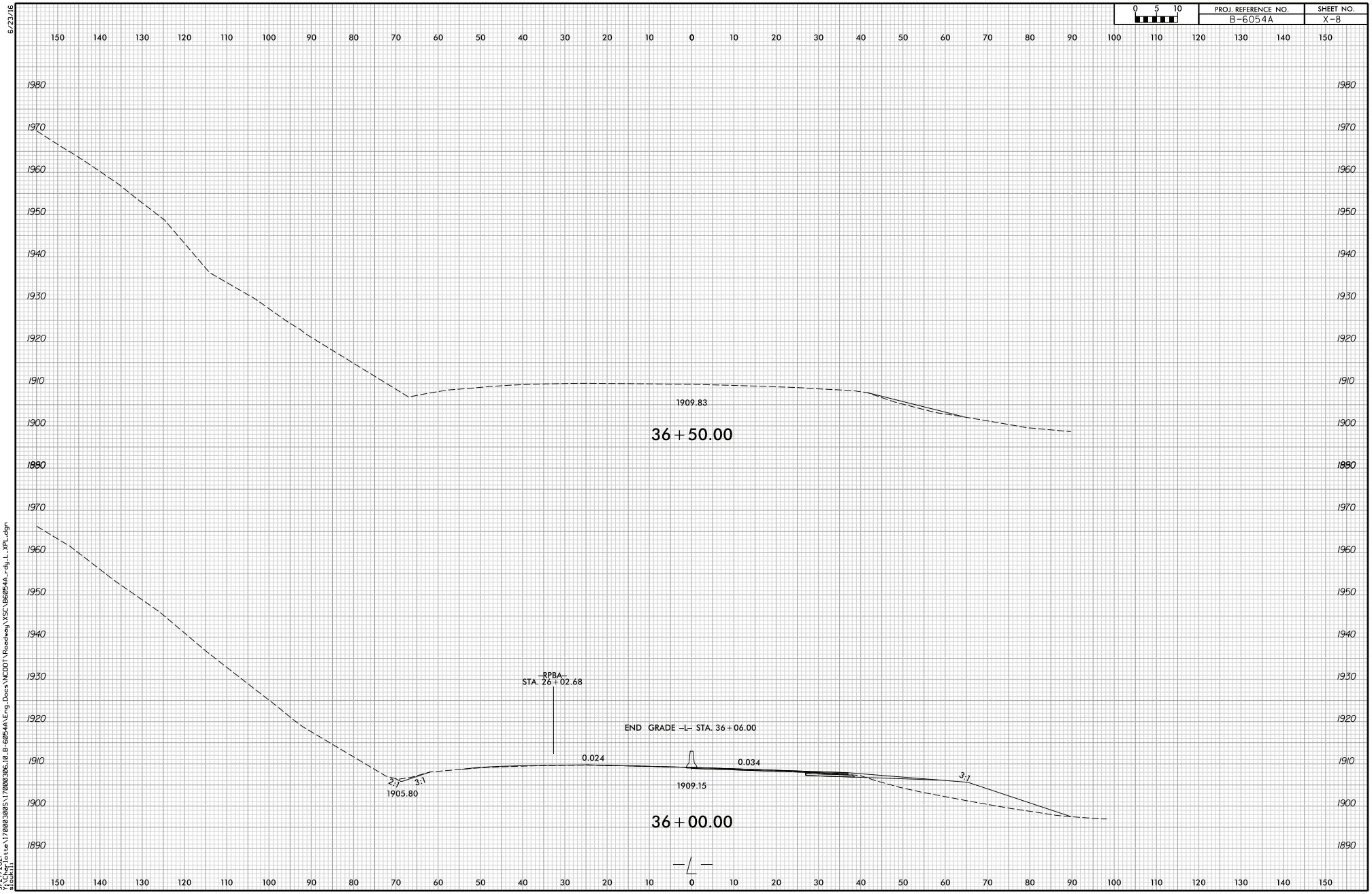

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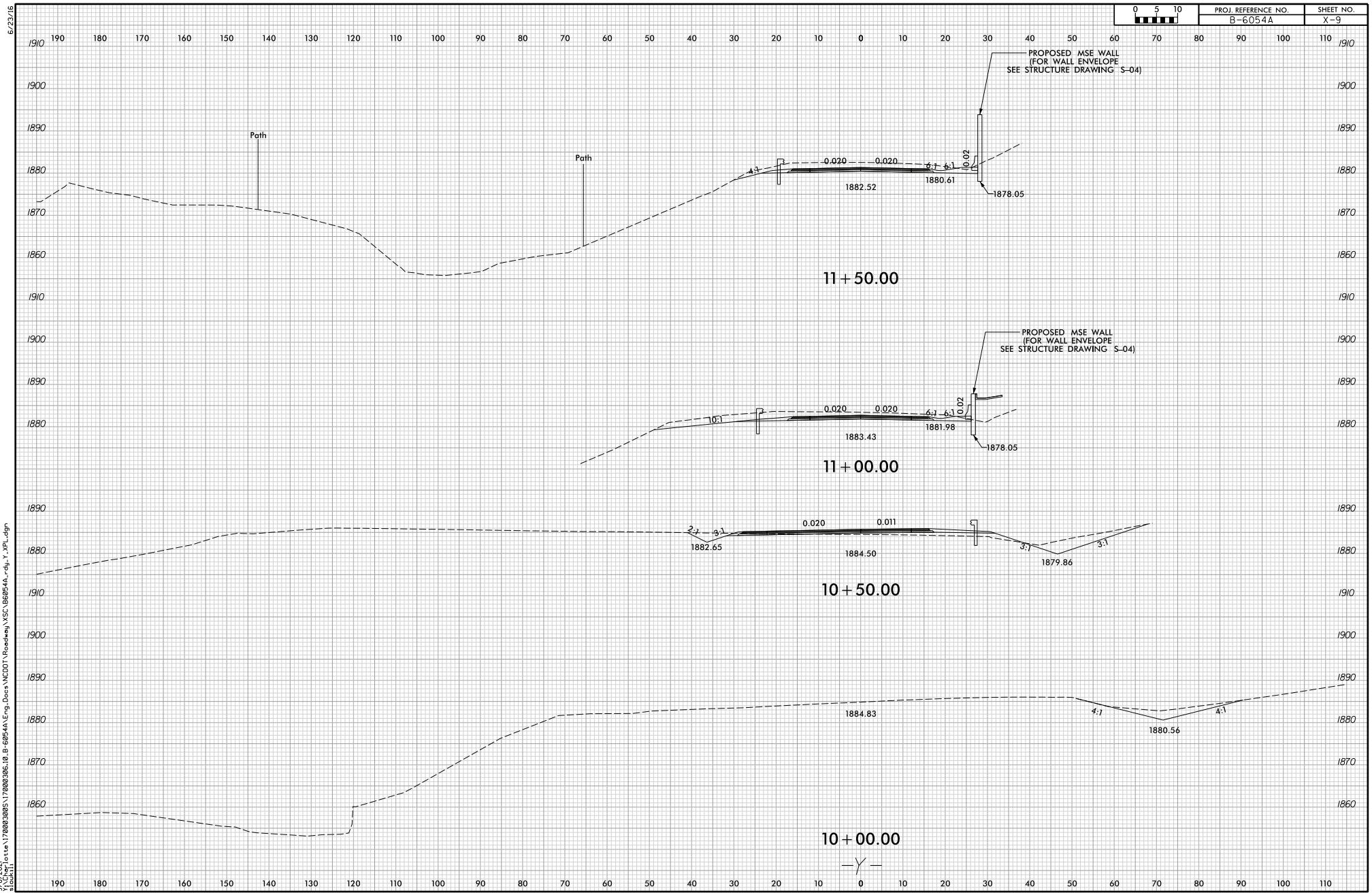

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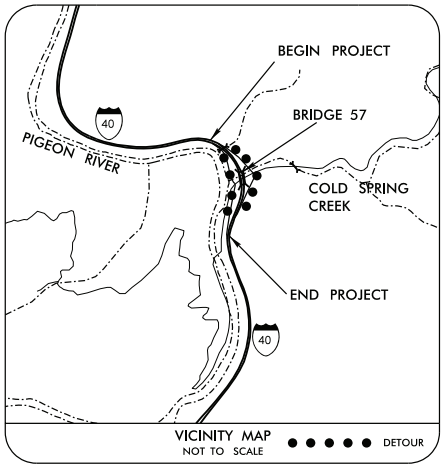
CONTRACT TIP PROJECT: B-6054A



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

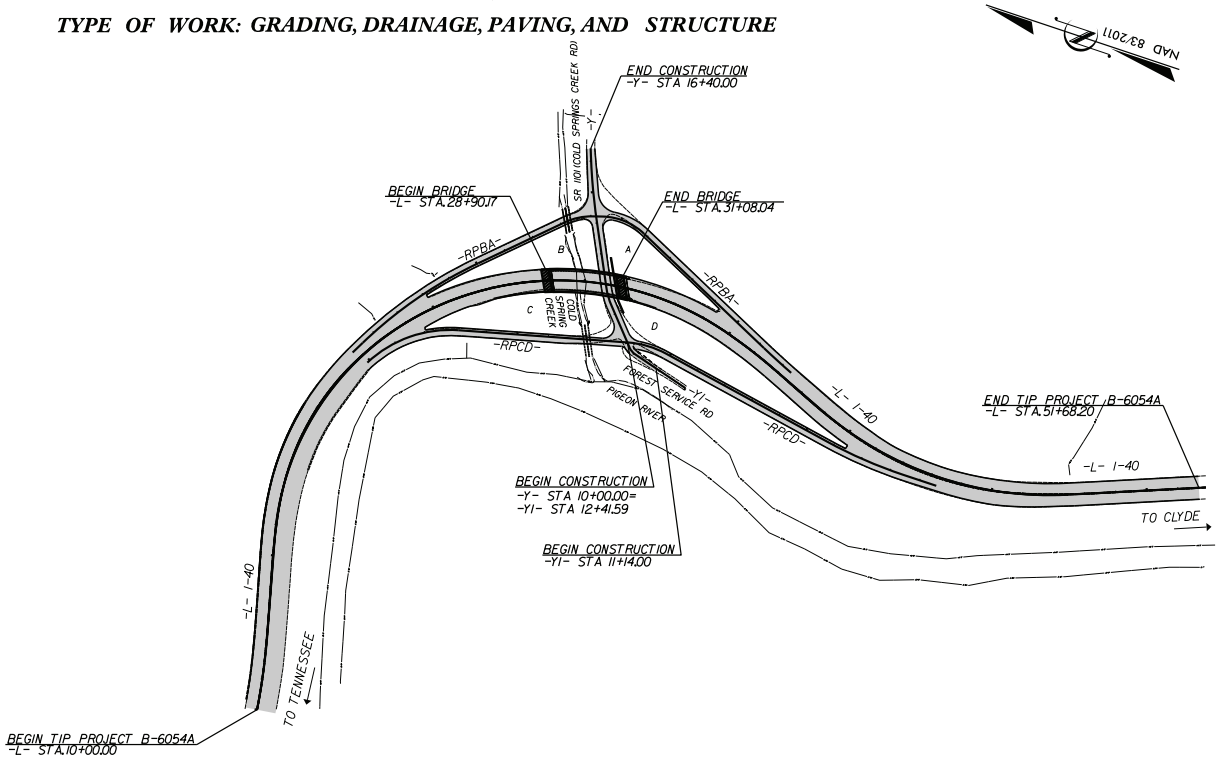
HAYWOOD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.		1A	53

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
49070.1.1		PE
49070.2.1		R/W & UTILITIES
49070.3.1		CONSTRUCTION

LOCATION: *BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, AND STRUCTURE*



STRUCTURES

DESIGN DATA

ADT 2018 = 28,500
K = 10 %
D = 55 %
T = 26 % *
V = 60 MPH
* TTST = 23 DUAL = 3
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-6054A	=	*0.749 MI*
LENGTH STRUCTURE TIP PROJECT B-6054A	=	*0.041 MI*
TOTAL LENGTH TIP PROJECT B-6054A	=	*0.790 MI*

Prepared In the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

2018 STANDARD SPECIFICATIONS

LETTING DATE :

SEPTEMBER 2021

GREG A. STEWART, PE
PROJECT ENGINEER

ALEXANDER FORFA , PE
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA * DEPARTMENT OF TRANSPORTATION *

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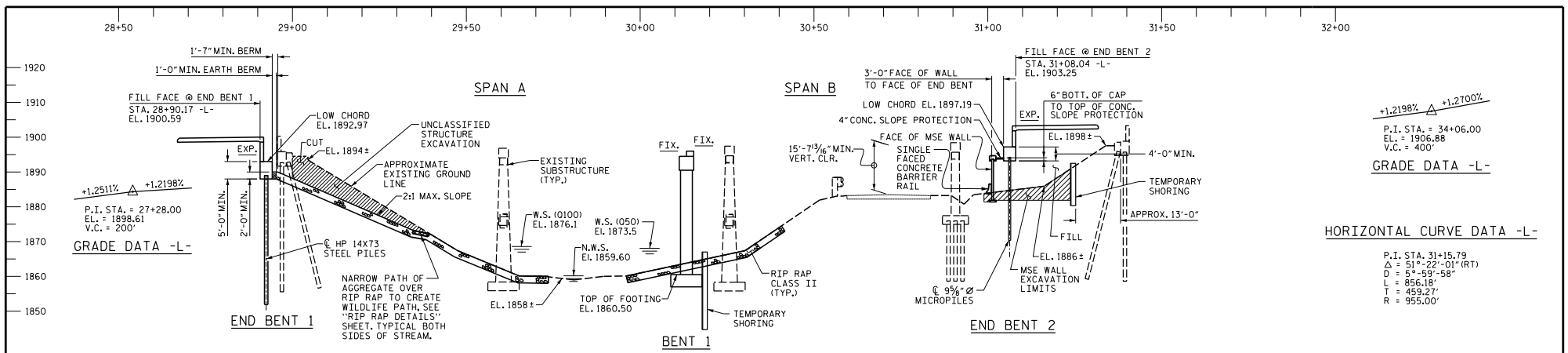
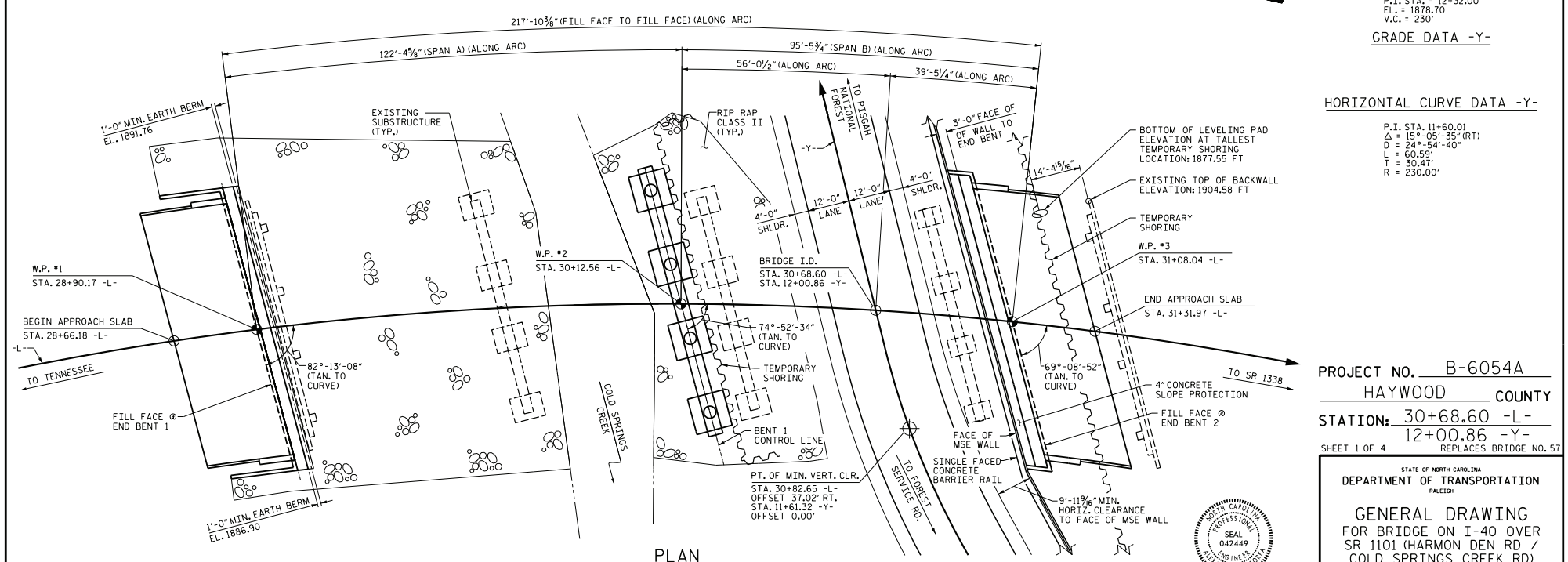


SECTION ALONG -L-

(SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)



PLAN

(PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-
12+00.86 -Y-

SHEET 1 OF 4 REPLACES BRIDGE NO. 57

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-01
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 02/2020
CHECKED BY : A. FORFA DATE : 12/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

9/22/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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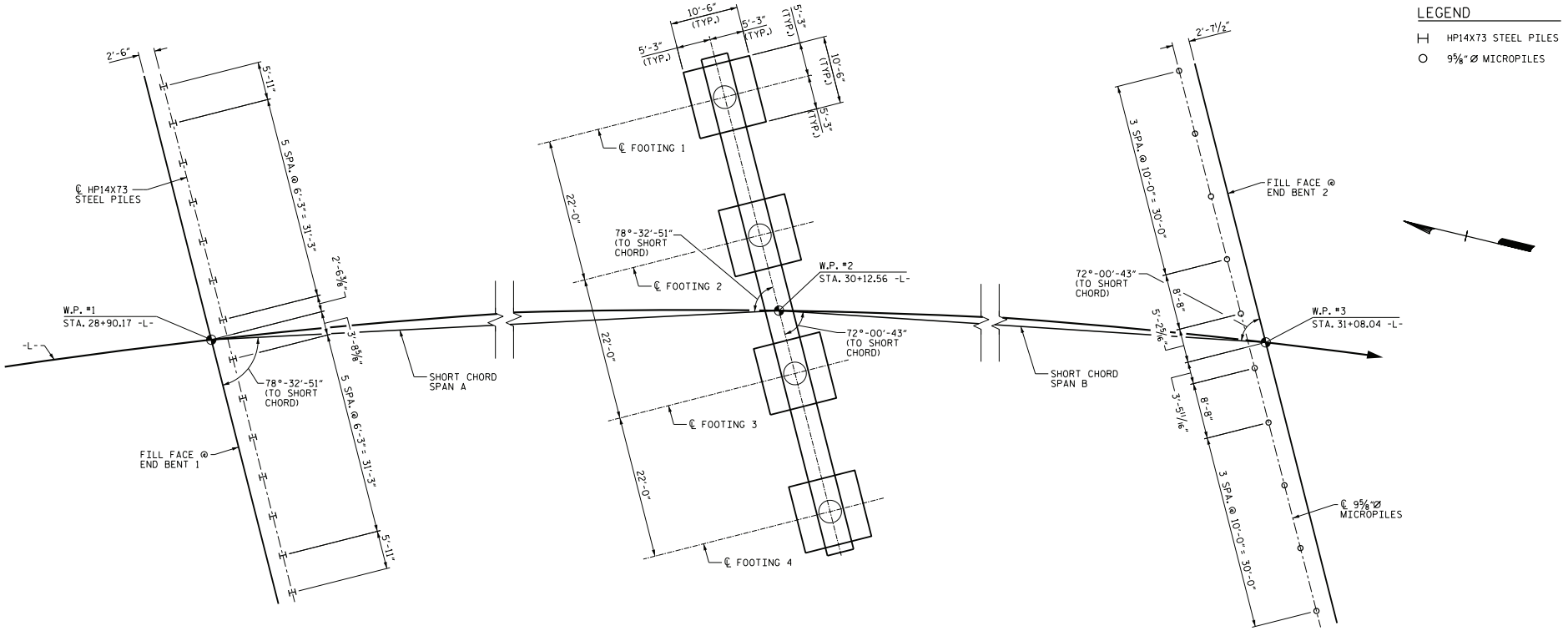

FOUNDATION LAYOUT

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO ℄ BENTS AND FILL FACES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE BENT AND END BENT DETAILS.

ALL PILE DIMENSIONS ARE TO ℄ OF PILES.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 145 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 245 TONS PER PILE.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

THE SPREAD FOOTINGS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 15 TSF. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE OF 34 TSF JUST BEFORE PLACING CONCRETE.

FOR MICROPILES, SEE MICROPILES PROVISION.

DESIGN BOND LENGTH FOR MICROPILES AT END BENT NO. 2 FOR A FACTORED RESISTANCE OF 330 TONS PER PILE. THIS INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

INSTALL REINFORCING CASINGS FOR MICROPILES AT END BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN 10 FEET BELOW THE TOP OF THE MSE RETAINING WALL LEVELING PAD.

ONE DEMONSTRATION MICROPILE IS REQUIRED AT END BENT NO. 2.

ONE VERIFICATION LOAD TEST IS REQUIRED FOR THE DEMONSTRATION MICROPILE AT END BENT NO. 2. LOAD TEST PILES TO TEST LOADS EQUAL TO THE NOMINAL RESISTANCE OF THE BOND LENGTH PLUS ANY ADDITIONAL RESISTANCE TO ACCOUNT FOR MATERIAL ABOVE THE BOND LENGTH.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-02
1			3			TOTAL SHEETS
2			4			53

DRAWN BY :	M. SPENCER	DATE : 01/2020
CHECKED BY :	A. FORFA	DATE : 12/2020
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA
Alexander Forfa 9/22/2021

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HORIZONTAL CURVE DATA -L-

P.I. STA. 30+03.12
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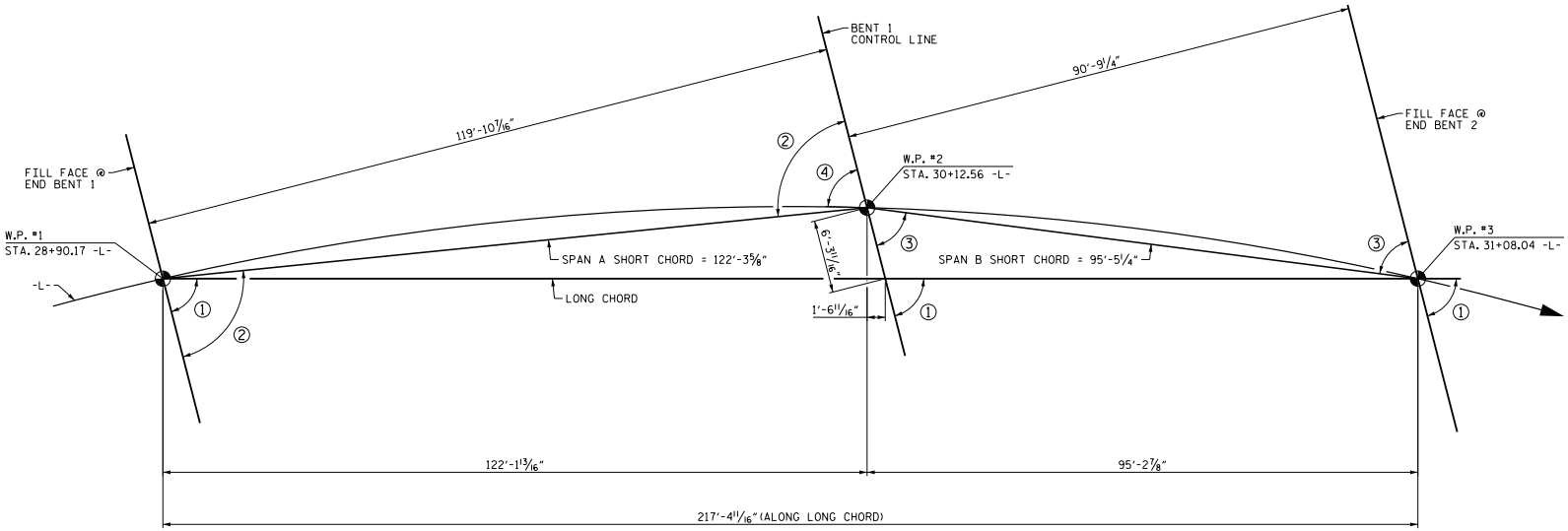
D = 5°-59'-58"
L = 1,214.51'
T = 704.93'
R = 955.00'



LONG CHORD LAYOUT

NOTE: END BENTS AND BENT ARE PARALLEL

ANGLES

① = 75°-41'-00"
② = 78°-32'-51"
③ = 72°-00'-43"
④ = 74°-52'-34"*
* = (TANGENT TO CURVE)

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LONG CHORD LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 02/2020
CHECKED BY : A. FORFA DATE : 12/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER J. FORFA
Alexander Forfa 9/22/2021

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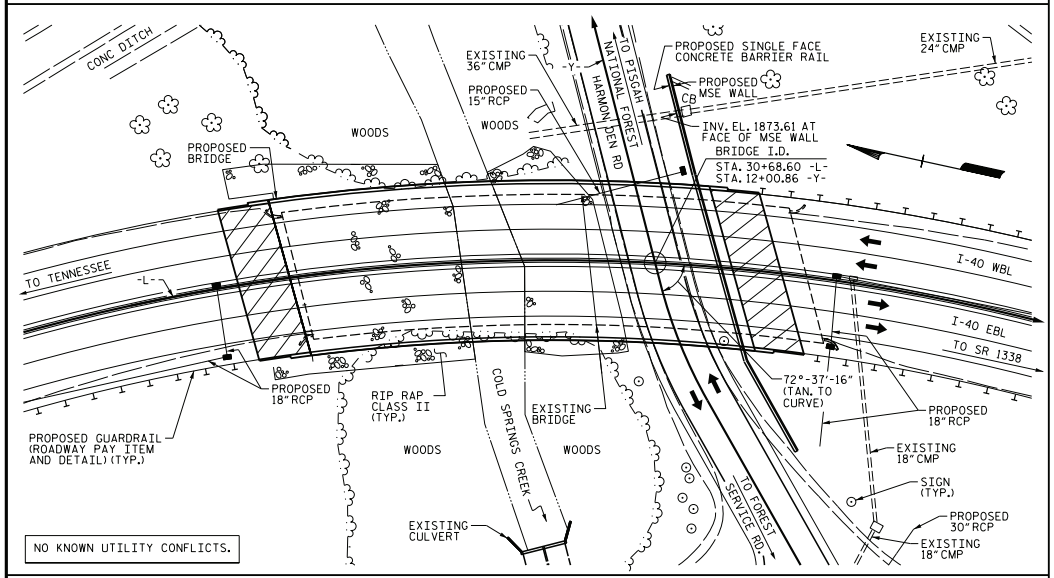
BM#8 - 8"SPIKE IN ROOT OF 28"DBL. WHITE PINE 549.36' LT. OF -L- STA. 29+68.67 EL. 1897.66



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 30+68.60 -L-."

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 56-FT LEFT OF CENTERLINE ROADWAY AND 48-FT RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN VIEW.

FOR TEMPORARY SHORING, SEE SPECIAL PROVISIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 3 SPANS @ 65'-0"± AND 1 SPAN @ 50'-0 $\frac{1}{16}$"± (ALL MEASURED ALONG SHORT CHORDS) WITH 2 SECTIONS OF 28'-0"± CLEAR ROADWAY WIDTH SEPERATED BY A 2'-0" CONCRETE MEDIAN BARRIER AND A REINFORCED CONCRETE DECK ON ROLLED STEEL BEAMS ON END BENTS OF REINFORCED CONCRETE ON STEEL PILES AND INTERIOR BENTS OF REINFORCED CONCRETE ON EITHER SPREAD FOOTINGS OR PILE FOOTINGS, LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS THE BOTTOM OF FOOTING ELEVATION. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

A CURING COMPOUND WITH SILANE SHALL BE APPLIED TO ALL CAST-IN-PLACE CONCRETE.

TOTAL BILL OF MATERIAL

	TEMPORARY SHORING	REMOVAL OF EXISTING STRUCTURE AT STA. 30+68.60	ASBESTOS ASSESSMENT	FOUNDATION EXCAVATION FOR BENT 1 AT STA. 30+68.60 -L-	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STA. 30+68.60 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	SQ.FT.	LUMP SUM	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE							16,652	17,323		LUMP SUM	
END BENT NO.1						LUMP SUM			94.0		17,493
BENT NO.1	1,700			LUMP SUM					185.1		43,411
END BENT NO.2	3,100					LUMP SUM			72.8		10,633
TOTAL	4,800	LUMP SUM	LUMP SUM	LUMP SUM	1	LUMP SUM	16,652	17,323	352.0	LUMP SUM	71,537

HYDRAULIC DATA

DESIGN DISCHARGE	= 2,300 CFS
FREQUENCY OF DESIGN DISCHARGE	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 1873.5
DRAINAGE AREA	= 8.99 SQ. MI.
BASE DISCHARGE (Q100)	= 2,800 CFS
BASE HIGH WATER ELEVATION	= 1876.1

OVERTOPPING DATA

OVERTOPPING DISCHARGE	= 70,000 CFS
FREQUENCY OF OVERTOPPING	= 500+ YEARS
* OVERTOPPING ELEVATION	= 1901.7

* OVERTOPPING WOULD OCCUR AT STA. 27+85.00 -L-

TOTAL BILL OF MATERIAL

	SPIRAL COLUMN REINFORCING STEEL	36" FLORIDA I-BEAM CONCRETE GIRDERS		54" FLORIDA I-BEAM CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	CONCRETE MEDIAN BARRIER	4" SLOPE PROTECTION	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	9 5/8" Ø MICROPILES
	LBS.	NO.	LIN.FT.	NO.	LIN.FT.	EACH	NO.	LIN.FT.	NO.	LIN.FT.	LIN.FT.	SQ. YDS.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	EACH
SUPERSTRUCTURE		8	745	8	962					472	265.6				LUMP SUM	LUMP SUM	
END BENT NO.1						14	14	400	14				1,147	1,074			
BENT NO.1	3,788												398	401			
END BENT NO.2												24					10
TOTAL	3,788	8	745	8	962	14	14	400	14	472	265.6	24	1,545	1,475	LUMP SUM	LUMP SUM	10

DRAWN BY : M. SPENCER DATE : 05/2021
CHECKED BY : A. FORFA DATE : 05/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA
Alexander Forfa 9/22/2021

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PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH & TOTAL BILL OF MATERIAL

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			53

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT					
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.01	--	1.75	0.835	1.32	B	EXT. RIGHT	46.02	1.031	1.24	B	INTERIOR	64.71	0.80	0.752	1.01	B	INTERIOR	46.02	
		HL-93 (OPERATING)	N/A	--	1.66	--	1.35	0.835	1.71	B	EXT. RIGHT	46.02	1.031	1.66	B	INTERIOR	64.71	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.38	49.680	1.75	0.835	1.81	B	EXT. RIGHT	46.02	1.031	1.60	B	INTERIOR	64.71	0.80	0.752	1.38	B	INTERIOR	46.02	
		HS-20 (OPERATING)	36.000	--	2.12	76.320	1.35	0.835	2.34	B	EXT. RIGHT	46.02	1.031	2.12	B	INTERIOR	64.71	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500	--	3.51	43.875	1.40	0.835	5.76	B	EXT. RIGHT	46.02	1.031	5.53	B	INTERIOR	64.71	0.80	0.752	3.51	B	INTERIOR	46.02	
		S3C	21.500	--	2.05	44.075	1.40	0.835	3.37	B	EXT. RIGHT	46.02	1.031	3.17	B	INTERIOR	64.71	0.80	0.752	2.05	B	INTERIOR	46.02	
		S3A	22.750	--	1.95	44.363	1.40	0.835	3.19	B	EXT. RIGHT	46.02	1.031	3.01	B	INTERIOR	64.71	0.80	0.752	1.95	B	INTERIOR	46.02	
		S4A	26.750	--	1.71	45.743	1.40	0.835	2.80	B	EXT. RIGHT	46.02	1.031	2.62	B	INTERIOR	64.71	0.80	0.752	1.71	B	INTERIOR	46.02	
		S5A	30.500	--	1.51	46.055	1.40	0.835	2.47	B	EXT. RIGHT	46.02	1.031	2.41	B	INTERIOR	64.71	0.80	0.752	1.51	B	INTERIOR	46.02	
		S6A	34.500	--	1.37	47.265	1.40	0.835	2.24	B	EXT. RIGHT	46.02	1.031	2.16	B	INTERIOR	64.71	0.80	0.752	1.37	B	INTERIOR	46.02	
		S7B	38.500	--	1.24	47.740	1.40	0.835	2.04	B	EXT. RIGHT	46.02	1.031	2.03	B	INTERIOR	64.71	0.80	0.752	1.24	B	INTERIOR	46.02	
		S7A	40.000	⟨3⟩	1.23	49.200	1.40	0.835	2.01	B	EXT. RIGHT	46.02	1.031	2.11	B	INTERIOR	64.71	0.80	0.752	1.23	B	INTERIOR	46.02	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250	--	1.68	47.460	1.40	0.835	2.75	B	EXT. RIGHT	46.02	1.031	2.55	B	INTERIOR	64.71	0.80	0.752	1.68	B	INTERIOR	46.02	
		T5B	32.000	--	1.48	47.360	1.40	0.835	2.42	B	EXT. RIGHT	46.02	1.031	2.45	B	INTERIOR	64.71	0.80	0.752	1.48	B	INTERIOR	46.02	
		T6A	36.000	--	1.35	48.600	1.40	0.835	2.21	B	EXT. RIGHT	46.02	1.031	2.25	B	INTERIOR	64.71	0.80	0.752	1.35	B	INTERIOR	46.02	
		T7A	40.000	--	1.25	50.000	1.40	0.835	2.05	B	EXT. RIGHT	46.02	1.031	2.10	B	INTERIOR	64.71	0.80	0.752	1.25	B	INTERIOR	46.02	
		T7B	40.000	--	1.33	53.200	1.40	0.835	2.18	B	EXT. RIGHT	46.02	1.031	1.94	B	INTERIOR	64.71	0.80	0.752	1.33	B	INTERIOR	46.02	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

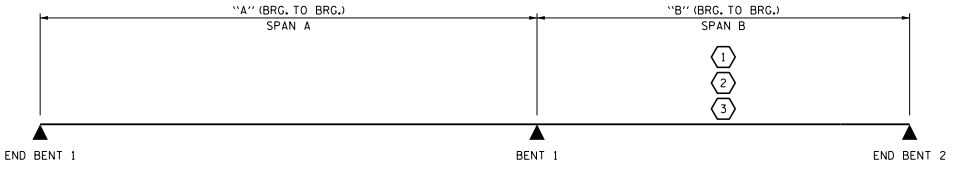
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



	"A"	"B"
GIRDER 1	118'-7 3/16"	91'-3 7/8"
GIRDER 2	118'-7 3/4"	91'-5"
GIRDER 3	118'-8 5/16"	91'-6 1/8"
GIRDER 4	118'-8 15/16"	91'-7 5/16"
GIRDER 5	118'-9 9/16"	91'-8 9/16"
GIRDER 6	118'-10 3/16"	91'-9 13/16"
GIRDER 7	118'-10 13/16"	91'-11 1/8"
GIRDER 8	118'-11 1/2"	92'-0 1/2"

LRFR SUMMARY

NOTE: SPAN LENGTHS SHOWN ARE BEARING TO BEARING LENGTHS.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY
PRESTRESSED
CONCRETE GIRDERS
(INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

ASSEMBLED BY : M. SPENCER	DATE : 01/2021
CHECKED BY : A. FORFA	DATE : 01/2021
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

REVISIONS						SHEET NO.
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2			4			53

STD. NO. LRFR2

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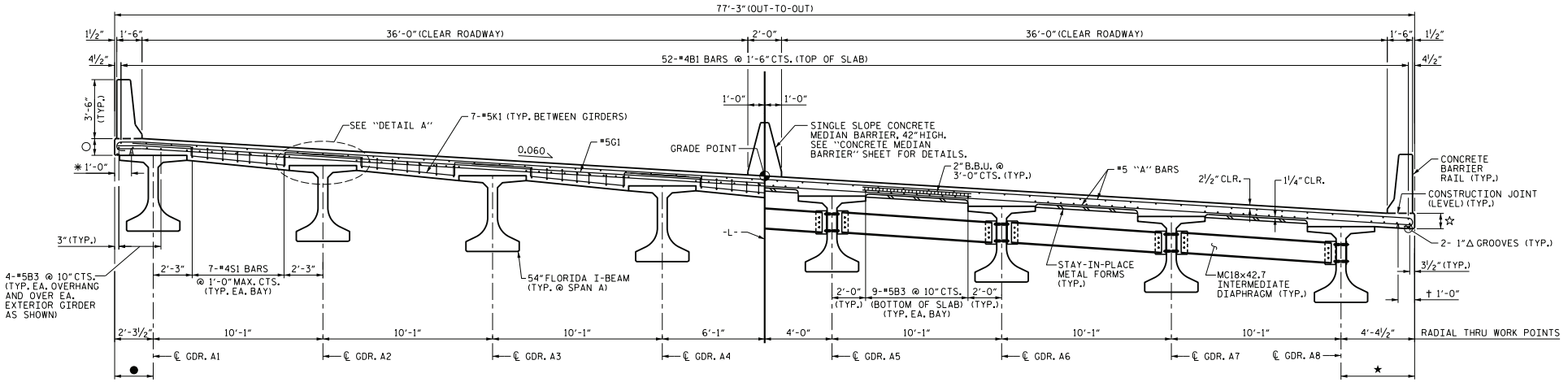
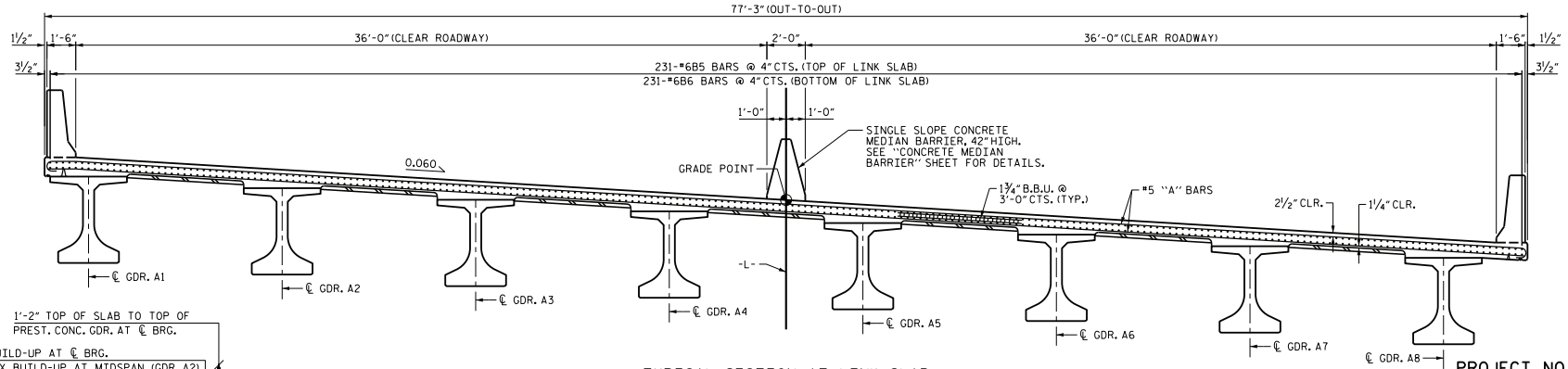
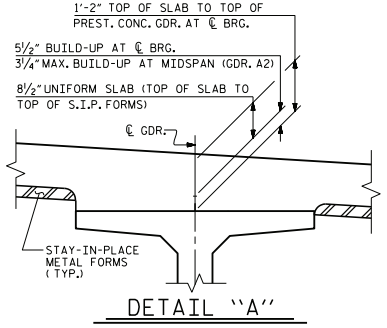


HALF TYPICAL SECTION AT END DIAPHRAGM

HALF TYPICAL SECTION AT INTERIOR DIAPHRAGM



TYPICAL SECTION AT LINK SLAB



DETAIL "A"

LEGEND

- ● OVERHANG = 2'-3½" MIN. TO 4'-2 1/16" MAX. IN SPAN A
- ★ OVERHANG = 2'-4" MIN. TO 4'-4½" MAX. IN SPAN A
- ○ OVERHANG MINIMUM THICKNESS = 11¾" @ MIDSPAN IN SPAN A
  OVERHANG MAXIMUM THICKNESS = 1'-2¼" @ ℄ BRG. IN SPAN A
- ☆ OVERHANG MINIMUM THICKNESS = 10¾" @ MIDSPAN IN SPAN A
  OVERHANG MAXIMUM THICKNESS = 1'-1¾" @ ℄ BRG. IN SPAN A
- ✱ B.B. MINIMUM HEIGHT = 5½" @ MIDSPAN IN SPAN A
  B.B. MAXIMUM HEIGHT = 7½" @ ℄ BRG. IN SPAN A
- † B.B. MINIMUM HEIGHT = 2¾" @ MIDSPAN IN SPAN A
  B.B. MAXIMUM HEIGHT = 5¼" @ ℄ BRG. IN SPAN A

TYPICAL SECTIONS AT SPAN A

DRAWN BY :	M. SPENCER	DATE : 11/2020
CHECKED BY :	A. FORFA	DATE : 11/2020
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPAN A

REVISIONS						SHEET NO.
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2			4			53

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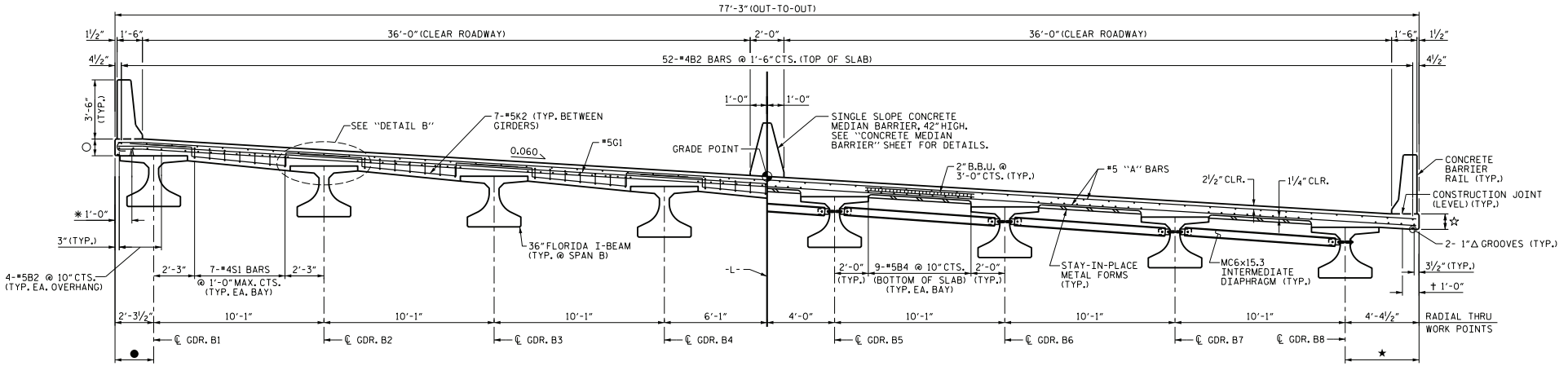
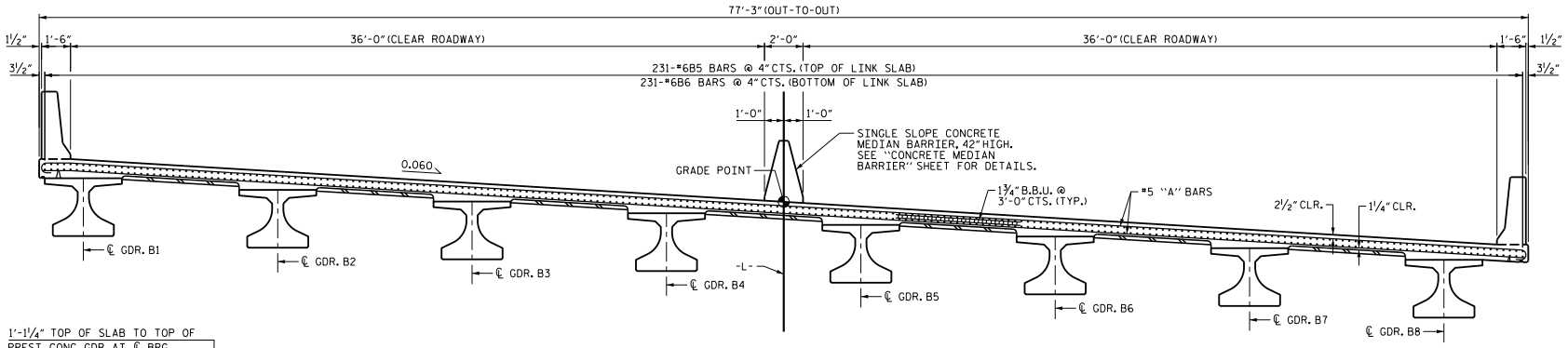
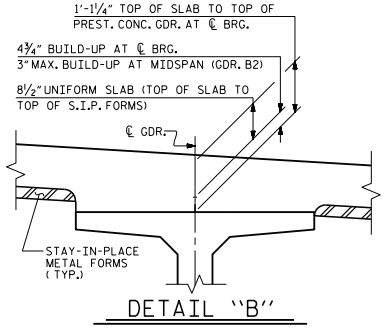


HALF TYPICAL SECTION AT END DIAPHRAGM

HALF TYPICAL SECTION AT INTERIOR DIAPHRAGM



TYPICAL SECTION AT LINK SLAB



DETAIL "B"

TYPICAL SECTIONS AT SPAN B

LEGEND

- ● OVERHANG = 2'-3½" MIN. TO 3'-5 3/16" MAX. IN SPAN B
- ★ OVERHANG = 3'-1 3/16" MIN. TO 4'-4½" MAX. IN SPAN B
- ○ OVERHANG MINIMUM THICKNESS = 11½" @ MIDSPAN IN SPAN B
  OVERHANG MAXIMUM THICKNESS = 1'-1½" @ ℄ BRG. IN SPAN B
- ☆ OVERHANG MINIMUM THICKNESS = 10¾" @ MIDSPAN IN SPAN B
  OVERHANG MAXIMUM THICKNESS = 1'-1" @ ℄ BRG. IN SPAN B
- ✱ B.B. MINIMUM HEIGHT = 5¼" @ MIDSPAN IN SPAN B
  B.B. MAXIMUM HEIGHT = 6¾" @ ℄ BRG. IN SPAN B
- † B.B. MINIMUM HEIGHT = 2¼" @ MIDSPAN IN SPAN B
  B.B. MAXIMUM HEIGHT = 4½" @ ℄ BRG. IN SPAN B

DRAWN BY :	M. SPENCER	DATE :	11/2020
CHECKED BY :	A. FORFA	DATE :	11/2020
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE :	09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA
Alexander Forfa 9/22/2021

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PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPAN B

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1			3			TOTAL SHEETS
2			4			53

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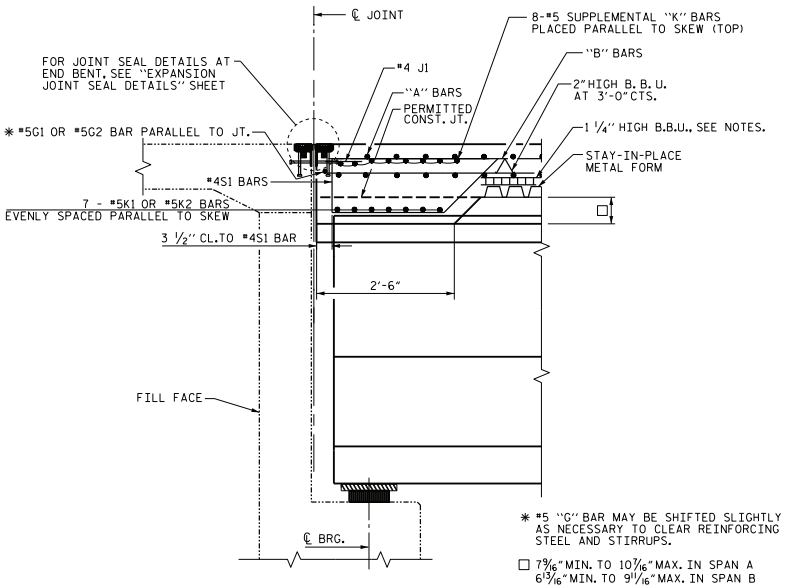
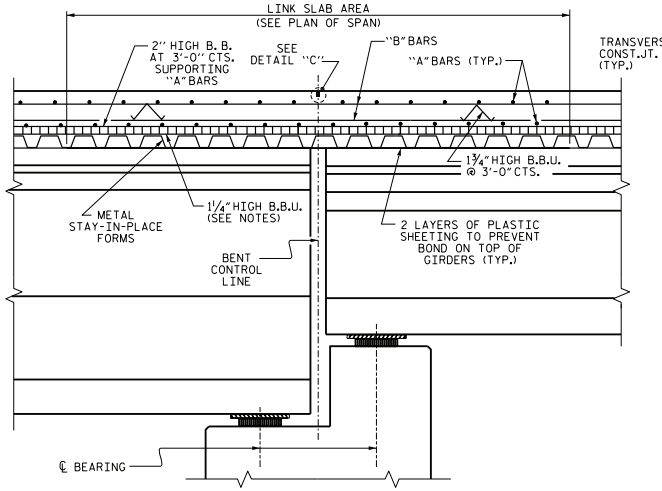


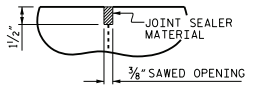
SECTION THROUGH END BENT

✱ #5 "G" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

□ 7 9/16" MIN. TO 10 7/16" MAX. IN SPAN A
6 13/16" MIN. TO 9 11/16" MAX. IN SPAN B

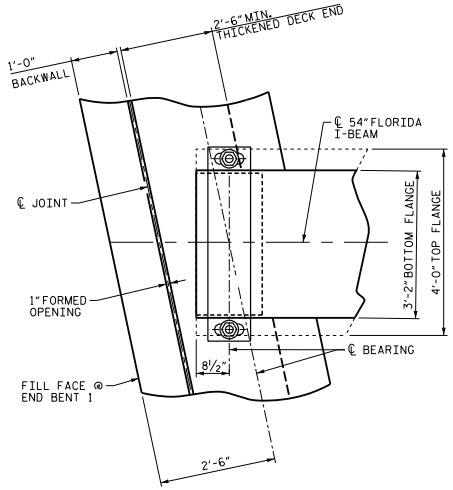


SECTION THROUGH BENT

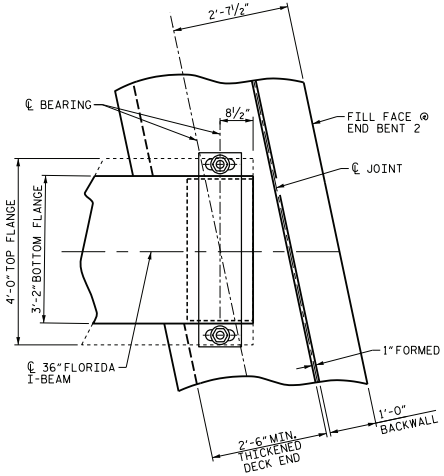


DETAIL "C"

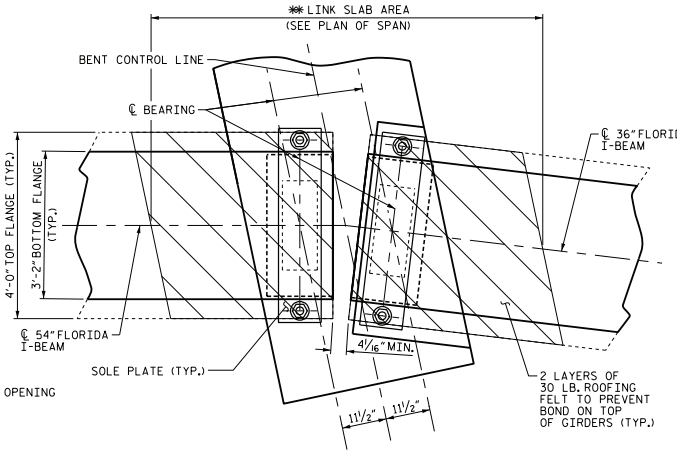
A 1/2" DEEP CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.



