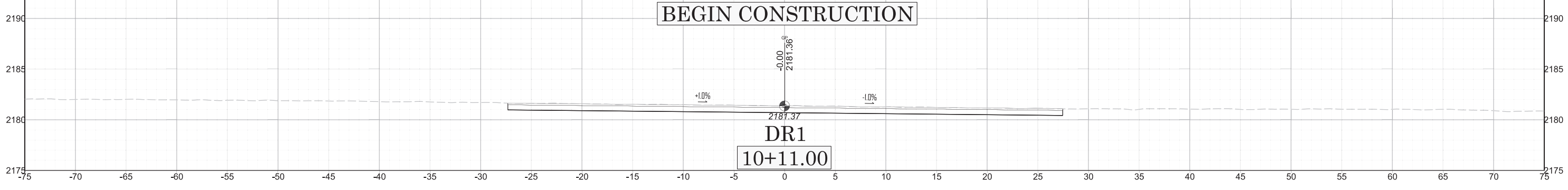
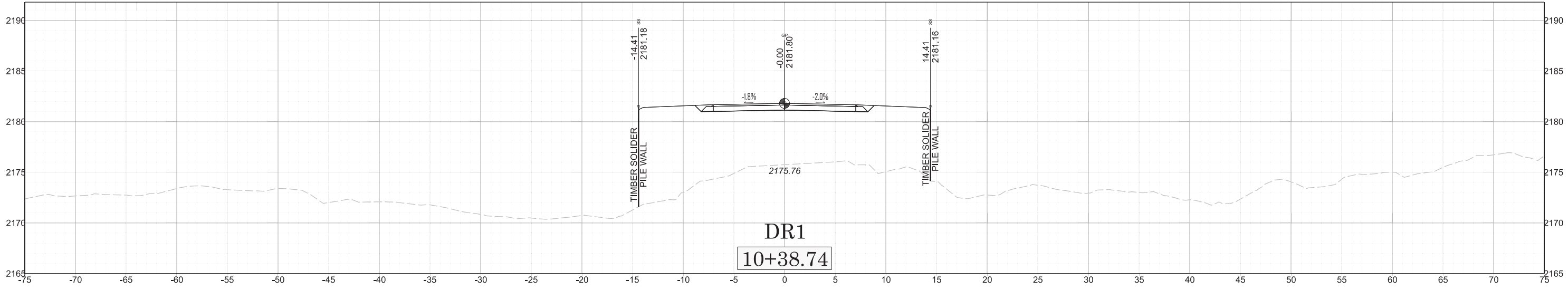
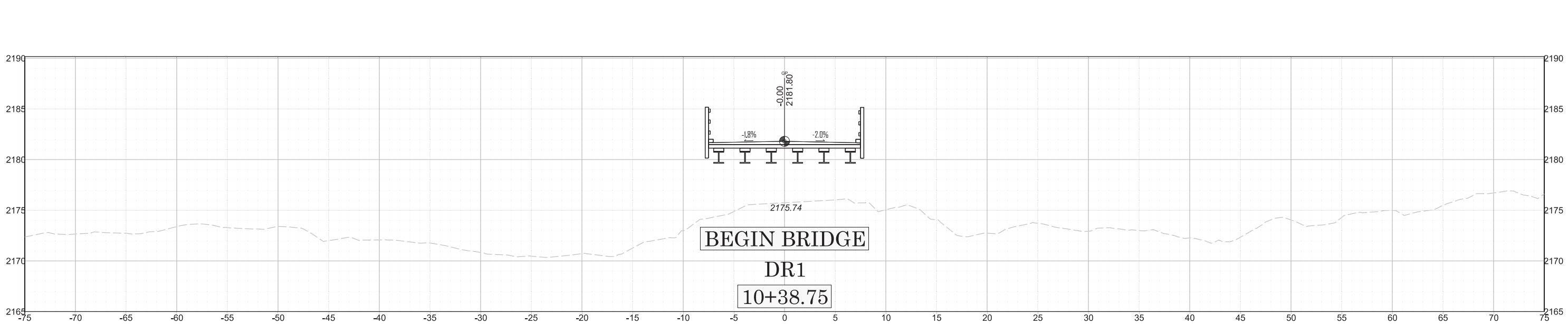