PLAN OF END BENT 1 THICKENED DECK END



PLAN OF END BENT 2 THICKENED DECK END



TYPICAL PLAN AT BENT 1

✱✱ THE TOP OF THE BEAM IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH AND FREE OF STIRRUPS OR ANCHOR STUDS.

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-08
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2			4			53

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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Suite 175
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984-275-2490
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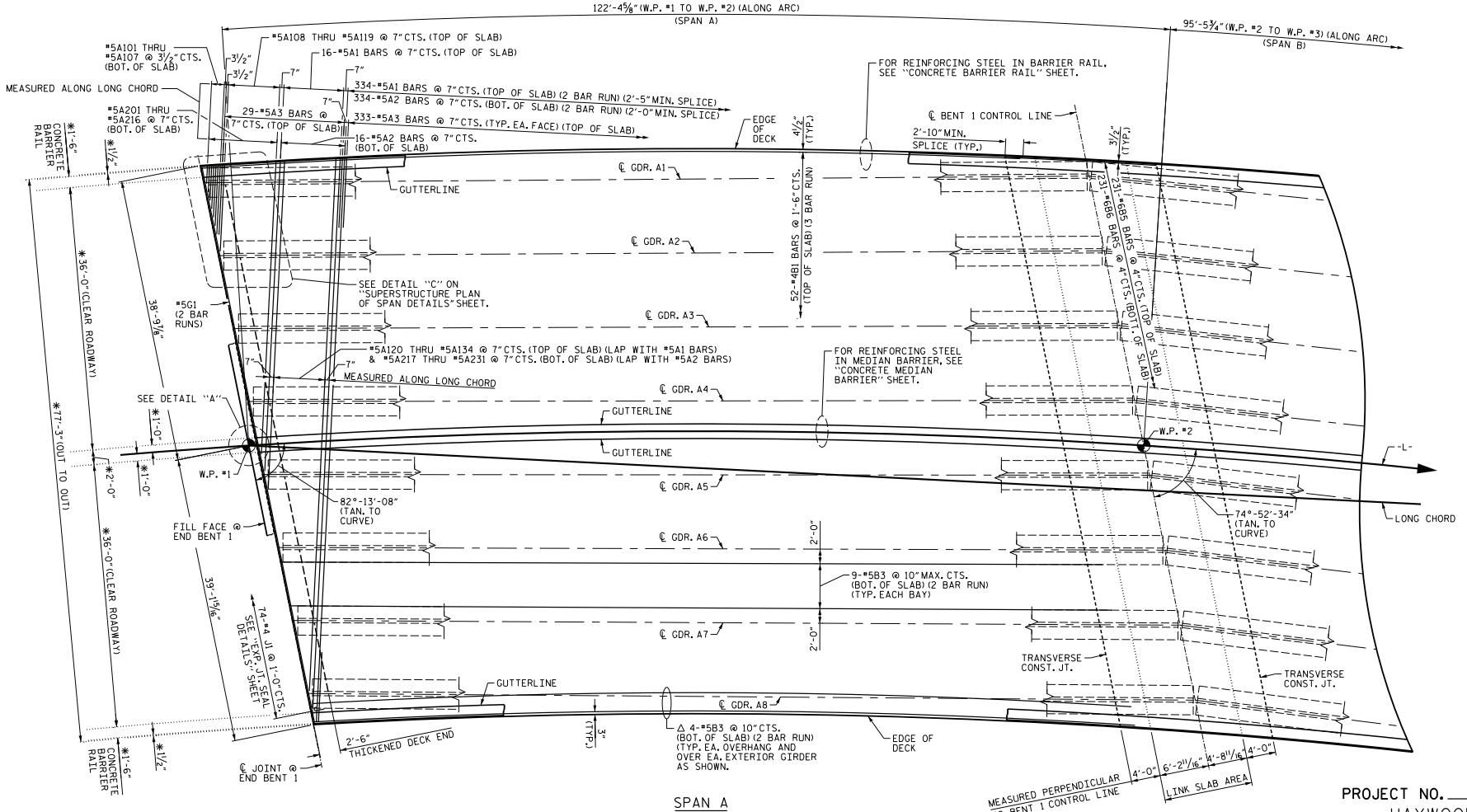


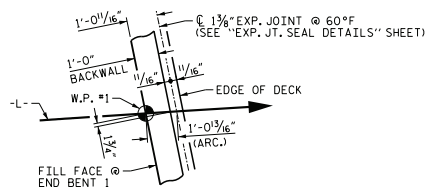
SPAN A

PLAN OF SPANS

✱ = MEASURED RADIALLY

△ = FIELD ADJUST AS NECESSARY TO MAINTAIN MINIMUM CLEARANCE AND SPACING

NOTE: ALL "A" BARS ARE ORIENTED PERPENDICULAR TO THE LONG CHORD.



DETAIL "A"

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
SPAN A

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8000 Regency Parkway
Suite 175
Cary, NC 27518
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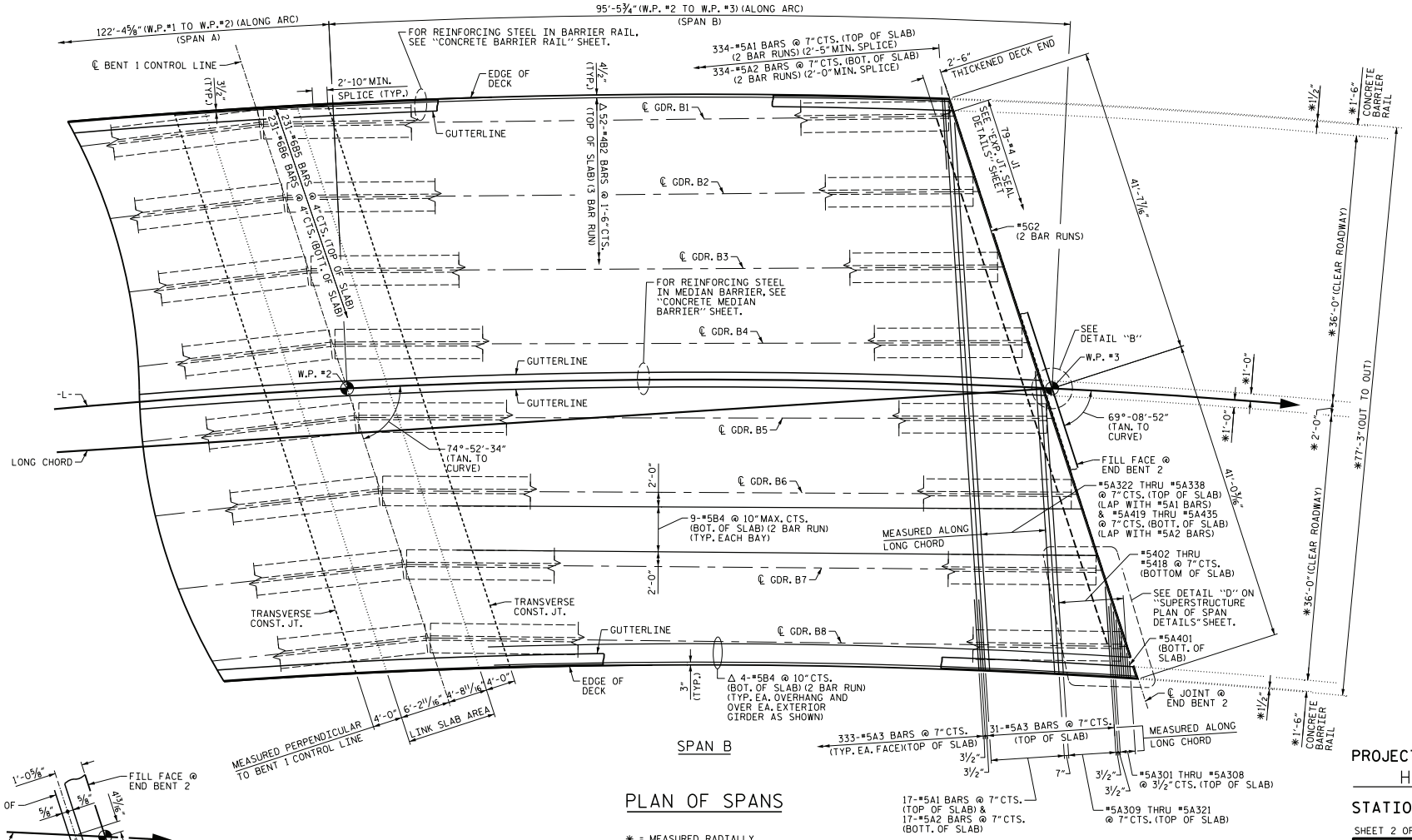


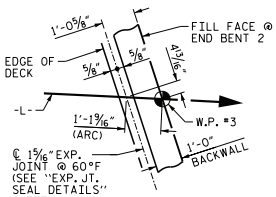
SPAN B

PLAN OF SPANS

* = MEASURED RADIALLY

Δ = FIELD ADJUST AS NECESSARY TO MAINTAIN MINIMUM CLEARANCE AND SPACING

NOTE: ALL "A" BARS ARE ORIENTED PERPENDICULAR TO THE LONG CHORD.



DETAIL "B"

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Cary, NC 27518
984-275-2490
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HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
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2			4			53

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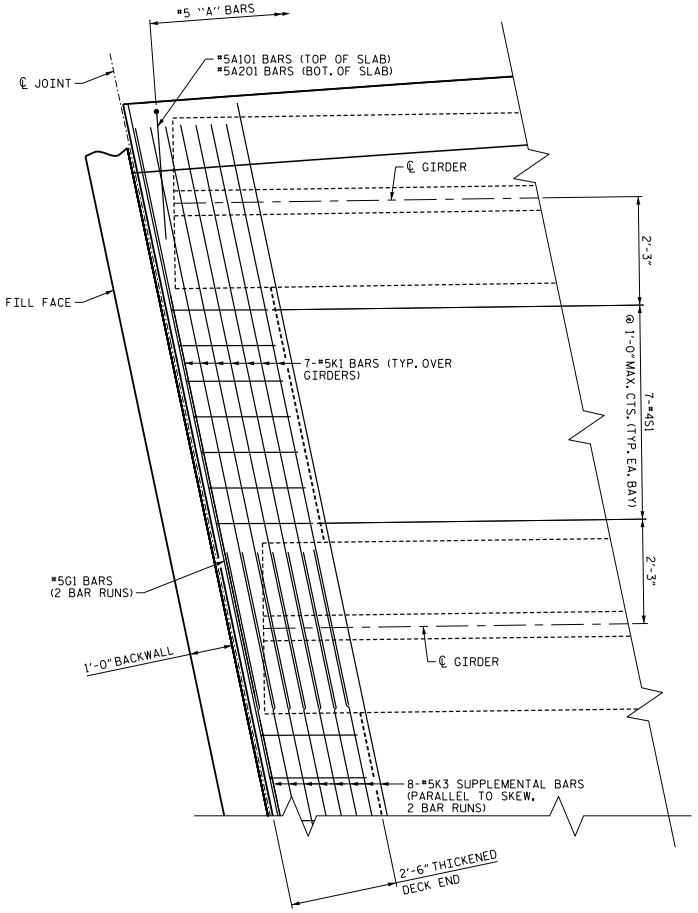
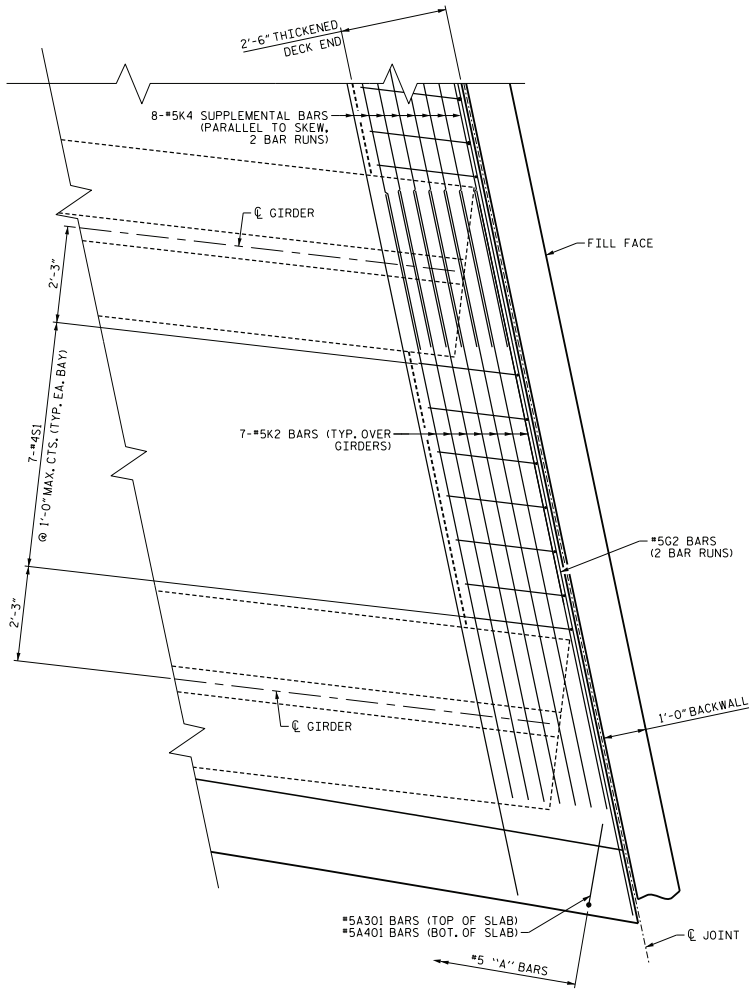


DETAIL "C"



DETAIL "D"

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			53

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Cary, NC 27518
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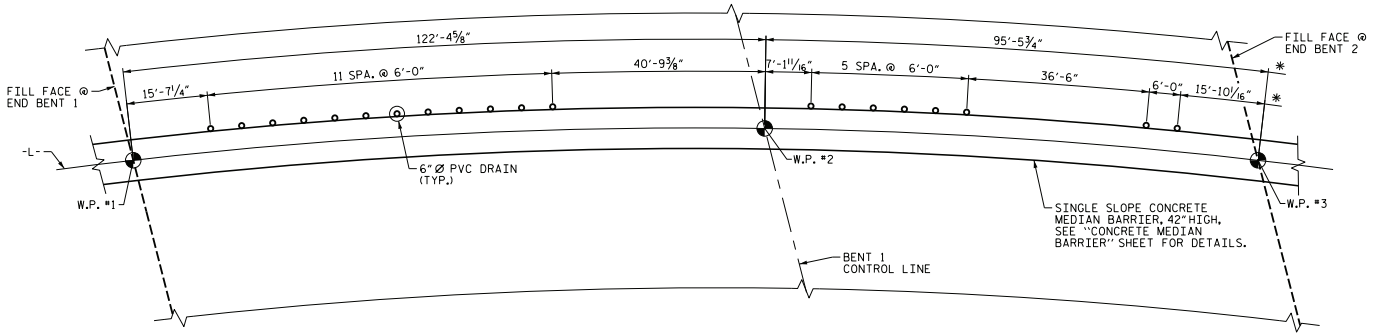
NOTES

TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.

4 - 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

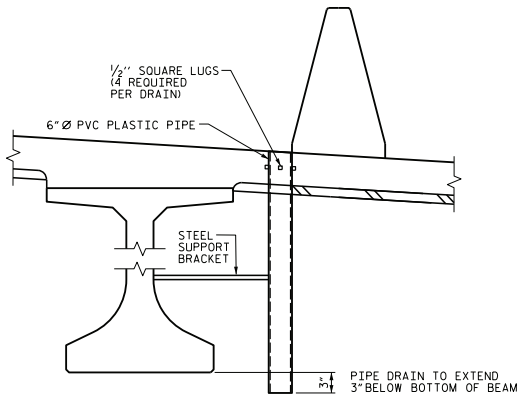
THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.



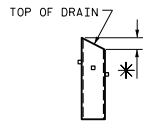
SPAN A SPAN B

✳ MEASURED ALONG -L-

PLAN



ELEVATION



✳ TO BE SET TO MATCH DECK CROSS SLOPE (20 DRAINS REQUIRED)

PIPE DETAIL

PIPE DRAIN DETAILS

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
PIPE DRAIN LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
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Suite 175
Cary, NC 27518
984-275-2490
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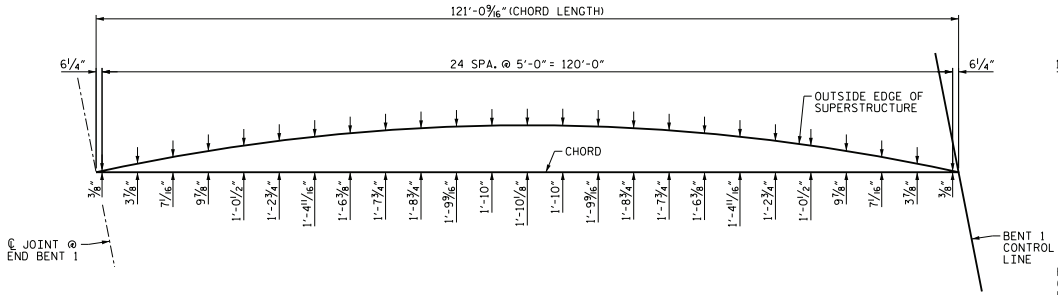
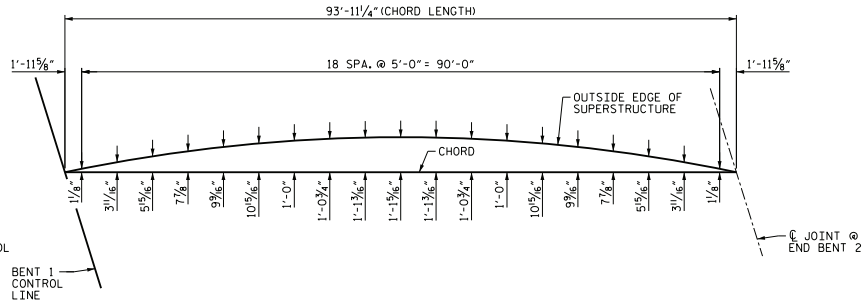
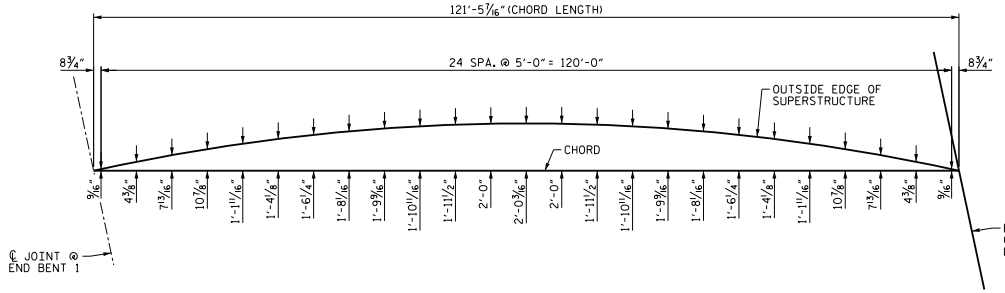


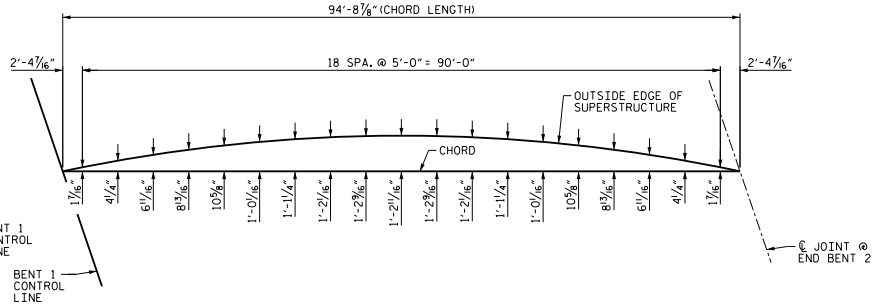
SPAN A - LEFT SIDE



SPAN B - LEFT SIDE



SPAN A - RIGHT SIDE



SPAN B - RIGHT SIDE

NOTE:
USE THE CONSTRUCTION ELEVATIONS IN CONJUNCTION WITH THIS SHEET TO SET THE OUTSIDE EDGES OF THE BRIDGE DECK.

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			53

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benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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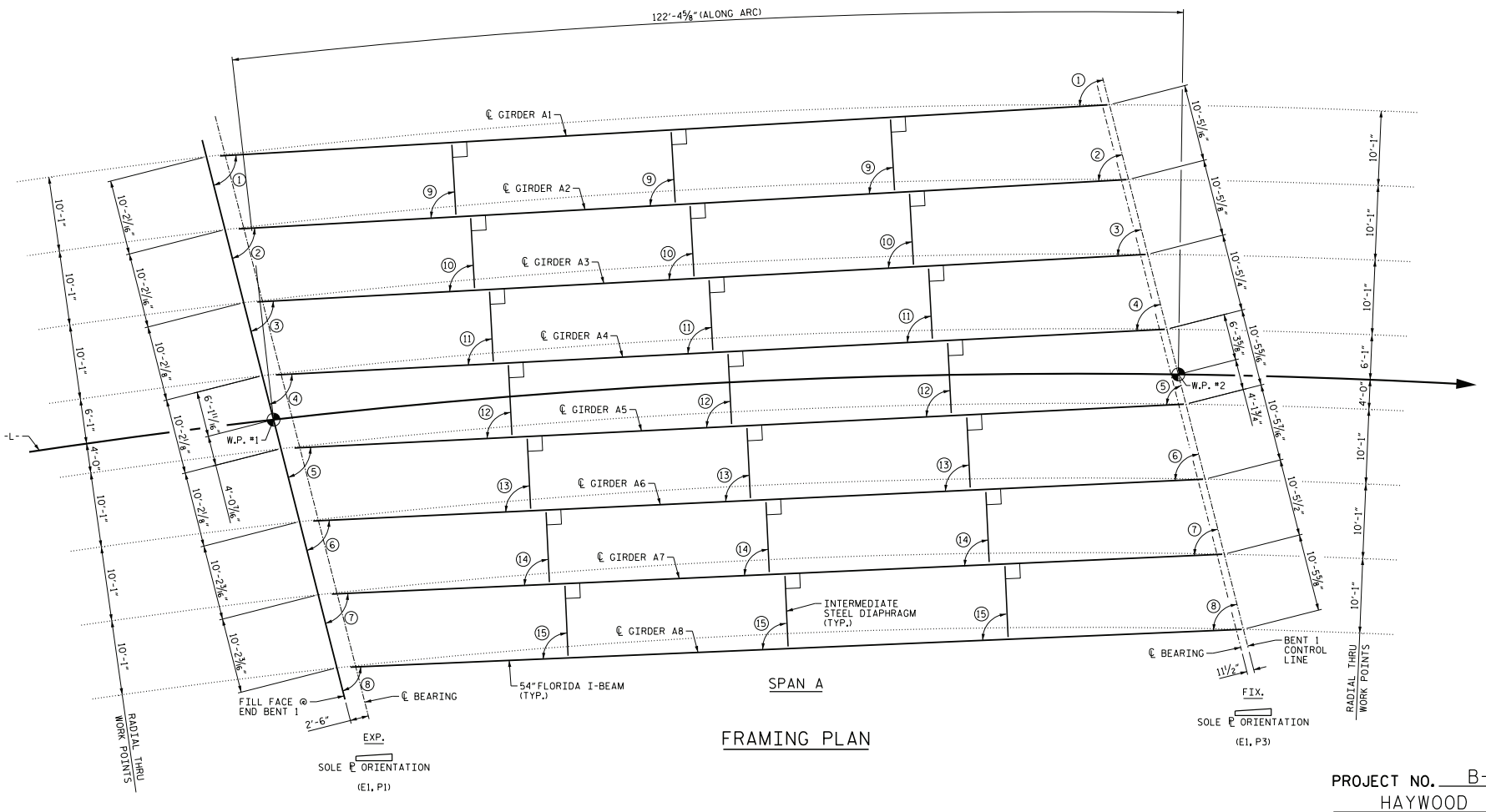

FRAMING PLAN

① 78°-58'-27"	⑨ 89°-53'-05"
② 78°-51'-33"	⑩ 89°-52'-56"
③ 78°-44'-29"	⑪ 89°-52'-47"
④ 78°-37'-16"	⑫ 89°-52'-38"
⑤ 78°-29'-54"	⑬ 89°-52'-28"
⑥ 78°-22'-22"	⑭ 89°-52'-18"
⑦ 78°-14'-40"	⑮ 89°-52'-08"
⑧ 78°-06'-48"	

NOTES:

FOR LOCATION OF FORMED HOLES FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER DETAILS" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "PRESTRESSED CONCRETE GIRDER INTERMEDIATE STEEL DIAPHRAGMS SPAN A" SHEET.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
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Suite 175
Cary, NC 27518
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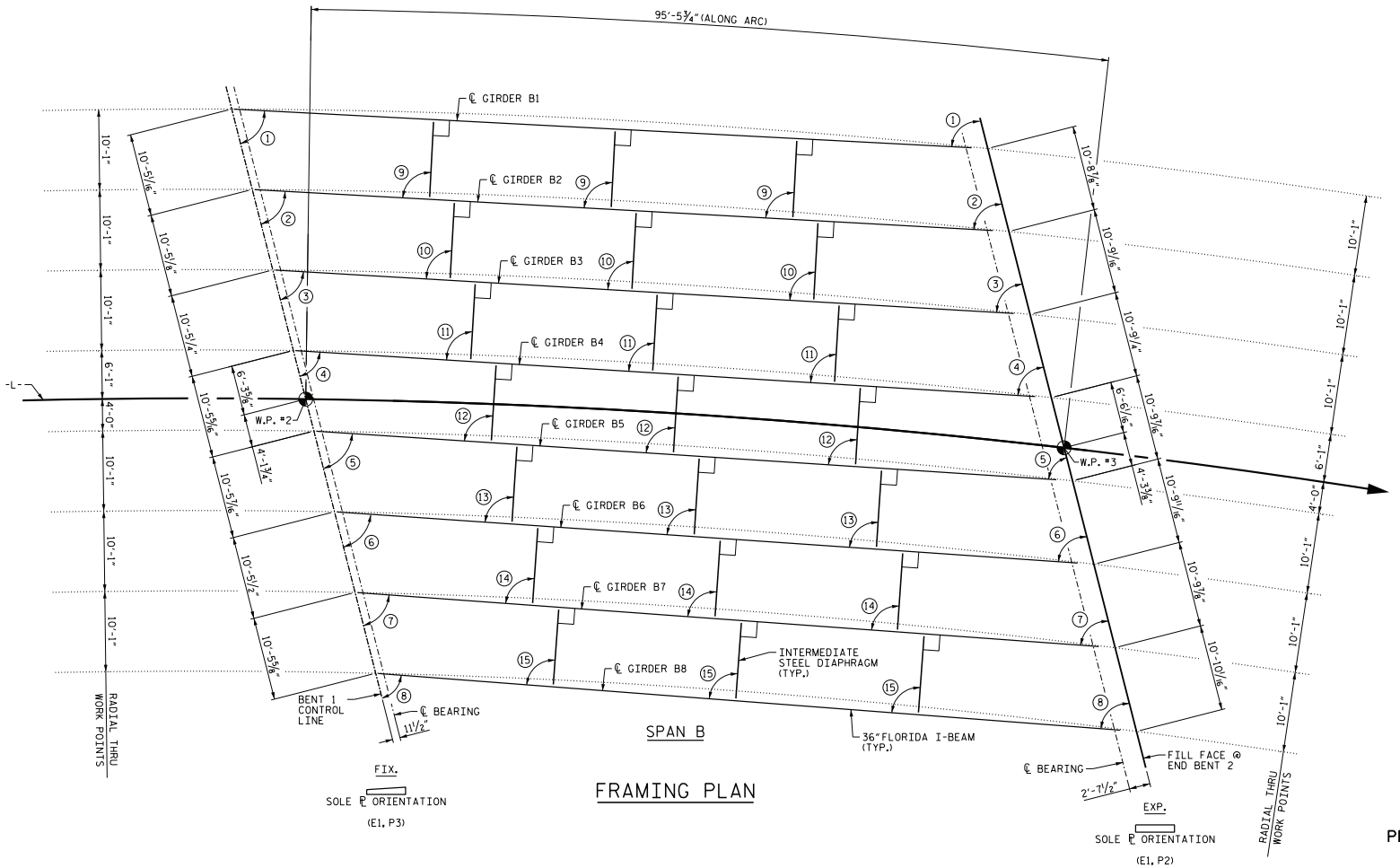

FRAMING PLAN

① 72°-41'-39"
② 72°-30'-37"
③ 72°-19'-20"
④ 72°-07'-48"
⑤ 71°-56'-01"
⑥ 71°-43'-57"
⑦ 71°-31'-37"
⑧ 71°-19'-00"
⑨ 89°-48'-58"
⑩ 89°-48'-43"
⑪ 89°-48'-28"
⑫ 89°-48'-13"
⑬ 89°-47'-56"
⑭ 89°-47'-40"
⑮ 89°-47'-23"

NOTES:

FOR LOCATION OF FORMED HOLES FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER DETAILS" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "PRESTRESSED CONCRETE GIRDER INTERMEDIATE STEEL DIAPHRAGMS SPAN B" SHEET.

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE

FRAMING PLAN
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
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Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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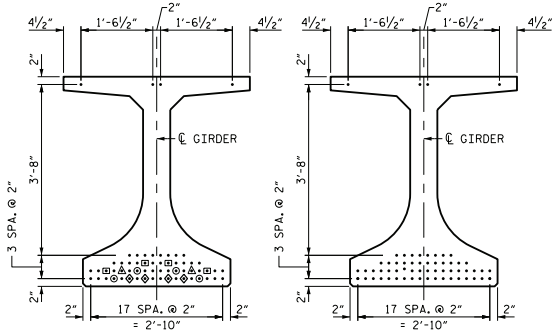
DEBONDING LEGEND

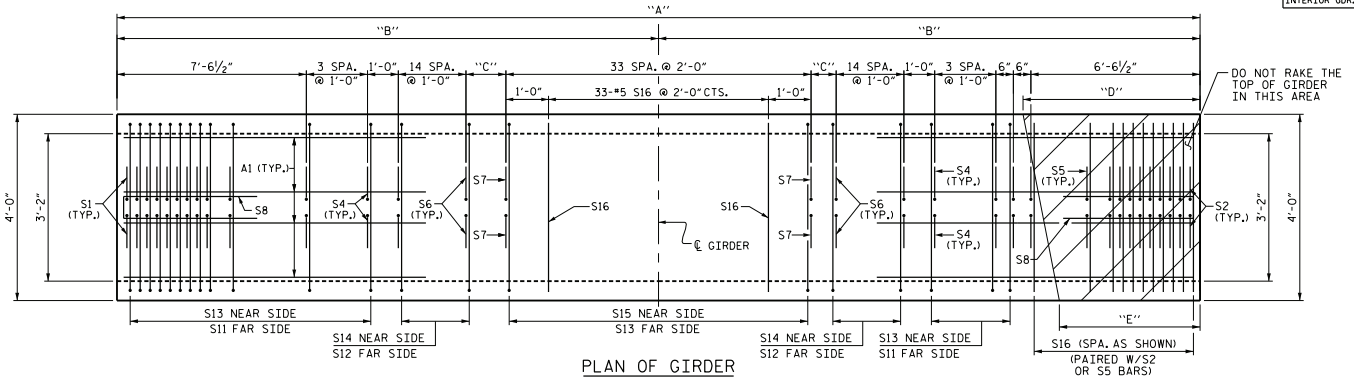
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 24'-0" FROM END OF GIRDER



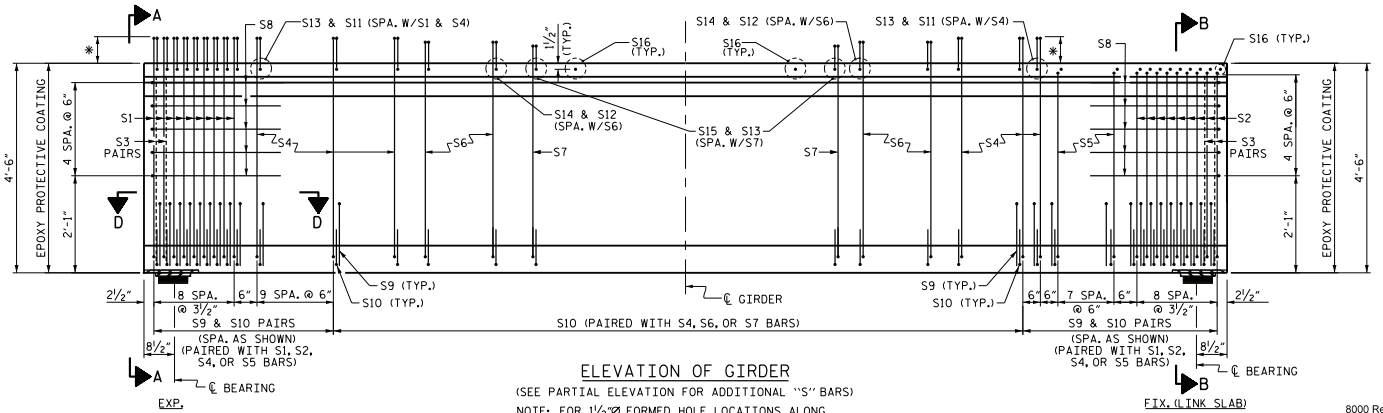
AT END OF GIRDER AT ℄ OF GIRDER

GIRDER	"A"	"B"	"C"	"D"	"E"
A1	120'-0 3/16"	60'-0 1/16"	1'-5 3/16"	6'-5 3/16"	5'-8 1/4"
A2	120'-0 3/4"	60'-0 3/8"	1'-5 7/8"	6'-5 5/8"	5'-8 3/16"
A3	120'-1 5/16"	60'-0 11/16"	1'-6 3/16"	6'-5 3/4"	5'-8 3/16"
A4	120'-1 15/16"	60'-0 15/16"	1'-6 7/16"	6'-5 13/16"	5'-8 1/8"
A5	120'-2 3/16"	60'-1 1/4"	1'-6 3/4"	6'-5 7/8"	5'-8 1/8"
A6	120'-3 3/16"	60'-1 3/16"	1'-7 1/16"	6'-6"	5'-8 1/8"
A7	120'-3 13/16"	60'-1 15/16"	1'-7 7/16"	6'-6 1/16"	5'-8 1/16"
A8	120'-4 1/2"	60'-2 1/4"	1'-7 3/4"	6'-6 1/8"	5'-8 1/16"

0.6"Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

NOTE: FOR 1½"Ø FORMED HOLE LOCATIONS ALONG THE LENGTH OF THE GIRDER, SEE "PRESTRESSED CONCRETE GIRDER DETAILS" SHEET.

*SEE STIRRUP PROJECTION TABLE FOR BOTH WEB AND FLANGE STIRRUPS.

0.6"Ø L.R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	A1	8	#5	STR	22'-0"	184
	S1	18	#6	1	6'-5"	173
	S2	18	#6	1	5'-5"	146
	S3	8	#6	STR	4'-0"	48
	S4	36	#5	1	6'-5"	241
	S5	16	#5	1	5'-5"	90
	S6	60	#5	1	6'-4"	396
	S7	68	#5	1	6'-3"	443
	S8	10	#3	5	8'-5"	32
	S9	38	#3	2	3'-5"	49
	S10	216	#3	3	4'-5"	359
	S11	27	#5	4	5'-1"	143
	S12	30	#5	4	5'-0"	156
	S13	61	#5	4	4'-11"	313
	S14	30	#5	4	4'-10"	151
	S15	34	#5	4	4'-9"	168
	S16	50	#5	STR	3'-8"	191
EXTERIOR GDR.	S17	6	#5	6	8'-6"	53
INTERIOR GDR.	S17	12	#5	6	8'-6"	106
EXTERIOR GDR.	S18	15	#4	STR	8'-0"	80
INTERIOR GDR.	S19	15	#4	STR	10'-2"	102

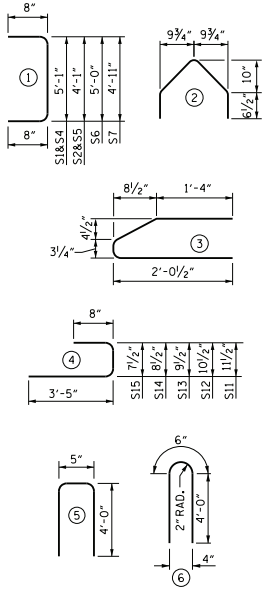
QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,500 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
GIRDER A1	3,416	28.8	60
GIRDER A2	3,491	28.8	60
GIRDER A3	3,491	28.8	60
GIRDER A4	3,491	**28.8**	60
GIRDER A5	3,491	28.8	60
GIRDER A6	3,491	28.8	60
GIRDER A7	3,491	28.9	60
GIRDER A8	3,416	28.9	60

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	SEE TABLE	961'-6¼"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

STIRRUP PROJECTIONS

BAR	PROJECTION
S1 & S4	9"
S6	8"
S7	7"
S11	10"
S12	9"
S13	8"
S14	7"
S15	6"

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

54"FLORIDA I-BEAM (FIB) PRESTRESSED CONCRETE GIRDER SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Digitally Signed by Alexander Forfa 9/22/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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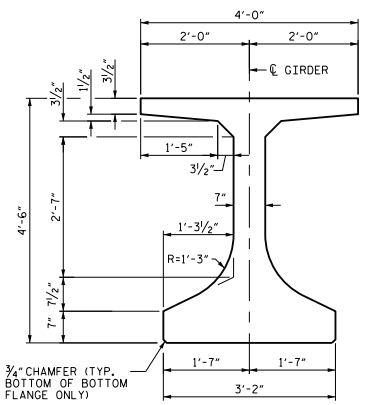
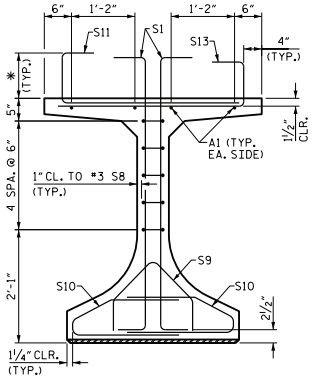


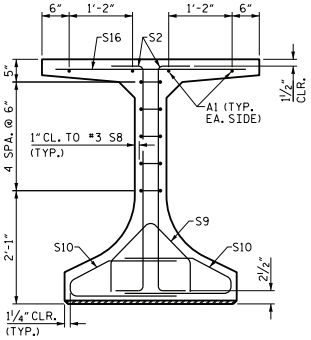
OUTSIDE GIRDER DIMENSIONS



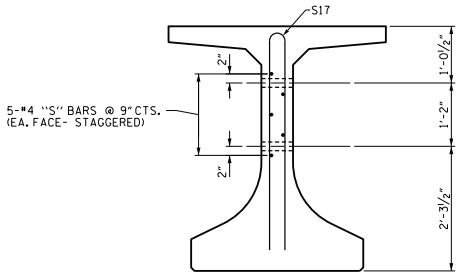
SECTION A-A

(LOOKING IN DIRECTION OF INCREASING STATIONS)

* SEE STIRRUP PROJECTION TABLE ON SHEET 1 OF 9 FOR BOTH WEB AND FLANGE STIRRUPS.

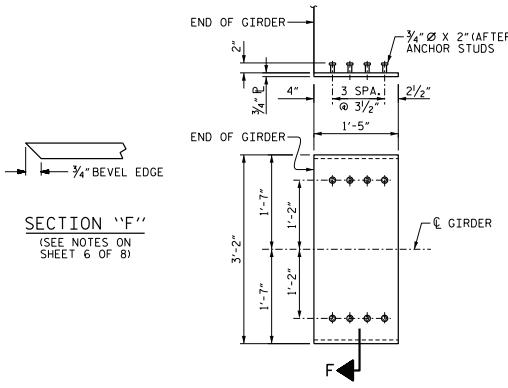


SECTION B-B



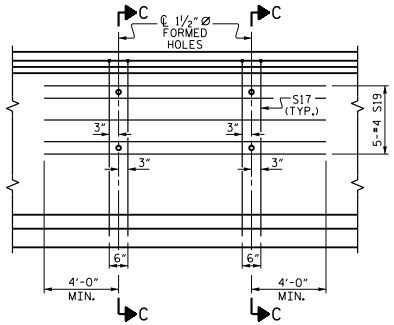
SECTION C-C

(MAIN GIRDER REINFORCING NOT SHOWN FOR CLARITY)



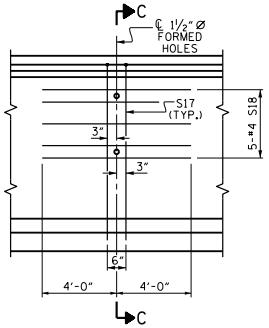
EMBEDDED PLATE "B-1" DETAILS

(2 REQ'D PER GIRDER)



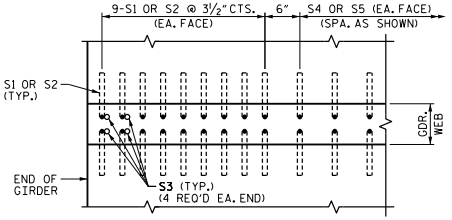
PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS 2 - 7



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS 1 AND 8



SECTION D-D

(TYP. EA. GIRDER END)

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

54" FLORIDA I-BEAM (FIB) PRESTRESSED CONCRETE GIRDER SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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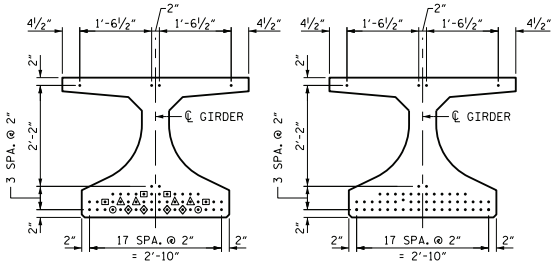
DEBONDING LEGEND

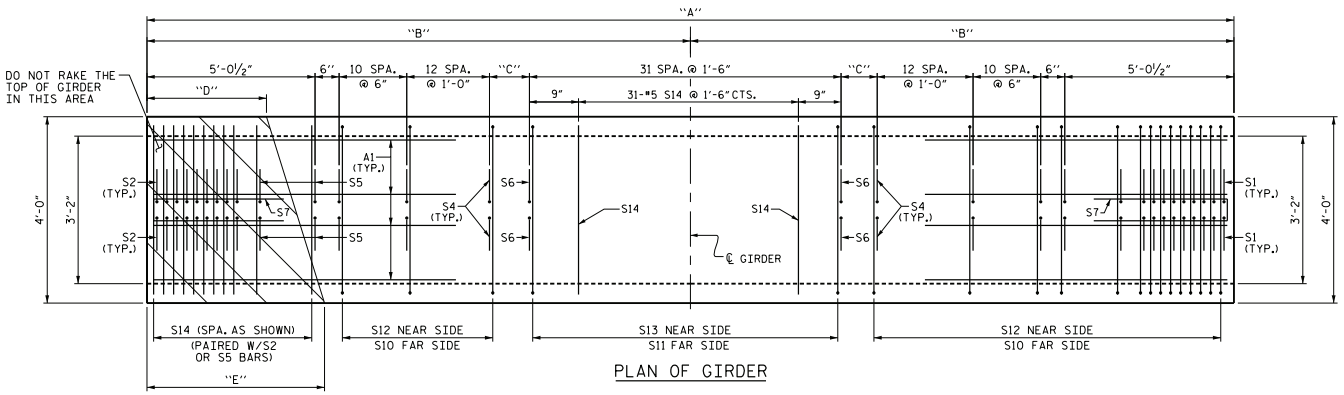
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER



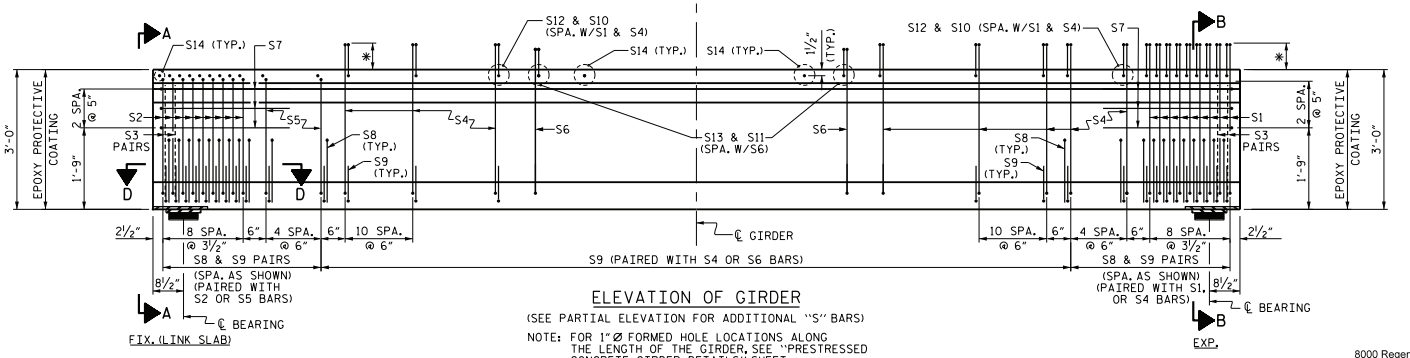
AT END OF GIRDER AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT

GIRDER	"A"	"B"	"C"	"D"	"E"
B1	92'-8⅞"	46'-4 1/16"	6 15/16"	4'-0 5/16"	5'-3 5/16"
B2	92'-10"	46'-5"	7½"	4'-0 5/16"	5'-3 7/16"
B3	92'-11⅛"	46'-5 5/16"	8 1/16"	4'-0¼"	5'-3 9/16"
B4	93'-0 5/16"	46'-6 5/16"	8 1/16"	4'-0¼"	5'-3 1/16"
B5	93'-1 5/16"	46'-6¾"	9¼"	4'-0 3/16"	5'-3 13/16"
B6	93'-2 13/16"	46'-7⅞"	9⅞"	4'-0⅛"	5'-4"
B7	93'-4⅛"	46'-8 1/16"	10 3/16"	4'-0⅛"	5'-4⅛"
B8	93'-5½"	46'-8¾"	11¼"	4'-0 1/16"	5'-4 5/16"



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

NOTE: FOR 1"Ø FORMED HOLE LOCATIONS ALONG THE LENGTH OF THE GIRDER, SEE "PRESTRESSED CONCRETE GIRDER DETAILS" SHEET.

*SEE STIRRUP PROJECTION TABLE FOR BOTH WEB AND FLANGE STIRRUPS.

0.6"Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	A1	8	#5	STR	16'-0"	134
	S1	18	#6	1	4'-10"	131
	S2	18	#6	1	3'-11"	106
	S3	8	#6	STR	2'-6"	30
	S4	102	#5	1	4'-10"	514
	S5	10	#5	1	3'-11"	41
	S6	64	#5	1	4'-9"	317
	S7	6	#3	5	8'-5"	19
	S8	28	#3	2	3'-5"	36
	S9	212	#3	3	4'-5"	352
	S10	60	#5	4	5'-0"	313
	S11	32	#5	4	4'-11"	164
	S12	60	#5	4	4'-10"	302
	S13	32	#5	4	4'-9"	159
	S14	45	#5	STR	3'-8"	172
EXTERIOR GDR.	S15	6	#5	6	5'-6"	34
INTERIOR GDR.	S15	12	#5	6	5'-6"	69
EXTERIOR GDR.	S16	6	#4	STR	8'-0"	32
INTERIOR GDR.	S17	6	#4	STR	11'-5"	46

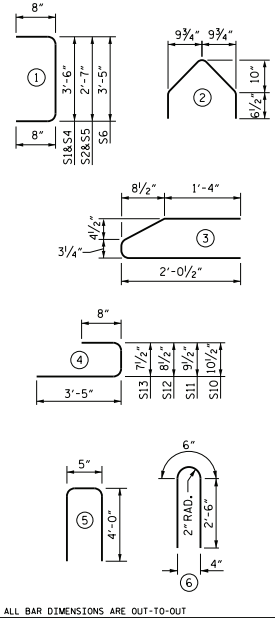
QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,500 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
GIRDER B1	2,856	19.2	54
GIRDER B2	2,905	19.3	54
GIRDER B3	2,905	19.3	54
GIRDER B4	2,905	19.3	54
GIRDER B5	2,905	19.3	54
GIRDER B6	2,905	19.3	54
GIRDER B7	2,905	19.4	54
GIRDER B8	2,856	19.4	54

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	SEE TABLE	744'-8⅝"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

STIRRUP PROJECTIONS

BAR	PROJECTION
S1 & S4	8"
S6	7"
S10	9"
S11	8"
S12	7"
S13	6"

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

36"FLORIDA I-BEAM (FIB) PRESTRESSED CONCRETE GIRDER SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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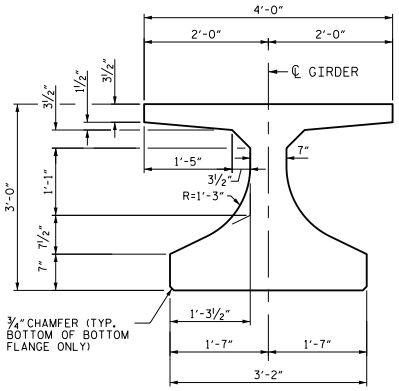
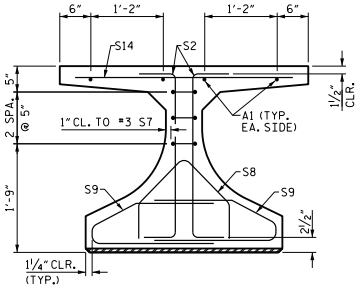
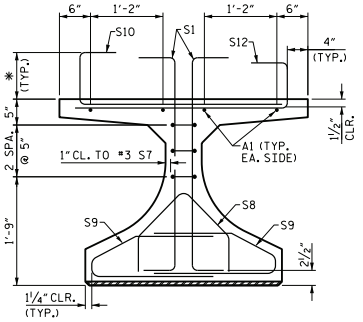


OUTSIDE GIRDER DIMENSIONS

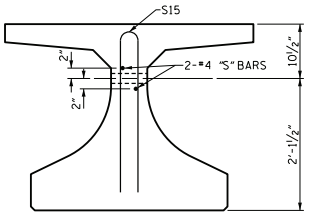


SECTION A-A

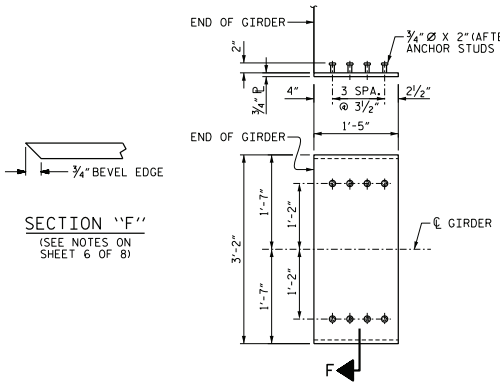


SECTION B-B
(LOOKING IN DIRECTION OF INCREASING STATIONS)

✱ SEE STIRRUP PROJECTION TABLE ON SHEET 3 OF 9 FOR BOTH WEB AND FLANGE STIRRUPS.

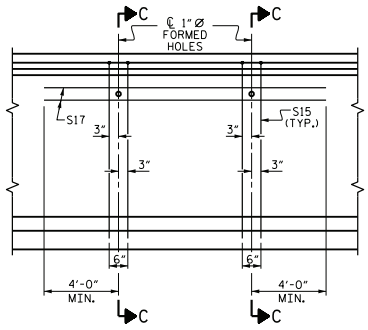


SECTION C-C
(MAIN GIRDER REINFORCEMENT NOT SHOWN FOR CLARITY)

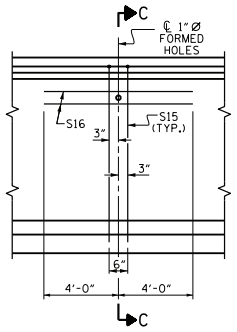


SECTION "F"
(SEE NOTES ON SHEET 6 OF 8)

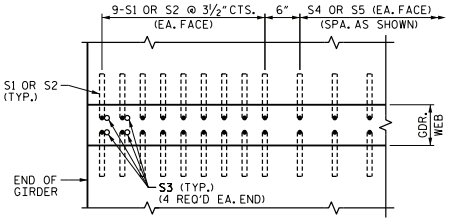
EMBEDDED PLATE "B-1" DETAILS
(2 REQ'D PER GIRDER)



PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS 2 - 7



PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS 1 AND 8



SECTION D-D
(TYP. EA. GIRDER END)

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

36" FLORIDA I-BEAM (FIB) PRESTRESSED CONCRETE GIRDER SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
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Digitally signed by Alexander Forfa
9/22/2021

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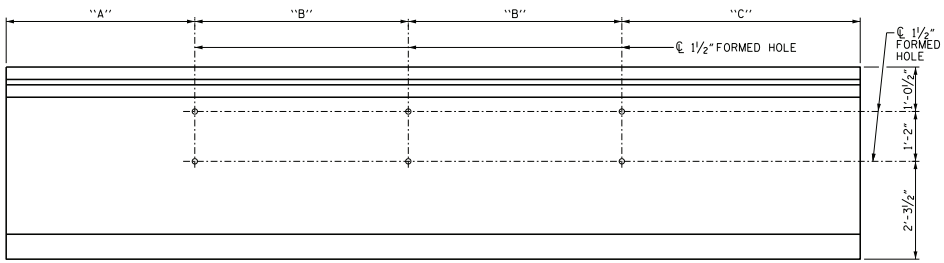
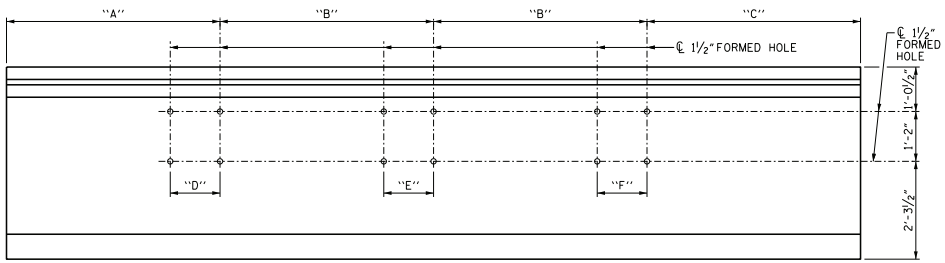
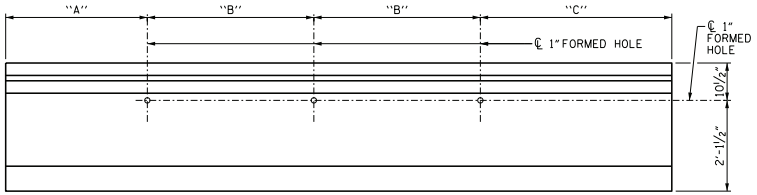


SPAN A EXTERIOR GIRDER ELEVATION

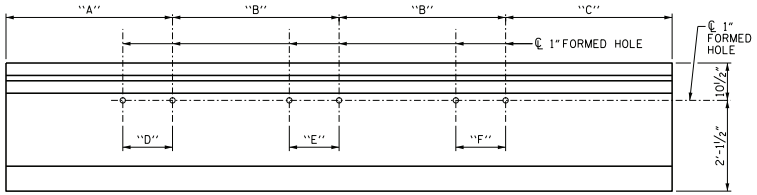


SPAN A INTERIOR GIRDER ELEVATION

LOCATION OF 1½"Ø FORMED HOLES SPAN A



SPAN B EXTERIOR GIRDER ELEVATION



SPAN B INTERIOR GIRDER ELEVATION

LOCATION OF 1"Ø FORMED HOLES SPAN B

LOCATION OF 1½"Ø FORMED HOLES TABLE SPAN A

GIRDER	"A"	"B"	"C"	"D"	"E"	"F"
GDR. A1	31'-4 1/16"	29'-7 7/8"	29'-4 7/16"	-	-	-
GDR. A2	31'-4 5/16"	29'-8"	29'-4 7/16"	1'-11 5/8"	1'-11 3/4"	1'-11 7/8"
GDR. A3	31'-4 5/16"	29'-8 1/8"	29'-4 7/16"	1'-11 7/8"	2'-0"	2'-0 3/16"
GDR. A4	31'-4 7/8"	29'-8 5/16"	29'-4 7/16"	2'-0 1/8"	2'-0 5/16"	2'-0 7/16"
GDR. A5	31'-5 1/8"	29'-8 7/16"	29'-4 7/16"	2'-0 3/8"	2'-0 9/16"	2'-0 11/16"
GDR. A6	31'-5 7/16"	29'-8 5/8"	29'-4 1/2"	2'-0 11/16"	2'-0 13/16"	2'-1"
GDR. A7	31'-5 3/4"	29'-8 13/16"	29'-4 1/2"	2'-0 15/16"	2'-1 1/8"	2'-1 1/4"
GDR. A8	29'-4 13/16"	29'-8 13/16"	31'-6 1/16"	-	-	-

LOCATION OF 1"Ø FORMED HOLES TABLE SPAN B

GIRDER	"A"	"B"	"C"	"D"	"E"	"F"
GDR. B1	25'-1 3/16"	22'-10 1/8"	21'-11 7/16"	-	-	-
GDR. B2	25'-1 11/16"	22'-10 3/8"	21'-11 1/2"	3'-1 11/16"	3'-2"	3'-2 1/4"
GDR. B3	25'-2 3/16"	22'-10 11/16"	21'-11 9/16"	3'-2 1/8"	3'-2 7/16"	3'-2 11/16"
GDR. B4	25'-2 11/16"	22'-11"	21'-11 5/8"	3'-2 5/16"	3'-2 7/8"	3'-3 1/8"
GDR. B5	25'-3 1/4"	22'-11 5/16"	21'-11 11/16"	3'-3"	3'-3 5/16"	3'-3 5/8"
GDR. B6	25'-3 13/16"	22'-11 5/8"	21'-11 3/4"	3'-3 7/16"	3'-3 3/4"	3'-4 1/8"
GDR. B7	25'-4 3/8"	22'-11 15/16"	21'-11 7/8"	3'-3 15/16"	3'-4 1/4"	3'-4 9/16"
GDR. B8	22'-0 9/16"	22'-11 15/16"	25'-5 1/16"	-	-	-

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-

SHEET 5 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER T. FORFA

Alexander Forfa 9/22/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A																				
GIRDER 1 FORTIETH POINTS	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.028	0.056	0.083	0.110	0.136	0.161	0.185	0.208	0.229	0.250	0.268	0.285	0.299	0.313	0.324	0.334	0.340	0.346	0.348	0.350
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.022	0.044	0.066	0.088	0.109	0.130	0.151	0.172	0.189	0.205	0.222	0.238	0.249	0.259	0.270	0.280	0.284	0.287	0.291	0.295
FINAL CAMBER ↑	0	1/16	1/8	3/16	1/4	5/16	3/8	3/8	7/16	1/2	9/16	9/16	9/16	5/8	5/8	5/8	5/8	11/16	11/16	11/16	11/16

GIRDER 1 FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.348	0.346	0.340	0.334	0.324	0.313	0.299	0.285	0.268	0.250	0.229	0.208	0.185	0.161	0.136	0.110	0.083	0.056	0.028	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.291	0.287	0.284	0.280	0.270	0.259	0.249	0.238	0.222	0.205	0.189	0.172	0.151	0.130	0.109	0.088	0.066	0.044	0.022	0
FINAL CAMBER ↑	11/16	11/16	11/16	5/8	5/8	5/8	5/8	9/16	9/16	9/16	1/2	7/16	3/8	3/8	5/16	1/4	3/16	1/8	1/16	0

GIRDERS 2 & 7 FORTIETH POINTS	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.028	0.056	0.083	0.110	0.136	0.161	0.185	0.208	0.229	0.250	0.268	0.285	0.299	0.313	0.324	0.334	0.340	0.346	0.348	0.350
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.023	0.046	0.069	0.093	0.115	0.137	0.159	0.181	0.198	0.215	0.232	0.250	0.261	0.272	0.283	0.294	0.297	0.301	0.305	0.309
FINAL CAMBER ↑	0	1/16	1/8	3/16	3/16	1/4	5/16	5/16	5/16	3/8	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	9/16	1/2	1/2

GIRDERS 2 & 7 FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.348	0.346	0.340	0.334	0.324	0.313	0.299	0.285	0.268	0.250	0.229	0.208	0.185	0.161	0.136	0.110	0.083	0.056	0.028	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.305	0.301	0.297	0.294	0.283	0.272	0.261	0.250	0.232	0.215	0.198	0.181	0.159	0.137	0.115	0.093	0.069	0.046	0.023	0
FINAL CAMBER ↑	1/2	9/16	1/2	1/2	1/2	1/2	7/16	7/16	7/16	7/16	3/8	5/16	5/16	5/16	1/4	3/16	3/16	1/8	1/16	0

GIRDERS 3 & 6 FORTIETH POINTS	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.028	0.056	0.083	0.110	0.136	0.161	0.185	0.208	0.229	0.250	0.268	0.285	0.299	0.313	0.324	0.334	0.340	0.346	0.348	0.350
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.023	0.046	0.069	0.092	0.114	0.136	0.158	0.180	0.197	0.214	0.231	0.248	0.259	0.270	0.281	0.292	0.296	0.300	0.303	0.307
FINAL CAMBER ↑	0	1/16	1/8	3/16	3/16	1/4	5/16	5/16	5/16	3/8	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	9/16	9/16	1/2

GIRDERS 3 & 6 FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.348	0.346	0.340	0.334	0.324	0.313	0.299	0.285	0.268	0.250	0.229	0.208	0.185	0.161	0.136	0.110	0.083	0.056	0.028	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.303	0.300	0.296	0.292	0.281	0.270	0.259	0.248	0.231	0.214	0.197	0.180	0.158	0.136	0.114	0.092	0.069	0.046	0.023	0
FINAL CAMBER ↑	9/16	9/16	1/2	1/2	1/2	1/2	1/2	7/16	7/16	7/16	3/8	5/16	5/16	5/16	1/4	3/16	3/16	1/8	1/16	0

GIRDERS 4 & 5 FORTIETH POINTS	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.028	0.056	0.083	0.110	0.136	0.161	0.185	0.208	0.229	0.250	0.268	0.285	0.299	0.313	0.324	0.334	0.340	0.346	0.348	0.350
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.023	0.045	0.068	0.090	0.111	0.133	0.154	0.176	0.192	0.209	0.226	0.243	0.253	0.264	0.275	0.285	0.289	0.293	0.296	0.300
FINAL CAMBER ↑	0	1/16	1/8	3/16	1/4	5/16	5/16	3/8	3/8	7/16	1/2	1/2	1/2	9/16	9/16	9/16	9/16	5/8	5/8	5/8	5/8

GIRDERS 4 & 5 FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.348	0.346	0.340	0.334	0.324	0.313	0.299	0.285	0.268	0.250	0.229	0.208	0.185	0.161	0.136	0.110	0.083	0.056	0.028	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.296	0.293	0.289	0.285	0.275	0.264	0.253	0.243	0.226	0.209	0.192	0.176	0.154	0.133	0.111	0.090	0.068	0.045	0.023	0
FINAL CAMBER ↑	5/8	5/8	5/8	9/16	9/16	9/16	9/16	1/2	1/2	1/2	7/16	3/8	3/8	5/16	5/16	1/4	3/16	1/8	1/16	0

GIRDER 8 FORTIETH POINTS	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.028	0.056	0.083	0.110	0.136	0.161	0.185	0.208	0.229	0.250	0.268	0.285	0.299	0.313	0.324	0.334	0.340	0.346	0.348	0.350
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.020	0.039	0.059	0.079	0.098	0.116	0.135	0.154	0.169	0.183	0.198	0.213	0.222	0.231	0.241	0.250	0.253	0.257	0.260	0.263
FINAL CAMBER ↑	0	1/8	3/16	5/16	3/8	7/16	9/16	9/16	5/8	3/4	13/16	13/16	7/8	15/16	1	1	1	1 1/16	1 1/16	1 1/16	1 1/16

GIRDER 8 FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.348	0.346	0.340	0.334	0.324	0.313	0.299	0.285	0.268	0.250	0.229	0.208	0.185	0.161	0.136	0.110	0.083	0.056	0.028	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.260	0.257	0.253	0.250	0.241	0.231	0.222	0.213	0.198	0.183	0.169	0.154	0.135	0.116	0.098	0.079	0.059	0.039	0.020	0
FINAL CAMBER ↑	1 1/16	1 1/16	1 1/16	1	1	1	15/16	7/8	13/16	13/16	3/4	5/8	9/16	9/16	7/16	3/8	5/16	3/16	1/8	0

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203M EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6200 PSI (SPAN A GIRDERS) OR 6800 PSI (SPAN B GIRDERS).

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4", EXCEPT WHERE OTHERWISE NOTED.

FOR 54" AND 36" FLORIDA I-BEAM GIRDERS, SEE SPECIAL PROVISIONS.

↑ = UPWARD CAMBER

↓ = DOWNWARD DEFLECTION

* INCLUDES FUTURE WEARING SURFACE

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTION TABLES SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSign Envelope ID: 24718D59-38B4-4F78-BBFE-480B63AAE2C8

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN B																				
GIRDER 1 TWENTIETH POINTS	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.053	0.105	0.154	0.199	0.239	0.273	0.300	0.319	0.332	0.336	0.332	0.319	0.300	0.273	0.239	0.199	0.154	0.105	0.053	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.039	0.079	0.117	0.156	0.186	0.216	0.235	0.254	0.261	0.267	0.261	0.254	0.235	0.216	0.186	0.156	0.117	0.079	0.039	0
FINAL CAMBER ↑	0	3/16	5/16	7/16	1/2	5/8	11/16	3/4	3/4	7/8	13/16	7/8	3/4	3/4	11/16	5/8	1/2	7/16	5/16	3/16	0
GIRDERS 2 & 7 TWENTIETH POINTS	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.053	0.105	0.154	0.199	0.239	0.273	0.300	0.319	0.332	0.336	0.332	0.319	0.300	0.273	0.239	0.199	0.154	0.105	0.053	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.044	0.088	0.131	0.174	0.207	0.241	0.262	0.284	0.291	0.298	0.291	0.284	0.262	0.241	0.207	0.174	0.131	0.088	0.044	0
FINAL CAMBER ↑	0	1/8	3/16	1/4	5/16	3/8	3/8	7/16	7/16	1/2	7/16	1/2	7/16	7/16	3/8	3/8	5/16	1/4	3/16	1/8	0
GIRDERS 3 & 6 TWENTIETH POINTS	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.053	0.105	0.154	0.199	0.239	0.273	0.300	0.319	0.332	0.336	0.332	0.319	0.300	0.273	0.239	0.199	0.154	0.105	0.053	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.044	0.088	0.131	0.174	0.208	0.241	0.263	0.284	0.292	0.299	0.292	0.284	0.263	0.241	0.208	0.174	0.131	0.088	0.044	0
FINAL CAMBER ↑	0	1/8	3/16	1/4	5/16	3/8	3/8	7/16	7/16	1/2	7/16	1/2	7/16	7/16	3/8	3/8	5/16	1/4	3/16	1/8	0
GIRDERS 4 & 5 TWENTIETH POINTS	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.053	0.105	0.154	0.199	0.239	0.273	0.300	0.319	0.332	0.336	0.332	0.319	0.300	0.273	0.239	0.199	0.154	0.105	0.053	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.043	0.086	0.129	0.171	0.204	0.237	0.258	0.279	0.286	0.293	0.286	0.279	0.258	0.237	0.204	0.171	0.129	0.086	0.043	0
FINAL CAMBER ↑	0	1/8	1/4	5/16	5/16	7/16	7/16	1/2	1/2	9/16	1/2	9/16	1/2	1/2	7/16	7/16	5/16	5/16	1/4	1/8	0
GIRDER 8 TWENTIETH POINTS	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.053	0.105	0.154	0.199	0.239	0.273	0.300	0.319	0.332	0.336	0.332	0.319	0.300	0.273	0.239	0.199	0.154	0.105	0.053	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.040	0.079	0.118	0.156	0.187	0.217	0.236	0.255	0.262	0.268	0.262	0.255	0.236	0.217	0.187	0.156	0.118	0.079	0.040	0
FINAL CAMBER ↑	0	3/16	5/16	7/16	1/2	5/8	11/16	3/4	3/4	7/8	13/16	7/8	3/4	3/4	11/16	5/8	1/2	7/16	5/16	3/16	0

↑ = UPWARD CAMBER

↓ = DOWNWARD DEFLECTION

✱ INCLUDES FUTURE WEARING SURFACE

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD
DEFLECTION TABLES
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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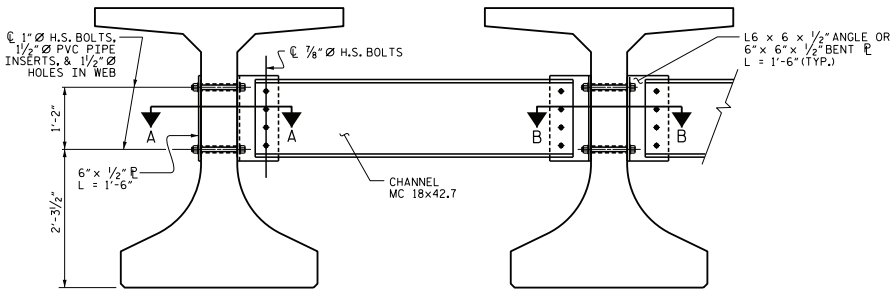
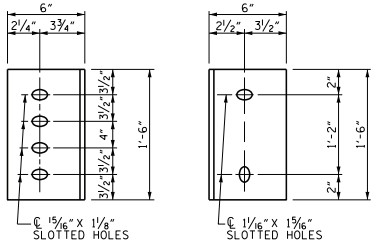
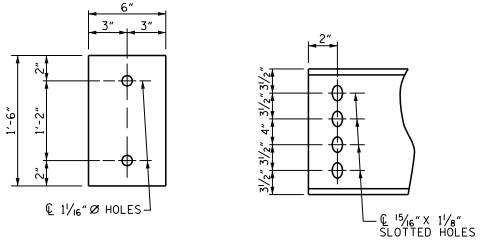
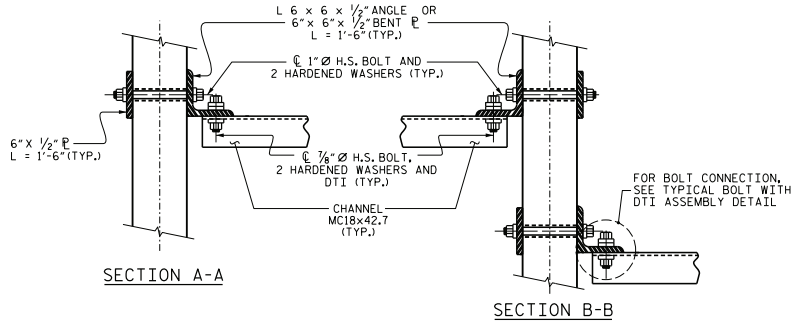


PART SECTION AT INTERMEDIATE DIAPHRAGM

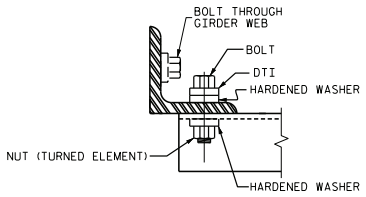


CONNECTOR PLATE DETAILS





CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW. COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE CONTRACTOR SHALL TAKE INTO ACCOUNT CROSS SLOPE, SKEW, GIRDER DEFLECTIONS AND OTHER PERTINENT GEOMETRIC PARAMETERS INTO ACCOUNT WHEN DETAILING DIAPHRAGMS.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 8 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PRESTRESSED CONCRETE GIRDER INTERMEDIATE STEEL DIAPHRAGMS SPAN A

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-23
1			3			TOTAL SHEETS	
2			4				53

DRAWN BY : M. SPENCER DATE : 10/2020
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DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA
Alexander Forfa 9/22/2021

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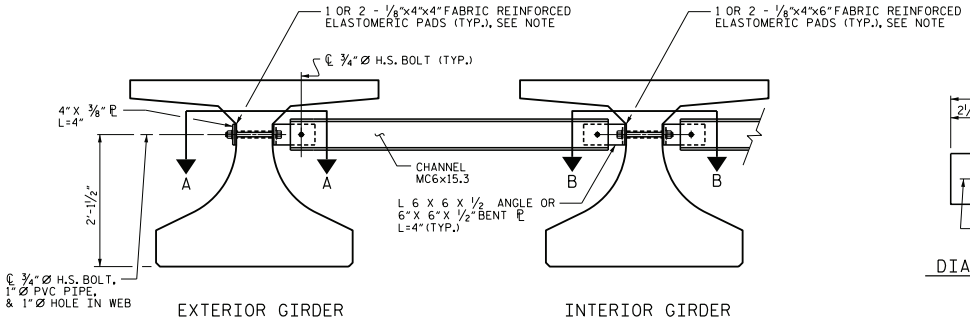
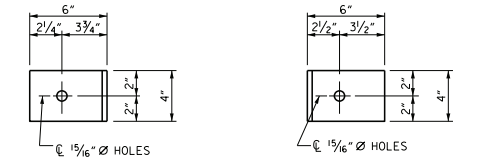
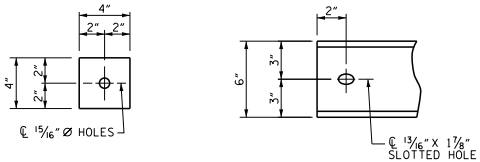
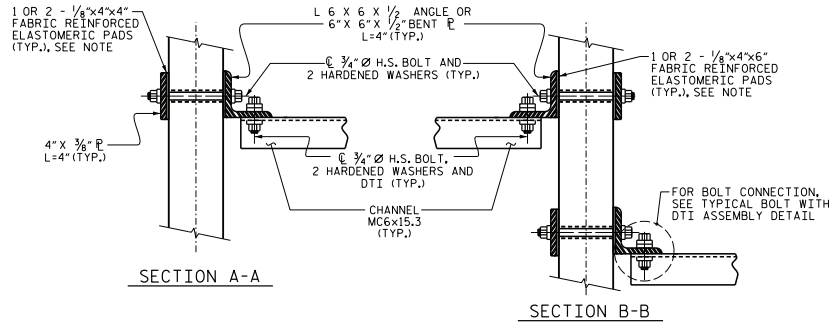


PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAILS





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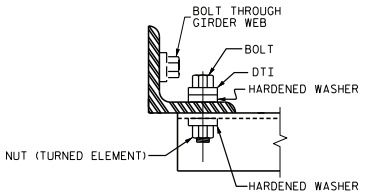

BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

DIAPHRAGMS SHALL BE INSTALLED AS BEAMS ARE ERECTED AND TIGHTENED AS SOON AS POSSIBLE DURING ERECTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE CONTRACTOR SHALL TAKE INTO ACCOUNT CROSS SLOPE, SKEW, GIRDER DEFLECTIONS AND OTHER PERTINENT GEOMETRIC PARAMETERS WHEN DETAILING DIAPHRAGMS.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

NOTE:

PLACE ELASTOMERIC PADS AS NECESSARY TO PROVIDE A FLAT MOUNTING SURFACE BETWEEN THE STEEL AND CONCRETE.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PRESTRESSED CONCRETE GIRDER
INTERMEDIATE STEEL DIAPHRAGMS
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			53

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Digitally Signed by Alexander Forfa
9/22/2021

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benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
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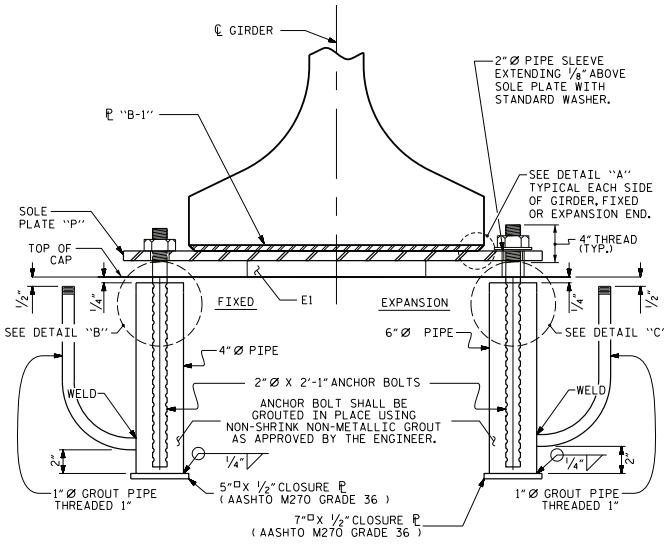
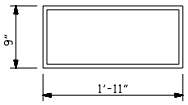


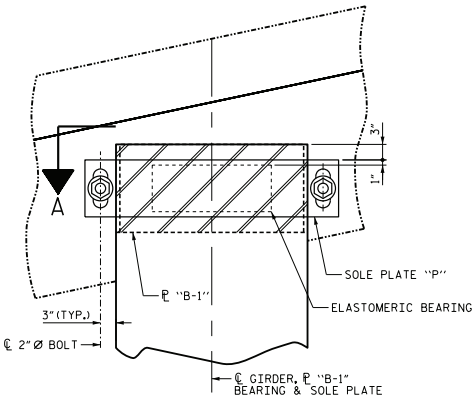
SECTION A-A



E1 (32 REQ'D)

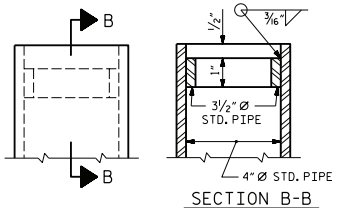
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



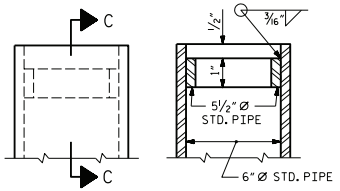
TYPICAL PLAN AT END BENT

(SHOWING EXPANSION BEARING)



SECTION B-B

DETAIL "B"



SECTION C-C

DETAIL "C"

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2"Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-0H OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

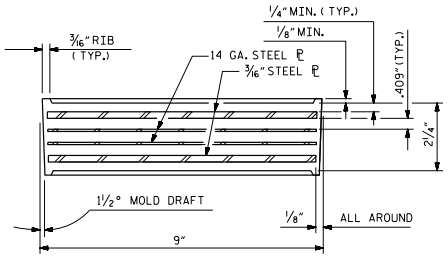
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

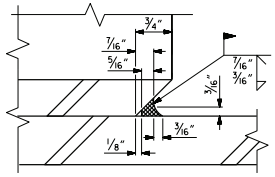
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

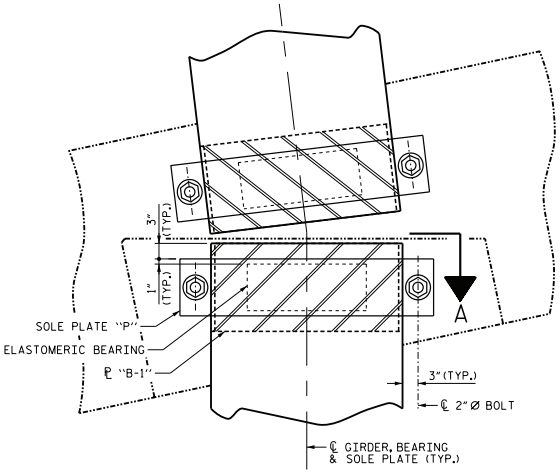
THE WELD BETWEEN PLATE "B1" AND THE SOLE PLATE CAN BE COMPLETED PRIOR TO SETTING THE GIRDERS TO AVOID FIELD WELDING THESE PLATES.



TYPICAL SECTION OF ELASTOMERIC BEARINGS

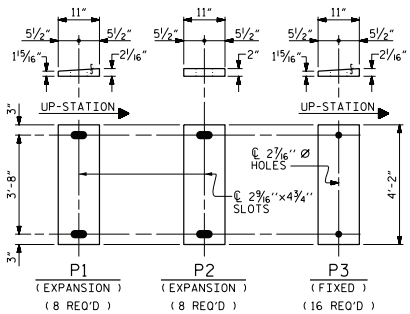


DETAIL "A"



TYPICAL PLAN AT BENT

(SHOWING FIXED BEARING)



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			53

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

DRAWN BY :	M. SPENCER	DATE :	10/2020
CHECKED BY :	A. FORFA	DATE :	10/2020
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE :	09/2021

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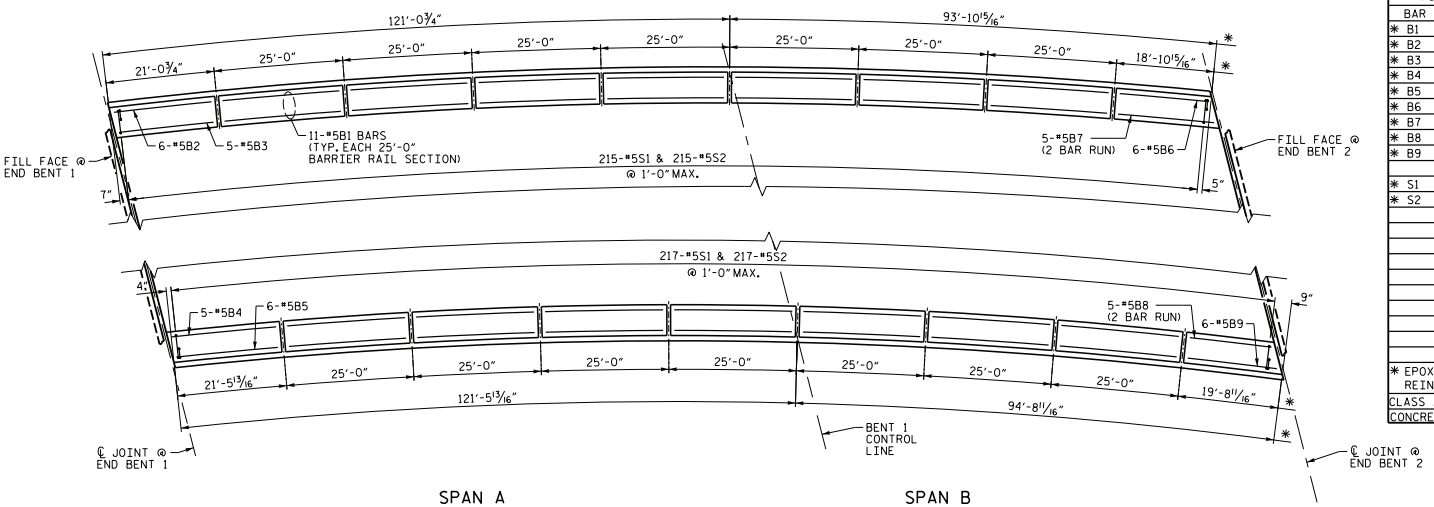


SPAN A

SPAN B

PLAN

* MEASURED ALONG OUTSIDE FACE OF BARRIER.

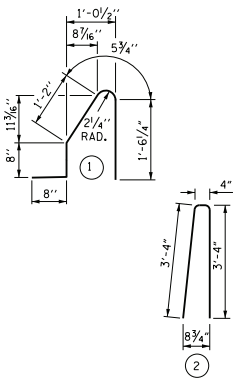
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

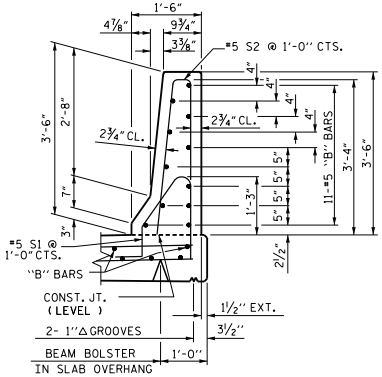
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	154	#5	STR.	24'-8"	3,962
* B2	6	#5	STR.	20'-8"	129
* B3	5	#5	STR.	20'-6"	107
* B4	5	#5	STR.	21'-3"	111
* B5	6	#5	STR.	21'-2"	132
* B6	6	#5	STR.	18'-8"	117
* B7	10	#5	STR.	11'-1"	116
* B8	10	#5	STR.	11'-2"	116
* B9	6	#5	STR.	19'-3"	120
* S1	432	#5	1	4'-6"	2,028
* S2	432	#5	2	7'-0"	3,154

* EPOXY COATED REINFORCING STEEL	10,092 LBS.
CLASS AA CONCRETE	58.7 CU. YDS.
CONCRETE BARRIER RAIL	431.2 LIN. FT.

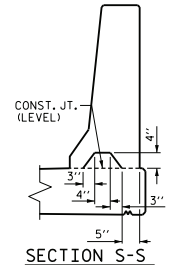
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

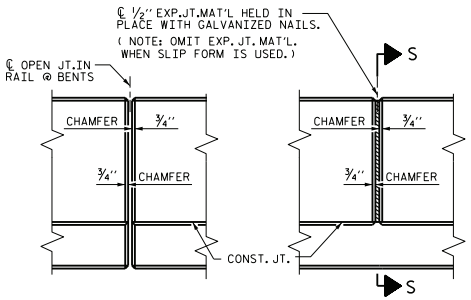


SECTION THRU RAIL



SECTION S-S

AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR LIST AND QUANTITIES SHOWN ON THIS SHEET DO NOT INCLUDE BARRIER RAILS ON APPROACH SLABS. FOR BARRIER RAILS ON APPROACH SLABS, SEE "BRIDGE APPROACH SLABS" SHEET 4 OF 5.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 12/2020
CHECKED BY : A. FORFA DATE : 12/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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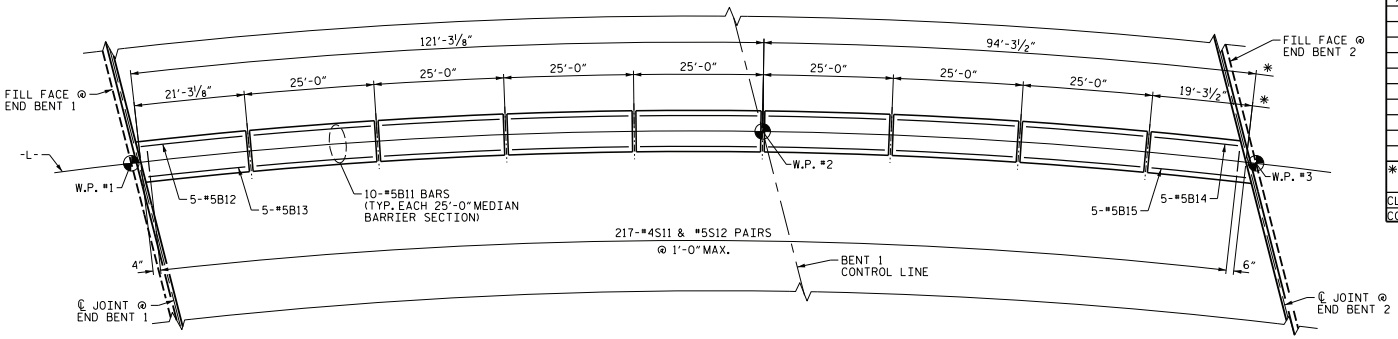


SPAN A SPAN B

✱ MEASURED ALONG -L-

PLAN OF MEDIAN BARRIER RAIL

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

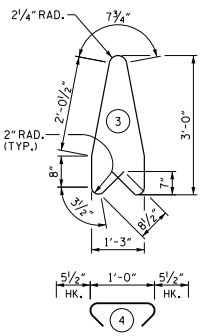
BILL OF MATERIAL

FOR CONCRETE MEDIAN BARRIER ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B11	70	#5	STR.	24'-8"	1801
✱ B12	5	#5	STR.	21'-0"	110
✱ B13	5	#5	STR.	20'-10"	109
✱ B14	5	#5	STR.	18'-9"	98
✱ B15	5	#5	STR.	19'-1"	100
✱ S11	217	#4	3	8'-1"	1172
✱ S12	434	#5	4	1'-11"	868

✱ EPOXY COATED REINFORCING STEEL	4,258 LBS.
CLASS AA CONCRETE	37.3 CU. YDS.
CONCRETE MEDIAN BARRIER	215.6 LIN. FT.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

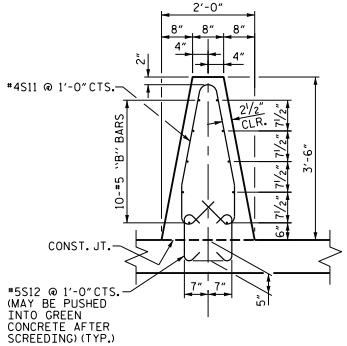
NOTES

THE MEDIAN BARRIER IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

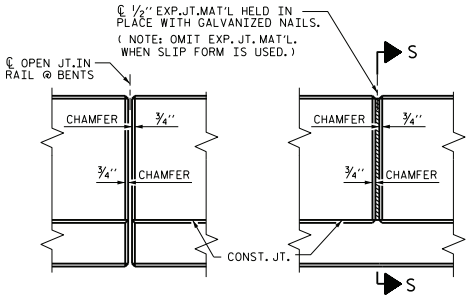
ALL REINFORCING STEEL IN MEDIAN BARRIERS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MEDIAN BARRIER AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN MEDIAN BARRIER EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF MEDIAN BARRIER SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR LIST AND QUANTITIES SHOWN ON THIS SHEET DO NOT INCLUDE MEDIAN BARRIERS ON APPROACH SLABS. FOR MEDIAN BARRIERS ON APPROACH SLABS, SEE "BRIDGE APPROACH SLABS" SHEET 5 OF 5.



SECTION THRU CONCRETE MEDIAN BARRIER



ELEVATION AT EXPANSION JOINTS

CONCRETE MEDIAN BARRIER DETAILS

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE MEDIAN BARRIER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 10/2020
CHECKED BY : A. FORFA DATE : 10/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER I. FORFA

Alexander Forfa 9/22/2021

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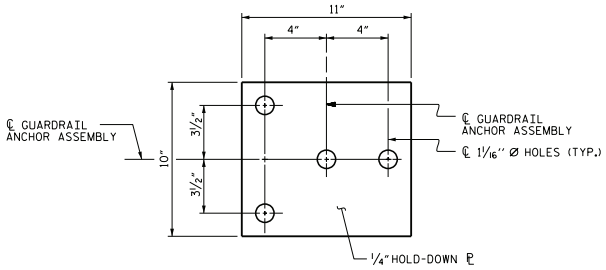
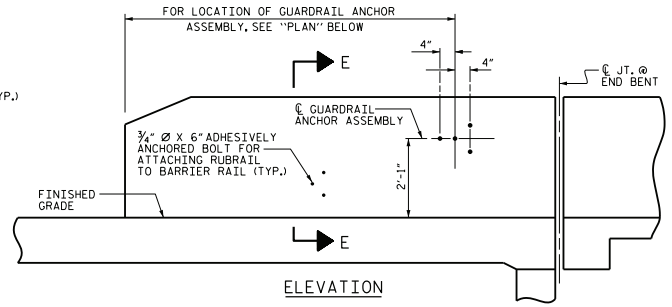


PLAN



ELEVATION

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 7/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

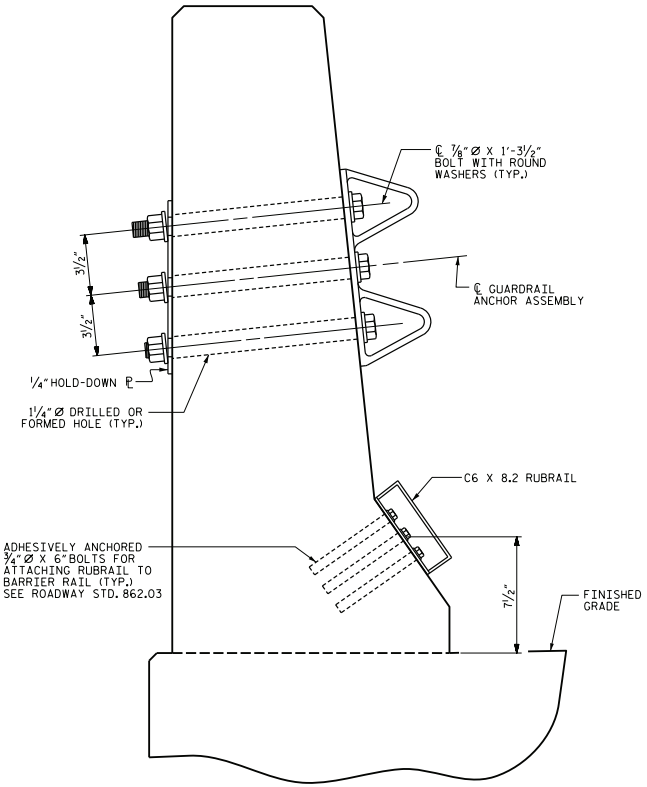
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

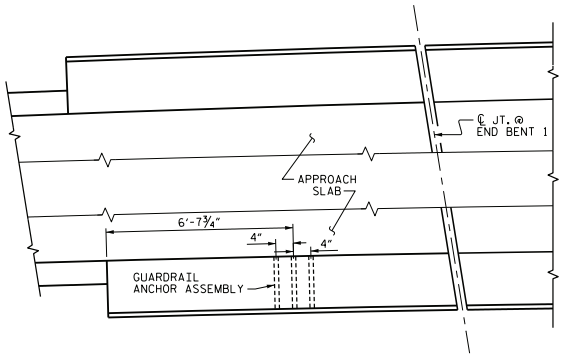
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

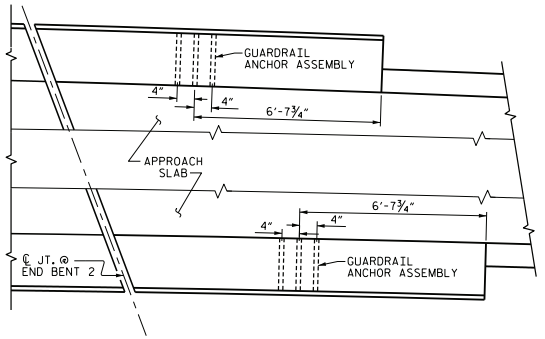


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

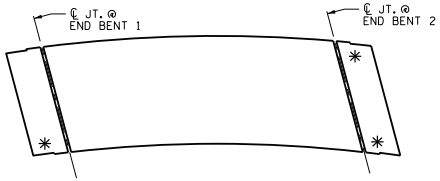


PLAN AT END BENT 1



PLAN AT END BENT 2

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			53

STD. NO. GRA2

DRAWN BY : M. SPENCER DATE : 12/2020
CHECKED BY : A. FORFA DATE : 12/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042449 ALEXANDER J. FORFA
Digitally signed by Alexander Forfa
9/22/2021

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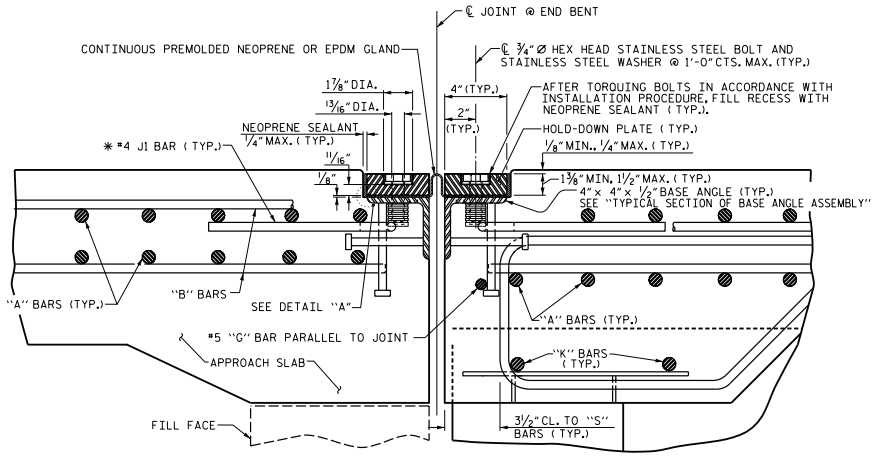


EXPANSION JOINT DETAILS

(SECTION NORMAL TO JOINT)

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

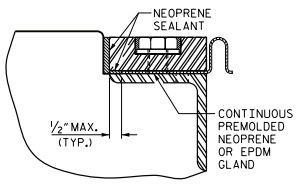
INSTALLATION PROCEDURE

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE ¾" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X ½" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED ⅞" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

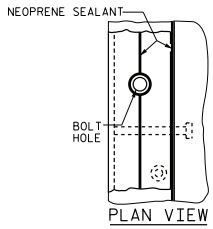
GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE ½" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE ¾" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.