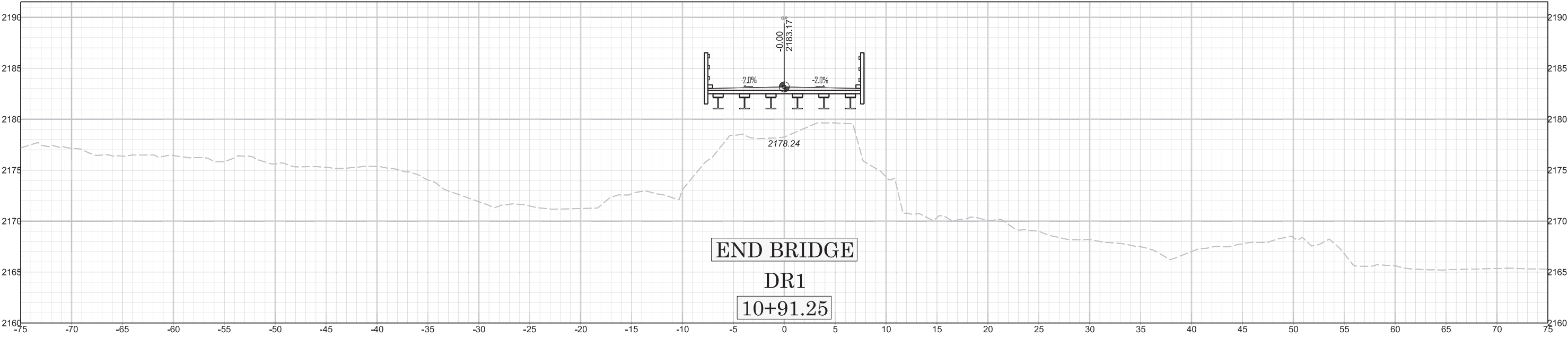
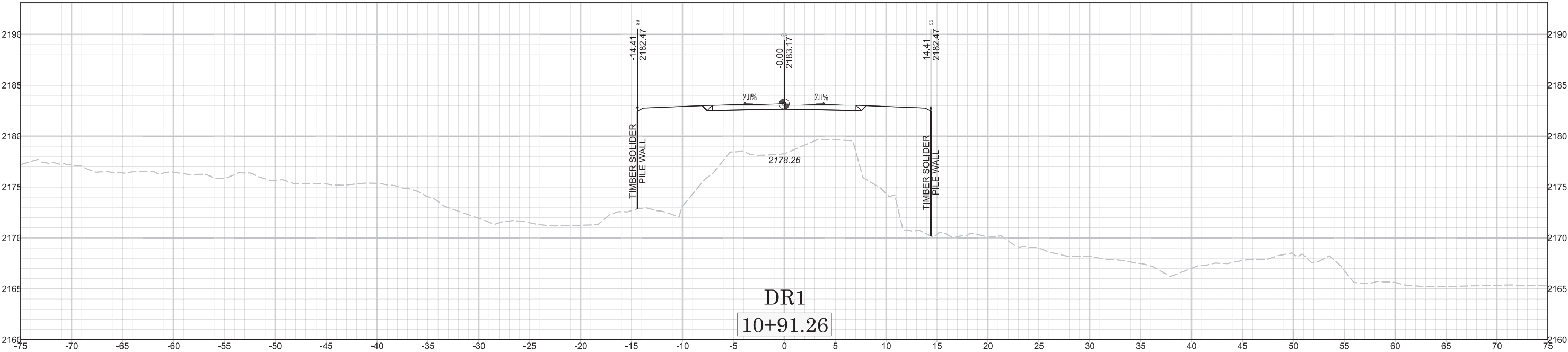