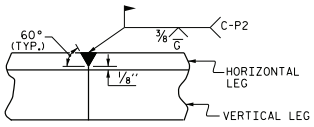
MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	78°-31'-02"	¾"	1½"	1⅜"	1⅛"
2	72°-02'-39"	9/16"	1⅜"	1⅝"	1⅛"



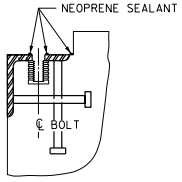
DETAIL "A"



PLAN VIEW

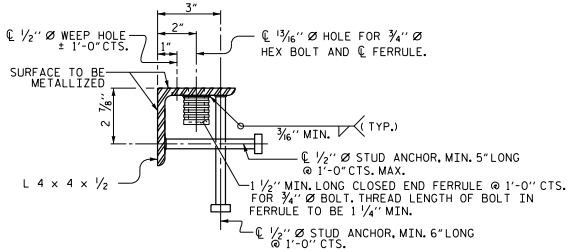


DETAIL- FIELD WELD SPLICE OF BASE ANGLE



CROSS SECTION

INSTALLATION SKETCH



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			53

DRAWN BY :	M. SPENCER	DATE :	05/2021
CHECKED BY :	A. FORFA	DATE :	05/2021
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE :	09/2021

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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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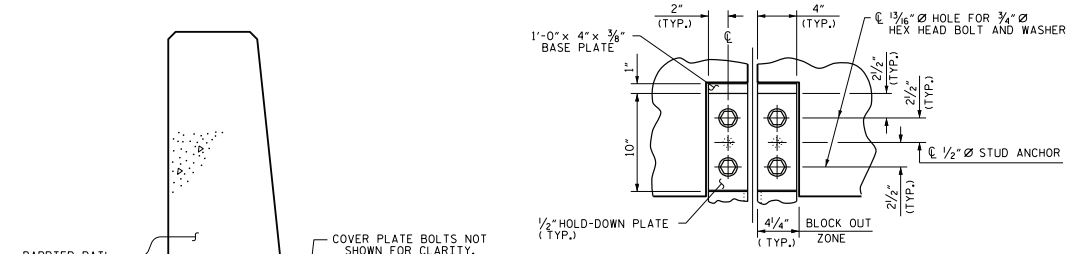
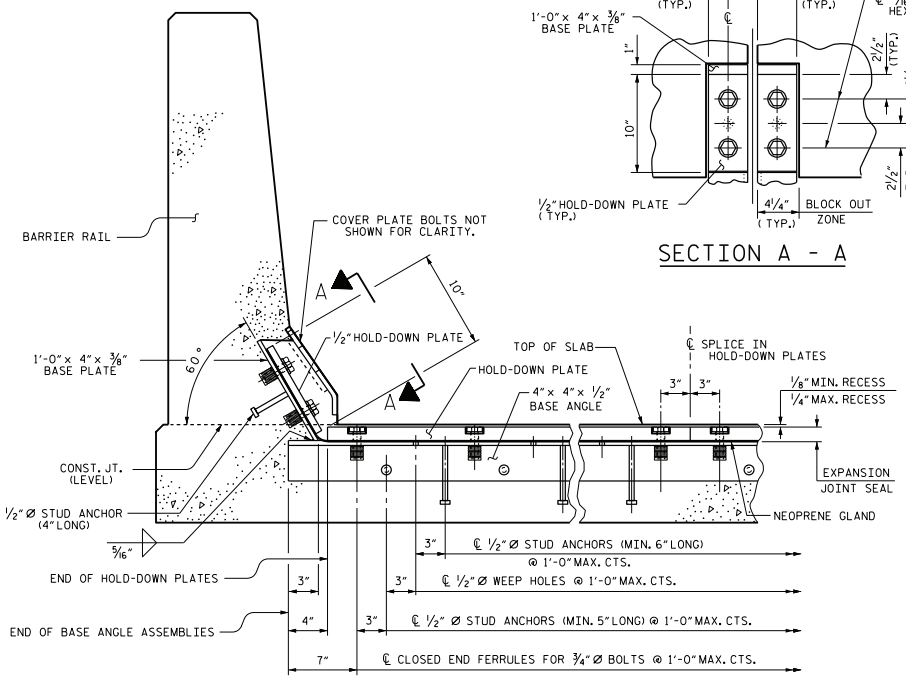
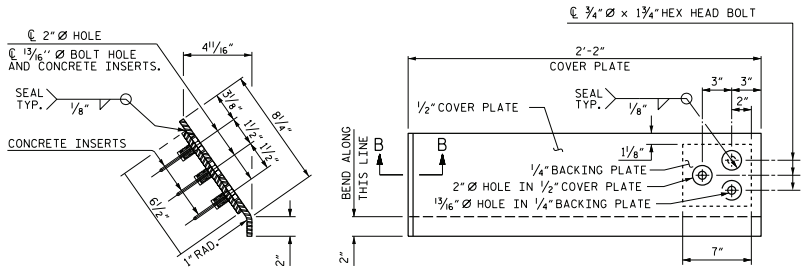


SECTION A - A



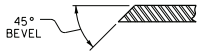
SECTION THRU RAIL NORMAL TO JOINT



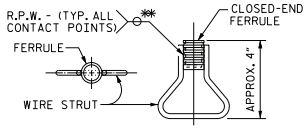
END VIEW

TYPE II - ELEVATION VIEW

COVER PLATE DETAILS



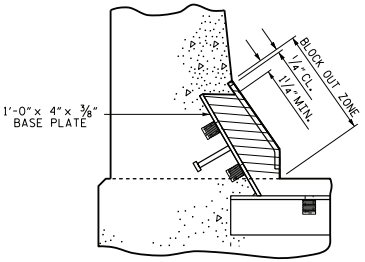
SECTION B - B



PLAN ELEVATION

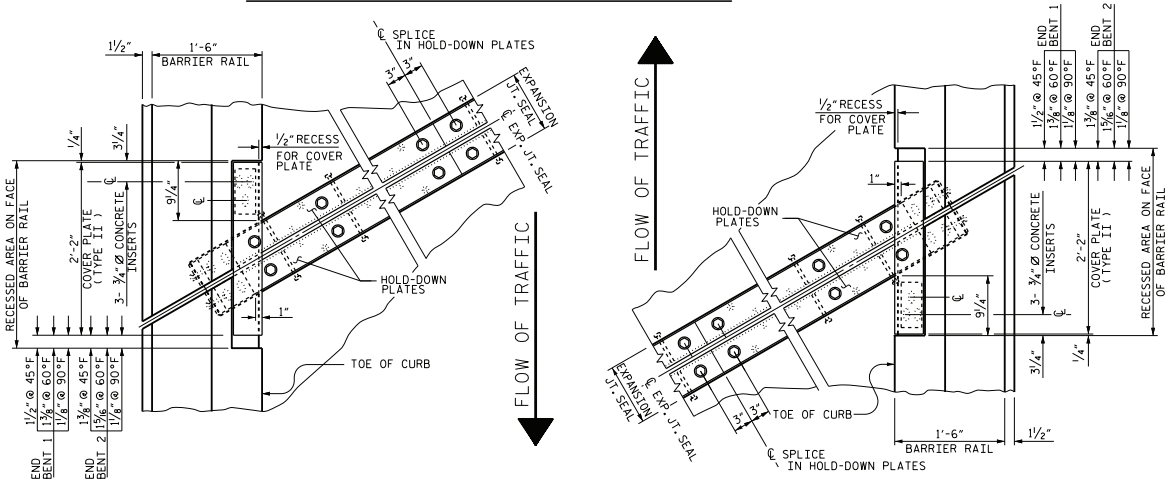
CONCRETE INSERT

** EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



BLOCK OUT DETAIL

SEE "SECTION A-A" FOR OTHER DETAILS.



PLAN OF EXPANSION JOINT SEAL

ASSEMBLED BY : M. SPENCER	DATE : 12/2020
CHECKED BY : A. FORFA	DATE : 02/2021
DRAWN BY : REK 9/87	REV. 7/12 MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA
Alexander Forfa 9/22/2021

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PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SUPERSTRUCTURE
EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			53

STD. NO. EJS2 SHT 3

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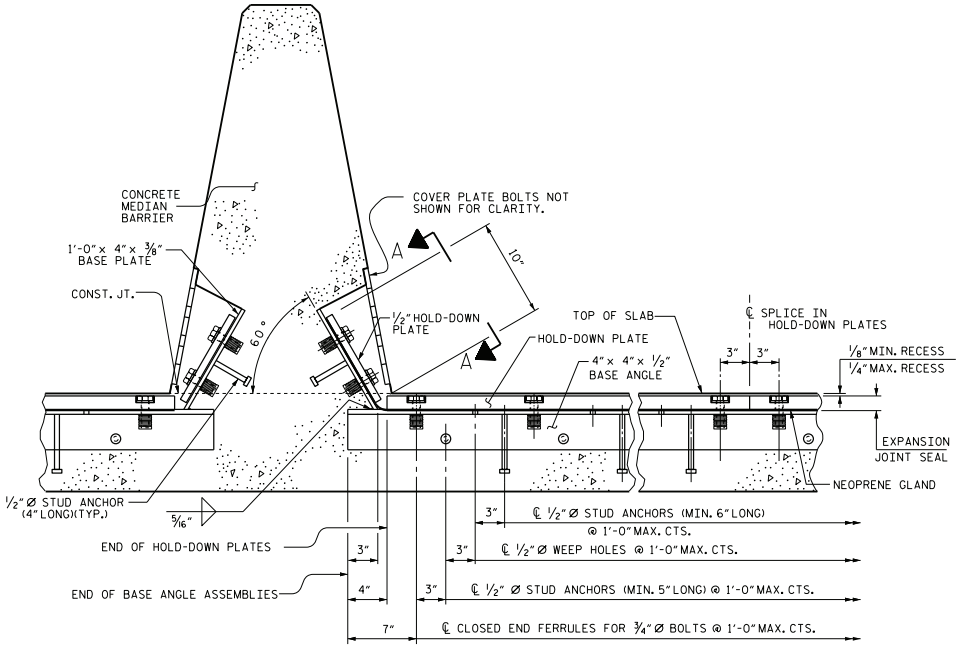
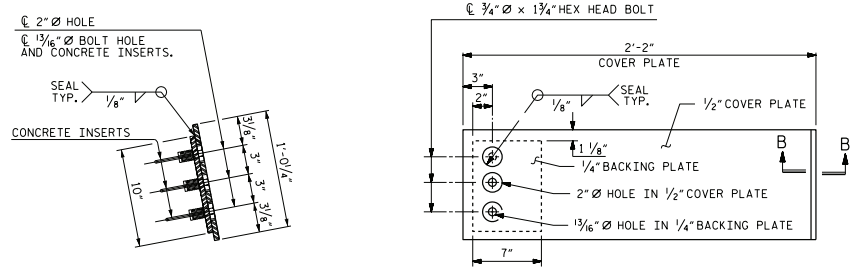
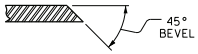


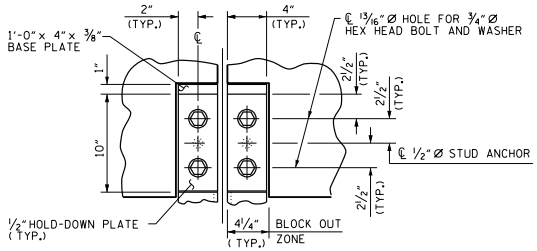
SECTION THRU MEDIAN BARRIER NORMAL TO JOINT



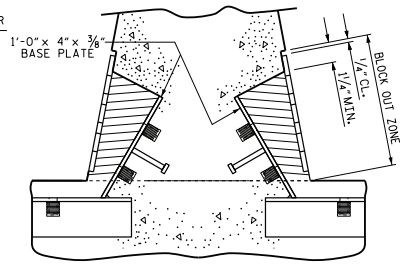
COVER PLATE DETAILS



SECTION B - B

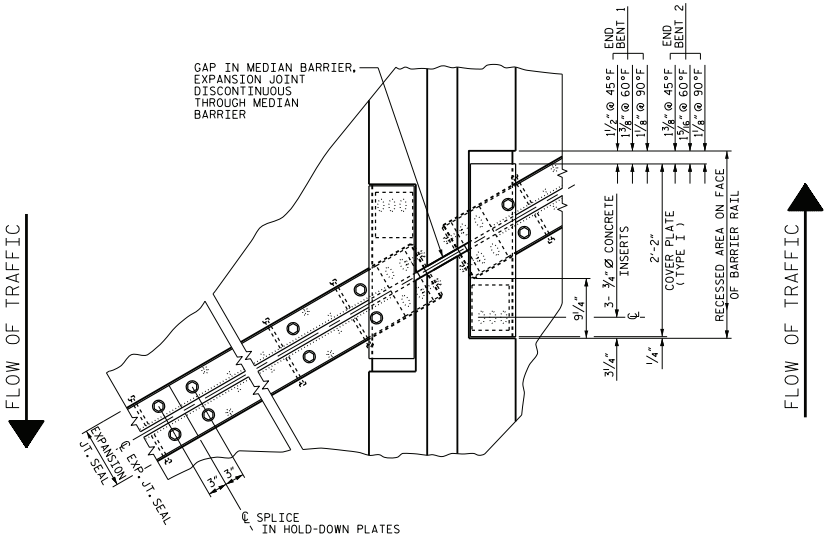


SECTION A - A



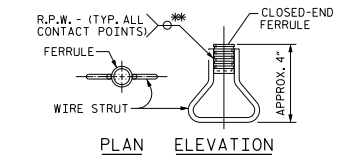
BLOCK OUT DETAIL

SEE "SECTION A-A" FOR OTHER DETAILS.



PLAN OF EXPANSION JOINT SEAL

(BOTH SIDES SIMILAR)



CONCRETE INSERT

** EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR CONCRETE MEDIAN BARRIER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 12/2020
CHECKED BY : A. FORFA DATE : 02/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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Alexander Forfa 9/22/2021

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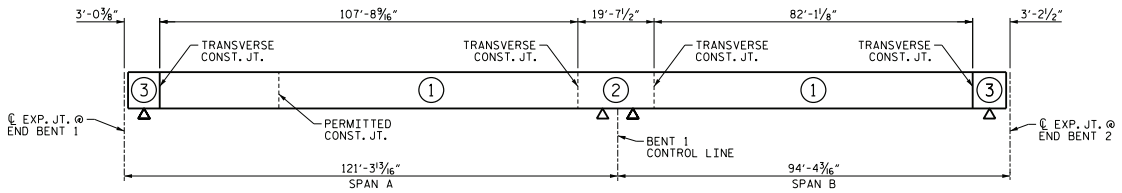
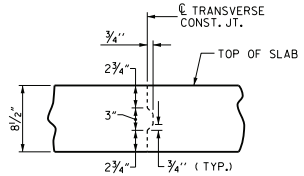


NOTE: ALL DIMENSIONS ARE ALONG -L- AND ARE ARC DIMENSIONS

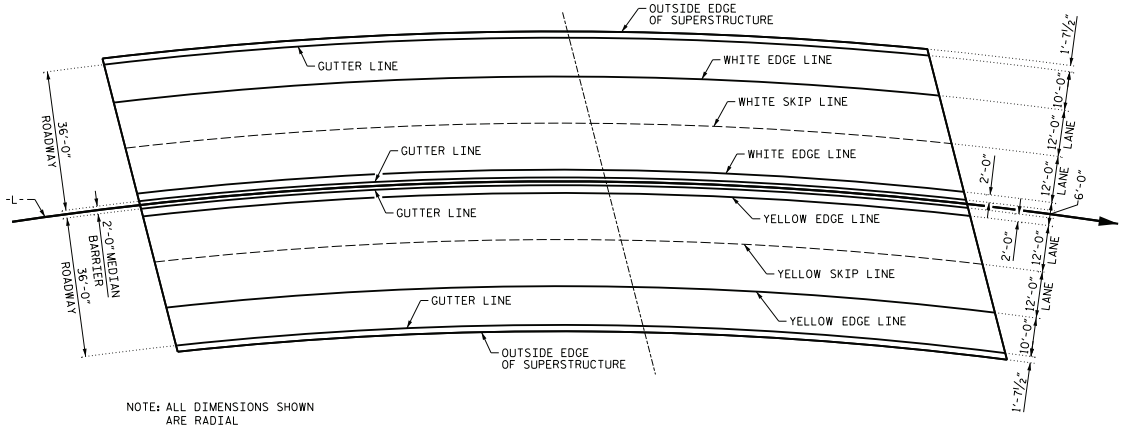
POURING SEQUENCE

POUR (2) SHALL NOT BE STARTED UNTIL BOTH ADJACENT (1) POURS REACH A MINIMUM OF 3000 PSI



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



NOTE: ALL DIMENSIONS SHOWN ARE RADIAL

PAVEMENT MARKING ALIGNMENT

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL AND POURING SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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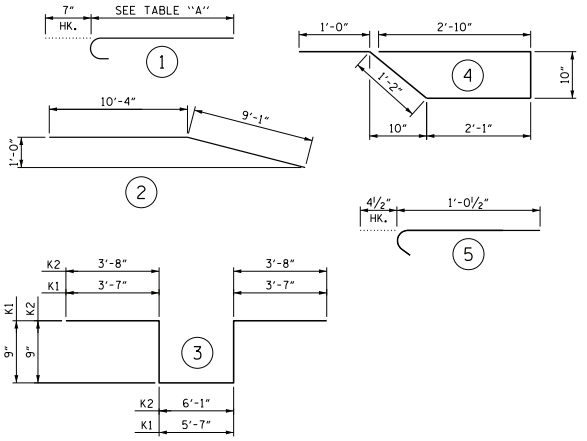
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	701	#5	1	40'-6"	29611
A2	701	#5	STR	39'-9"	29063
✱ A3	726	#5	1	10'-1"	7635
✱ A101	1	#5	1	2'-11"	3
✱ A102	1	#5	1	4'-1"	4
✱ A103	1	#5	1	5'-3"	5
✱ A104	1	#5	1	6'-5"	7
✱ A105	1	#5	1	7'-7"	8
✱ A106	1	#5	1	8'-9"	9
✱ A107	1	#5	1	10'-0"	10
✱ A108	1	#5	1	12'-4"	13
✱ A109	1	#5	1	14'-8"	15
✱ A110	1	#5	1	17'-0"	18
✱ A111	1	#5	1	19'-4"	20
✱ A112	1	#5	1	21'-9"	23
✱ A113	1	#5	1	24'-1"	25
✱ A114	1	#5	1	26'-5"	28
✱ A115	1	#5	1	28'-9"	30
✱ A116	1	#5	1	31'-2"	33
✱ A117	1	#5	1	33'-6"	35
✱ A118	1	#5	1	35'-10"	37
✱ A119	1	#5	1	38'-2"	40
✱ A120	1	#5	STR	4'-10"	5
✱ A121	1	#5	STR	7'-3"	8
✱ A122	1	#5	STR	9'-7"	10
✱ A123	1	#5	STR	11'-11"	12
✱ A124	1	#5	STR	14'-3"	15
✱ A125	1	#5	STR	16'-7"	17
✱ A126	1	#5	STR	18'-11"	20
✱ A127	1	#5	STR	21'-4"	22
✱ A128	1	#5	STR	23'-8"	25
✱ A129	1	#5	STR	26'-0"	27
✱ A130	1	#5	STR	28'-4"	30
✱ A131	1	#5	STR	30'-8"	32
✱ A132	1	#5	STR	33'-0"	34
✱ A133	1	#5	STR	35'-4"	37
✱ A134	1	#5	STR	37'-9"	39
✱ A301	1	#5	1	2'-9"	3
✱ A302	1	#5	1	3'-10"	4
✱ A303	1	#5	1	4'-11"	5
✱ A304	1	#5	1	6'-1"	6
✱ A305	1	#5	1	7'-2"	7
✱ A306	1	#5	1	8'-3"	9
✱ A307	1	#5	1	9'-5"	10
✱ A308	1	#5	1	10'-6"	11
✱ A309	1	#5	1	12'-8"	13
✱ A310	1	#5	1	14'-11"	16
✱ A311	1	#5	1	17'-1"	18
✱ A312	1	#5	1	19'-4"	20
✱ A313	1	#5	1	21'-7"	23
✱ A314	1	#5	1	23'-9"	25
✱ A315	1	#5	1	26'-0"	27
✱ A316	1	#5	1	28'-2"	29
✱ A317	1	#5	1	30'-5"	32
✱ A318	1	#5	1	32'-7"	34
✱ A319	1	#5	1	34'-10"	36
✱ A320	1	#5	1	37'-1"	39
✱ A321	1	#5	1	39'-3"	41
✱ A322	1	#5	STR	3'-6"	4
✱ A323	1	#5	STR	5'-8"	6
✱ A324	1	#5	STR	7'-11"	8
✱ A325	1	#5	STR	10'-2"	11
✱ A326	1	#5	STR	12'-4"	13
✱ A327	1	#5	STR	14'-7"	15
✱ A328	1	#5	STR	16'-10"	18
✱ A329	1	#5	STR	19'-0"	20
✱ A330	1	#5	STR	21'-3"	22
✱ A331	1	#5	STR	23'-5"	24
✱ A332	1	#5	STR	25'-8"	27
✱ A333	1	#5	STR	27'-11"	29
✱ A334	1	#5	STR	30'-1"	31
✱ A335	1	#5	STR	32'-4"	34
✱ A336	1	#5	STR	34'-7"	36
✱ A337	1	#5	STR	36'-9"	38
✱ A338	1	#5	STR	39'-0"	41
A401	1	#5	STR	2'-2"	2
A402	1	#5	STR	3'-3"	3
A403	1	#5	STR	5'-6"	6
A404	1	#5	STR	7'-8"	8
A405	1	#5	STR	9'-11"	10
A406	1	#5	STR	12'-1"	13
A407	1	#5	STR	14'-4"	15
A408	1	#5	STR	16'-6"	17
A409	1	#5	STR	18'-9"	20
A410	1	#5	STR	21'-0"	22
A411	1	#5	STR	23'-2"	24
A412	1	#5	STR	25'-5"	27
A413	1	#5	STR	27'-7"	29
A414	1	#5	STR	29'-10"	31
A416	1	#5	STR	32'-0"	33
A416	1	#5	STR	34'-3"	36
A417	1	#5	STR	36'-6"	38
A418	1	#5	STR	38'-8"	40
A419	1	#5	STR	3'-6"	4
A420	1	#5	STR	5'-8"	6
A421	1	#5	STR	7'-11"	8
A422	1	#5	STR	10'-2"	11
A423	1	#5	STR	12'-4"	13
A424	1	#5	STR	14'-7"	15
A425	1	#5	STR	16'-10"	18
A426	1	#5	STR	19'-0"	20
A427	1	#5	STR	21'-3"	22
A428	1	#5	STR	23'-5"	24
A429	1	#5	STR	25'-8"	27
A430	1	#5	STR	27'-11"	29
A431	1	#5	STR	30'-1"	31
A432	1	#5	STR	32'-4"	34
A433	1	#5	STR	34'-7"	36
A434	1	#5	STR	36'-9"	38
A435	1	#5	STR	39'-0"	41
✱ B1	156	#4	STR	39'-3"	4090
✱ B2	156	#4	STR	30'-10"	3213
B3	71	#5	STR	58'-1"	4301
B4	71	#5	STR	45'-5"	3363
✱ B5	231	#6	2	19'-5"	6737
B6	231	#6	2	19'-5"	6737
✱ G1	2	#5	STR	40'-0"	83
✱ G2	2	#5	STR	42'-4"	88
✱ J1	153	#4	5	1'-5"	145
✱ K1	49	#5	3	14'-3"	728
✱ K2	49	#5	3	14'-11"	762
✱ K3	16	#5	STR	40'-1"	669
✱ K4	16	#5	STR	42'-4"	706
✱ S1	98	#4	4	7'-11"	518

REINFORCING STEEL 44,881 LBS.
✱EPOXY COATED REINF. STEEL 56,466 LBS.

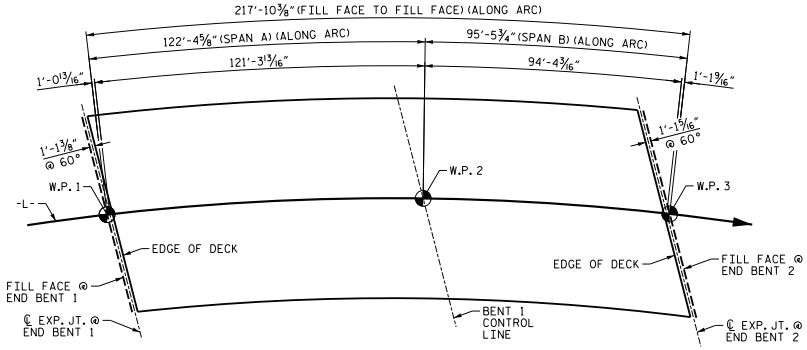
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 16,652)

TABLE "A"	
BAR	LENGTH
A1	39'-11"
A3	9'-6"
A101	2'-4"
A102	3'-6"
A103	4'-8"
A104	5'-10"
A105	7'-0"
A106	8'-2"
A107	9'-5"
A108	11'-9"
A109	14'-1"
A110	16'-5"
A111	18'-9"
A112	21'-2"
A113	23'-6"
A114	25'-10"
A115	28'-2"
A116	30'-7"
A117	32'-11"
A118	35'-3"
A119	37'-7"
A301	2'-2"
A302	3'-3"
A303	4'-4"
A304	5'-6"
A305	6'-7"
A306	7'-8"
A307	8'-10"
A308	9'-11"
A309	12'-1"
A310	14'-4"
A311	16'-6"
A312	18'-9"
A313	21'-0"
A314	23'-2"
A315	25'-5"
A316	27'-7"
A317	29'-10"
A318	32'-0"
A319	34'-3"
A320	36'-6"
A321	38'-8"

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1 (SPAN A)	268.1		
POUR 1 (SPAN B)	200.5		
POUR 2	50.0		
POUR 3 (SPAN A)	10.1		
POUR 3 (SPAN B)	9.8		
TOTALS✱✱	538.5	44,881	56,466

✱✱QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	3,165	SQ.FT.
BRIDGE DECK	14,158	SQ.FT.
TOTAL	17,323	SQ.FT.

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

REVISIONS						SHEET NO.
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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
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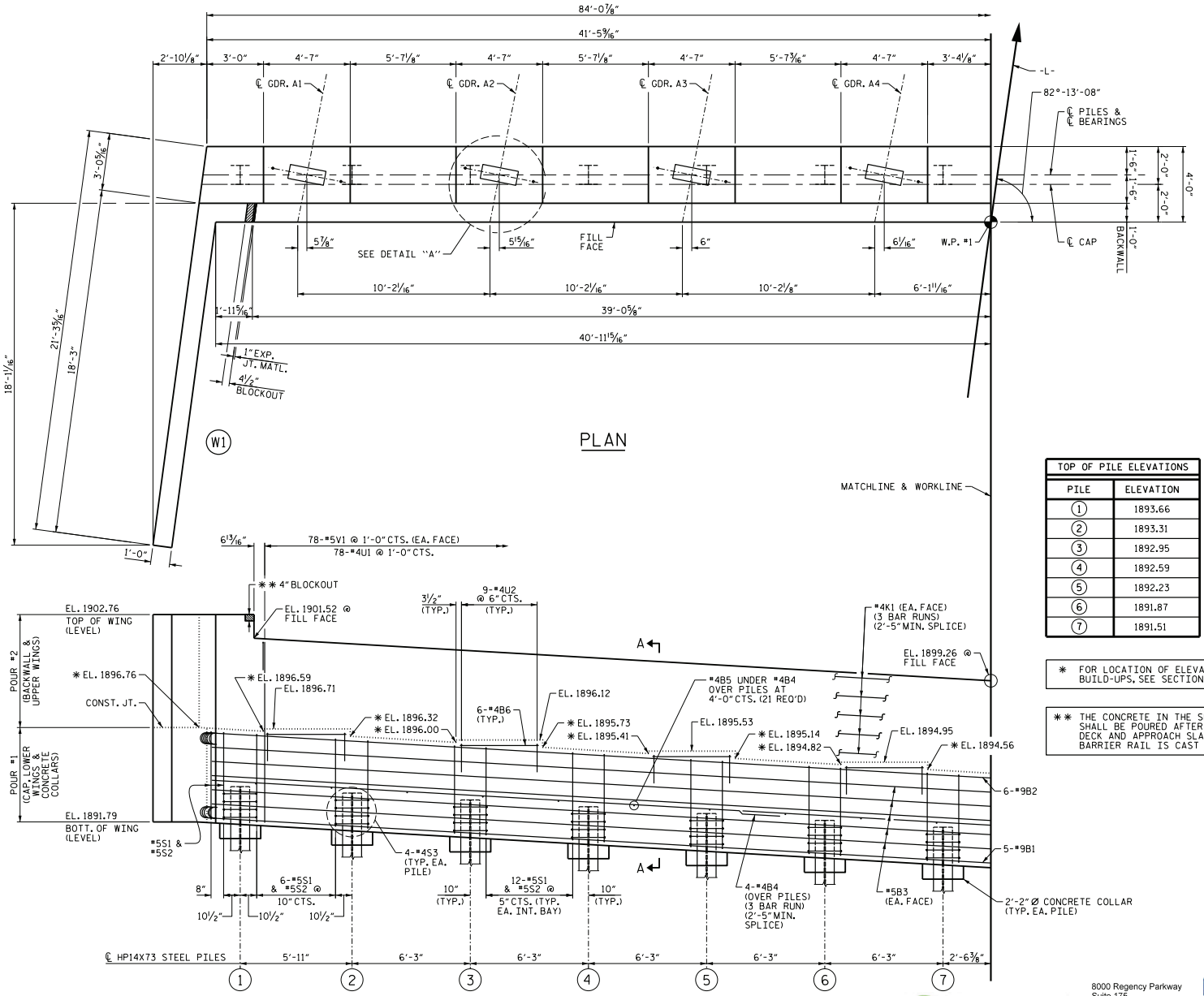


NOTES

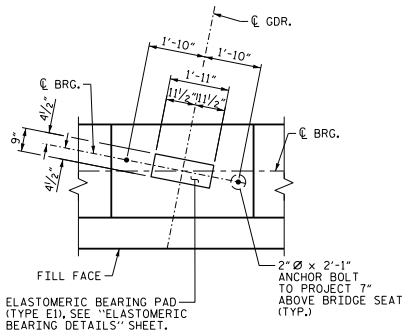
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT A RATE OF 2%.

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
1	1893.66
2	1893.31
3	1892.95
4	1892.59
5	1892.23
6	1891.87
7	1891.51



DETAIL "A"

(TYP. AT EACH BRIDGE SEAT)

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTIONS A-A & B-B, SHEET 5 OF 5.

** THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
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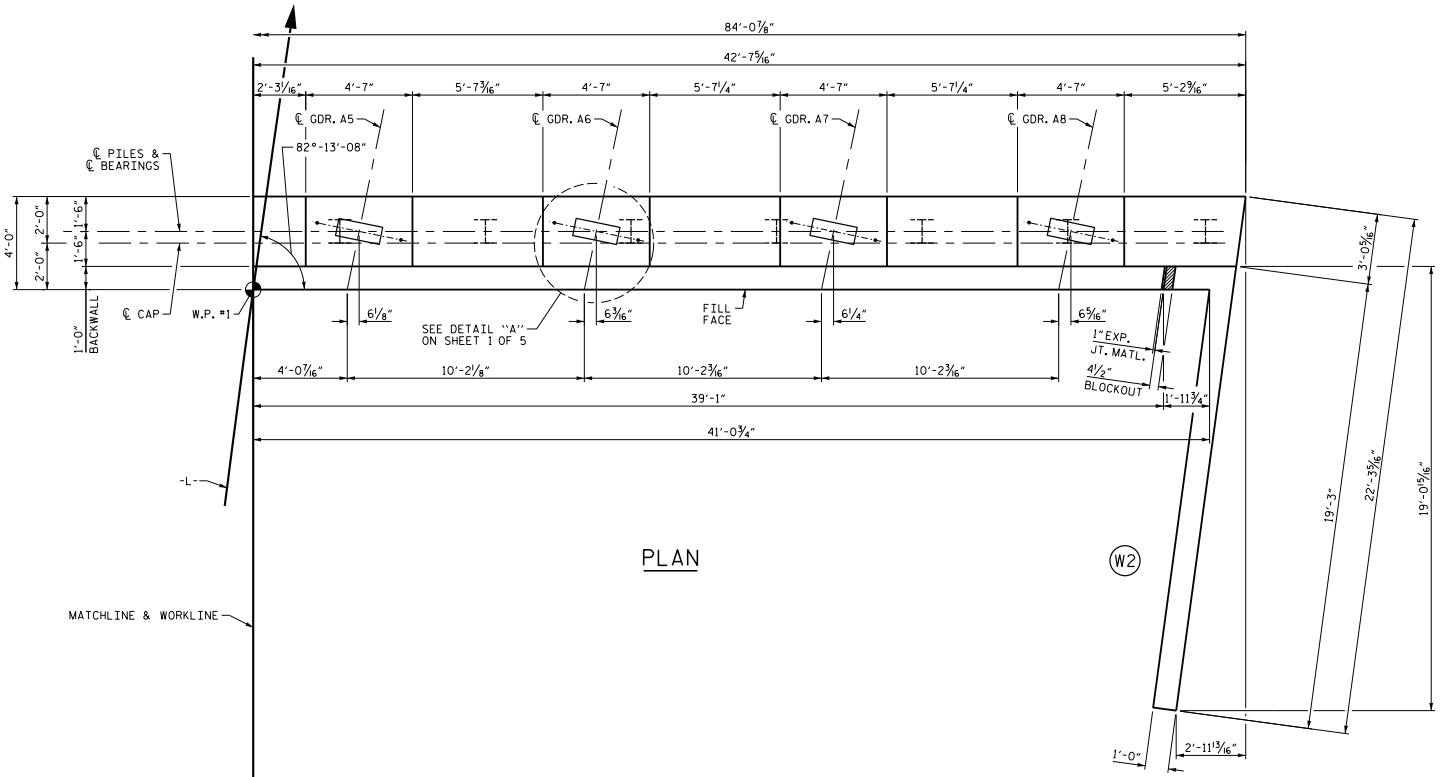

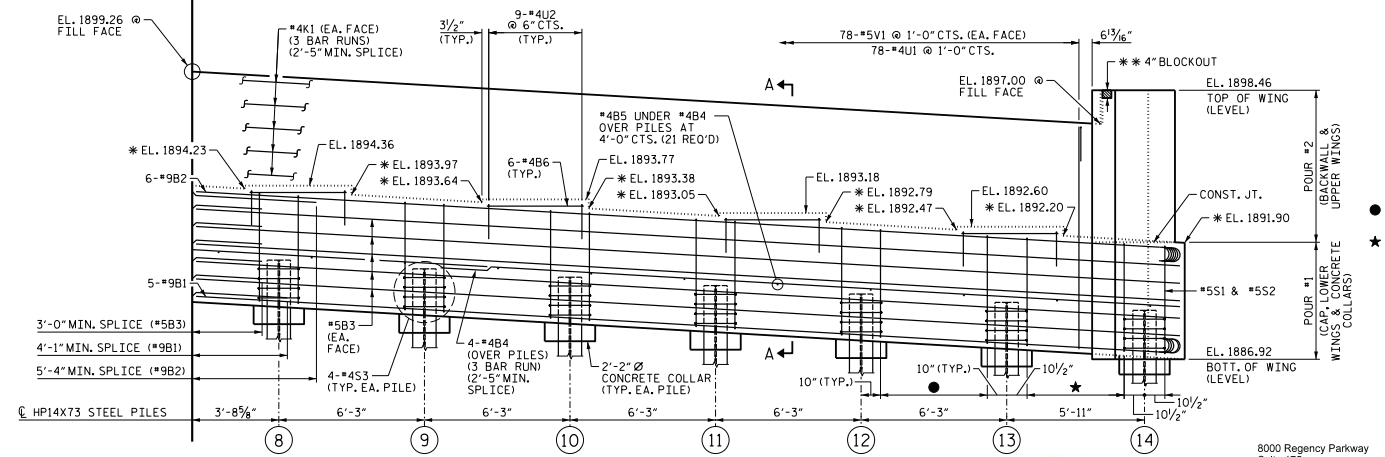

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
⑧	1891.15
⑨	1890.79
⑩	1890.42
⑪	1890.06
⑫	1889.70
⑬	1889.34
⑭	1889.00

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTIONS A-A & B-B, SHEET 5 OF 5.

** THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

● 12-*5S1 & *5S2 @ 5" CTS. (TYP. EA. INT. BAY)

★ 6-*5S1 & *5S2 @ 10" CTS.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

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Suite 175
Cary, NC 27518
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Digitally signed by Alexander Forfa 9/22/2021

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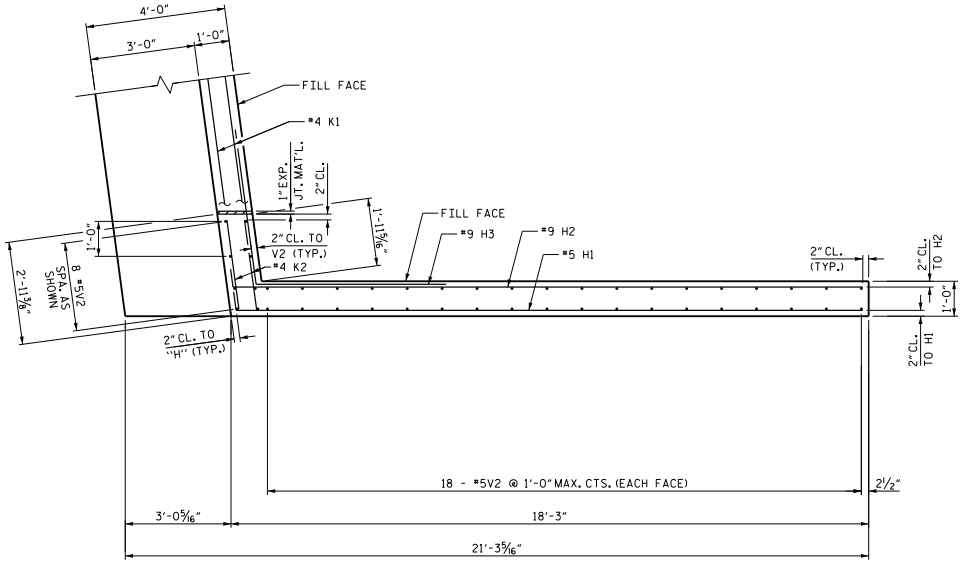
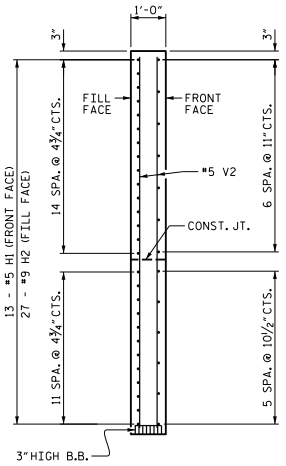
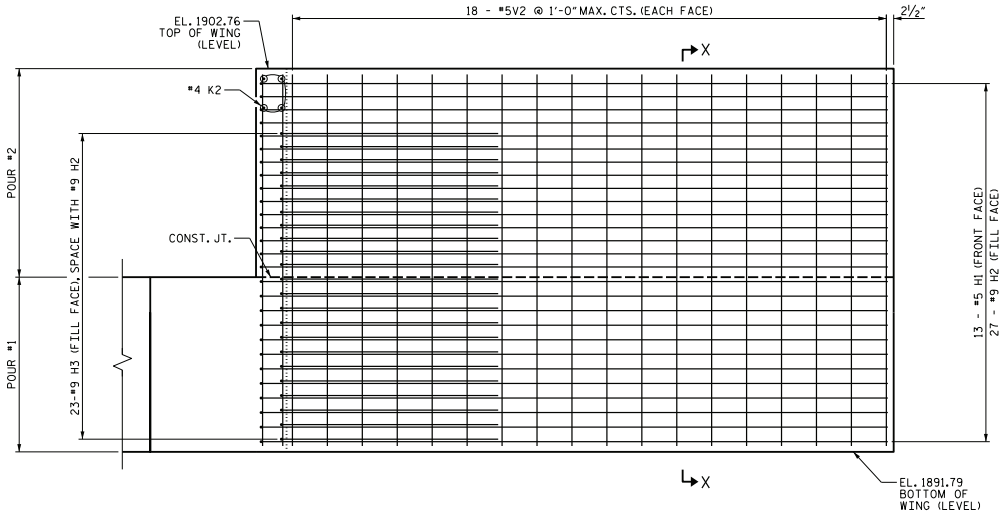


PLAN - WINGWALL W1



SECTION X-X



ELEVATION - WINGWALL W1

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			53

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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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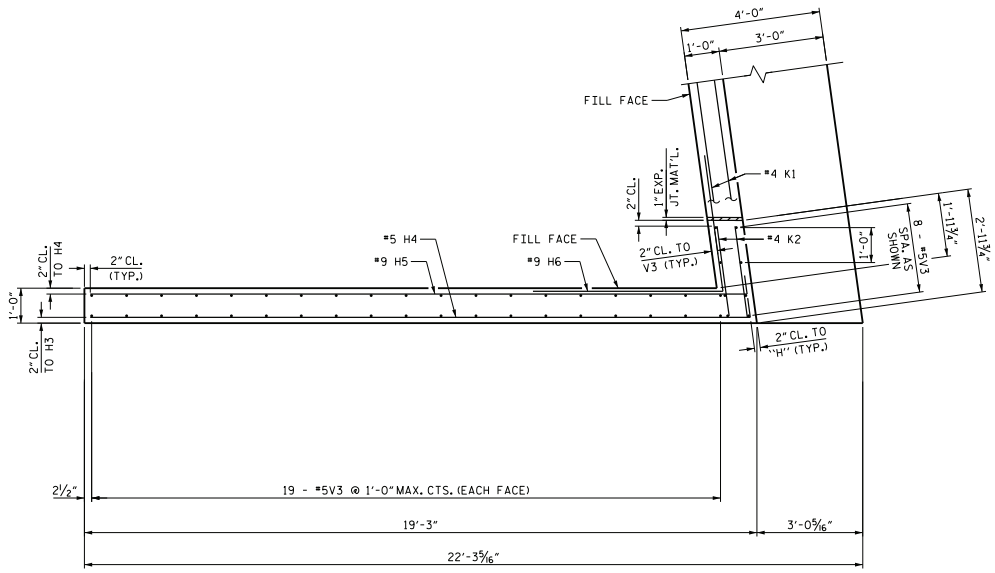
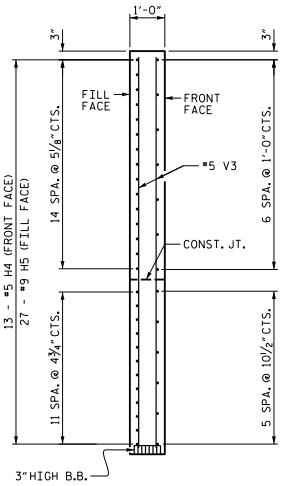
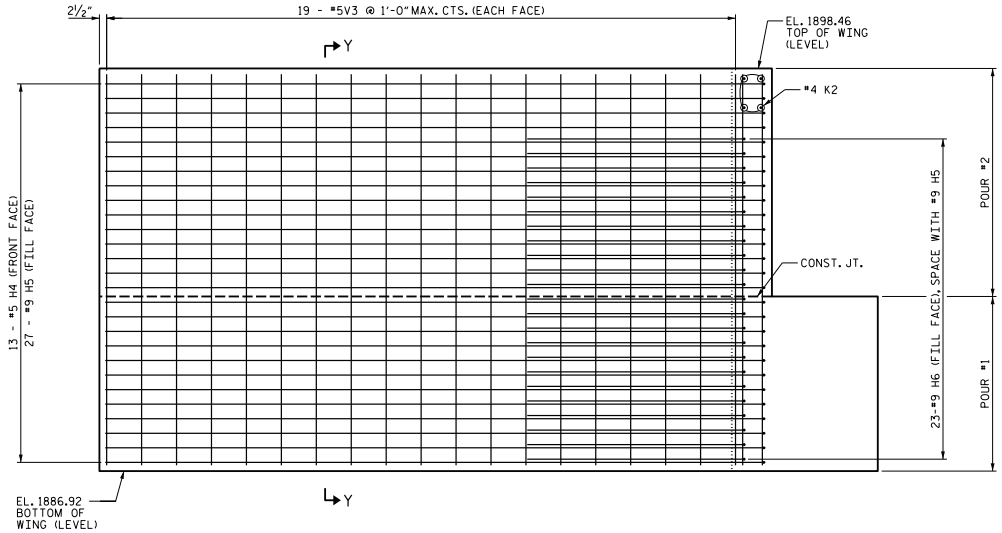


PLAN - WINGWALL W2



SECTION Y-Y



ELEVATION - WINGWALL W2

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			53

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8000 Regency Parkway
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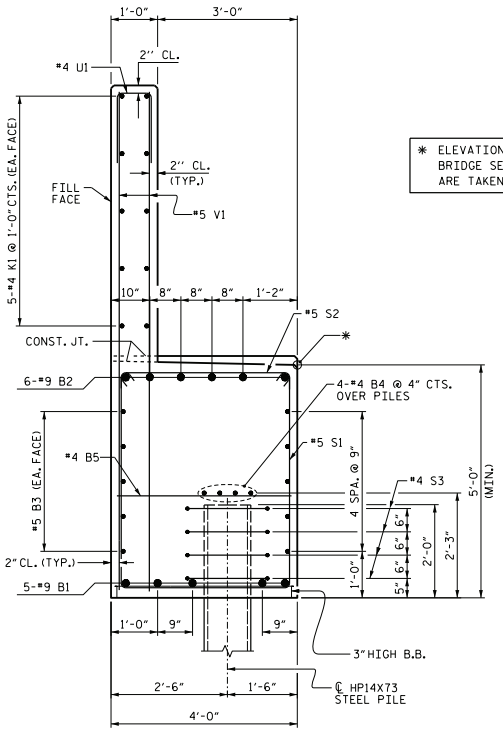
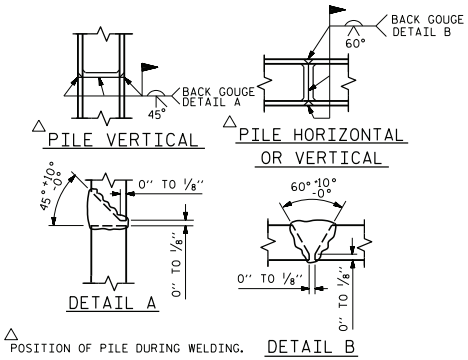
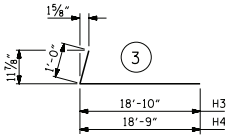


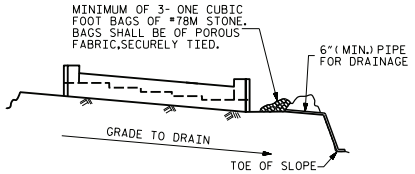
SECTION A-A

* ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS ARE TAKEN AT THIS POINT.