Site # 011-01-9a58c
2511 NC Hwy 9, Black Mountain
over Broad River
Buncombe County

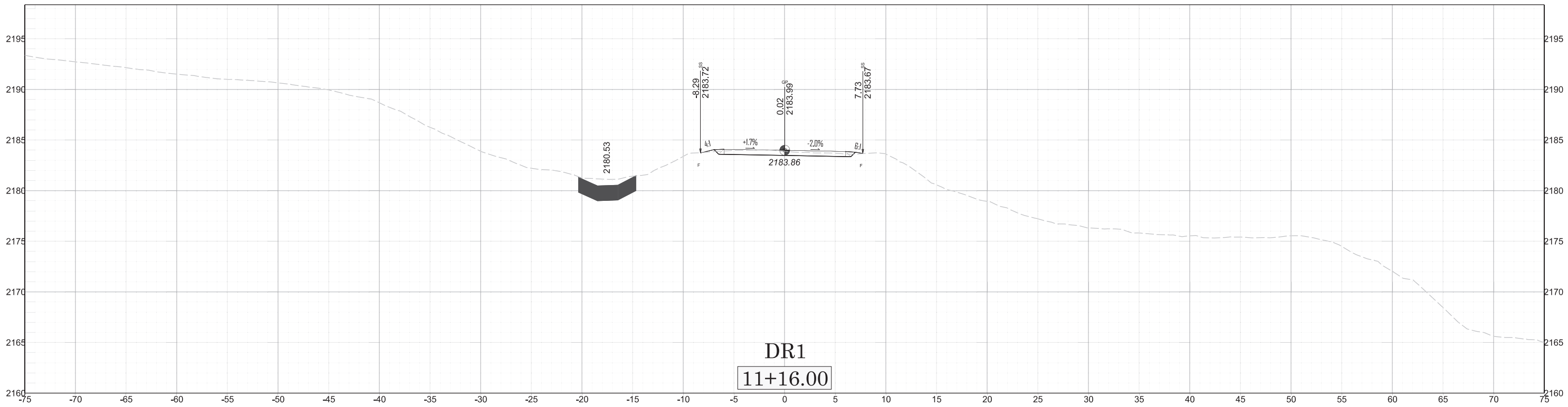
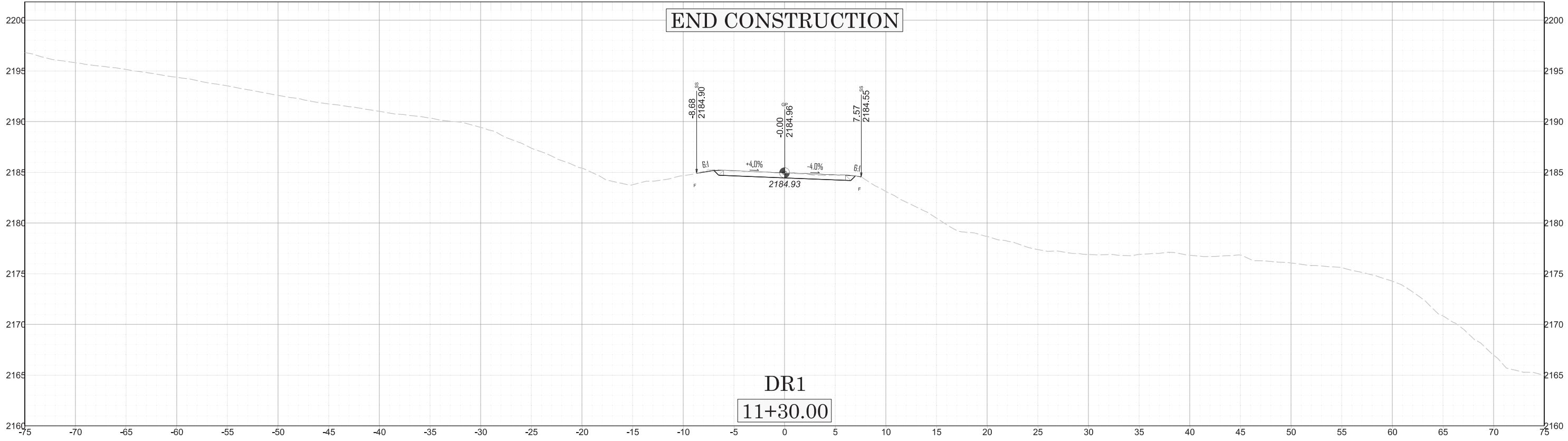
Final surveys were not provided. LIDAR dated 2017 was used for design.





X 2

011-01-9a58c



9+50

10+00

10+50

11+00

11+50

12+00

(-)0.5000% (+)2.6000%

PI STA = 10+20.00 -DR1-
EL = 2181.32
L = 15.0'