PILE SPLICE DETAILS



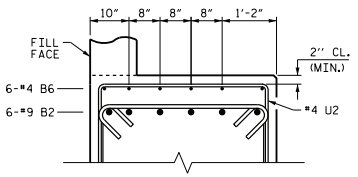


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



SECTION THRU BRIDGE SEAT

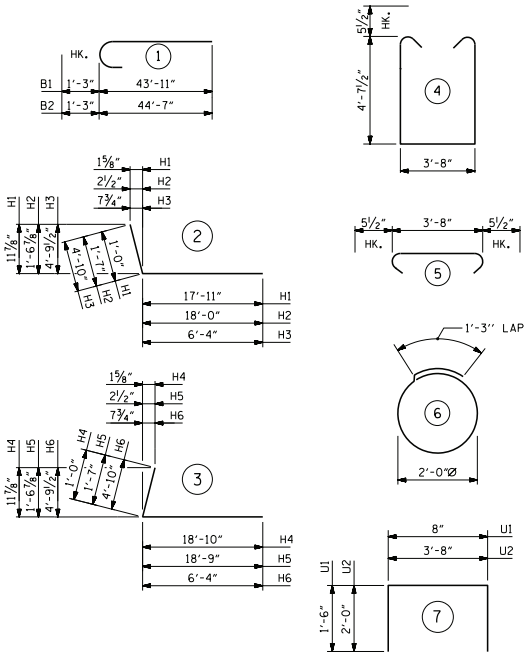
BILL OF MATERIAL

END BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	45'-2"	1536
B2	12	#9	1	45'-10"	1870
B3	20	#5	STR	43'-5"	906
B4	12	#4	STR	29'-7"	237
B5	21	#4	STR	3'-8"	51
B6	48	#4	STR	4'-3"	136
H1	13	#5	2	18'-11"	256
H2	27	#9	2	19'-7"	1798
H3	23	#9	2	11'-2"	873
H4	13	#5	3	19'-10"	269
H5	27	#9	3	20'-4"	1867
H6	23	#9	3	11'-2"	873
K1	30	#4	STR	29'-7"	593
K2	8	#4	STR	2'-7"	14
S1	147	#5	4	13'-10"	2121
S2	147	#5	5	4'-7"	703
S3	56	#4	6	7'-7"	284
U1	78	#4	7	3'-8"	191
U2	72	#4	7	7'-8"	369
V1	156	#5	STR	9'-5"	1532
V2	44	#5	STR	10'-6"	482
V3	46	#5	STR	11'-1"	532

REINFORCING STEEL	17,493 LBS.
CLASS "A" CONCRETE	
POUR #1 (CAP, LOWER PART OF WINGS & COLLARS)	69.9 C.Y.
POUR #2 (BACKWALL & UPPER PART OF WINGS)	24.1 C.Y.
TOTAL CLASS "A" CONCRETE	94.0 C.Y.
HP14X73 STEEL PILES	
NO.	14
LIN. FT.	400

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			53

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benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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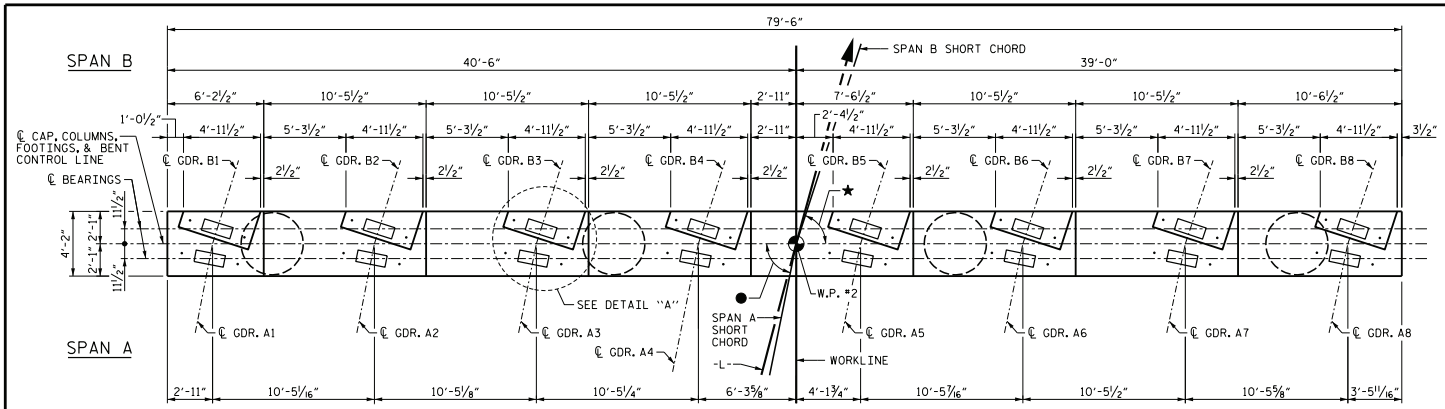
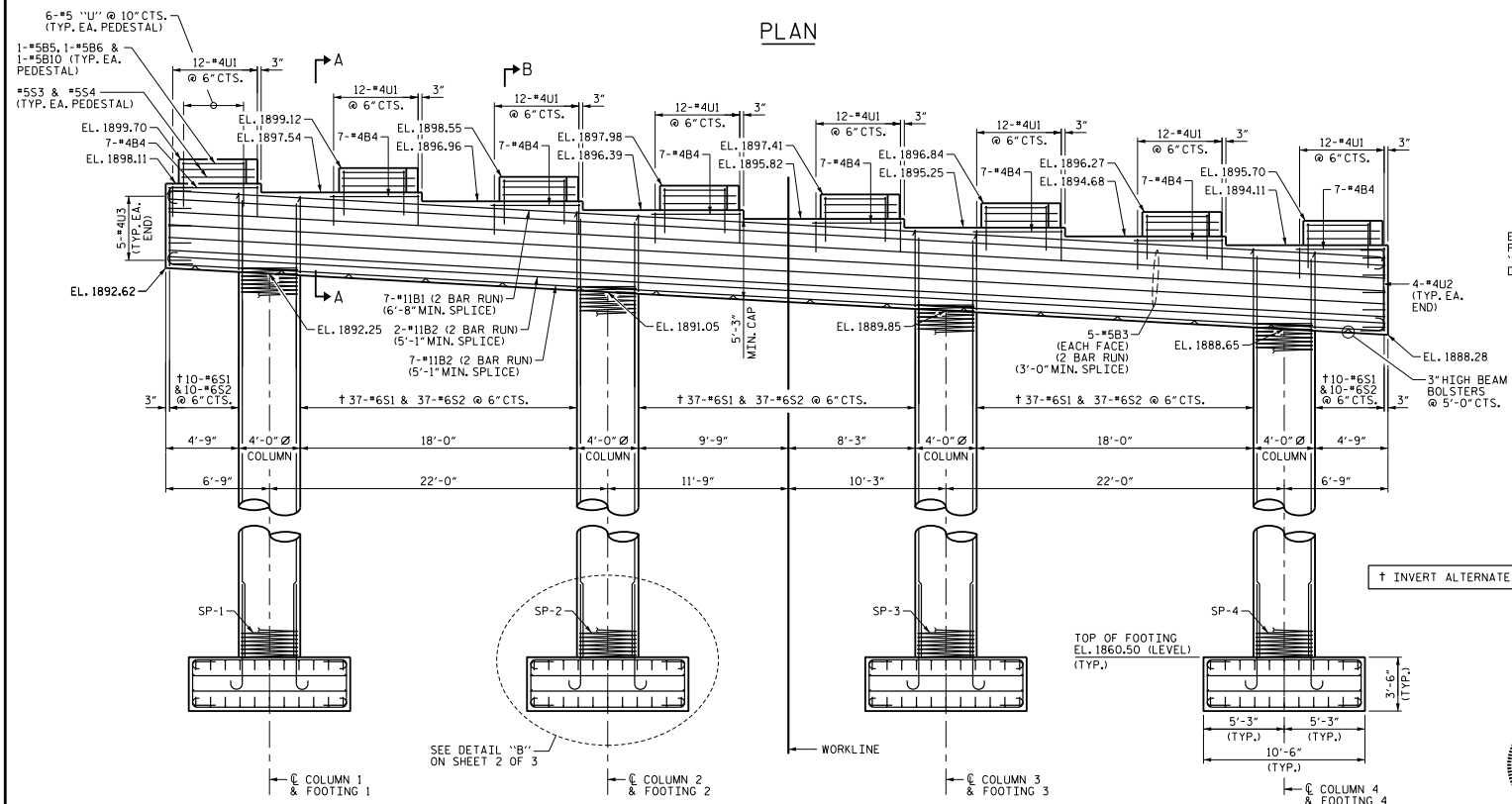


PLAN



ELEVATION

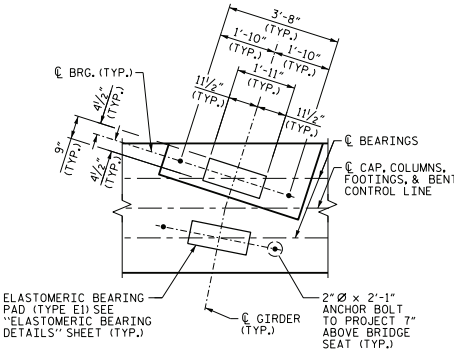
† INVERT ALTERNATE SETS OF STIRRUPS

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

● 78°-32'-51" TO SPAN A SHORT CHORD
★ 72°-00'-43" TO SPAN B SHORT CHORD



DETAIL "A"

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			53

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Suite 175
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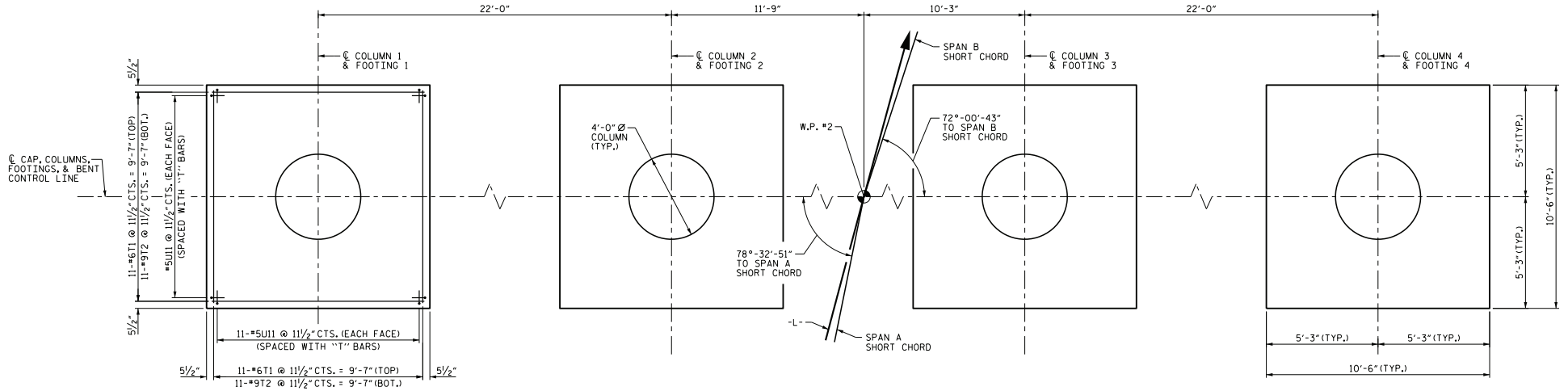
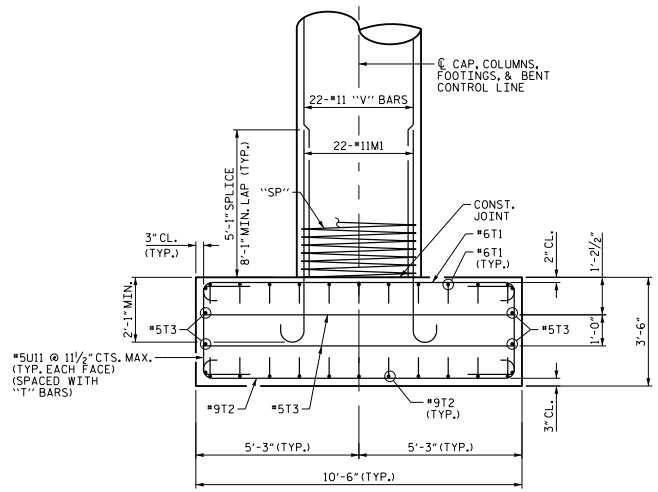
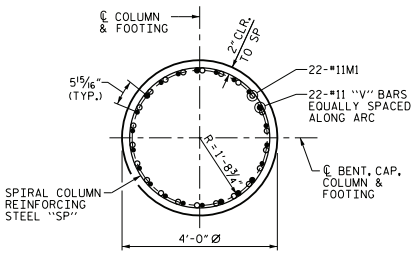


FOOTING PLAN

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR ALL FOOTINGS)



DETAIL "B"



TYPICAL SECTION THROUGH COLUMN

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			53

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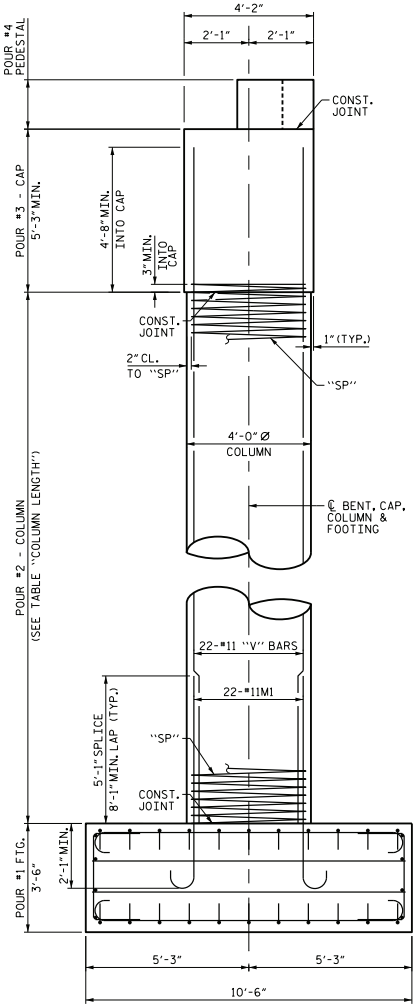
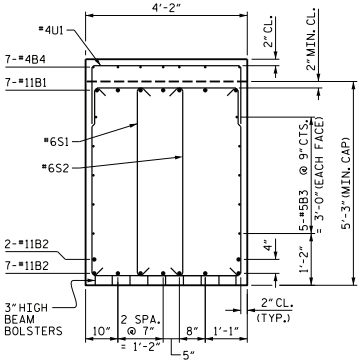


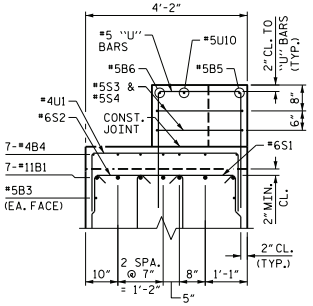
END ELEVATION

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING)

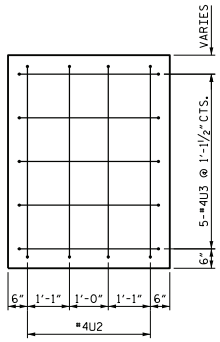
TABLE OF COLUMN REINFORCING			COLUMN HEIGHT
COLUMN	SPIRAL	"V" BAR	
1	SP-1	V1	31'-9 9/16"
2	SP-2	V2	30'-6 5/8"
3	SP-3	V3	29'-4 3/16"
4	SP-4	V4	28'-1 3/4"



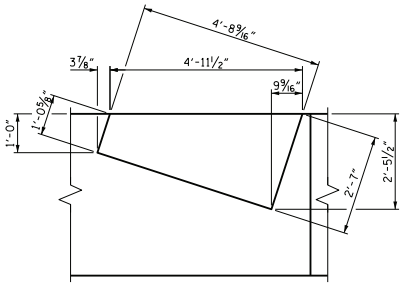
SECTION A-A



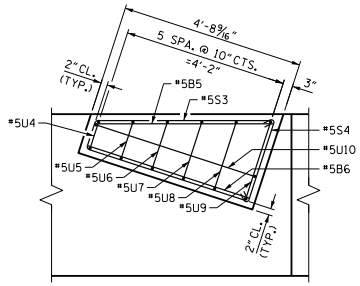
PARTIAL SECTION B-B



END OF CAP DETAIL



BRIDGE SEAT DETAIL



BRIDGE SEAT REINFORCEMENT DETAIL

BILL OF MATERIAL

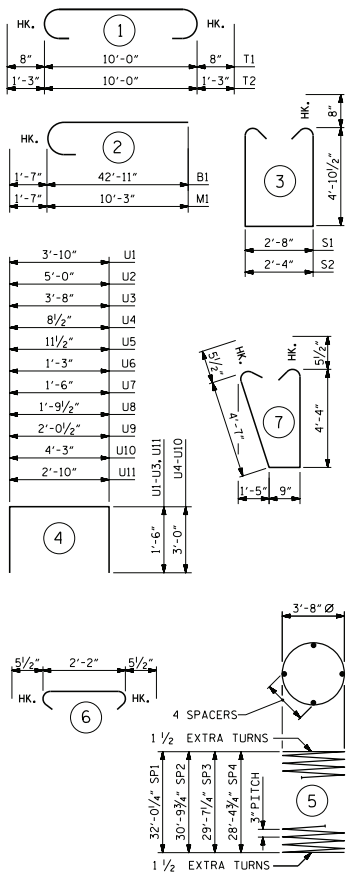
BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#11	2	44'-6"	3310
B2	18	#11	STR	42'-2"	4033
B3	20	#5	STR	41'-1"	857
B4	56	#4	STR	5'-10"	218
B5	8	#5	STR	4'-7"	38
B6	8	#5	STR	4'-4"	36
M1	88	#11	2	11'-10"	5533
S1	131	#6	3	13'-9"	2705
S2	131	#6	3	13'-5"	2640
S3	16	#5	7	10'-7"	177
S4	16	#5	6	3'-1"	51
T1	88	#6	1	11'-4"	1498
T2	88	#9	1	12'-6"	3740
T3	32	#5	STR	10'-0"	334
U1	96	#4	4	6'-10"	438
U2	8	#4	4	8'-0"	43
U3	10	#4	4	6'-8"	45
U4	8	#5	4	6'-9"	56
U5	8	#5	4	7'-0"	58
U6	8	#5	4	7'-3"	60
U7	8	#5	4	7'-6"	63
U8	8	#5	4	7'-10"	65
U9	8	#5	4	8'-1"	67
U10	8	#5	4	10'-3"	86
U11	176	#5	4	5'-10"	1071
V1	22	#11	STR	36'-5"	4257
V2	22	#11	STR	35'-3"	4120
V3	22	#11	STR	34'-0"	3974
V4	22	#11	STR	32'-10"	3838
REINFORCING STEEL					43,411 LBS.
SP-1	1	*	5	1503'-8"	1004
SP-2	1	*	5	1446'-8"	966
SP-3	1	*	5	1389'-9"	928
SP-4	1	*	5	1332'-9"	890
SPIRAL COLUMN REINFORCING STEEL					3,788 LBS.

CLASS "A" CONCRETE	
POUR #1 (FTG.)	57.2 C.Y.
POUR #2 (COLUMN)	55.8 C.Y.
POUR #3 (CAP)	68.1 C.Y.
POUR #4 (PEDESTAL)	4.0 C.Y.
TOTAL CLASS "A" CONCRETE	185.1 C.Y.
FOUNDATION EXCAVATION	LUMP SUM

* THE SP-1, SP-2, SP-3, AND SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			53

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benesch
8000 Regency Parkway
Suite 175
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984-275-2490
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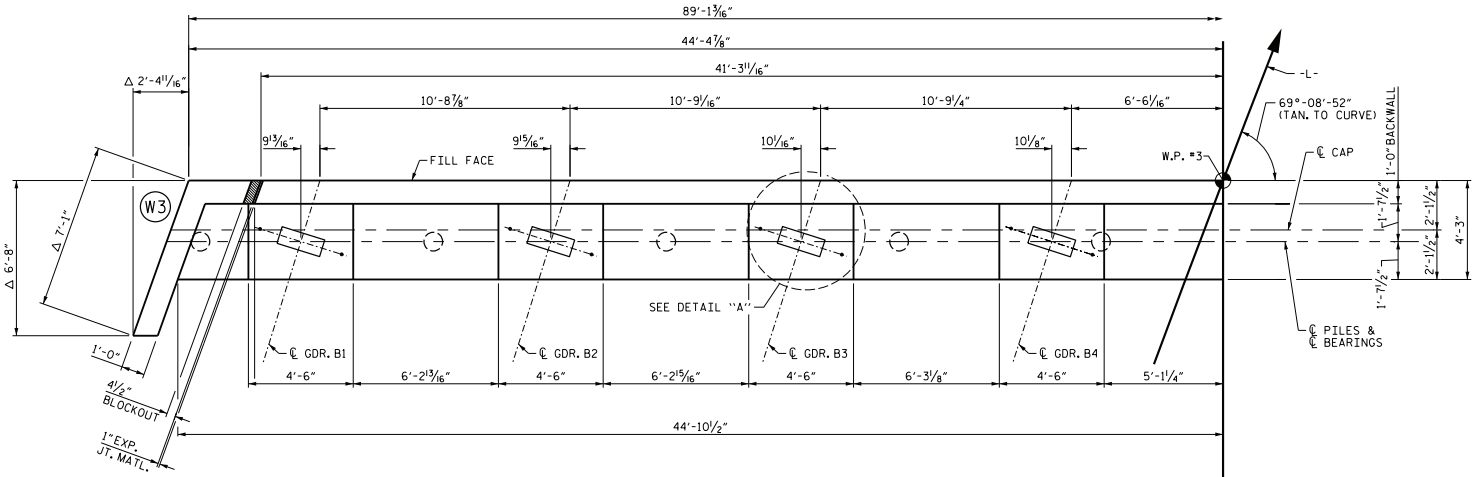
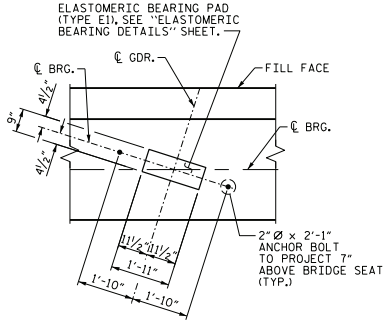


PLAN



DETAIL "A"
(TYP. AT EACH BRIDGE SEAT)

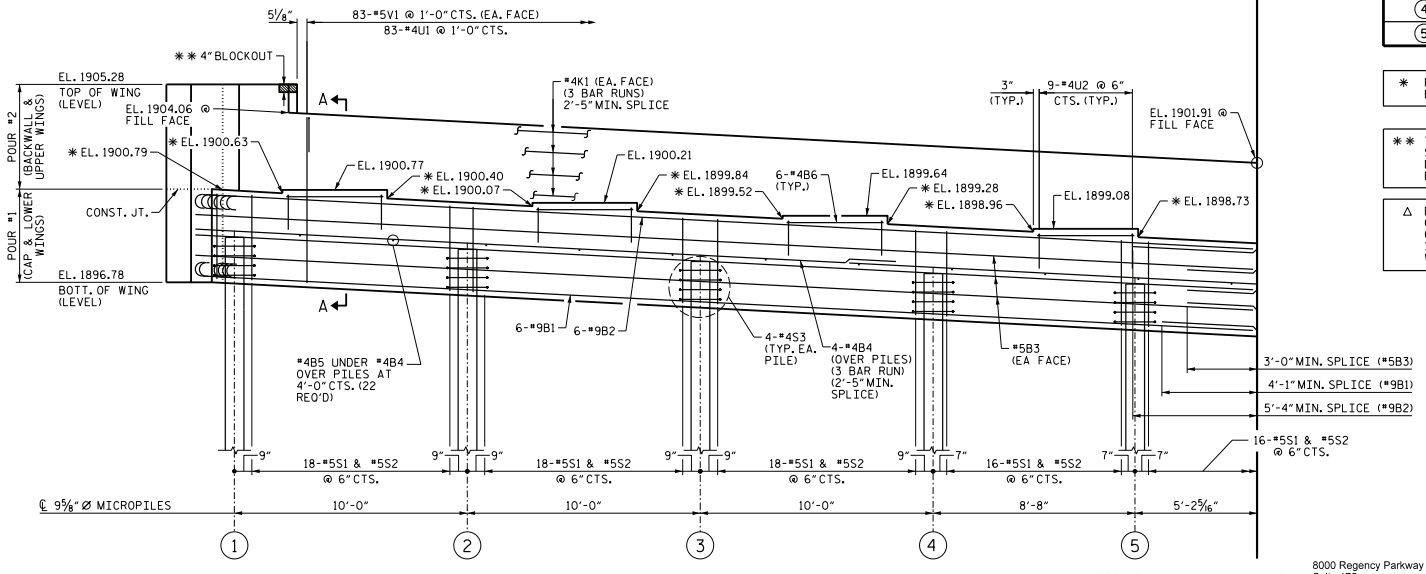
MATCHLINE & WORKLINE

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
①	1898.74
②	1898.22
③	1897.70
④	1897.18
⑤	1896.73

✱ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A, SHEET 4 OF 4.

✱✱ THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

Δ EARWALL EXTENSION DIMENSION BASED ON ASSUMED 6"DISTANCE FROM FRONT FACE OF MSE WALL TO BACK OF COPING. FIELD ADJUST AS REQUIRED TO PROVIDE 1"EXPANSION JOINT MATERIAL BETWEEN BACK OF MSE WALL COPING AND EARWALL EXTENSION.



ELEVATION

PROJECT NO. B-6054A
HAYWOOD COUNTY
STATION: 30+68.60 -L-
SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 04/2021
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DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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Digitally Signed by Alexander Forfa 9/22/2021

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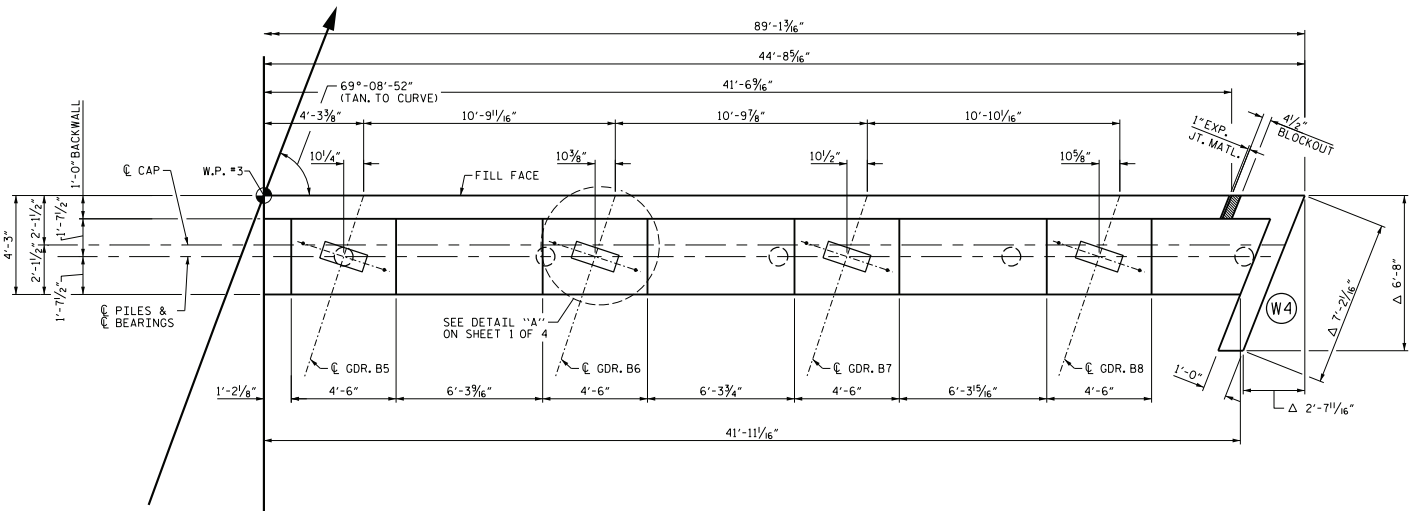
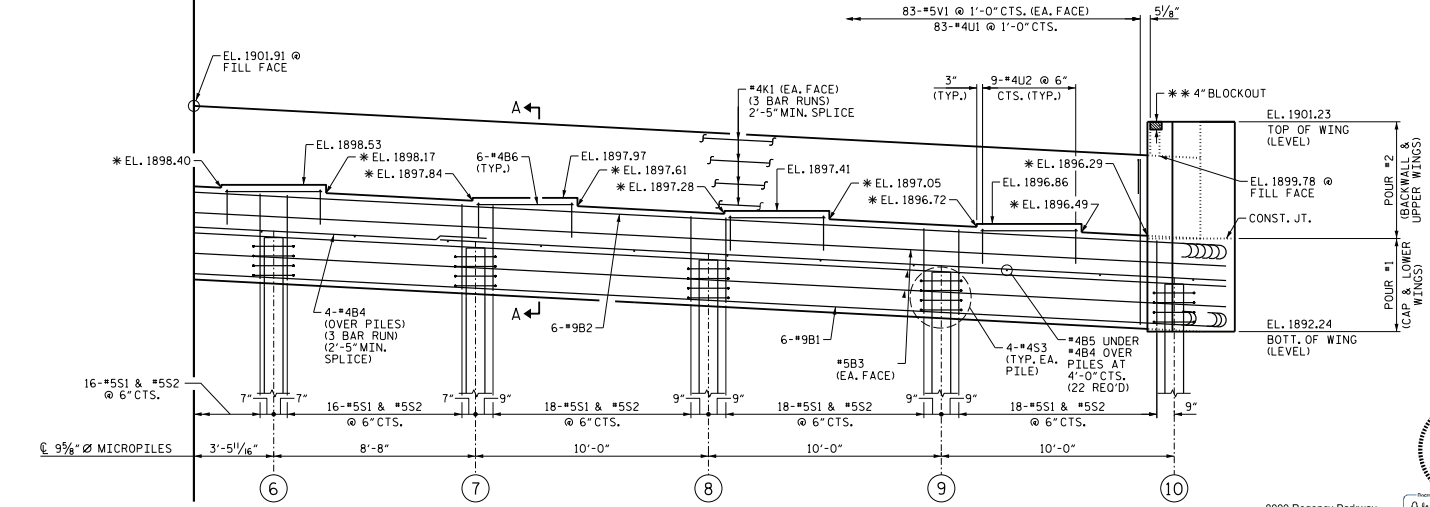


PLAN

MATCHLINE & WORKLINE



ELEVATION

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
6	1896.28
7	1895.84
8	1895.31
9	1894.80
10	1894.28

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A SHEET 4 OF 4.

** THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

Δ EARWALL EXTENSION DIMENSION BASED ON ASSUMED 6" DISTANCE FROM FRONT FACE OF MSE WALL TO BACK OF COPING. FIELD ADJUST AS REQUIRED TO PROVIDE 1" EXPANSION JOINT MATERIAL BETWEEN BACK OF MSE WALL COPING AND EARWALL EXTENSION.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-43
1			3					TOTAL SHEETS
2			4					53

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8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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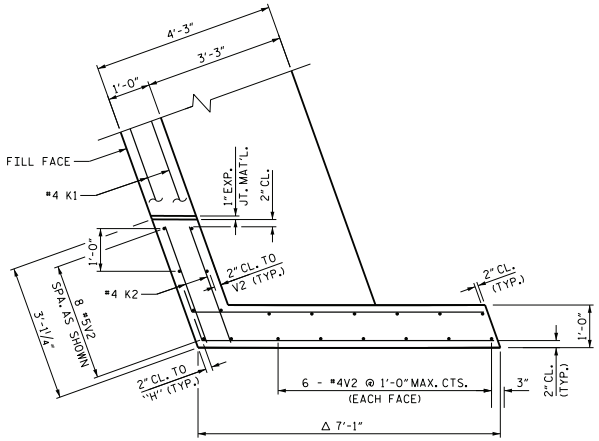
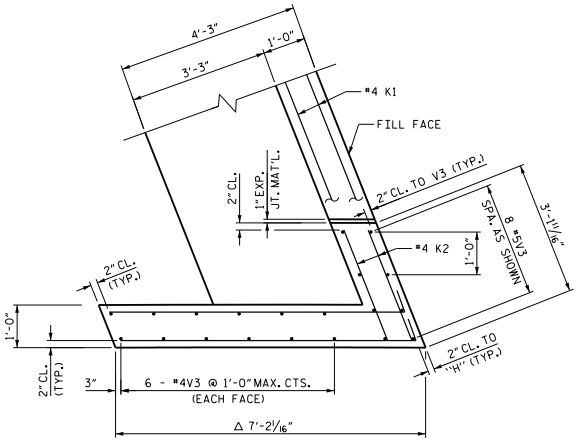
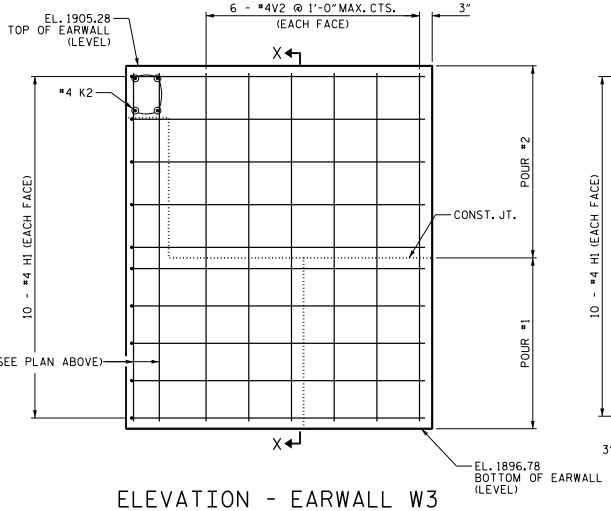


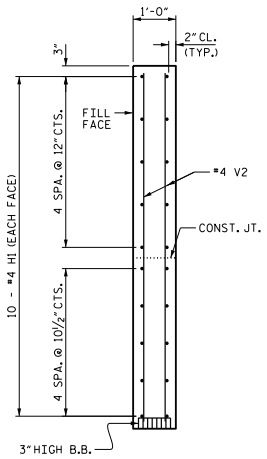
PLAN - EARWALL W3



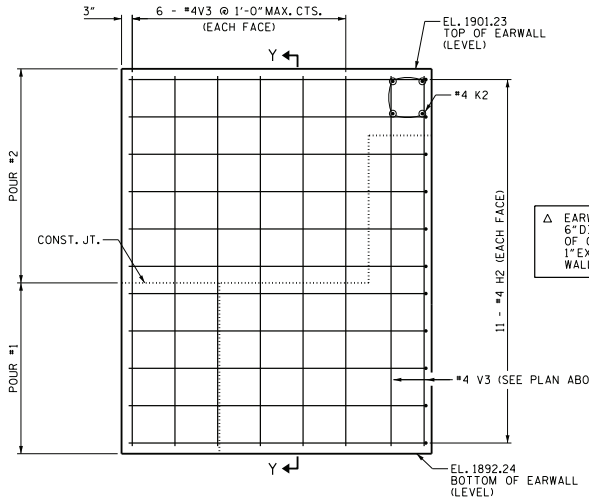
PLAN - EARWALL W4



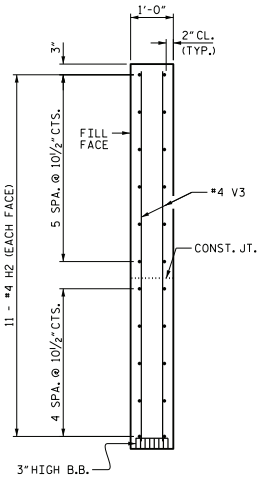
ELEVATION - EARWALL W3



SECTION X-X



ELEVATION - EARWALL W4



SECTION Y-Y

Δ EARWALL EXTENSION DIMENSION BASED ON ASSUMED 6" DISTANCE FROM FRONT FACE OF MSE WALL TO BACK OF COPING. FIELD ADJUST AS REQUIRED TO PROVIDE 1" EXPANSION JOINT MATERIAL BETWEEN BACK OF MSE WALL COPING AND EARWALL EXTENSION.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			53

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benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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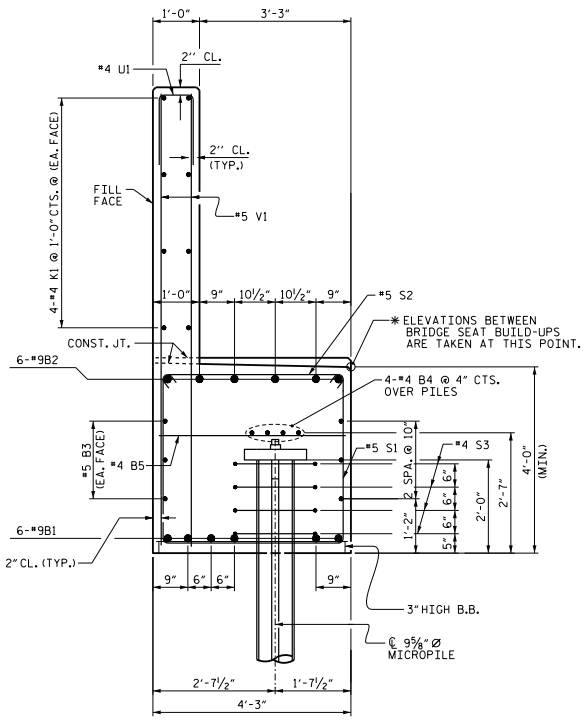
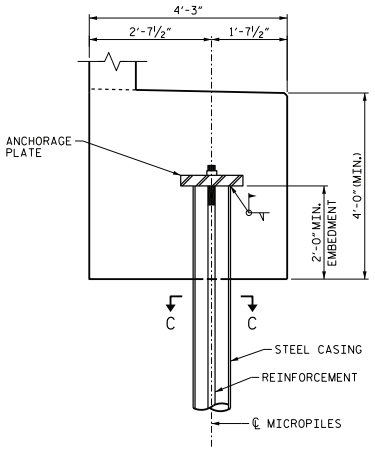


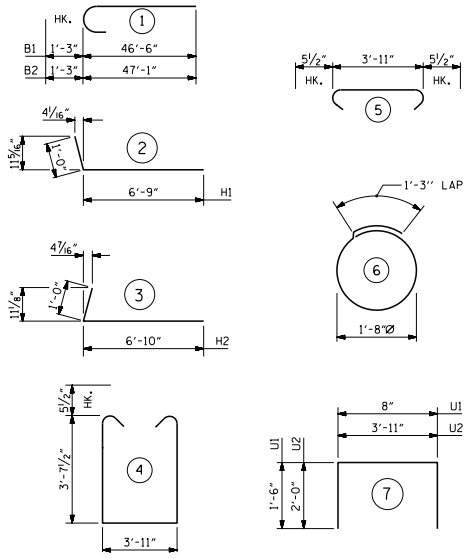
SECTION A-A



MICROPILE DETAIL

(TYP. EACH MICROPILE)

BAR TYPES



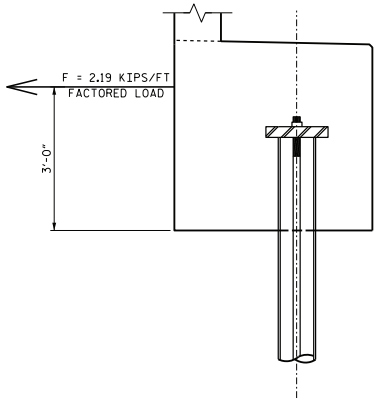
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT #2

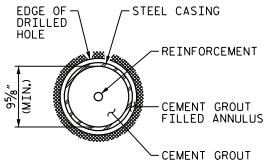
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	47'-9"	1948
B2	12	#9	1	48'-4"	1972
B3	12	#5	STR	45'-11"	575
B4	12	#4	STR	31'-3"	251
B5	22	#4	STR	3'-11"	58
B6	48	#4	STR	4'-2"	134
H1	20	#4	2	7'-9"	104
H2	22	#4	3	7'-10"	115
K1	24	#4	STR	31'-3"	501
K2	8	#4	STR	2'-9"	15
S1	156	#5	4	12'-1"	1966
S2	156	#5	5	4'-10"	786
S3	40	#4	6	6'-6"	174
U1	83	#4	7	3'-8"	203
U2	72	#4	7	7'-11"	381
V1	166	#5	STR	7'-1"	1226
V2	20	#4	STR	8'-2"	109
V3	20	#4	STR	8'-7"	115

REINFORCING STEEL	10,633 LBS.
CLASS "A" CONCRETE	
POUR #1 (CAP & LOWER PART OF WINGS)	58.8 C.Y.
POUR #2 (BACKWALL & UPPER PART OF WINGS)	14.0 C.Y.
TOTAL CLASS "A" CONCRETE	72.8 C.Y.
9⅝" Ø MICROPILES	
NO.	10
LIN. FT.	725

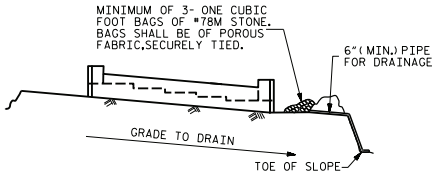


TIEBACK DETAIL

(DETAIL SHOWING TIEBACK RESTRAINT FOR END BENT 2)



SECTION C-C



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DRAWN BY :	M. SPENCER	DATE :	04/2021		
CHECKED BY :	A. FORFA	DATE :	04/2021		
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE :	09/2021		

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			53

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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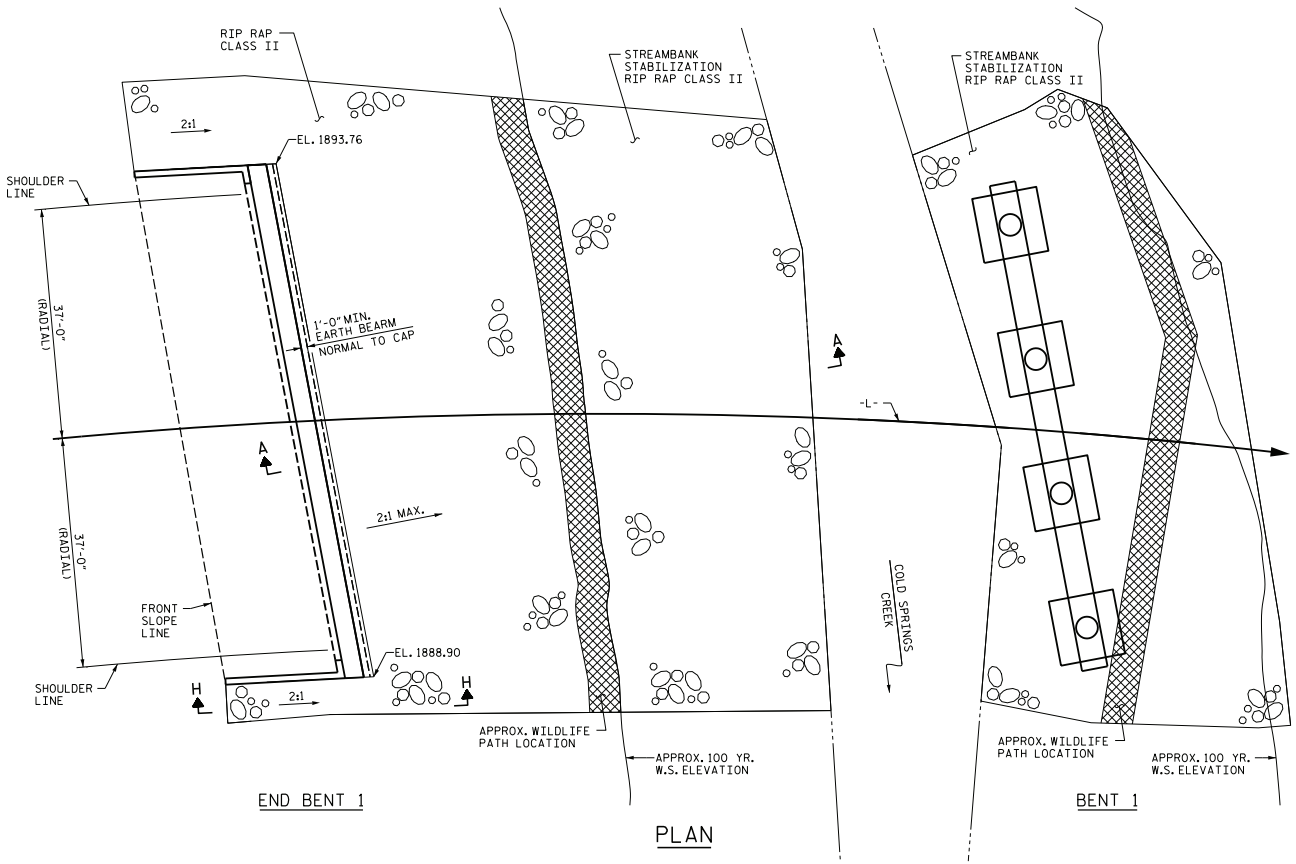
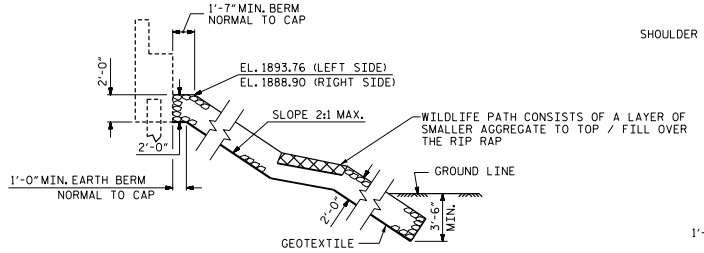
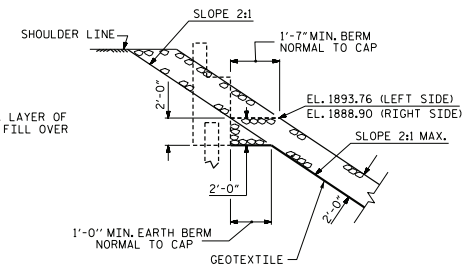


PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 30+68.60 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	1147	1074
BENT 1	398	401



SECTION A-A



SECTION H-H

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			53

DRAWN BY :	M. SPENCER	DATE : 01/2021
CHECKED BY :	A. FORFA	DATE : 01/2021
DESIGN ENGINEER OF RECORD :	A. FORFA	DATE : 09/2021

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8000 Regency Parkway
Suite 175
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984-275-2490
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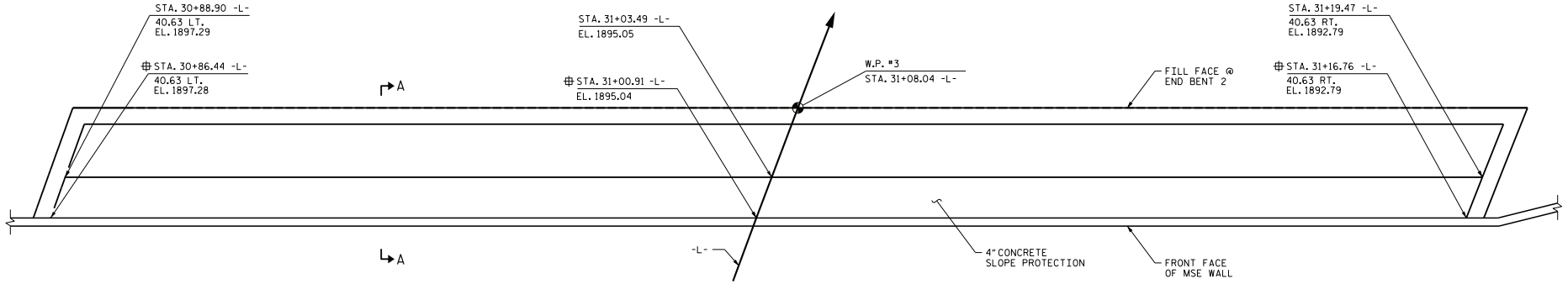
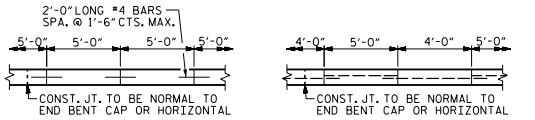


PLAN AT END BENT 2

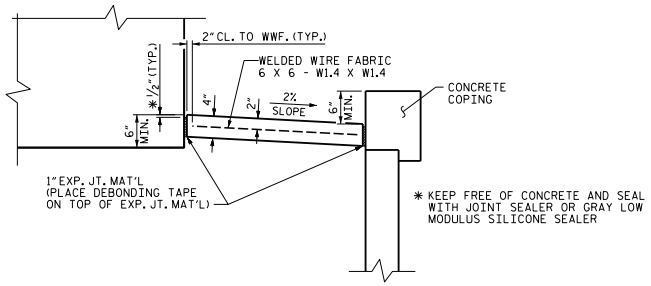


STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



SECTION A-A

NOTES:

FOR BERM WIDTH, SEE GENERAL DRAWING.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 30+68.60 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 2	24	38

* QUANTITY SHOWN IS BASED ON 5' POURS.

STATIONING BASED ON ASSUMED 6" DISTANCE FROM FRONT FACE OF MSE WALL TO BACK FACE OF COPING. ADJUST STATIONING AS NECESSARY TO PROVIDE 1" EXPANSION JOINT MATERIAL BETWEEN SLOPE PROTECTION AND BACK OF COPING. NO CHANGE TO ELEVATIONS REQUIRED.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION

DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 11/2020
CHECKED BY : A. FORFA DATE : 11/2020
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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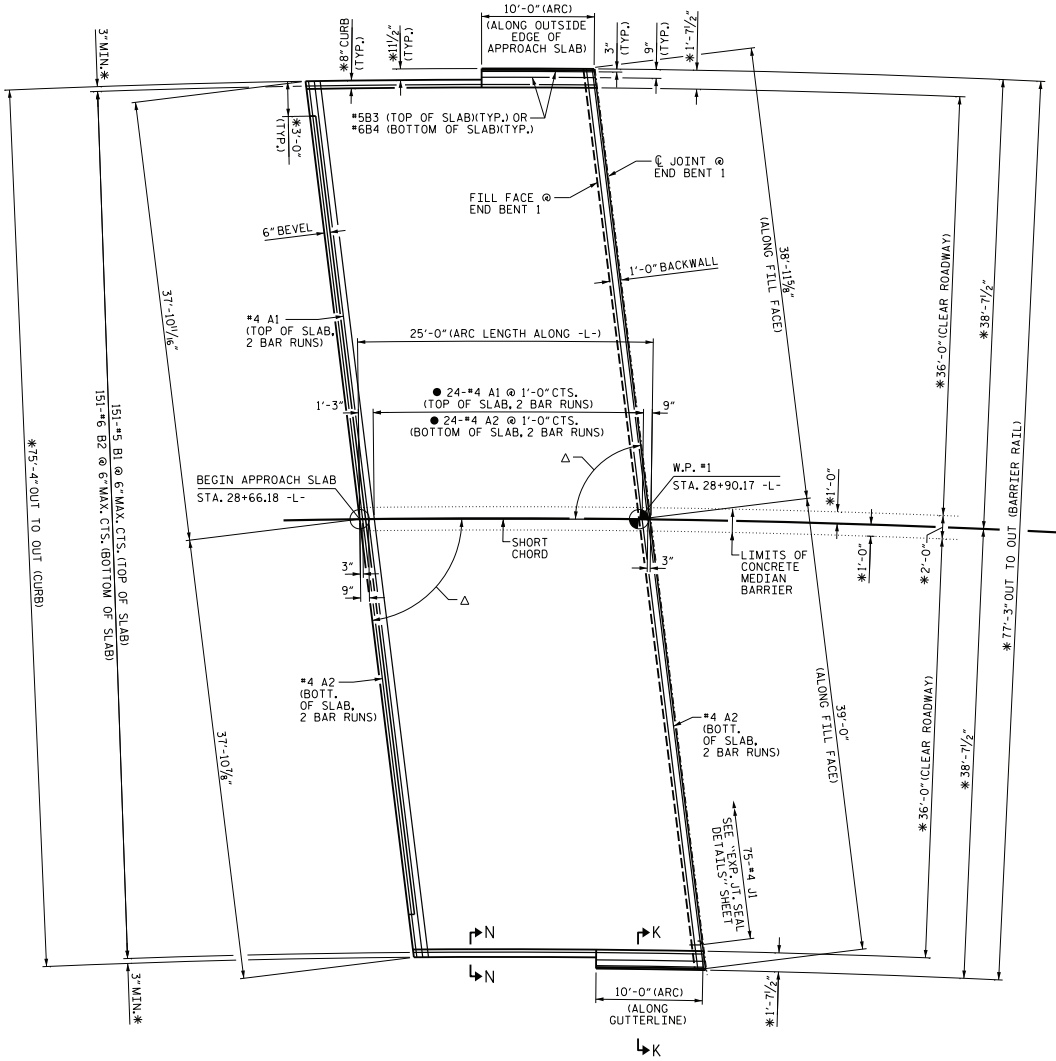


PLAN AT END BENT 1

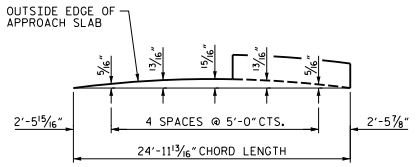
* = MEASURED RADIALLY

● = "A" BARS ARE PLACED PARALLEL TO FILL FACE AND SPACED ALONG ARC

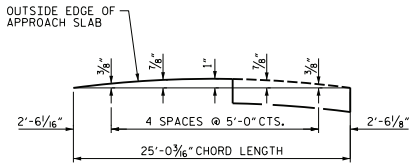
△ = 82°-56'-18" TO SHORT CHORD

NOTE:

USE THE CONSTRUCTION ELEVATIONS IN CONJUNCTION WITH THIS SHEET TO SET THE OUTSIDE EDGES OF THE APPROACH SLAB.



LEFT SIDE



RIGHT SIDE

ARC OFFSETS AT END BENT 1

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLABS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 01/2021
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benesch
8000 Regency Parkway
Suite 175
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984-275-2490
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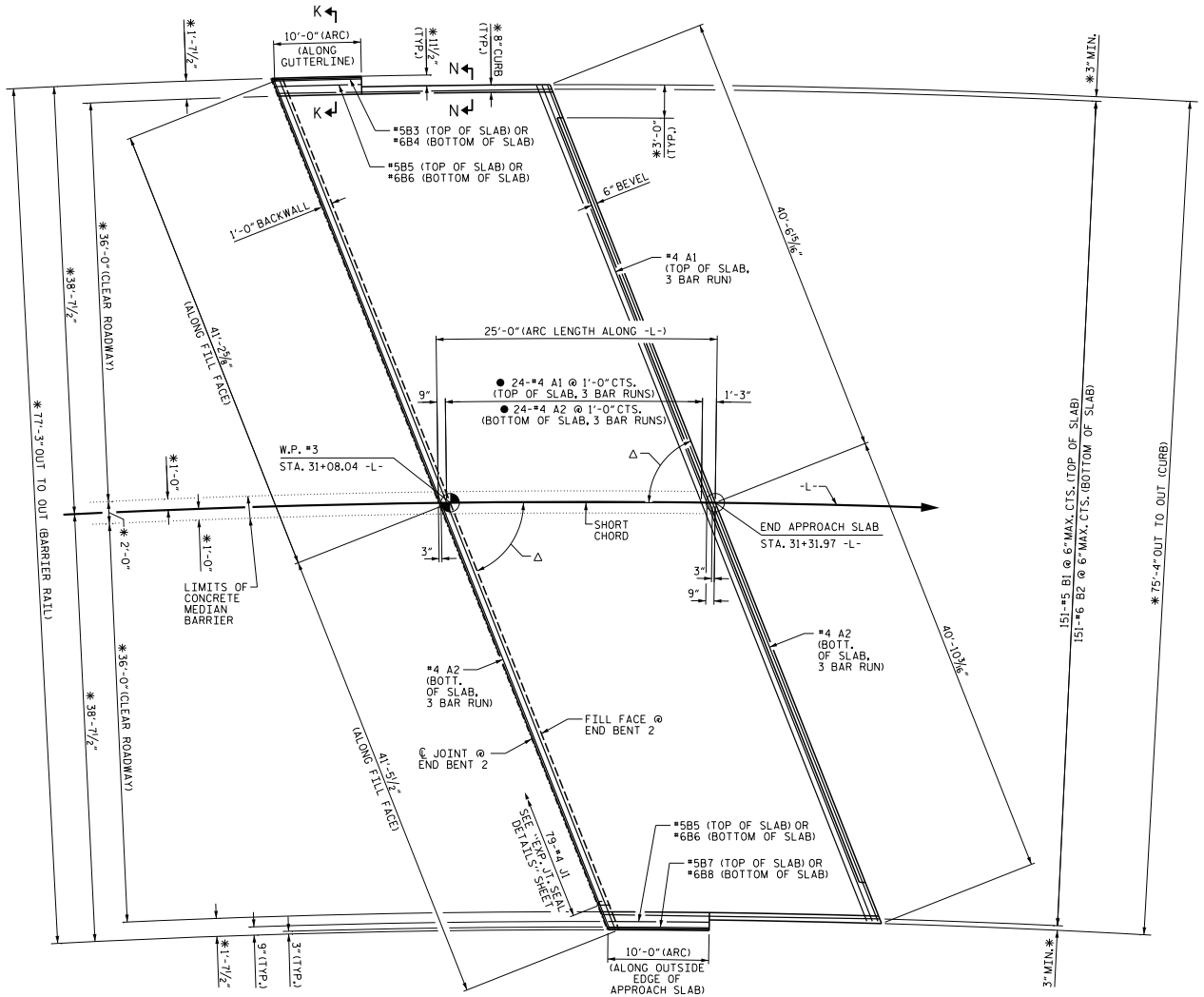


PLAN AT END BENT 2

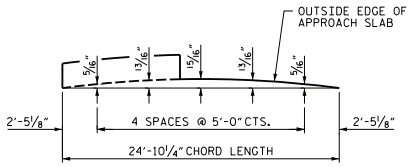
* = MEASURED RADIALLY

● = "A" BARS ARE PLACED PARALLEL TO FILL FACE

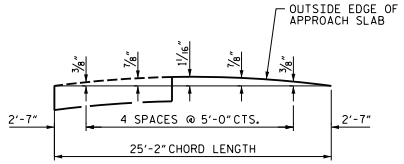
Δ = 68°-25'-48" TO SHORT CHORD

NOTE:

USE THE CONSTRUCTION ELEVATIONS IN CONJUNCTION WITH THIS SHEET TO SET THE OUTSIDE EDGES OF THE APPROACH SLAB.



LEFT SIDE



RIGHT SIDE

ARC OFFSETS AT END BENT 2

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLABS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 01/2021
CHECKED BY : A. FORFA DATE : 01/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Digitally signed by Alexander Forfa 9/22/2021

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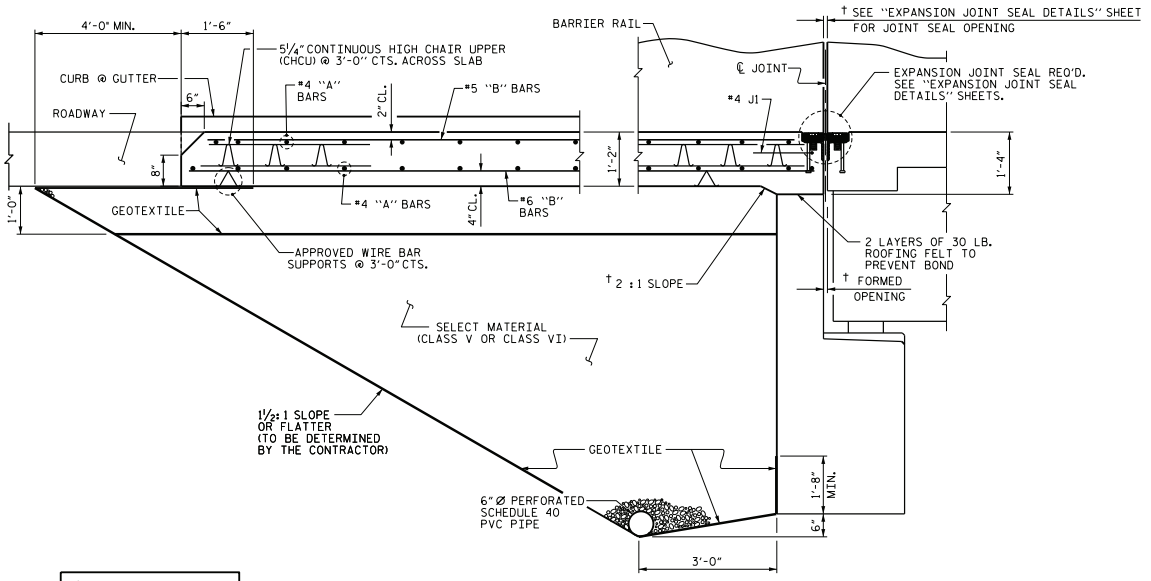
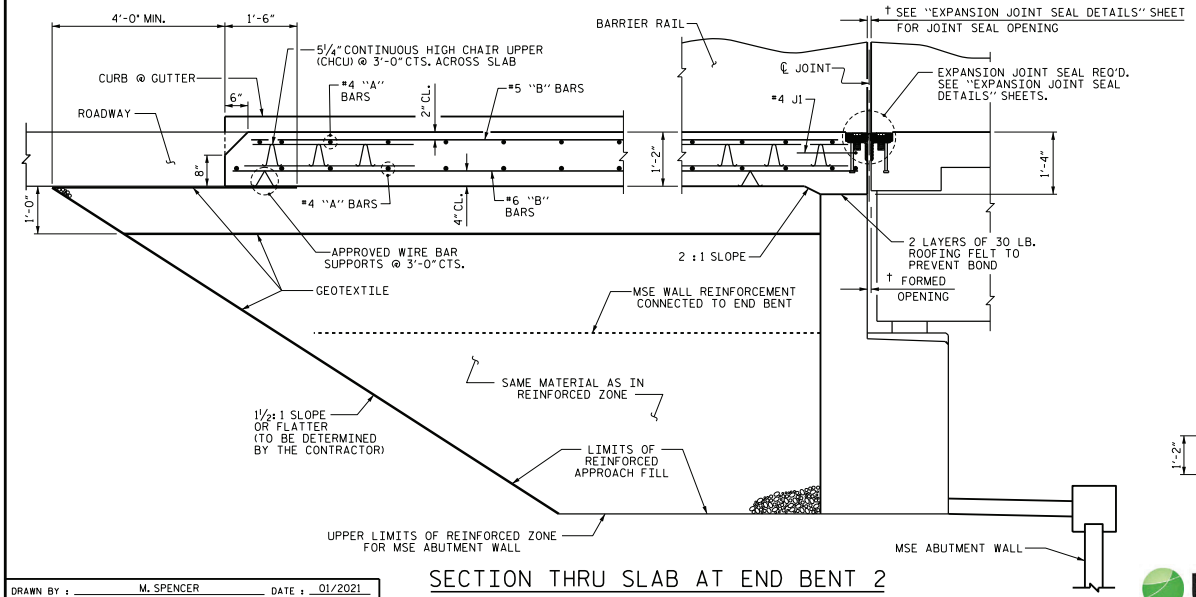


† NORMAL TO END BENT

SECTION THRU SLAB AT END BENT 1

(TYPE I - STANDARD APPROACH FILL)



SECTION THRU SLAB AT END BENT 2

(TYPE III - REINFORCED APPROACH FILL)

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT, 6" Ø DRAINAGE PIPE, AND BACKFILL MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) AT END BENT 1 SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL AT END BENT 1 IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

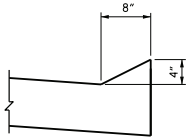
BACKFILL MATERIAL AT END BENT 2 SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S) AT END BENT 1, SEE ROADWAY STANDARD DRAWINGS.

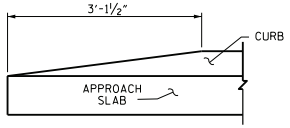
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

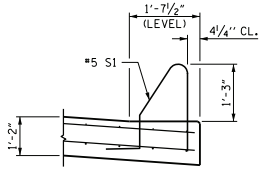


SECTION N-N

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION K-K

BILL OF MATERIAL

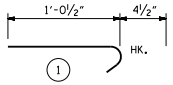
APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	50	#4	STR	39'-10"	1330
A2	52	#4	STR	39'-8"	1378
✱B1	151	#5	STR	23'-10"	3754
B2	151	#6	STR	24'-8"	5594
✱B3	4	#5	STR	9'-8"	40
B4	4	#6	STR	9'-8"	58
✱J1	75	#4	1	1'-5"	71
REINFORCING STEEL ✱✱				LBS.	7030
✱EPOXY COATED REINFORCING STEEL				✱✱ LBS.	5195
CLASS AA CONCRETE ✱✱				C.Y.	82.3

APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	75	#4	STR	28'-10"	1445
A2	78	#4	STR	28'-8"	1494
✱B1	151	#5	STR	23'-9"	3740
B2	151	#6	STR	24'-7"	5576
✱B3	1	#5	STR	10'-2"	11
B4	1	#6	STR	10'-2"	15
✱B5	2	#5	STR	9'-11"	21
B6	2	#6	STR	9'-11"	30
✱B7	1	#5	STR	9'-9"	10
B8	1	#6	STR	9'-9"	15
✱J1	#4	#4	1	1'-5"	75
REINFORCING STEEL ✱✱				LBS.	7130
✱EPOXY COATED REINFORCING STEEL				✱✱ LBS.	5302
CLASS AA CONCRETE ✱✱				C.Y.	82.3

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

✱✱ QUANTITIES FOR BARRIER RAIL AND MEDIAN BARRIER NOT INCLUDED. SEE "BRIDGE APPROACH SLABS" SHEETS 4 OF 5 AND 5 OF 5 FOR QUANTITIES.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLABS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 01/2021
CHECKED BY : A. FORFA DATE : 01/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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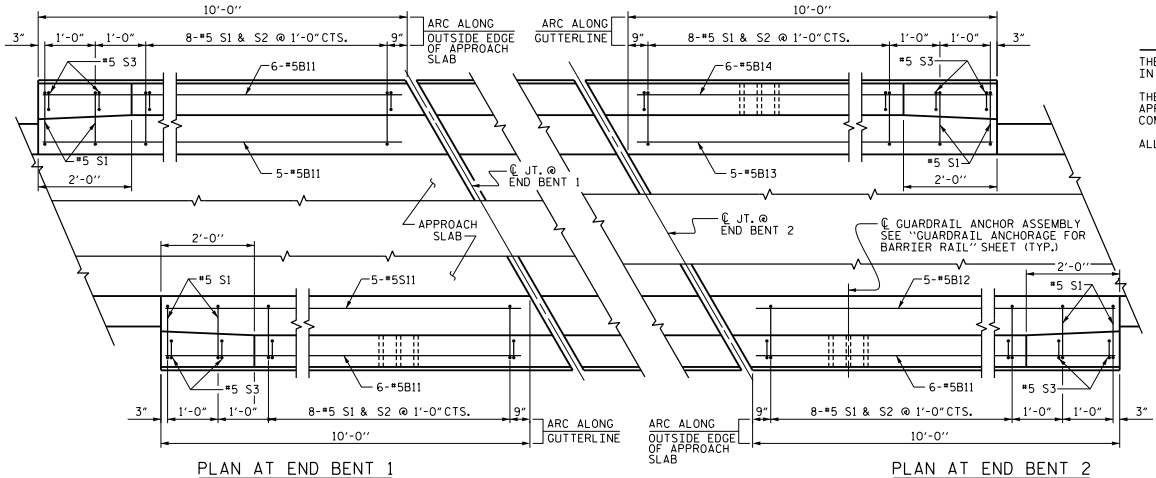


PLAN AT END BENT 1

PLAN AT END BENT 2

PLAN OF BARRIER RAIL

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

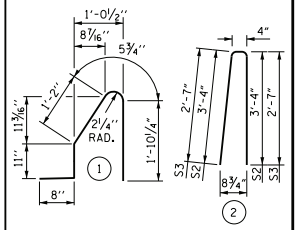
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

BILL OF MATERIAL

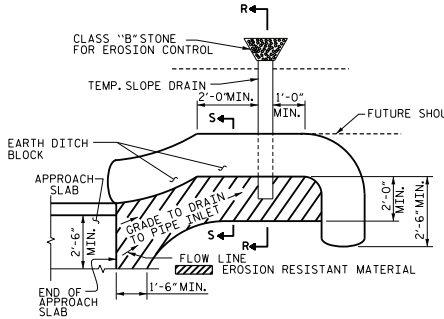
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B11	28	#5	STR.	9'-8"	282
* B12	5	#5	STR.	10'-0"	52
* B13	5	#5	STR.	9'-10"	51
* B14	6	#5	STR.	10'-2"	64
* S1	40	#5	1	5'-1"	212
* S2	32	#5	2	7'-0"	234
* S3	8	#5	2	5'-6"	46

* EPOXY COATED REINFORCING STEEL	941 LBS.
CLASS AA CONCRETE	5.6 CU. YDS.
CONCRETE BARRIER RAIL	40.8 LIN. FT.

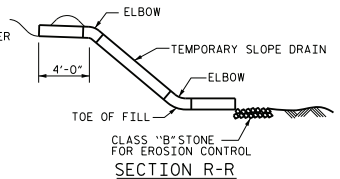


ALL BAR DIMENSIONS ARE OUT TO OUT

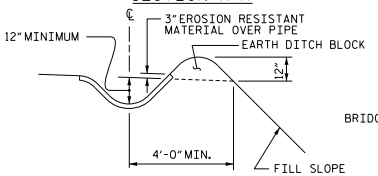


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



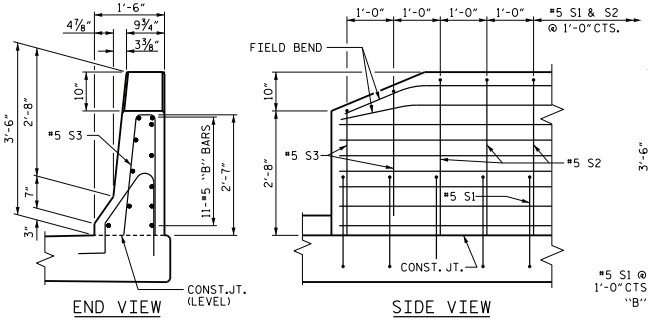
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

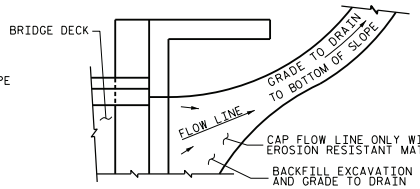


END VIEW

SIDE VIEW

SECTION THRU RAIL

END OF RAIL DETAILS



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLABS

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-51

TOTAL SHEETS 53

DRAWN BY : M. SPENCER DATE : 01/2021
CHECKED BY : A. FORFA DATE : 01/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

NORTH CAROLINA PROFESSIONAL SEAL 042449 ENGINEER ALEXANDER J. FORFA

Alexander Forfa 9/22/2021

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NOTES

THE COST OF THE CONCRETE MEDIAN BARRIER ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE MEDIAN BARRIER".

THE CONCRETE MEDIAN BARRIER ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN CONCRETE MEDIAN BARRIERS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MEDIAN BARRIER AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN MEDIAN BARRIER EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF MEDIAN BARRIER SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BILL OF MATERIAL

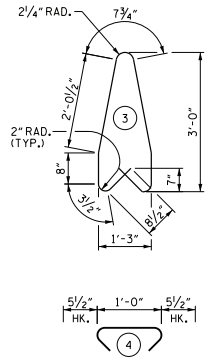
FOR CONCRETE MEDIAN BARRIER ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B15	20	#5	STR.	24'-8"	515
✳ S11	50	#4	3	8'-1"	270
✳ S12	100	#5	4	1'-11"	200

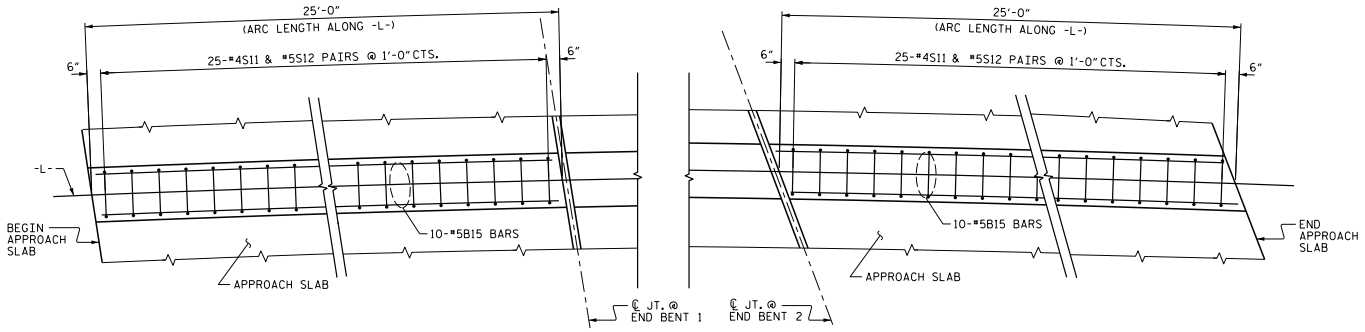
✳ EPOXY COATED REINFORCING STEEL 985 LBS.

CLASS AA CONCRETE 8.6 CU. YDS.

CONCRETE MEDIAN BARRIER 50.0 LIN. FT.



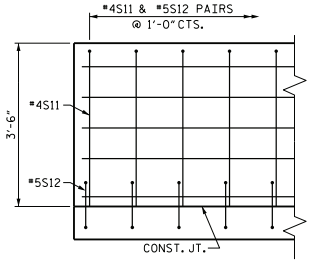
ALL BAR DIMENSIONS ARE OUT TO OUT



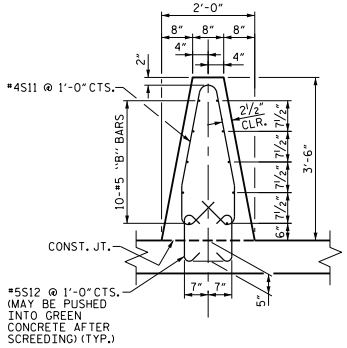
PLAN AT END BENT 1

PLAN AT END BENT 2

PLAN OF CONCRETE MEDIAN BARRIER



SIDE VIEW



SECTION THRU CONCRETE MEDIAN BARRIER

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLABS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			53

DRAWN BY : M. SPENCER DATE : 01/2021
CHECKED BY : A. FORFA DATE : 01/2021
DESIGN ENGINEER OF RECORD : A. FORFA DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
NC License No. F-1320

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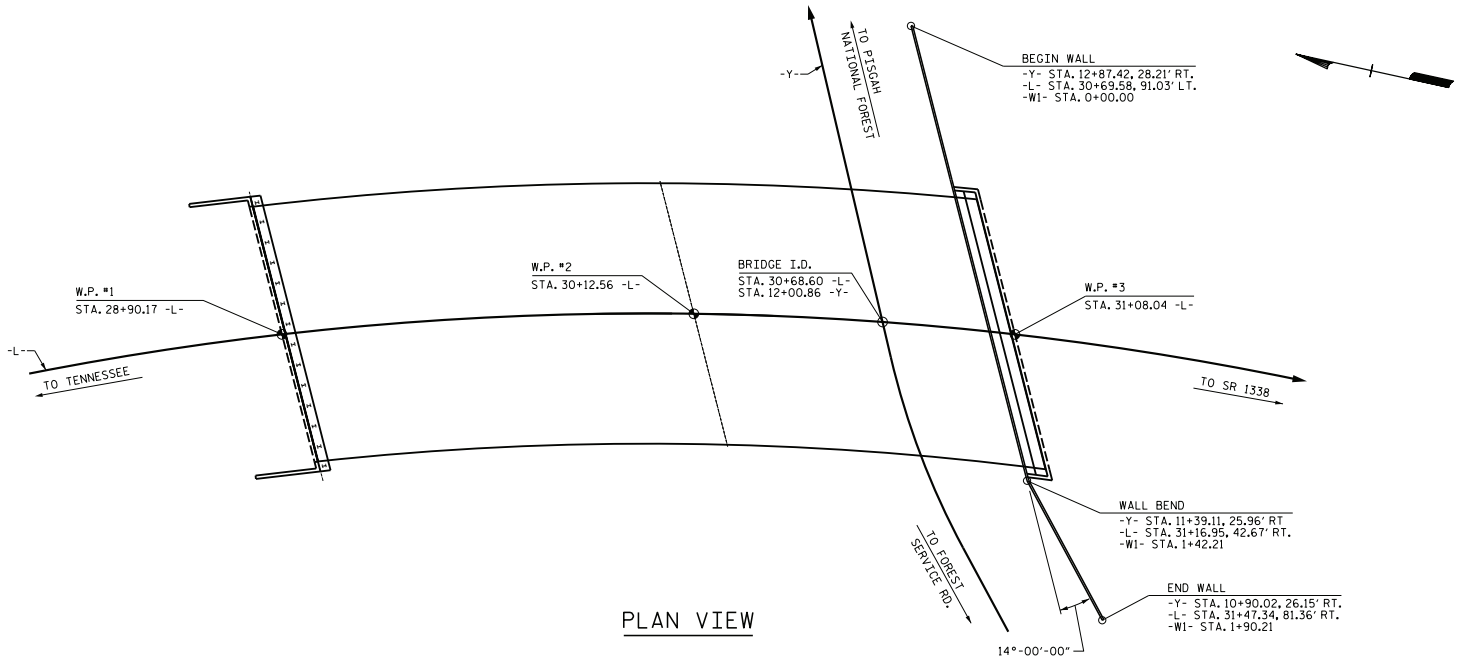
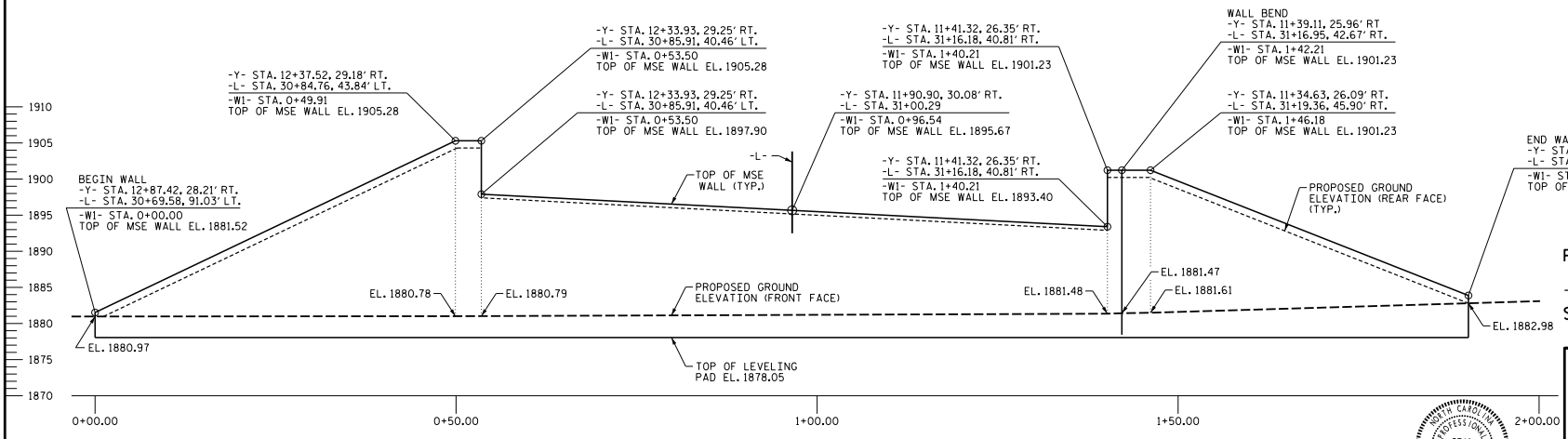


PLAN VIEW



WALL ENVELOPE AT END BENT 2

(LOOKING AT FRONT FACE OF WALL)

PROJECT NO. B-6054A

HAYWOOD COUNTY

STATION: 30+68.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MSE WALL

LAYOUT AND ELEVATIONS

DRAWN BY :	M. SPENCER — DATE : 03/2020
CHECKED BY :	A. FORFA — DATE : 04/2020
DESIGN ENGINEER OF RECORD :	A. FORFA — DATE : 09/2021

benesch
8000 Regency Parkway
Suite 175
Cary, NC 27518
984-275-2490
benesch.com
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Alexander Forfa 9/22/2021

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1			3			TOTAL SHEETS
2			4			53

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞"Ø SHEAR STUDS FOR THE ¾"Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞"Ø STUDS FOR 4 - ¾"Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞"Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾"Ø STUDS BASED ON THE RATIO OF 3 - ⅞"Ø STUDS FOR 4 - ¾"Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST ⅜" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM @ RGW REV. 5-7-03 RWW @ JTE REV. 10-1-11 MAA @ GM
REV. 8-16-99 RWW @ LES REV. 5-1-06 TLA @ GM REV. 12-17 MAA @ THC
$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

Appendix D

Project Permits

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DEQ State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2018 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2021-01081** County: **Haywood County** U.S.G.S. Quad: **Cove Creek Gap**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **North Carolina Department of Transportation - Division 14**
Mr. Dave McHenry
Address: **253 Webster Rd**
Sylva NC, 28779

Nearest Town **Clyde**
Nearest Waterway **Cold Springs Creek** River Basin **French Broad-Holston**
USGS HUC **06010106** Coordinates Latitude: **35.7374634769165**
Longitude: **-83.0241159628058**

Location description: **The Br 57 replacement project (B6054A) is located on Interstate 40 near exit #7 at Harmon Den, where Interstate 40 crosses over Cold Springs Creek in Clyde, Haywood County, North Carolina.**

Description of projects area and activity: **This permit verification authorizes impacts to waters associated with the replacement of a deteriorated bridge with a new bridge. The project will also involve the replacement of three existing pipes. Specific impacts are as follows:**

Site No.	Existing Condition	Proposed Condition	Net Impacts
Site 1	Cold Springs Creek	rip rap on banks under bridge #430057	100'
Site 1	Cold Springs Creek	temporary fill/dewatering for demolition and construction	53'
Site 2 (SA)	UT Pigeon River	channel length reduction (20') from a culvert inlet shift and rip rap bank protection at outlet (10') for 42" RCP (reinforced concrete pipe) construction	30'
Site 2 (SA)	UT Pigeon River	temporary fill/dewatering for demolition and construction	20'
Site 3 (SD)	UT Pigeon River	temporary fill/dewatering for 54" CMP (corrugated metal pipe) lining and replacement (only first 10' above inlet to be replaced, the remainder will be lined in place)	10'
Site 4 (SB)	UT Pigeon River	temporary fill/dewatering for 24" CMP (corrugated metal pipe) replacement	10'

Total Permanent Stream Impact **130'**
Total Temporary Stream Impact **93'**

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number and/or Nationwide Permit Number: **GP 50 - NCDOT - Bridge, Road Widenings and Interchanges**

SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND/OR SPECIAL CONDITIONS

Special Conditions

1) **Endangered Species: In order to avoid and minimize effects to endangered bats DOT will comply with the following measures:**
    - **Trees will be removed between October 15 and April 1 (winter removal)**
    - **minimize illumination and avoid direct illumination of the Pigeon River and its riparian area**

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application dated May 19, 2021 and ensuing record. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide and/or regional general permit authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide and/or regional general permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide and/or regional general permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide and/or regional general permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide and/or regional general permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Crystal Amschler at (828) 271-7980 X 4231 or Crystal.C.Amschler@usace.army.mil**.

Corps Regulatory Official: Crystal Amschler Digitally signed by Crystal Amschler Date: 2021.07.29 14:40:38 -04'00 Date: **July 29, 2025**
Expiration Date of Verification: **May 25, 2025**

A. Determination of Jurisdiction:

1. ☒ There are waters on the above described project area that may be subject to Section 404 of the Clean Water Act (CWA) (33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction. Please note, if work is authorized by either a general or nationwide permit, and you wish to request an appeal of an approved JD, the appeal must be received by the Corps and the appeal process concluded prior to the commencement of any work in waters of the United States and prior to any work that could alter the hydrology of waters of the United States.

2. ☐ There are Navigable Waters of the United States within the above described project area subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

3. ☐ There are waters, including wetlands, within the above described project area that are subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

4. ☐ A jurisdiction determination was not completed with this request. Therefore, this is not an appealable action. However, you may request an approved JD, which is an appealable action, by contacting the Corps for further instruction.

5. ☐ The aquatic resources within the above described project area have been identified under a previous action. Please reference the approved jurisdictional determination issued . Action ID: **SAW-** .

B. Basis For Jurisdictional Determination: N/A. An Approved JD has not been completed.

C. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

D. Appeals Information for Approved Jurisdiction Determinations (as indicated in A2 and A3 above).

If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Philip Shannin, Appeal Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by _____.

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: Crystal Amschler Digitally signed by Crystal Amschler Date: 2021.07.29 14:41:23 -04'00' Date of JD: **July 29, 2021**

Crystal Amschler

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Action ID Number: SAW-2021-01081 **County:** Haywood County

Permittee: North Carolina Department of Transportation - Division 14

Project Name: NCDOT / B 6054A / Replacement Bridge 57 / I 40 Forest Service and Cold Spring Road / Haywood County / Div 14

Date Verification Issued: July 29, 2021

Project Manager: Crystal Amschler

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Crystal Amschler, Project Manager
Asheville Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, North Carolina 28801

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Regional General Permit No. SAW-2019-02350 (RGP 50)
Name of Permittee: North Carolina Department of Transportation
Effective Date: May 26, 2020
Expiration Date: May 25, 2025

DEPARTMENT OF THE ARMY
REGIONAL GENERAL PERMIT

A regional general permit (RGP) to perform work in or affecting navigable waters of the United States and waters of the United States, upon recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344), is hereby issued by authority of the Secretary of the Army by the

District Commander
U.S. Army Engineer District, Wilmington
Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

TO AUTHORIZE THE DISCHARGE OF DREDGED OR FILL MATERIAL IN WATERS OF THE UNITED STATES (U.S.), INCLUDING WETLANDS, ASSOCIATED WITH MAINTENANCE, REPAIR, AND CONSTRUCTION PROJECTS CONDUCTED BY THE VARIOUS DIVISIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT), INCLUDING THE NCDOT DIVISION OF HIGHWAYS, RAIL, BICYCLE/PEDESTRIAN, ETC.

Activities authorized by this RGP:

a. (1) Road widening, and/or (2) construction, maintenance, and/or repair of bridges. For bridge projects, work can include the approaches.

b. (1) Improvement of interchanges or intersections, or (2) construction of interchanges or intersections over, or on, existing roads.

Full descriptions/terms of "a" and "b":

a. (1) Road widening, and/or (2) construction, maintenance, and/or repair of bridges. For bridge projects, work can include the approaches.

Permanent impacts that result in a loss of waters of the U.S., excluding stream relocation(s), must be less than or equal to 500 linear feet (lf) of stream and/or one (1) acre of wetland/open water for each single and complete linear project.

Single and complete linear project. As noted in 33 CFR 330.2(i), for linear projects, the ''single and complete project'' (i.e., single and complete crossing) will apply to each crossing of a separate water of the U.S. (i.e., single waterbody) at that location; except that for linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies and crossing of such features cannot be considered separately.

Also authorized under "a": (1) stream relocation(s) and (2) temporary impacts, such as those from temporary structures, fills, dewatering, and other work necessary to conduct the activities listed under "a". Stream relocation(s) and temporary impacts will be evaluated independently and are not limited to the permanent loss limits of 500 lf of stream and/or 1 acre of wetland/open water (i.e., stream relocations and/or temporary impacts do not factor into these limits) for each single and complete linear project; however, if the Corps determines that the proposed stream relocation(s) and/or temporary impacts are of such magnitude that they cannot be authorized under this section ("a") of RGP 50, even if the permanent losses from road widening, and/or construction, maintenance, and repair of bridges do not exceed the impact limits for this section ("a") of RGP 50, an Individual Permit will be required.

If the Corps determines, on a case-by-case basis, that the concerns for the aquatic environment so indicate, he/she may exercise discretionary authority to override this RGP and require an Individual Permit.

b. (1) Improvement of interchanges or intersections, or (2) construction of interchanges or intersections, over or, on existing roads.

For activities authorized under "b", the limits for permanent impacts that result in a loss of waters of the U.S. depend on the location of the impacts, as described below:

- In the coastal plain of North Carolina (both inner coastal plain and outer coastal plain) - permanent impacts that result in a loss of waters of the U.S., excluding stream relocation(s), must be less than or equal to 1,000 lf of stream and/or 3 acres of wetland/open water for the entire interchange or intersection project.

• All other areas of North Carolina - permanent impacts that result in a loss of waters of the U.S., excluding stream relocation(s), must be less than or equal to 1,000 lf of stream and/or 2 acres of wetland/open water for the entire interchange or intersection project.

Coastal plain – See http://saw-reg.usace.army.mil/JD/LRRs_PandT.pdf for Land Resource Areas LRRP (inner coastal plain) and LRRT (outer coastal plain).

When proposed impacts to waters of the U.S. are located both inside AND outside of the coastal plain, the Corps will determine, based on the location(s) of proposed impacts to waters of the U.S., if a project is a "coastal plain project".

Single and complete project. For permitting purposes, each interchange or intersection is considered to be one single and complete project. For example, an interchange project cannot result in a permanent loss (excluding stream relocation), of (1) greater than 1,000 lf of stream and/or 3 acres of wetland/open water in the coastal plain OR (2) greater than 1,000 lf of stream and/or 2 acres of wetland/open water in all other areas of North Carolina.

Approach fills may be considered to be part of an interchange or intersection project if the Corps determines that inclusion of these areas meet the terms of this section ("b") of RGP 50. Early coordination with the Corps is encouraged.

Intersections, regardless of the mode of transportation (e.g., railroad, other roadways, etc.), may be at grade or grade separated if the Corps determines that the project would meet the terms of this section ("b") of RGP 50. Early coordination with the Corps is encouraged.

Also authorized under "b": (1) stream relocation(s) and (2) temporary impacts, such as those from temporary structures, fills, dewatering, and other work necessary to conduct the activities listed under "b". Stream relocation(s) and temporary impacts will be evaluated independently and are not limited to the permanent loss limits of (1) 1,000 lf of stream and/or 3 acres of wetland/open water in the coastal plain OR (2) 1,000 lf of stream and/or 2 acres of wetland/open water in all other areas of North Carolina (i.e., stream relocations and/or temporary impacts do not factor into these limits) for each interchange or intersection project; however, if the Corps determines that the proposed stream relocation(s) and/or temporary impacts are of such magnitude that they cannot be authorized under this section ("b") of RGP 50, even if the permanent losses from improvement of interchanges or intersections, or construction of interchanges or intersections over, or on, existing roads do not exceed the impact limits for this section ("b") of RGP 50, an Individual Permit will be required.

If the Corps determines, on a case-by-case basis, that the concerns for the aquatic environment so indicate, he/she may exercise discretionary authority to override this RGP and require an Individual Permit.

1. Special Conditions.

a. The prospective permittee must submit a pre-construction notification (PCN) and applicable supporting information to the District Engineer and receive written verification from the Corps that the proposed work complies with this RGP prior to commencing any activity authorized by this RGP.

b. If the project will not impact a designated "Area of Environmental Concern" (AEC) in the twenty* (20) counties of North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) ("CAMA counties"), a consistency submission is not required. If the project will impact a designated AEC and meets the definition of "development", the prospective permittee must obtain the required CAMA permit. Development activities shall not commence until a copy of the approved CAMA permit is furnished to the appropriate Corps Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

***The 20 CAMA counties in North Carolina include Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington.**

c. No work shall be authorized by this RGP within the 20* CAMA counties without prior consultation with the National Oceanic and Atmospheric Administration's (NOAA) Habitat Conservation Division. For each activity reviewed by the Corps where it is determined that the activity may affect Essential Fish Habitat (EFH) for federally managed species, an EFH Assessment shall be prepared by the prospective permittee and forwarded to the Corps and NOAA Fisheries for review and comment prior to authorization of work.

d. Culverts and pipes. The following conditions [(1)-(8)] apply to the construction of culverts/pipes, and work on existing culverts/pipes.

Additionally, if the proposed work would affect an existing culvert/pipe (e.g., culvert/pipe extensions), the prospective permittee must include actions (in the PCN) to correct any existing deficiencies that are located:

- At the inlet and/or outlet of the existing culvert/pipe, IF these deficiencies are/were caused by the existing culvert/pipe, or

- Near the inlet or outlet of the existing culvert/pipe, IF these deficiencies are/were caused by the existing culvert/pipe.

These deficiencies may include, but are not limited to, stream over-widening, bank erosion, streambed scour, perched culvert/pipes, and inadequate water depth in culvert(s). Also note if the proposed work would address the existing deficiency or eliminate it – e.g., bank erosion on left bank, but the culvert extension will be placed in this eroded area. If the prospective permittee is unable to correct the deficiencies caused by the existing culvert/pipe, they must document the reasons in the PCN for Corps consideration.

(1) No activity may result in substantial, permanent disruption of the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. Measures will be included that will promote the safe passage of fish and other aquatic organisms.

(2) The dimension, pattern, and profile of the stream above and below a culvert/pipe shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. It is acceptable to use rock vanes at culvert/pipe outlets to ensure, enhance, or maintain aquatic passage. Pre-formed scour holes are acceptable when designed for velocity reduction. The width, height, and gradient of a proposed opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow will be determined from gauge data, if available. In the absence of such data, bankfull flow will be used as a comparable level.

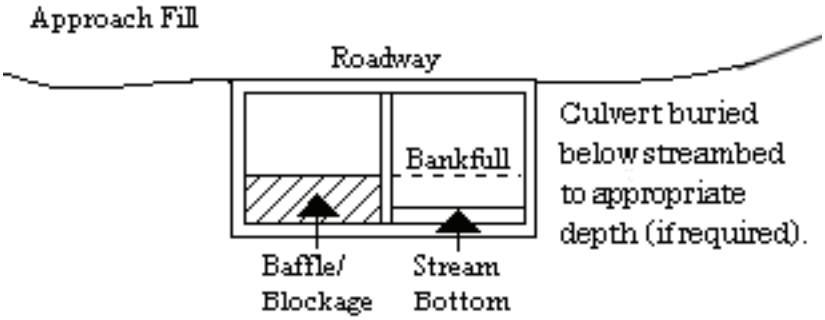
(3) Burial/depth specifications: If the project is located within any of the 20* CAMA counties, culvert/pipe inverts will be buried at least one foot below normal bed elevation when they are placed within the Public Trust AEC and/or the Estuarine Waters AEC as designated by CAMA. If the project is located outside of the 20* CAMA counties, culvert/pipe inverts will be buried at least one foot below the bed of the stream for culverts/pipes that are greater than 48 inches in diameter. Culverts/pipes that are 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, to include passage during drought or low flow conditions. Every effort shall be made to maintain the existing channel slope. A waiver from the burial/depth specifications in this condition may be requested in writing. The prospective permittee is encouraged to request agency input about waiver requests as early as possible, and prior to submitting the PCN for a specific project; this will allow the agencies time to conduct a site visit, if necessary, and will prevent time delays and potential project revisions for the prospective permittee. The waiver will only be issued by the Corps if it can be demonstrated that the impacts of complying with burial requirements would result in more adverse impacts to the aquatic environment.

(4) Appropriate actions to prevent destabilization of the channel and head cutting upstream shall be incorporated in the design and placement of culverts/pipes.

(5) Culverts/pipes placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the U.S. Culverts/pipes placed across wetland fills purely for the purposes of equalizing surface

water do not have to be buried, but must be of adequate size and/or number to ensure unrestricted transmission of water.

(6) Bankfull flows (or less) shall be accommodated through maintenance of the existing bankfull channel cross sectional area in no more than one culvert/pipe or culvert/pipe barrel. Additional culverts/pipes or barrels at such crossings shall be allowed only to receive flows exceeding the bankfull flow. A waiver from this condition may be requested in writing; this request must be specific as to the reason(s) for the request. The waiver will be issued if it can be demonstrated that it is not practicable to comply with this condition.



(7) Where adjacent floodplain is available, flows exceeding bankfull will be accommodated by installing culverts/pipes at the floodplain elevation. When multiple culverts/pipes are used, baseflow must be maintained at the appropriate width and depth by the construction of floodplain benches, sills, and/or construction methods to ensure that the overflow culvert(s)/pipe(s) is elevated above the baseflow culvert(s)/pipe(s).

(8) The width of the baseflow culvert/pipe shall be comparable to the width of the bankfull width of the stream channel. If the width of the baseflow culvert/pipe is wider than the stream channel, the culvert/pipe shall include baffles, benches and/or sills to maintain the width of the stream channel. A waiver from this condition may be requested in writing; this request must be specific as to the reason(s) for the request. The waiver will be issued if it can be demonstrated that it is not practicable or necessary to include baffles, benches or sills.

See the remaining special conditions for additional information about culverts/pipes in specific areas.

e. Discharges into waters of the U.S. designated by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are prohibited during the period between February 15th and June 30th, without prior written approval from the Corps and the appropriate wildlife agencies (NCDMF, NCWRC, and/or the National Marine Fisheries Service (NMFS)). Discharges into waters of the U.S. designated by NCWRC as primary nursery areas in inland waters are prohibited during the period between February 15th and September 30th, without prior written approval from the Corps and the appropriate wildlife agencies. Discharges into waters of the U.S. designated by NCDMF as primary nursery areas shall be coordinated with NCDMF prior to being authorized by

this RGP. Coordination with NCDMF may result in a required construction moratorium during periods of significant biological productivity or critical life stages.

The prospective permittee should contact:

NC Division of Marine Fisheries	**North Carolina Wildlife Resources Commission**
3441 Arendell Street	**Habitat Conservation Division**
Morehead City, NC 28557	**1721 Mail Service Center**
Telephone 252-726-7021	**Raleigh, NC 27699-1721**
or 800-682-2632	**Telephone (919) 707-0220**

f. This permit does not authorize the use of culverts in areas designated as anadromous fish spawning areas by the NCDMF or the NCWRC.

g. No in-water work shall be conducted in Waters of the U.S. designated as Atlantic sturgeon critical habitat during the periods between February 1st and June 30th. No in-water work shall be conducted in Waters of the U.S. in the Roanoke River designated as Atlantic sturgeon critical habitat during the periods between February 1st and June 30th, and between August 1st to October 31st, without prior written approval from NMFS.

h. Before discharging dredged or fill material into waters of the U.S. in designated trout watersheds in North Carolina, the PCN will be sent to the NCWRC and the Corps concurrently. See https://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Trout.aspx for the designated trout watersheds. The PCN shall summarize alternatives to conducting work in waters of the U.S. in trout watersheds that were considered during the planning process and detail why alternatives were or were not selected. For proposals where (1) a bridge in a trout stream will be replaced with a culvert, or (2) a culvert will be placed in a trout stream, the PCN must also include a compensatory mitigation plan for all loss of stream bed, and details of any on-site evaluations that were conducted to determine that installation of a culvert will not adversely affect passage of fish or other aquatic biota at the project site. The evaluation information must include factors such as the proposed slope of the culvert and determinations of how the slope will be expected to allow or impede passage, the necessity of baffles and/or sills to ensure passage, design considerations to ensure that expected baseflow will be maintained for passage and that post-construction velocities will not prevent passage, site conditions that will or will not allow proper burial of the culvert, existing structures (e.g., perched culverts, waterfalls, etc.) and/or stream patterns up and downstream of the culvert site that could affect passage and bank stability, and any other considerations regarding passage. The level of detail for this information shall be based on site conditions (i.e., culverts on a slope over 3% will most likely require more information than culverts on a slope that is less than 1%, etc.). Also, in order to evaluate potential impacts, the prospective permittee will describe bedforms that will be impacted by the proposed culvert – e.g., pools, glides, riffles, etc. The NCWRC will respond to both the prospective permittee and the Corps.

i. For all activities authorized by this RGP that involve the use of riprap material for bank stabilization, the following measures shall be applied:

(1) Where bank stabilization is conducted as part of an activity, natural design, bioengineering, and/or geoengineering methods that incorporate natural durable materials, native seed mixes, and native plants and shrubs are to be utilized, as appropriate to site conditions, to the maximum extent practicable.

(2) Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters; however, the prospective permittee may request a waiver from this requirement. The waiver request must be in writing. The Corps will only issue a waiver if the prospective permittee demonstrates that the impacts of complying with this requirement would result in greater adverse impacts to the aquatic environment. Note that filter fabric is not required if the riprap will be pushed or "keyed" into the bank of the waterbody.

(3) The placement of riprap shall be limited to the areas depicted on submitted work plan drawings.

(4) Riprap shall not be placed in a manner that prevents or impedes fish passage.

(5) Riprap shall be clean and free from loose dirt or any pollutant except in trace quantities that will not have an adverse environmental effect.

(6) Riprap shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

(7) Riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

j. Discharges of dredged or fill material into waters of the U.S., including wetlands, must be minimized or avoided to the maximum extent practicable.

k. Generally, off-site detours are preferred to avoid and minimize impacts to the human and natural environment; however, if an off-site detour is considered impracticable, then an on-site detour may be considered as a necessary component of the actions authorized by this RGP. Impacts from the detour may be considered temporary and may not require compensatory mitigation if the impacted area is restored to pre-construction elevations and contours after construction is complete. The permittee shall also restore natural hydrology and stream corridors (if applicable), and reestablish native vegetation/riparian corridors. If the construction of a detour (on-site or off-site) includes standard undercutting methods, removal of all material and backfilling with suitable material is required. See special condition "s" for additional information.

l. All activities authorized by this RGP shall, to the maximum extent practicable, be

conducted "in the dry", with barriers installed between work areas and aquatic habitat to protect that habitat from sediment, concrete, and other pollutants. Where concrete is utilized, measures will be taken to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with waters of the U.S. until the concrete has set and cured. All water in the work area that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

m. In cases where new alignment approaches are to be constructed and the existing approach fill in waters of the U.S. is to be abandoned and no longer maintained as a roadway, the abandoned fill shall be removed and the area will be restored to pre-construction elevations and contours. The permittee shall also restore natural hydrology and stream corridors (if applicable), and reestablish native vegetation/riparian corridors, to the extent practicable. This activity may qualify as compensatory mitigation credit for the project and will be assessed on a case-by-case basis in accordance with Special Conditions “q” and “r” in this document. Any proposed on-site wetland restoration area must be void of utility conflicts and/or utility maintenance areas. A restoration plan detailing this activity will be required with the submittal of the PCN.

n. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

o. The project must be implemented and/or conducted so that all reasonable and practicable measures to ensure that equipment, structures, fill pads, and work associated with the project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, scour, flooding, and/or shoreline/streambank erosion. During construction, the permittee shall routinely monitor for these effects, cease all work if/when detected, take initial corrective measures to correct actively eroding areas, and notify the Corps immediately. Permanent corrective measures may require additional authorization from the Corps.

p. All PCNs will describe sedimentation and erosion control structures and measures proposed for placement in waters of the U.S. To the maximum extent practicable, structures and measures will be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams. In addition, appropriate soil and erosion control measures must be established and maintained during construction. All fills, temporary and permanent, must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

q. Compensatory mitigation will be required for permanent impacts resulting in a loss of waters of the U.S. due to culvert/pipe installation and other similar activities. Mitigation may be required for stream relocation projects (see Special Condition "r" below). When compensatory mitigation is required, the prospective permittee will attach a proposed mitigation plan to the PCN. Compensatory mitigation proposals will be written in accordance with currently approved Wilmington District guidance and Corps mitigation regulations, unless the purchase of mitigation credits from an approved mitigation bank or the North Carolina Division of Mitigation Services (NCDMS) is proposed to address all compensatory mitigation requirements. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

r. Stream Relocations (non-tidal only) - for the purposes of permitting, stream relocations are considered a loss of waters of the U.S. Depending on the condition and location of (1) the existing stream, and (2) the relocated channel, stream relocation(s) may provide a functional uplift. The Corps will determine if an uplift is possible based on the information submitted with the PCN. If the anticipated uplift(s) occurs, it may offset, either partially or fully, the loss associated with a stream relocation(s) - (i.e., due to the uplift, either no compensatory mitigation would be required for the stream relocation itself, or compensatory mitigation would be required at a reduced ratio).

Because the amount of potential uplift is dependent upon the condition (or quality) of the channel to be relocated, there is no pre-determined amount of uplift needed to satisfy the requirements for a successful relocation project. After performing the evaluation(s) noted in this document, the prospective permittee will propose a certain amount of uplift potential and the Corps project manager will make the final determination. Baseline conditions and subsequent monitoring must show that the relocated channel is providing/will provide aquatic function at, or above, the level provided by the baseline (pre-project) condition. If the required uplift is not achieved, the work will not be in compliance with this special condition of RGP 50 and remediation will be required through repair (and continued monitoring), or by the permittee providing compensatory mitigation (e.g., mitigation credit through an approved bank, mitigation credit through NCDMS, etc.).

Compensatory mitigation, in addition to the stream relocation activity, may be required if the Corps determines that (a) no uplift in stream function is achievable, (b) the proposed uplift in stream function is not sufficient, by itself, (c) the risks associated with achieving potential uplifts in stream function are excessive, and/or (d) the time period for achieving the potential uplifts/functional success is too great.

On-site compensatory mitigation is not the same as stream relocation. While stream relocation simply moves a stream to a nearby, geographically similar area, it does not generate mitigation credits. If NCDOT proposes to generate compensatory mitigation on a project site, NCDOT must submit a mitigation plan that complies with 33 CFR 332.4.

The prospective permittee is required to submit the following information for any proposed project that involves stream relocation, regardless of the size/length of the stream relocation (note that 1-5 below only apply to stream relocations and not to compensatory mitigation):

(1) A statement detailing why relocating the stream is unavoidable. In order to ensure that this action is separate from a compensatory mitigation project, the need for the fill must be related to road/interchange/intersection construction or improvement, and the project must meet the requirements set forth in the full descriptions/terms of "a" and "b" on pages 2 and 3 of this permit.

(2) An evaluation of effects on the relocated stream and buffer from utilities, or potential for impact from utility placement in the future.

(3) An evaluation of the baseline condition of the stream to be relocated. In order to demonstrate a potential uplift, the prospective permittee must provide the baseline (pre-impact) condition of the stream that is proposed for relocation. The prospective permittee will document the baseline condition of the stream by using the Corps' (Wilmington District's) current functional assessment method - e.g., the North Carolina Stream Assessment Method (NCSAM). The functional assessment must be used to identify specific areas where an uplift would reasonably be expected to occur, and also show important baseline functions that will remain after the relocation.

(4) An evaluation of the potential uplifts to stream function for the relocated channel. The amount of detail required in the plan will be commensurate with the functional capacity of the original stream and proposed uplift(s). Low functional capacity will warrant less monitoring and less detail in the plan in order to ensure that the relocated channel provides the same, or better/increased, suite of aquatic functions as the existing channel.

(5) A proposed monitoring plan for the relocated channel (and buffer, if applicable), will be prepared in accordance with current District guidance. The level of detail needed in the plan will be directly related to the quality of baseline functions and the anticipated uplift, therefore it is recommended that a pre-application discussion occur with the Corps Project Manager as early as possible. For example, if the risk for achieving the anticipated functional uplift is moderate or low, or if there is a low amount of proposed uplift, less information and monitoring will be required in the proposed relocation plan; similar to the requirements found in the "2003 Stream Mitigation Guidelines". If the risk for uplift is higher, or if there is a high amount of proposed uplift, additional monitoring and information will be required, trending toward the prescriptions found in the most recent Wilmington District Compensatory Mitigation Guidance – e.g., the 2016 Wilmington District Stream and Wetland Compensatory Mitigation Update. All monitoring will be for at least 5 years unless the Corps project manager determines that (a) a specific project requires less than 5 years due to site conditions or limited risk/uplift potential, and/or complexity (or simplicity) of the existing channel and/or the

relocation work, or (b) the Corps project manager determines (during the monitoring period) that the 5 years of monitoring may be reduced (or that no further monitoring is required) based on monitoring information received once the stream relocation has been completed.

s. Upon completion of any work authorized by this RGP, all temporary fills (to include culverts, pipes, causeways, etc.) will be completely removed from waters of the U.S. and the areas will be restored to pre-construction elevations and contours. The permittee shall also restore natural hydrology and stream corridors (if applicable), and reestablish native vegetation/riparian corridors. This work will be completed within 60 days of completion of project construction. If this timeframe occurs while a required moratorium of this permit is in effect, the temporary fill shall be removed in its entirety within 60 days of the moratorium end date. If vegetation cannot be planted due to the time of the year, all disturbed areas will be seeded with a native mix appropriate for the impacted area, and vegetation will be planted during the next appropriate time frame. A native seed mix may contain non-invasive small grain annuals (e.g. millet and rye grain) to ensure adequate cover while native vegetation becomes established. The PCN must include a restoration plan showing how all temporary fills and structures will be removed and how the area will be restored to pre-project elevations and contours.

t. Once the authorized work in waters of the U.S. is complete, the permittee shall sign and return the compliance certificate that is attached to the RGP verification letter.

u. The District Engineer will consider any comments from Federal and/or State agencies concerning the proposed activity's compliance with the terms and conditions of this RGP.

v. The Corps may place additional special conditions, limitations, or restrictions on any verification of the use of RGP 50 on a project-by-project basis.

2. General Conditions.

a. Except as authorized by this RGP or any Corps approved modification to this RGP, no excavation, fill or mechanized land-clearing activities shall take place within waters or wetlands, at any time during construction or maintenance of the project. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with the project.

b. Authorization under this RGP does not obviate the need to obtain other federal, state, or local authorizations.

c. All work authorized by this RGP must comply with the terms and conditions of the applicable CWA Section 401 Water Quality Certification for this RGP issued by the North Carolina Division of Water Resources (NCDWR).

d. The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside of the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

e. The activities authorized by this RGP must not interfere with the public's right to free navigation on all navigable waters of the U.S. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at, or adjacent to, the authorized work for a reason other than safety.

f. The permittee understands and agrees that if future operations by the U.S. require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

g. The permittee, upon receipt of a notice of revocation of this RGP for the verified individual activity, may apply for an individual permit, or will, without expense to the U.S. and in such time and manner as the Secretary of the Army or his/her authorized representative may direct, restore the affected water of the U.S. to its former conditions.

h. This RGP does not authorize any activity that would conflict with a federal project's congressionally authorized purposes, established limitations or restrictions, or limit an agency's ability to conduct necessary operation and maintenance functions. Per Section 14 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. 408), no project that has the potential to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, or obstruct a federally constructed work or project, including, but not limited to, levees, dams, jetties, navigation channels, borrow areas, dredged material disposal sites, flood control projects, etc., shall be permitted unless the project has been reviewed and approved by the appropriate Corps approval authority. Permittees shall not begin the activity authorized by this RGP until notified by the Corps that the activity may proceed.

i. The permittee shall obtain a Consent to Cross Government Easement from the appropriate Corps District's Land Use Coordinator prior to any crossing of a Corps easement and/or prior to commencing construction of any structures, authorized dredging, or other work within the right-of-way of, or in proximity to, a federally designated disposal area.

j. The permittee will allow the Wilmington District Engineer or his/her representative to inspect the authorized activity at any time deemed necessary to ensure that the activity is being performed or maintained in strict accordance with the Special and General Conditions of this permit.

k. This RGP does not grant any property rights or exclusive privileges.

l. This RGP does not authorize any injury to the property or rights of others.

m. This RGP does not authorize the interference with any existing or proposed federal project.

n. In issuing this permit, the Federal Government does not assume any liability for the following:

(1) Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

(2) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest.

(3) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

(4) Design or construction deficiencies associated with the permitted work.

(5) Damage claims associated with any future modification, suspension, or revocation of this permit.

o. Authorization provided by this RGP may be modified, suspended or revoked in whole, or in part, if the Wilmington District Engineer, acting for the Secretary of the Army, determines that such action would be in the best public interest. The term of this RGP shall be five (5) years unless subject to modification, suspension, or revocation. Any modification, suspension, or revocation of this authorization will not be the basis for any claim for damages against the U.S. Government.

p. No activity may occur in a component of the National Wild and Scenic Rivers System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or "study river" (e.g., National Park Service, U.S. Forest Service, etc.).

q. Endangered Species.

(1) No activity is authorized under this RGP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under this RGP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(2) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal prospective permittees (and when FHWA is the lead federal agency) must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements. The District Engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the RGP activity, or whether additional ESA consultation is necessary.

(3) Non-federal prospective permittees - for activities that might affect federally-listed endangered or threatened species or designated critical habitat, the PCN must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The District Engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat. In cases where the non-federal prospective permittee has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the prospective permittee shall not begin work until the Corps has provided notification that the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed.

(4) As a result of formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) or NMFS, the District Engineer may add species-specific endangered species conditions to the RGP verification letter for a project.

(5) Authorization of an activity by a RGP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, the ESA prohibits any person subject to the jurisdiction of the U.S. to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(6) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS in North Carolina at the addresses provided below, or from the USFWS and NMFS via their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

USFWS offices in North Carolina:

The Asheville USFWS Office covers all NC counties west of, and including, Anson, Stanly, Davidson, Forsyth and Stokes Counties.

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

The Raleigh USFWS Office covers all NC counties east of, and including, Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

r. The Wilmington District, USFWS, NCDOT, and the FHWA have conducted programmatic Section 7(a)(2) consultation for a number of federally listed species and habitat, and programmatic consultation concerning other federally listed species and/or habitat may occur in the future. The result of completed programmatic consultation is a Programmatic Biological Opinion (PBO) issued by the USFWS. These PBOs contain mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" of whichever species or critical habitat is covered by a specific PBO. Authorization under RGP 50 is conditional upon the permittee's compliance with all the mandatory terms and conditions associated with incidental take of the applicable PBO (or PBOs), which are incorporated by reference in RGP 50. Failure to comply with the terms and conditions associated with incidental take of an applicable PBO, where a take of the federally listed species occurs, would constitute an unauthorized take by the permittee, and would also constitute permittee non-compliance with the authorization under RGP 50. If the terms and conditions of a specific PBO (or PBOs) apply to a project, the Corps will include this/these requirements in any RGP 50 verification that may be issued for a project. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its PBO, and with the ESA.

s. Northern long-eared bat (NLEB) (*Myotis septentrionalis*). Standard Local Operating Procedures for Endangered Species (SLOPES) for the NLEB have been approved by the Corps and the U.S. Fish and Wildlife Service. See http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/ESA/ . This SLOPES details how the Corps will make determinations of effect to the NLEB when the Corps is the lead federal agency for an NCDOT project that is located in the western 41 counties of North Carolina. This SLOPES does not address NCDOT projects (either federal or state funded) in the eastern 59 counties in North Carolina. Note that if another federal agency is the lead federal agency for a project in the western 41 counties, procedures for satisfying the requirements of Section 7(a)(2) of the ESA will be dictated by that agency and will not be applicable for consideration under the SLOPES; however, information that demonstrates the lead federal agency's (if other than the Corps) compliance with Section 7(a)(2) / 4(d) Rule for the NLEB, will be required in the PCN. Note that at the time of issuance of RGP 50, the federal listing status of the NLEB as "Threatened" is being litigated at the National level. If, as a result of litigation, the NLEB is federally listed as "Endangered", this general condition ("s") will no longer be applicable because the 4(d) Rule, and this NLEB SLOPES, will no longer apply/be valid.

t. For proposed activities the sixteen (16) counties listed below, prospective permittees must provide a copy of the PCN to the USFWS, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the USFWS and the Corps Project Manager for that specific county.

The 16 counties with tributaries that drain to designated critical habitat that require notification to the Asheville USFWS are: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

u. If the permittee discovers or observes any live, damaged, injured or dead individual of an endangered or threatened species during construction, the permittee shall immediately notify the Wilmington District Engineer so that required coordination can be initiated with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service.

v. Historic Properties.

(1) In cases where the District Engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(2) Federal prospective permittees (or when FHWA is the lead federal agency) should follow their own procedures for complying with the requirements of Section 106 of the NHPA. Federal prospective permittees must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements; this includes copies of correspondence sent to all interested, federally recognized tribes and a summary statement about

tribal consultation efforts or, if the Corps enters into a Programmatic Agreement (PA) with the FHWA/NCDOT, documentation that the FHWA/NCDOT has complied with PA requirements. The District Engineer will review the documentation and determine whether it is sufficient to address Section 106 compliance for this RGP activity, or whether additional Section 106 consultation is necessary.

(3) Non-federal prospective permittees - the PCN must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO), as appropriate, and the NRHP (see 33 CFR 330.4(g)). When reviewing PCNs, the District Engineer will comply with the current procedures for addressing the requirements of Section 106 of the NHPA. The District Engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the District Engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties.

(4) Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)).

(5) Section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to a prospective permittee who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit will relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the prospective permittee. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the prospective permittee, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

w. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this general permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

x. Permittees are advised that development activities in or near a floodway may be subject to the National Flood Insurance Program that prohibits any development, including fill, within a floodway that results in any increase in base flood elevations. This general permit does not authorize any activity prohibited by the National Flood Insurance Program.

y. The permittee must install and maintain, at his/her expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the permittee should contact Coast Guard Sector North Carolina at (910) 772-2191 or email Coast Guard Fifth District at cgd5waterways@uscg.mil.

z. The permittee must maintain any structure or work authorized by this general permit in good condition and in conformance with the terms and conditions of this general permit. The permittee is not relieved of this requirement if the permittee abandons the structure or work. Transfer in fee simple of the work authorized by this general permit will automatically transfer this general permit to the property's new owner, with all of the rights and responsibilities enumerated herein. The permittee must inform any subsequent owner of all activities undertaken under the authority of this general permit and provide the subsequent owner with a copy of the terms and conditions of this general permit.

aa. At his or her sole discretion, any time during the processing cycle, the Wilmington District Engineer may determine that this general permit will not be applicable to a specific proposal. In such case, the procedures for processing an individual permit in accordance with 33 CFR 325 will be available.

bb. Except as authorized by this general permit or any Corps approved modification to this general permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

cc. Except as authorized by this general permit or any Corps approved modification to this general permit, all excavated material will be disposed of in approved upland disposal areas.

dd. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon this general permit will remain authorized provided the activity is completed within twelve months of the date of the general permit's expiration, modification, or revocation. Activities completed under the authorization of this general permit that were in effect at the time the activity was completed continue to be authorized by the general permit.

ee. The permittee is responsible for obtaining any “take” permits required under the USFWS’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

ff. The activity must comply with applicable FEMA approved state or local floodplain management requirements.

gg. There will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by this RGP.

hh. Unless authorization to fill those specific wetlands or mudflats has been issued by the Corps, heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

ii. This RGP will not be applicable to proposed construction when the Wilmington District Engineer determines that the proposed activity will significantly affect the quality of the human environment and determines that an EIS must be prepared.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Robert J. Clark
Colonel, U. S. Army
District Commander

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ROY COOPER
Governor
JOHN NICHOLSON
Interim Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

June 9, 2021

DWR # 20210694
Haywood County

Mr. Dave McHenry, Division 14 Environmental Officer
NCDOT, Division 14
253 Webster Road
Sylva, NC 28779

Subject: **APPROVAL OF 401 WATER QUALITY CERTIFICATION WITH ADDITIONAL CONDITIONS**
Replace Bridge 57 on I-40 B-6054A
Cold Springs Creek [French Broad River Basin, 06010106, C; Trout]

Dear Mr. McHenry:

You have our approval for the impacts listed below for the purpose described in your application dated May 18, 2021 and received by the Division of Water Resources (Division) on May 18, 2021. These impacts are covered by the attached Water Quality General Certification Number 4135 and the conditions listed below. This certification is associated with the use of Regional General Permit Number 201902350 once it is issued to you by the U.S. Army Corps of Engineers. Please note that you should get any other federal, state, or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

The Division has determined that the proposed project will comply with water quality requirements provided that you adhere to the conditions listed in the enclosed certification and to the additional conditions itemized below.

The following proposed impacts are hereby approved. No other impacts are approved, including incidental impacts. [15A NCAC 02H .0506(b)]

Stream Impacts in the French Broad River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
S1			100		100	0
S2				53	53	0
S3			30		30	0
S4				20	20	0
S5				10	10	0
S6				10	10	0
TOTAL	**0**	**0**	**130**	**93**	**223**	**0**

Total Stream Impact for Project: 130 linear feet of permanent and 93 linear feet of temporary.

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This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)].

If you are unable to comply with any of the conditions of the attached Water Quality General Certification or with the additional conditions itemized below, you must notify the Asheville Regional Office within 24 hours (or the next business day if a weekend or holiday) from the time the permittee becomes aware of the circumstances.

The permittee shall report to the Asheville Regional Office any noncompliance with, and/or any violation of, stream or wetland standards [15A NCAC 02B .0200] including but not limited to sediment impacts to streams or wetlands. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the permittee became aware of the non-compliance circumstances.

Condition(s) of Certification:

Project Specific Conditions

1. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)]

2. As a condition of this 401 Water Quality Certification, the bridge demolition and construction must be accomplished in strict compliance with the most recent version of NCDOT's Best Management Practices for Construction and Maintenance Activities. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

3. The permittee shall use Design Standards in Sensitive Watersheds (15A NCAC 4B.0124[a]-[e]) in areas draining to Trout waters.

4. The permittee will need to adhere to all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission. No in-water work is permitted between October 15 and April 15of any year, without prior approval from the NC Division of Water Resources and the NC Wildlife Resources Commission.

   In-stream work and land disturbance within the 25-foot buffer zone are prohibited during the trout-spawning season of October 15 through April 15 to protect the egg and fry stages of trout.

General Conditions

1. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

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2. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

3. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S. or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

4. The dimension, pattern, and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

5. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

* 6. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

7. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]

8. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

9. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

10. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

11. Discharging hydroseed mixtures and washing out hydro seeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

12. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

13. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

14. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

15. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing

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activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

16. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

17. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

* 18. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

19. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B.0506(b)(2)]

20. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

21. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]):

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
    c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
    d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

22. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5] This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) **within sixty (60) calendar days**. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

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One (1) copy of the Petition must also be served to the North Carolina Department of Environmental Quality:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

This letter completes the review of the Division under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Kevin Mitchell at 828-296-4650 or kevin.mitchell@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...

S. Daniel Smith, Director
Division of Water Resources

ec: Crystal Amschler, US Army Corps of Engineers Asheville Regulatory Field Office (via email)
Marla Chambers, NC Wildlife Resources Commission (via email)
Holland Youngman, US Fish and Wildlife Service (via email)
File Copy

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES

WATER QUALITY GENERAL CERTIFICATION NO. 4135

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR US ARMY CORPS OF ENGINEERS

- **NATIONWIDE PERMIT NUMBER 14 (LINEAR TRANSPORTATION PROJECTS), AND**
- **REGIONAL GENERAL PERMIT 198200031 (NCDOT BRIDGES, WIDENING PROJECTS, INTERCHANGE IIMPROVEMENTS)**

Water Quality Certification Number 4135 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to surface waters and wetland areas as described in 33 CFR 330 Appendix A (B) (14) of the US Army Corps of Engineers regulations and Regional General Permit 198200031.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Effective date: December 1, 2017

Signed this day: December 1, 2017

By

for Linda Culpepper
Interim Director

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Resources (DWR):

a) If any of the conditions of this Certification (listed below) cannot be met; or
b) Any temporary or permanent impacts to wetlands, open waters and/or streams, except for construction of a driveway to a single family residential lot that is determined to not be part of a larger common plan of development, as long as the driveway involves a travel lane of less than 25 feet and total stream impacts of less than 60 feet, including any topographic/slope stabilization or in-stream stabilization needed for the crossing; or
c) Any stream relocation or stream restoration; or
d) Any high-density project, as defined in 15A NCAC 02H .1003(2)(a) and by the density thresholds specified in 15A NCAC 02H .1017, which:
    i. Disturbs one acre or more of land (including a project that disturbs less than one acre of land that is part of a larger common plan of development or sale); and
    ii. Has permanent wetland, stream or open water impacts; and
    iii. Is proposing new built-upon area; and
    iv. Does not have a stormwater management plan reviewed and approved under a state stormwater program[1] or a state-approved local government stormwater program[2].

    Projects that have vested rights, exemptions, or grandfathering from state or locally-implemented stormwater programs and projects that satisfy state or locally-implemented stormwater programs through use of community in-lieu programs **require written approval**; or
e) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as: ORW (including SAV), HQW (including PNA), SA, WS-I, WS-II, or North Carolina or National Wild and Scenic River.
f) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as Trout except for driveway projects that are below threshold (b) above provided that:
    i. The impacts are not adjacent to any existing structures
    ii. All conditions of this General Certification can be met, including adherence to any moratoriums as stated in Condition #10; and
    iii. A *Notification of Work in Trout Watersheds Form* is submitted to the Division at least 60 days prior to commencement of work; or
g) Any permanent impacts to coastal wetlands [15A NCAC 07H .0205], or Unique Wetlands (UWL); or
h) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), NC Surface Water or Wetland Standards (15A NCAC 02B .0200), or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200); or

[1] e.g. Coastal Counties, HQW, ORW, or state-implemented Phase II NPDES
[2] e.g. Delegated Phase II NPDES, Water Supply Watershed, Nutrient-Sensitive Waters, or Universal Stormwater Management Program

* i) Any impacts to subject water bodies and/or state regulated riparian buffers along subject water bodies in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman Lake, Jordan Lake or Goose Creek Watersheds (or any other basin or watershed with State Regulated Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless:*
    i. The activities are listed as "EXEMPT" from these rules; or
    ii. A Buffer Authorization Certificate is issued by the NC Division of Coastal Management (DCM); or
    iii. A Buffer Authorization Certificate or a Minor Variance is issued by a delegated or designated local government implementing a state riparian buffer program pursuant to 143-215.23

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval.

I. ACTIVITY SPECIFIC CONDITIONS:

*1. If this Water Quality Certification is used to access residential, commercial or industrial building sites, then all parcels owned by the applicant that are part of the single and complete project authorized by this Certification must be buildable without additional impacts to streams or wetlands. If required in writing by DWR, the applicant shall provide evidence that the parcels are buildable without requiring additional impacts to wetlands, waters, or state regulated riparian buffers. [15A NCAC 02H .0506(b)(4) and (c)(4)]

2. For road and driveway construction purposes, this Certification shall only be utilized from natural high ground to natural high ground. [15A NCAC 02H .0506(b)(2) and (c)(2)]

*3. Deed notifications or similar mechanisms shall be placed on all lots with retained jurisdictional wetlands, waters, and state regulated riparian buffers within the project boundaries in order to assure compliance with NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), and/or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200). These mechanisms shall be put in place at the time of recording of the property or individual parcels, whichever is appropriate. [15A NCAC 02H .0506(b)(4) and (c)(4)]

4. For the North Carolina Department of Transportation, compliance with the NCDOT's individual NPDES permit NCS000250 shall serve to satisfy this condition. All other high-density projects that trigger threshold item (d) above shall comply with one of the following requirements: [15A NCAC 02H .0506(b)(5) and (c)(5)]

a. Provide a completed Stormwater Management Plan (SMP) for review and approval, including all appropriate stormwater control measure (SCM) supplemental forms and associated items, that complies with the high-density development requirements of 15A NCAC 02H .1003. Stormwater management shall be provided throughout the entire project area in accordance with 15A NCAC 02H .1003. For the purposes of 15A NCAC 02H .1003(2)(a), density thresholds shall be determined in accordance with 15A NCAC 02H .1017.

b. Provide documentation (including calculations, photos, etc.) that the project will not cause degradation of downstream surface waters. Documentation shall include a detailed analysis of the hydrological impacts from stormwater runoff when considering the volume and velocity of stormwater runoff from the project built upon area and the size and existing condition of the receiving stream(s).

Exceptions to this condition require application to and written approval from DWR.

II. GENERAL CONDITIONS:

*1. When written authorization is required, the plans and specifications for the project are incorporated into the authorization by reference and are an enforceable part of the Certification. Any modifications to the project require notification to DWR and may require an application submittal to DWR with the appropriate fee. [15A NCAC 02H .0501 and .0502]

2. No waste, spoil, solids, or fill of any kind shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) as authorized in the written approval from DWR; or beyond the thresholds established for use of this Certification without written authorization. [15A NCAC 02H .0501 and .0502]

No removal of vegetation or other impacts of any kind shall occur to state regulated riparian buffers beyond the footprint of impacts approved in a Buffer Authorization or Variance or as listed as an exempt activity in the applicable riparian buffer rules. [15A NCAC 02B .0200]

*3. In accordance with 15A NCAC 02H .0506(h) and Session Law 2017-10, compensatory mitigation may be required for losses of greater than 300 linear feet of perennial streams and/or greater than one (1) acre of wetlands. Impacts associated with the removal of a dam shall not require mitigation when the removal complies with the requirements of Part 3 of Article 21 in Chapter 143 of the North Carolina General Statutes. Impacts to isolated and other non-404 jurisdictional wetlands shall not be combined with 404 jurisdictional wetlands for the purpose of determining when impact thresholds trigger a mitigation requirement. For linear publicly owned and maintained transportation projects that are not determined to be part of a larger common plan of development by the US Army Corps of Engineers, compensatory mitigation may be required for losses of greater than 300 linear feet per perennial stream.

Compensatory stream and/or wetland mitigation shall be proposed and completed in compliance with G.S. 143-214.11. For applicants proposing to conduct mitigation within a project site, a complete mitigation proposal developed in accordance with the most recent guidance issued by the US Army Corps of Engineers Wilmington District shall be submitted for review and approval with the application for impacts.

4. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2 of Title 15A.

5. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0200]

   Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

   All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

   For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

   If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

6. Sediment and erosion control measures shall not be placed in wetlands or waters except within the footprint of temporary or permanent impacts authorized under this Certification. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0501 and .0502]

7. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02B .0201]

8. An NPDES Construction Stormwater Permit (NCG010000) is required for construction projects that disturb one (1) or more acres of land. The NCG010000 Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If the project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. [15A NCAC 02H .0506(b)(5) and (c)(5)]

   The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit. [15A NCAC 02H .0506(b)(5) and (c)(5)]

9. All work in or adjacent to streams shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the *NC Sediment and Erosion Control Manual*, or the *NC DOT Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(3) and (c)(3)]

10. If activities must occur during periods of high biological activity (e.g. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities. [15A NCAC 02H .0506 (b)(2) and 15A NCAC 04B .0125]

    All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. A copy of the approval from the resource agency shall be forwarded to DWR.

    Work within a designated trout watershed of North Carolina (as identified by the Wilmington District of the US Army Corps of Engineers), or identified state or federal endangered or threatened species habitat, shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

11. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. [15A NCAC 02H .0506(b)(2) and (c)(2)]

Placement of culverts and other structures in streams shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20% of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

If multiple pipes or barrels are required, they shall be designed to mimic the existing stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel shall be avoided.

When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross vanes, etc.). Notification, including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations, shall be provided to DWR 60 calendar days prior to the installation of the culvert.

When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification, including supporting documentation such as, a location map of the culvert, geotechnical reports, photographs, etc. shall be provided to DWR a minimum of 60 calendar days prior to the installation of the culvert. If bedrock is discovered during construction, then DWR shall be notified by phone or email within 24 hours of discovery.

If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application to and written approval from DWR.

Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

12. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(5)]

13. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters. [15A NCAC 02B .0200 and 15A NCAC 02B .0231]

14. If concrete is used during construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. [15A NCAC 02B .0200]

15. All proposed and approved temporary fill and culverts shall be removed and the impacted area shall be returned to natural conditions within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, planform pattern, and longitudinal bed profile. For projects that receive written approval, no temporary impacts are allowed beyond those included in the application and authorization. All temporarily impacted sites shall be restored and stabilized with native vegetation. [15A NCAC 02H .0506(b)(2) and (c)(2)]

16. All proposed and approved temporary pipes/culverts/rip-rap pads etc. in streams shall be installed as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities* so as not to restrict stream flow or cause dis-equilibrium during use of this Certification. [15A NCAC 02H .0506(b)(2) and (c)(2)]

17. Any rip-rap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be placed such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or in a manner that precludes aquatic life passage. [15A NCAC 02H .0506(b)(2)]

18. Any rip-rap used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. [15A NCAC 02H .0506(b)(2)]

19. Applications for rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

20. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0211 (12)]

21. Heavy equipment working in wetlands shall be placed on mats or other measures shall be taken to minimize soil disturbance. [15A NCAC 02H .0506(b)(3) and (c)(3)]

22. In accordance with 143-215.85(b), the applicant shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.

*23. If an environmental document is required under the State Environmental Policy Act (SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse. If an environmental document is required under the National Environmental Policy Act (NEPA), then this General Certification is not valid until a Categorical Exclusion, the Final Environmental Assessment, or Final Environmental Impact Statement is published by the lead agency. [15A NCAC 01C .0107(a)]

24. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

25. The applicant and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If DWR determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then DWR may revoke or modify a written authorization associated with this General Water Quality Certification. [15A NCAC 02H .0507(d)]

26. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. A copy of this Certification, including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

* 27. When written authorization is required for use of this Certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return a certificate of completion (available on the DWR website https://edocs.deq.nc.gov/Forms/Certificate-of-Completion). [15A NCAC 02H .0502(f)]

28. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards. [15A NCAC 02H .0507(c)]

29. If the property or project is sold or transferred, the new permittee shall be given a copy of this Certification (and written authorization if applicable) and is responsible for complying with all conditions. [15A NCAC 02H .0501 and .0502]

III. GENERAL CERTIFICATION ADMINISTRATION:

* 1. In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. An applicant for a CAMA permit under Article 7 of Chapter 113A of the General Statutes for which a Water Quality Certification is required shall only make one payment to satisfy both agencies; the fee shall be as established by the Secretary in accordance with 143-215.3D(e)(7).

2. This Certification neither grants nor affirms any property right, license, or privilege in any waters, or any right of use in any waters. This Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and this Certification does not create any prescriptive right or any right of priority regarding any usage of water. This Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Certification to possess any prescriptive or other right of priority with respect to any other consumptive user regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded.

3. This Certification grants permission to the Director, an authorized representative of the Director, or DWR staff, upon the presentation of proper credentials, to enter the property during normal business hours. [15A NCAC 02H .0502(e)]

4. This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide Permit and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification. This General Certification is rescinded when the US Army Corps of Engineers reauthorizes any of the corresponding Nationwide Permits and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Resources.

5. Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

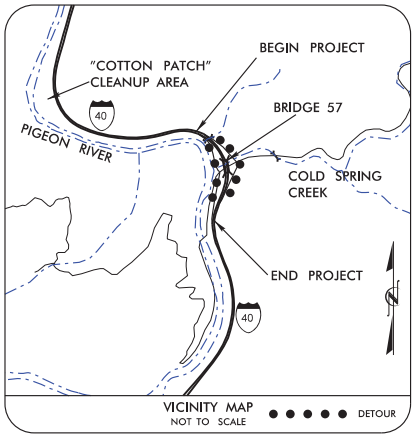
* 6. The Director of the North Carolina Division of Water Resources may require submission of a formal application for Individual Certification for any project in this category of activity if it is deemed in the public's best interest or determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the water or downstream waters are precluded.

History Note: *Water Quality Certification (WQC) Number 4135 issued December 1, 2017 replaces WQC Number 4088 issued March 3, 2017; WQC 3886 issued March 12, 2012; WQC Number 3820 issued April 6, 2010; WQC Number 3627 issued March 2007; WQC Number 3404 issued March 2003; WQC Number 3375 issued March 18, 2002; WQC Number 3289 issued June 1, 2000; WQC Number 3103 issued February 11, 1997; WQC Number 2732 issued May 1, 1992; WQC Number 2666 issued January 21, 1992; WQC Number 2177 issued November 5, 1987.*

CONTRACT:

TIP PROJECT: B-6054A

See Sheet 1A For Index of Sheets



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HAYWOOD COUNTY

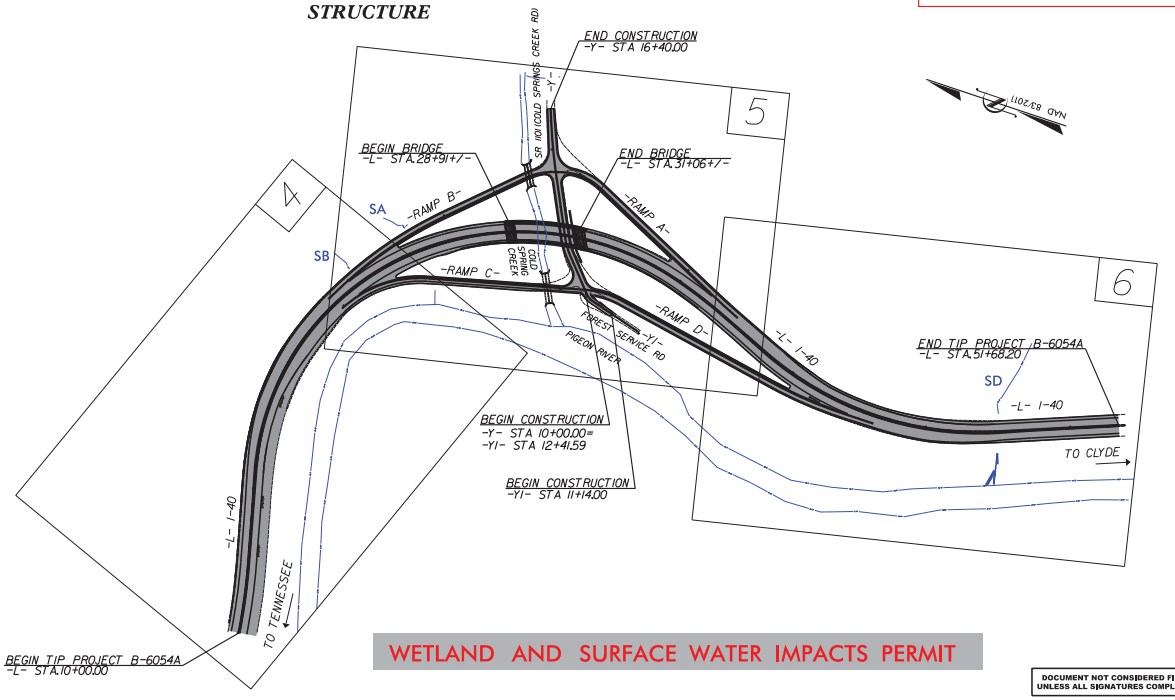
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6054A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
49070.1.1		PE
49070.2.1		R/W & UTILITIES
49070.3.1		CONSTRUCTION

LOCATION: BRIDGE NO.57 ON I-40 OVER SR 1101 (HARMON DEN RD / COLD SPRINGS CREEK RD) AND COLD SPRING CREEK

TYPE OF WORK: GRADING, RETAINING WALL, DRAINAGE, PAVING, AND STRUCTURE

PERMIT DRAWING
SHEET 1 OF 13



WETLAND AND SURFACE WATER IMPACTS PERMIT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 5 2.5 0 5 10

DESIGN DATA

ADT 2018 = 28,500
ADT 2041 = 29,800
K = 10 %
D = 55 %
T = 23 % *
V = 60 MPH
* TTST = 31 DUAL = 3
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-6054A = 0.749 MI
LENGTH STRUCTURE TIP PROJECT B-6054A = 0.041 MI
TOTAL LENGTH TIP PROJECT B-6054A = 0.790 MI

Prepared in the Office of:
benesch
NC FIRM LICENSE No: F-1320
8000 REGENCY PARKWAY, STE 175
CARY, NC 27518
(984) 275-2490

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 2021

LETTING DATE: SEPTEMBER 2021

GREG A. STEWART, PE
PROJECT ENGINEER

LAURA C. FISHER, PE
PROJECT DESIGN ENGINEER

JOSHUA B. DEYTON, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

JOY M. SADDLER
SIGNATURE:
SEAL NOT VALID UNLESS SIGNED AND DATED

ROADWAY DESIGN ENGINEER

SIGNATURE:
SEAL NOT VALID UNLESS SIGNED AND DATED

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

11-MAY-2021 17:57
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jsdeyton
NCDOT 11.1.1
NC2020-08-2
03/08/99

PERMIT DRAWING
SHEET 2 OF 13

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100' 0' 100'
GRAPHIC SCALE

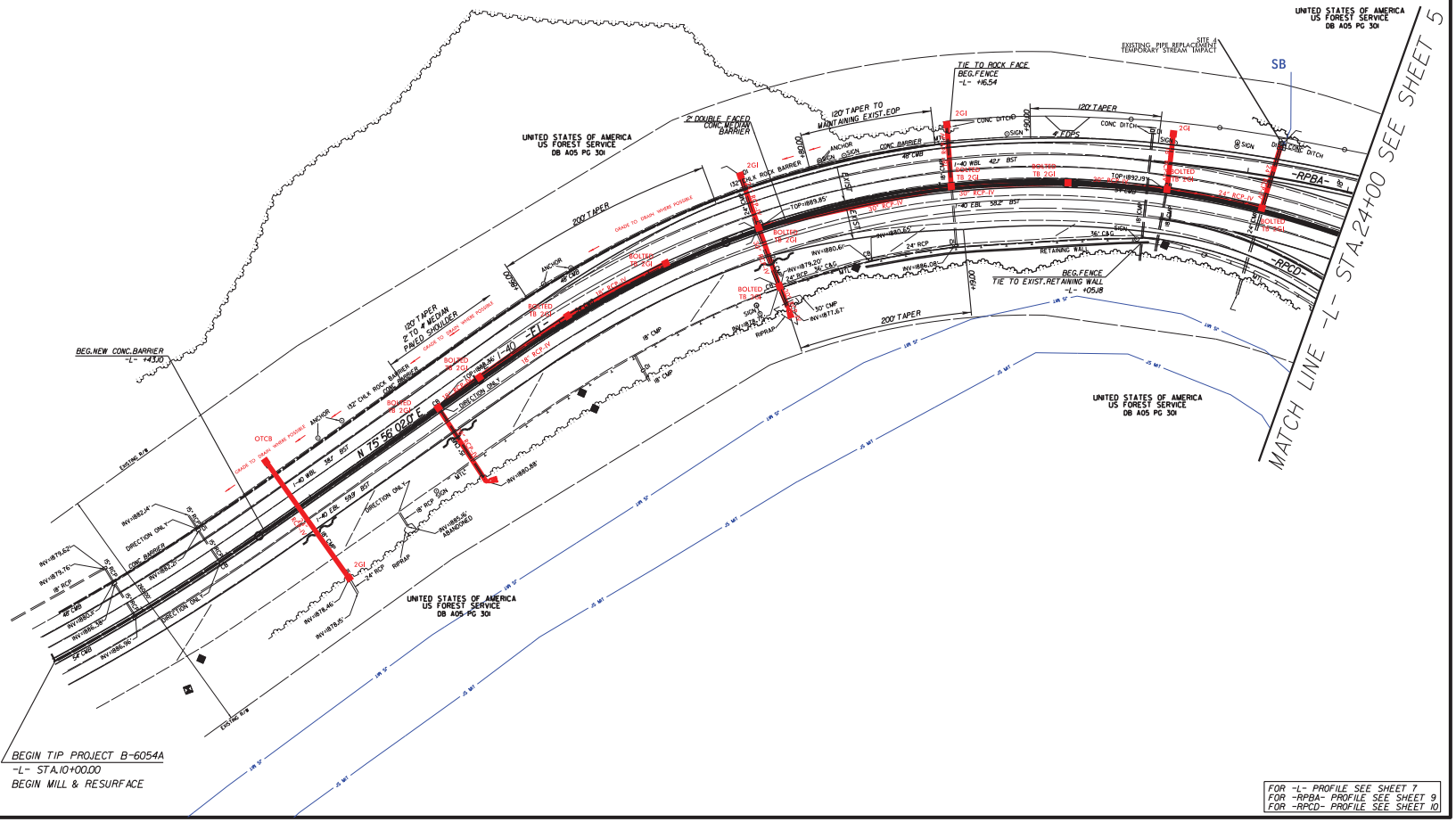
PROJECT REFERENCE NO.	SHEET NO.
B-6054A	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83

S 62°19'33.6" E



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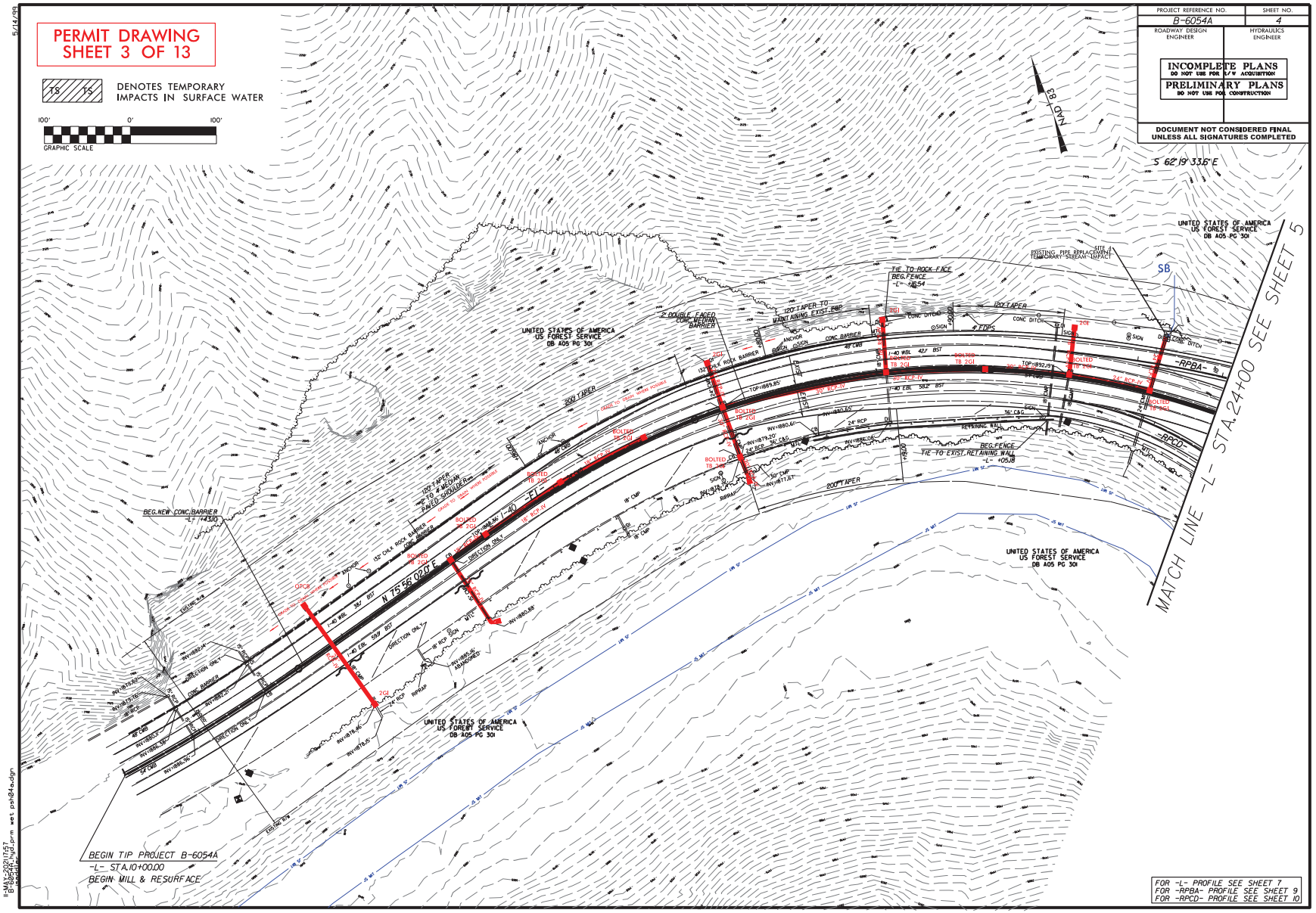
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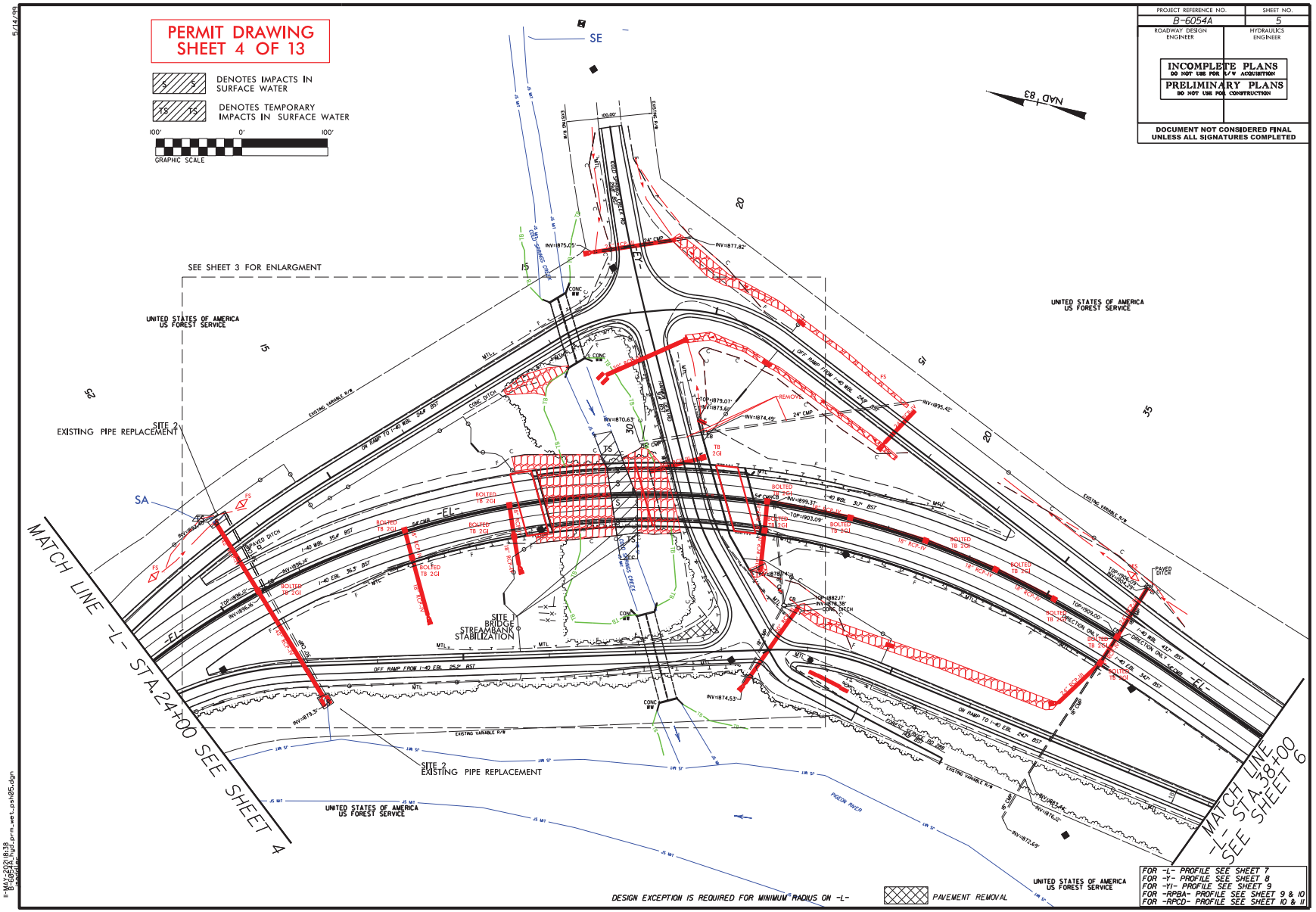
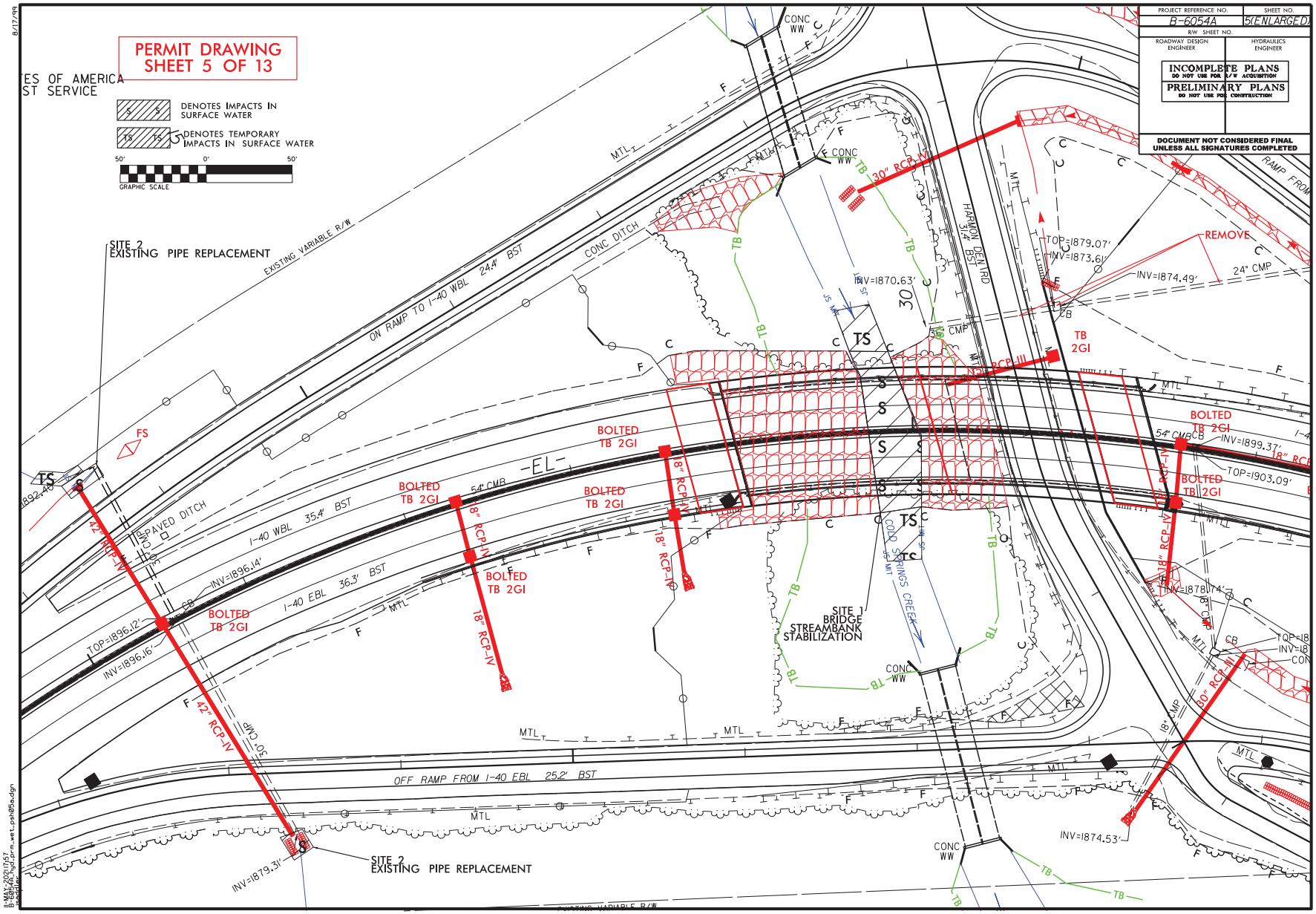
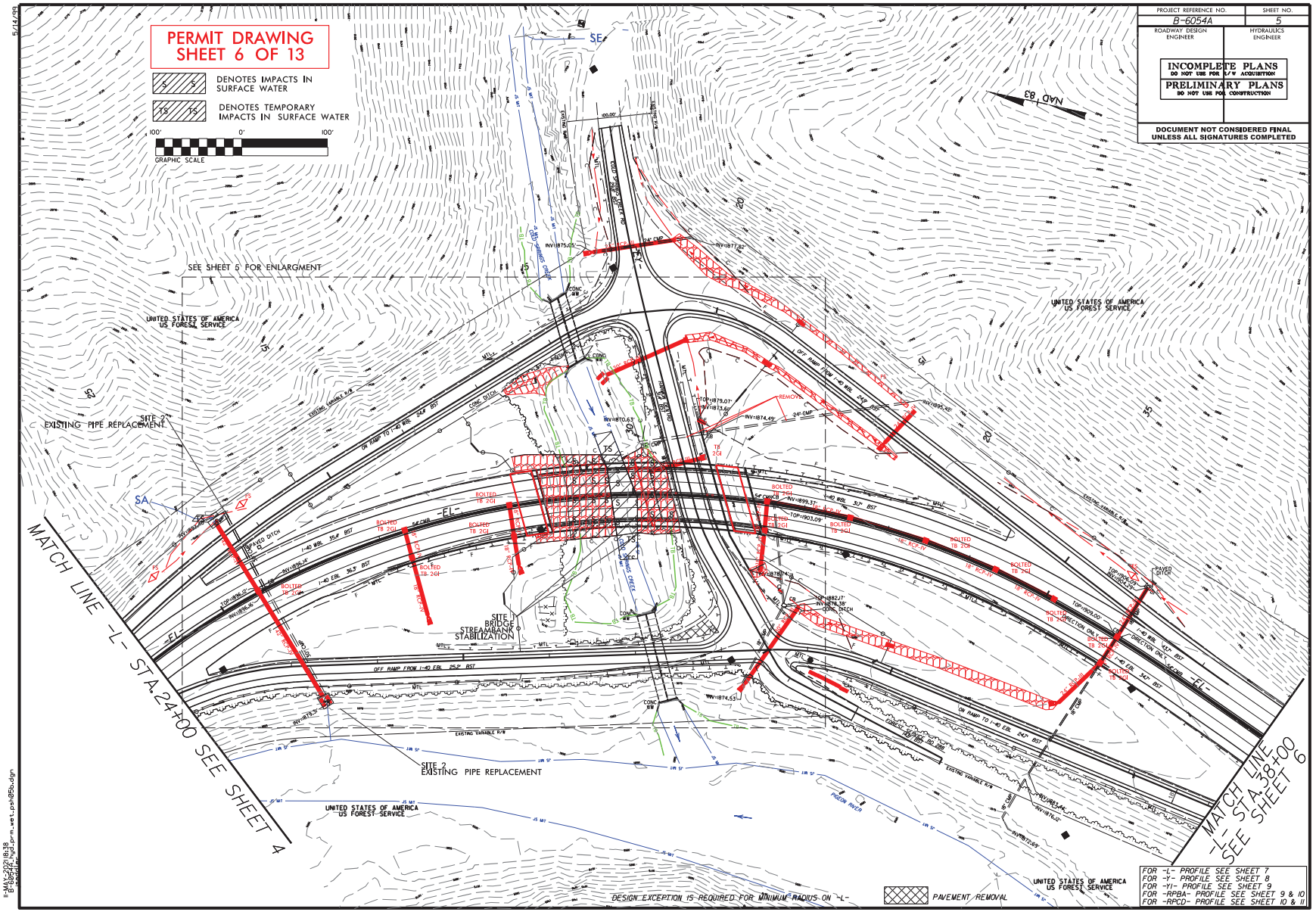
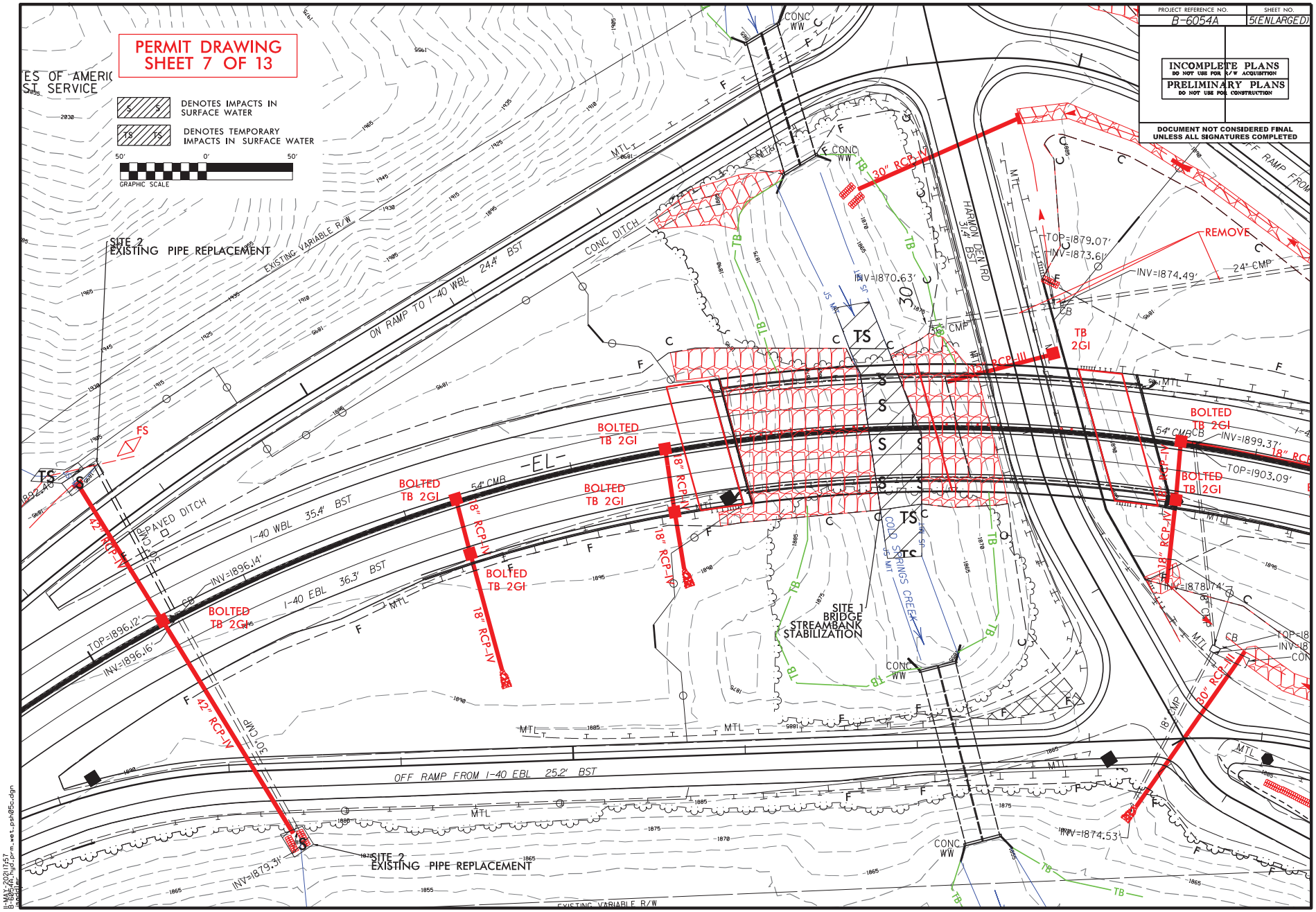
SHEET 3 OF 13
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
100' 0' 100'
GRAPHIC SCALE
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
4
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83
S 62°19'33.6" E
UNITED STATES OF AMERICA
US FOREST SERVICE
DB A05 PG 301
2 DOUBLE FACED CONC MEDIAN BARRIER
120' TAPER TO MAINTAINING EXIST. P&P
TIE TO ROCK FACE
BEG. FENCE
-L- 10+54
EXISTING PIPE REPLACEMENT TEMPORARY STREAM IMPACT
SITE 4
SB
MATCH LINE -L- STA. 24+00 SEE SHEET 5
-RPBA-
-RPCD-
I-40 WBL
I-40 EBL
BEG. NEW CONC. BARRIER
-L- 9+43.00
N 75°56'02.0" E
BEGIN TIP PROJECT B-6054A
-L- STA. 10+00.00
BEGIN MILL & RESURFACE
FOR -L- PROFILE SEE SHEET 7
FOR -RPBA- PROFILE SEE SHEET 9
FOR -RPCD- PROFILE SEE SHEET 10


PERMIT DRAWING
SHEET 4 OF 13
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
100' 0' 100'
GRAPHIC SCALE
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 1983
SE
SA
SEE SHEET 3 FOR ENLARGMENT
UNITED STATES OF AMERICA
US FOREST SERVICE
SITE 2
EXISTING PIPE REPLACEMENT
SITE 1
BRIDGE &
STREAMBANK &
STABILIZATION
MATCH LINE -L- STA.24+00 SEE SHEET 4
MATCH LINE -L- STA.38+00 SEE SHEET 6
OFF RAMP FROM I-40 EBL 25.2° BST
ON RAMP TO I-40 EBL 24.7° BST
I-40 EBL 36.9° BST
I-40 WBL 35.4° BST
I-40 WBL 43.1° BST
I-40 EBL 34.2° BST
DESIGN EXCEPTION IS REQUIRED FOR MINIMUM RADIUS ON -L-
PAVEMENT REMOVAL
FOR -L- PROFILE SEE SHEET 7
FOR -Y- PROFILE SEE SHEET 8
FOR -Y1- PROFILE SEE SHEET 9
FOR -RPBA- PROFILE SEE SHEET 9 & 10
FOR -RPCD- PROFILE SEE SHEET 10 & 11


PERMIT DRAWING
SHEET 5 OF 13
ES OF AMERICA
ST SERVICE
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
5(ENLARGED)
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 2
EXISTING PIPE REPLACEMENT
EXISTING VARIABLE R/W
ON RAMP TO I-40 WBL 24.4' BST
CONC DITCH
I-40 WBL 35.4' BST
I-40 EBL 36.3' BST
OFF RAMP FROM I-40 EBL 25.2' BST
PAVED DITCH
HARMON DEN RD
54" CMP
30" CMP
24" CMP
18" CMP
42" RCP-IV
30" RCP-IV
18" RCP-IV
BOLTED TB 2GI
REMOVE
TB 2GI
SITE 1
BRIDGE
STREAMBANK
STABILIZATION
COLD SPRINGS CREEK
INV=1896.14'
INV=1896.16'
TOP=1896.12'
INV=1879.31'
INV=1870.63'
TOP=1879.07'
INV=1873.61'
INV=1874.49'
INV=1899.37'
TOP=1903.09'
INV=1878.74'
INV=1874.53'
CONC WW
CB
MTL
TB
TS
FS
-EL-


PERMIT DRAWING
SHEET 6 OF 13
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
5
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83
SEE SHEET 5 FOR ENLARGMENT
UNITED STATES OF AMERICA US FOREST SERVICE
SITE 2 EXISTING PIPE REPLACEMENT
SITE 1 BRIDGE & STREAMBANK STABILIZATION
MATCH LINE -L- STA.24+00 SEE SHEET A
MATCH LINE -L- STA.38+00 SEE SHEET 6
DESIGN EXCEPTION IS REQUIRED FOR MINIMUM RADIUS ON -L-
PAVEMENT REMOVAL
FOR -L- PROFILE SEE SHEET 7
FOR -Y- PROFILE SEE SHEET 8
FOR -Y1- PROFILE SEE SHEET 9
FOR -RPBA- PROFILE SEE SHEET 9 & 10
FOR -RPCD- PROFILE SEE SHEET 10 & 11


PERMIT DRAWING
SHEET 7 OF 13
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
5(ENLARGED)
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
SITE 2
EXISTING PIPE REPLACEMENT
SITE 1
BRIDGE
STREAMBANK
STABILIZATION
SITE 2
EXISTING PIPE REPLACEMENT
ON RAMP TO I-40 WBL 24.4' BST
I-40 WBL 35.4' BST
I-40 EBL 36.3' BST
OFF RAMP FROM I-40 EBL 25.2' BST
HARMON DEN RD
COLD SPRINGS CREEK
UNPAVED DITCH
CONC DITCH
EXISTING VARIABLE R/W
BOLTED
TB 2GI
42" RCP-IV
18" RCP-IV
30" RCP-IV
24" CMP
54" CMP
18" CMP
REMOVE
INV=1896.14'
INV=1896.16'
INV=1879.31'
INV=1870.63'
INV=1874.49'
INV=1899.37'
INV=1878.74'
INV=1874.53'
TOP=1879.07'
TOP=1903.09'
TOP=1896.12'
CONC WW
CB
MTL
TS
FS
-EL-

PERMIT DRAWING
SHEET 8 OF 13

PROJECT REFERENCE NO.	SHEET NO.
B-6054A	07

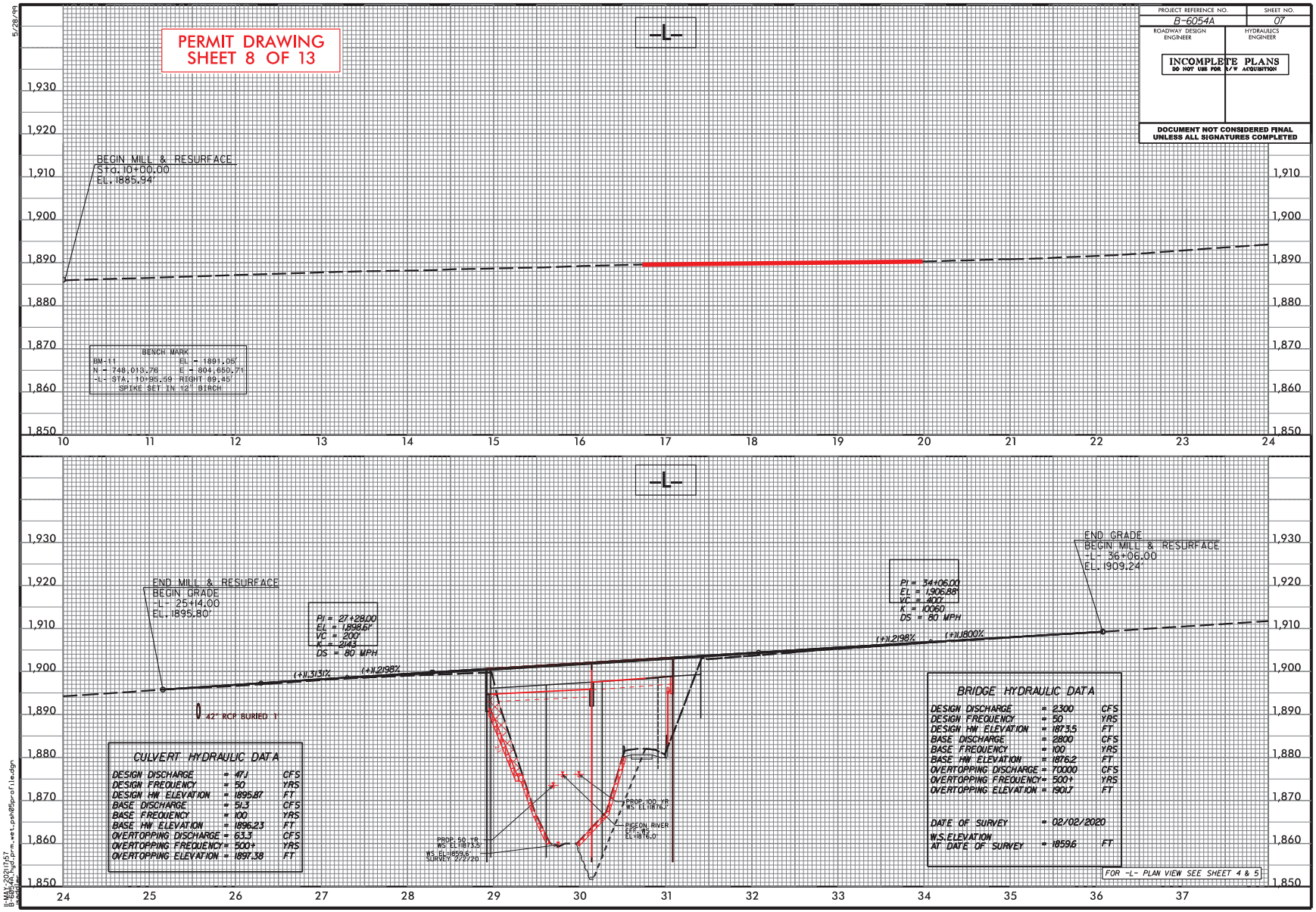
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/28/99



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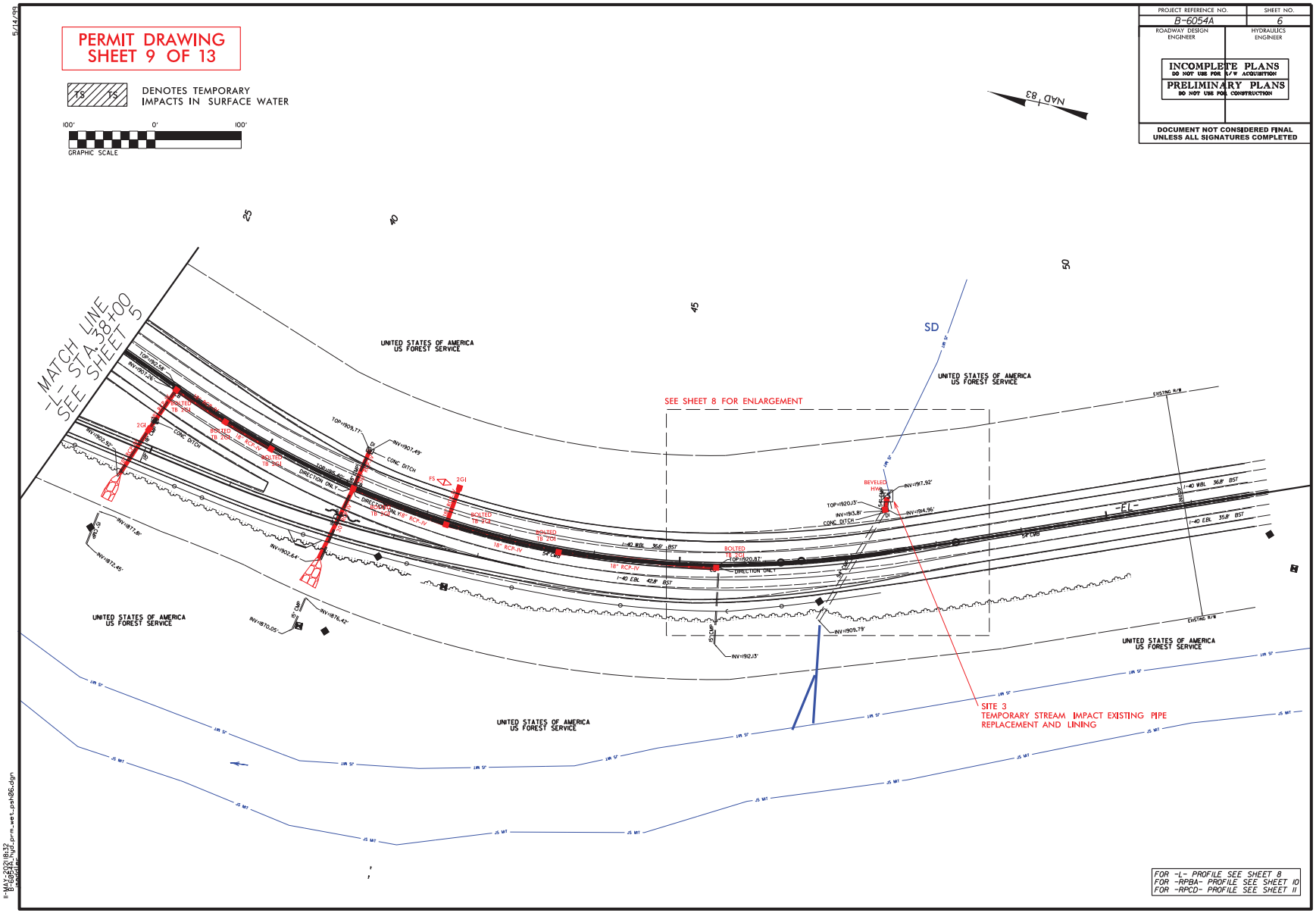
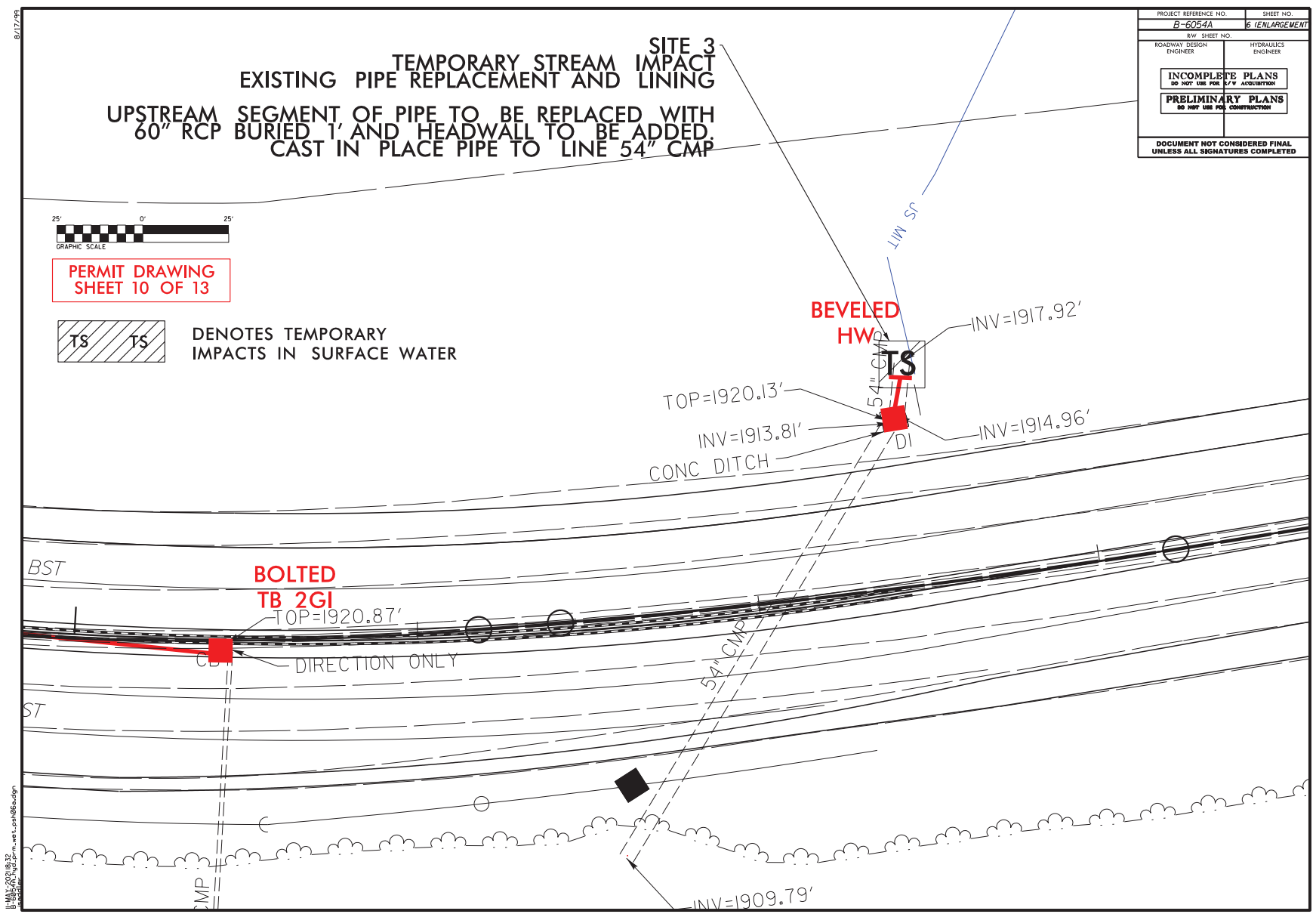

PERMIT DRAWING
SHEET 9 OF 13
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
NAD 83
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCH LINE -L- STA. 38+00 SEE SHEET 5
UNITED STATES OF AMERICA US FOREST SERVICE
SEE SHEET 8 FOR ENLARGEMENT
SD
SITE 3
TEMPORARY STREAM IMPACT EXISTING PIPE REPLACEMENT AND LINING
FOR -L- PROFILE SEE SHEET 8
FOR -RPBA- PROFILE SEE SHEET 10
FOR -RPCD- PROFILE SEE SHEET 11


SITE 3
TEMPORARY STREAM IMPACT
EXISTING PIPE REPLACEMENT AND LINING
UPSTREAM SEGMENT OF PIPE TO BE REPLACED WITH 60" RCP BURIED 1' AND HEADWALL TO BE ADDED.
CAST IN PLACE PIPE TO LINE 54" CMP
PROJECT REFERENCE NO. B-6054A
SHEET NO. 6 (ENLARGEMENT
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
25' 0' 25'
GRAPHIC SCALE
PERMIT DRAWING
SHEET 10 OF 13
TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
BEVELED
HW
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INV=1917.92'
54" CMP
TOP=1920.13'
INV=1913.81'
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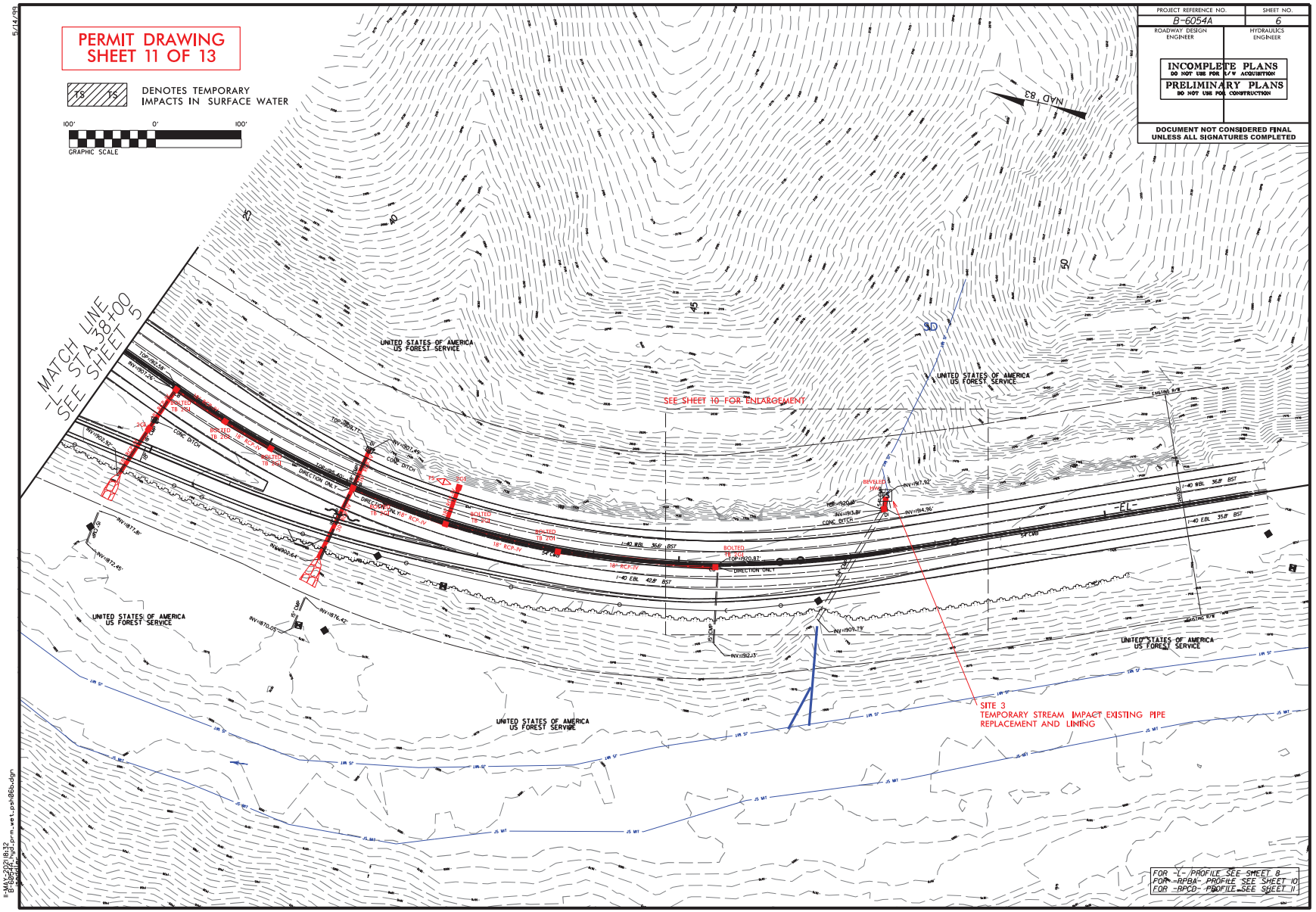
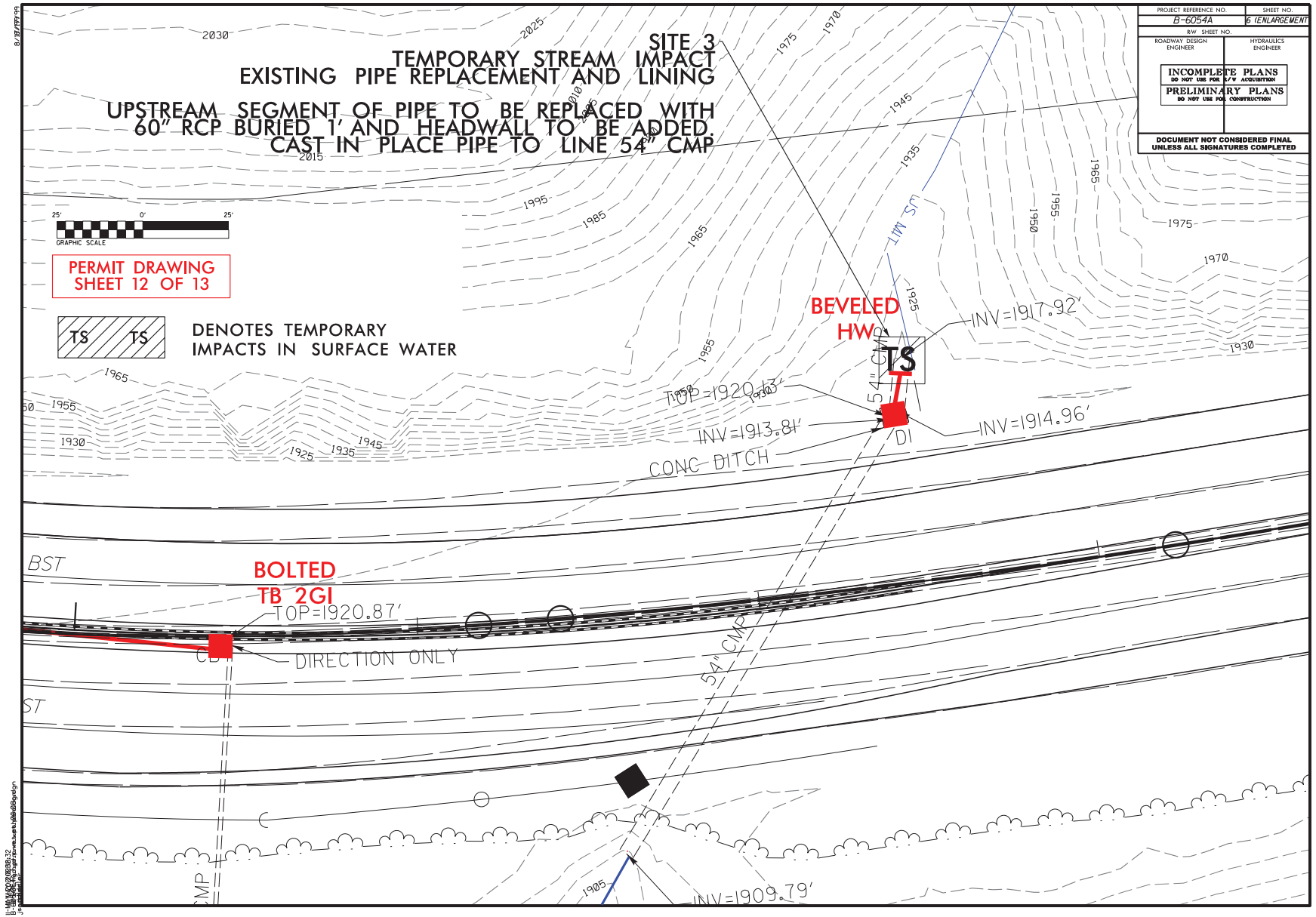
INV=1914.96'
.35 MIT
BST
BOLTED
TB 2GI
TOP=1920.87'
DIRECTION ONLY
54" CMP
INV=1909.79'
8/17/99


PERMIT DRAWING
SHEET 11 OF 13
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
PROJECT REFERENCE NO.
B-6054A
SHEET NO.
6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83
MATCH LINE -L- STA 38+00 SEE SHEET 5
UNITED STATES OF AMERICA US FOREST SERVICE
SEE SHEET 10 FOR ENLARGEMENT
SITE 3
TEMPORARY STREAM IMPACT EXISTING PIPE REPLACEMENT AND LINING
FOR -L- PROFILE SEE SHEET 8
FOR -RPBA- PROFILE SEE SHEET 10
FOR -RPCD- PROFILE SEE SHEET 11


SITE 3
TEMPORARY STREAM IMPACT
EXISTING PIPE REPLACEMENT AND LINING
UPSTREAM SEGMENT OF PIPE TO BE REPLACED WITH 60" RCP BURIED 1' AND HEADWALL TO BE ADDED.
CAST IN PLACE PIPE TO LINE 54" CMP
PROJECT REFERENCE NO. B-6054A
SHEET NO. 6 (ENLARGEMENT)
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
PERMIT DRAWING
SHEET 12 OF 13
TS TS
DENOTES TEMPORARY
IMPACTS IN SURFACE WATER
BEVELED
HW
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INV=1917.92'
54" CMP
TOP=1920.13'
INV=1913.81'
INV=1914.96'
DI
CONC DITCH
US 441
BST
BOLTED
TB 2GI
TOP=1920.87'
DIRECTION ONLY
54" CMP
INV=1909.79'

WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 29+14/30+55	Bridge (rip rap)						0.055	0.028	100	53	
2 (SA)	-L- 25+17/25+71	42" RCP Construction (channel shorten and rip rap)						0.009	0.004	~~21~~ 30	~~15~~ 20	
3 (SD)	-L- 47+46/47+62	54" CMP Replacement							0.005		10	
4 (SB)	-L- 23+16/23+23	24" CMP Replacement							0.002		10	
TOTALS*:			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.1***	**0.04****	~~**121**~~ 130	~~**88**~~ 93	**0**

*Rounded totals are sum of actual impacts

NOTES:

*Total Permanent SW impacts: 2764 sq. ft.

**Total Temporary SW Impacts: 1670 sq. ft.

all proposed outfalls are to match existing. Perched outfalls are avoided where possible, though due to topography, outfalls along the western ramp discharge along a steep slope.

Revised 2018 Feb

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5/11/2021
HAYWOOD
B-6054A
49070.1.1

Appendix E

Risk Register

RISK REGISTER

I-40 Bridge Replacements

Contractor Name: Kiewit Infrastructure South Co.

No.	Risk Name	Risk Description & Pre-Construction Mitigation Strategy	Bridge	Risk Owner	Post- Award Mitigation Strategy	Comments
31	Pipe Material Backfill	Assumed during cost comparison that all pipe backfill would be the pipe's excavated material except for the pipe bedding material which is paid as "Foundation Conditioning Materials".	57	NCDOT	Contractor will have to purchase select backfill material per spec.	If excavated material is not suitable for backfill, contractor will be compensated for purchasing select fill material that meet specifications.
32	Pipe Shoring	Assumed during cost comparison that all pipe shoring would be eliminated. Trench boxes would be used to install pipe. Sheet pile was eliminated from the estimate and replaced with TMA's and trench boxes	57	NCDOT	Contractor to utilize alternative shoring system.	If any other support of excavation is needed besides trench boxes, contractor will be compensated for labor, material, equipment, indirect cost and fee
33	Bent Shoring	Assumed during cost comparison that all bent 1 shoring would not be needed. Sheet pile was eliminated from the estimate	57	NCDOT	Contractor to utilize shoring system if necessary.	If any other support of excavation is needed besides trench boxes, contractor will be compensated for labor, material, equipment, indirect cost and fee
34	Cold Weather Protection	Assumed during the cost comparison was that cold weather concrete would not need heaters to keep concrete at the required minimum temperature. All heaters were eliminated from the estimate.	57	NCDOT	Contractor to provide heaters for cold weather protection if necessary.	If means other then cold weather blankets are needed to maintain concrete temperatures, contractor will be compensated for labor, material, equipment, indirect cost and fee associated with the additional means
35	Impervious Dike	Assumed during the cost comparison was that the impervious dike shown under bridge 57 would not be required. 500LF of impervious dike was eliminated from the estimate.	57	NCDOT	Contractor to provide impervious dike if necessary.	If impervious dike shown in contract drawings is requested, contractor will be compensated for labor, material, equipment, indirect cost and fee associated with the impervious dike

36	Top Soil	Assumed during the cost comparison that top soil would not be needed to cap slopes and embankments. On site material would be sufficient to grow vegetation. All top soil was removed from the estimate	57	NCDOT	Contractor to utilize top soil if necessary.	If top soil is required/requested contractor will be compensated for labor, material, equipment, indirect cost and fee associated with the placement of top soil
37	Pipe Rock Excavation	Assumed during cost comparison that common soil excavation would be required for pipe installation and no rock excavation would be required for pipe installation.	57	NCDOT	Contractor to be paid for rock excavation for pipe installation.	If top rock excavation is required, contractor will be compensated for labor, material, equipment, indirect cost and fee associated with rock excavation
38	End Bent 1 and Bent 1 Rock Excavation	Assumed no rock excavation at End Bent 1 and Bent 1	57	NCDOT	Contractor to be paid for rock excavation at End Bent 1 and Bent 1.	If top rock excavation is required, contractor will be compensated for labor, material, equipment, indirect cost and fee associated with rock excavation
39	MOT	Carried no additional Drums, Truck Mounted Attenuators, Crash Cushions, Type 3 Barricades, VMS Boards (Changeable Message Signs), Cameras, and other MOT devices in the estimate. Damage to and replacing these items are not included in the estimate. Damage and replacement would be covered by bid items.	57	NCDOT	Damaged equipment will be covered by private insurance company of individual that hit equipment. If unable dept will provide compensation.	
40	Dump Fees	Assumed during cost comparison that contractor would be able to find an alternative dump site to White Oak for all asphalt and concrete debris. Dump fees for the project were reduced from $1,200/LD to $100/LD. Risk remains that all loads would still go to White Oaks facility at $1,200/LD	57	NCDOT	If plan quantities are exceeded, contractor will be compensated for trucking/handling/disposal fees.	

41	Trucking Cycle Time	Assumed during cost comparison that trucking cycle time would be closer to 1.5hrs/trip. Cut cycle time from 2.5hr to 1.5hrs. Furthermore, through innovations, the overall job scheme was changed to allow material to remain on site permanently. The items to remain on site include excavated material suitable or unsuitable / bridge concrete will be crushed and hauled away by NCDOT provided trucks and operators / asphalt will be disposed of by the milling subcontractor.	57	NCDOT	Contractor will be compensated for additional trucking cycle time cost.	If excavated material needs to be hauled to a new disposal site, 2.5hr trucking and disposal fees would apply. If crushed concrete needs to be hauled disposed of, 2.5hr trucking and disposal fees would apply. If milling subcontractor refuses to take chunked asphalt, 2.5hr trucking and disposal fees would apply.
42	On Site Common	Assumed during cost comparison that all soil excavation would remain on site. Eliminated all disposal cost and cut trucking time by 1/2 .	57	NCDOT	If plan quantities are exceeded, contractor will be compensated for additional trucking/handling/disposal fees.	
43	Cotton Patch	It was agreed the scope of work related to the Cotton Patch would be eliminated from this project. Therefore, all cost associated with Cotton Patch was deleted from the estimate.	57	NCDOT	If Contractor does that Cotton Patch they will be compensated.	If the Cotton Patch is reinserted in to the contractors scope of work, the contractor will be compensated for labor, material, equipment, indirect cost and fee

Contract No. C204654

County Haywood

Rev. 1-16-18

EXECUTION OF CONTRACT
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

CORPORATION

The Contractor declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Contract, that the Contractor has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Contractor intends to do the work with its own bonafide employees or subcontractors and did not bid for the benefit of another contractor.

By submitting this Execution of Contract, Non-Collusion and Debarment Certification, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Kiewit Infrastructure South Co.

Full name of Corporation

450 DIVIDEND DRIVE PEACHTREE CITY, GA 30269

Address as Prequalified

Attest _____ By _____

~~Secretary~~/~~Assistant Secretary~~
Select appropriate title

~~President~~/Vice President/~~Assistant Vice President~~
Sr. *Select appropriate title*

Thomas J. Boyle

Print or type Signer's name

Benjamin J. Carnazzo

Print or type Signer's name

KIMBERLY ABRAMS
Notary Public, Georgia
Fayette County
My Commission Expires
February 05, 2024

CORPORATE SEAL

Contract No. C204654
County Haywood

Rev. 1-16-18

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Contract No. C204654

County Haywood

Rev. 1-16-18

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Contract No. **C204654**

County (ies): **Haywood**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:
Ronald E. Davenport, Jr.
F81B6038A47A442...
Contract Officer

10/25/2021
Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:
Scott Slusser
06A61E7CD374498...
Attorney General

10/25/2021
Date

Contract No. C204654
County Haywood

Rev 5-17-11

Bond No. 107511522

CONTRACT PAYMENT BOND

Date of Payment Bond Execution	10/08/2021
Name of Principal Contractor	Kiewit Infrastructure South Co.
Name of Surety:	Travelers Casualty and Surety Company of America
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	$18,945,378.96
Contract ID No.:	C204654
County Name:	Haywood

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C204654
County Haywood

Rev 5-17-11

CONTRACT PAYMENT BOND

Affix Seal of Surety Company

Travelers Casualty and Surety Company of America
Print or type Surety Company Name

By Deanne Jones, Attorney-in-Fact
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Kathy Wendorf
Print or type Signer's name

1550 Mike Fahey Street Omaha, NE 68102
Address of Attorney-in-Fact

Contract No. C204654
County Haywood

Rev 5-17-11

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Kiewit Infrastructure South Co.

Full name of Corporation

450 Dividend Drive, Peachtree City, GA 30269

Address as prequalified

By _____

Signature of President, Vice President, Assistant Vice President

Select appropriate title

Sr.

Benjamin J. Carnazzo, Sr. Vice President

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of Secretary, Assistant Secretary

Select appropriate title

Thomas J. Boyle, Assistant Secretary

Print or type Signer's name

Contract No. C204654
County Haywood

Rev 5-17-11

Bond No. 107511522

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution:	10/08/2021
Name of Principal Contractor:	Kiewit Infrastructure South Co.
Name of Surety:	Travelers Casualty and Surety Company of America
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	$18,945,378.96
Contract ID No.:	C204654
County Name:	Haywood

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C204654
County Haywood

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Travelers Casualty and Surety Company of America
Print or type Surety Company Name

By Deanne Jones, Attorney-in-Fact
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Kathy Wendorf
Print or type Signer's name

1550 Mike Fahey Street Omaha, NE 68102
Address of Attorney-in-Fact

Contract No. C204654

County Haywood

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Kiewit Infrastructure South Co.

Full name of Corporation

450 Dividend Drive, Peachtree City, GA 30269

Address as prequalified

By _____

Signature of **President, Vice President, Assistant Vice President**

Select appropriate title

Benjamin J. Carnazzo, Sr. Vice President

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of **Secretary, Assistant Secretary**

Select appropriate title

Thomas J. Boyle, Assistant Secretary

Print or type Signer's name

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Philip G. Dehn, Tammy Pike, Paul A. Foss, Marie Huggins, Traci Sutton, and Deanne Jones of Omaha, Nebraska,** their true and lawful Attorney (s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in the, r business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April, 2021.**

State of Connecticut

By: _____
Robert L. Raney, Senior Vice President

City of Hartford ss.

On this the **21st** day of **April, 2021**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2026**

_____
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 8th day of October , 2021 .

_____
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Philip G. Dehn, Tammy Pike, Paul A. Foss, Marie Huggins, Traci Sutton, and Deanne Jones of Omaha, Nebraska,** their true and lawful Attorney (s)-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in the,r business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **21st** day of **April, 2021.**

HARTFORD, CONN. — TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA
HARTFORD, CONN. — TRAVELERS CASUALTY AND SURETY COMPANY
CORPORATE SEAL — ST. PAUL FIRE AND MARINE INSURANCE COMPANY

State of Connecticut

By: _____
Robert L. Raney, Senior Vice President

City of Hartford ss.

On this the **21st** day of **April, 2021**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of each of the Companies, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2026**

ANNA P. NOWIK NOTARY PUBLIC CONNECTICUT

_____
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of each of the Companies, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of each of the Companies, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 8th day of October , 2021 .

HARTFORD, CONN. — TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA
HARTFORD, CONN. — TRAVELERS CASUALTY AND SURETY COMPANY
CORPORATE SEAL — ST. PAUL FIRE AND MARINE INSURANCE COMPANY

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Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney(s)-in-Fact and the details of the bond to which this Power of Attorney is attached.