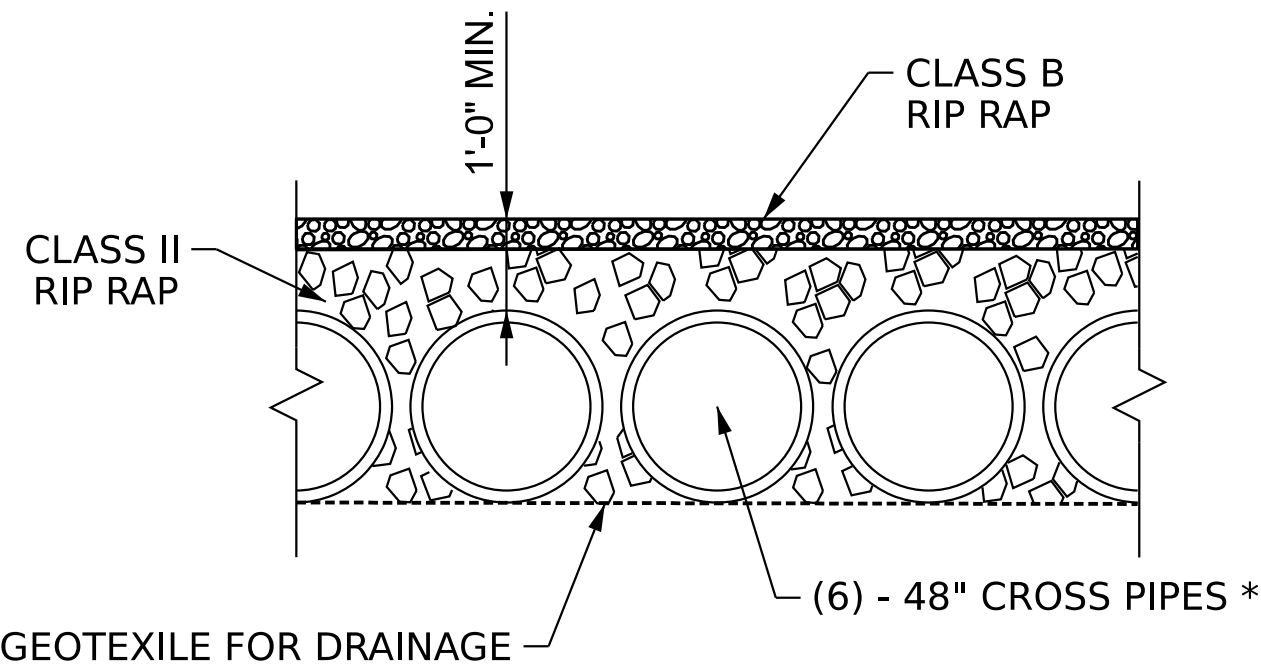
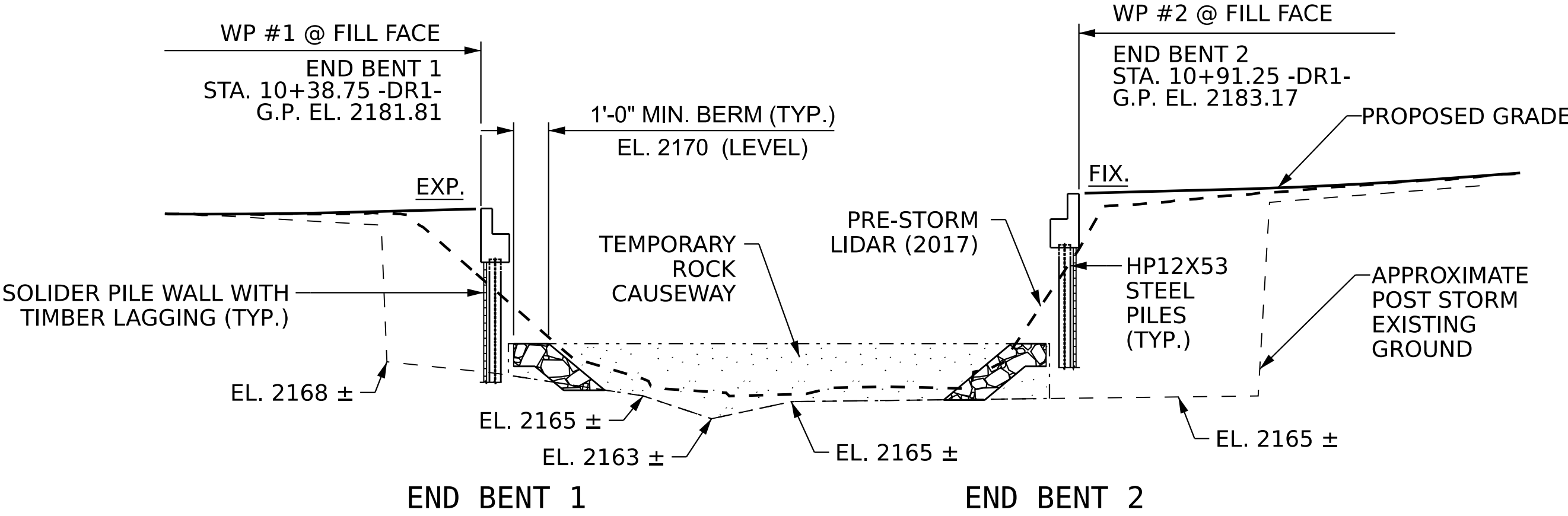
SPAN A

(+)2.6000% (+)7.5000%

PI STA = 11+14.00 -DR1-
EL = 2183.76
L = 20.0'

GRADE DATA $\mathbb{C}$ -DR1-

GRADE DATA $\mathbb{C}$ -DR1-

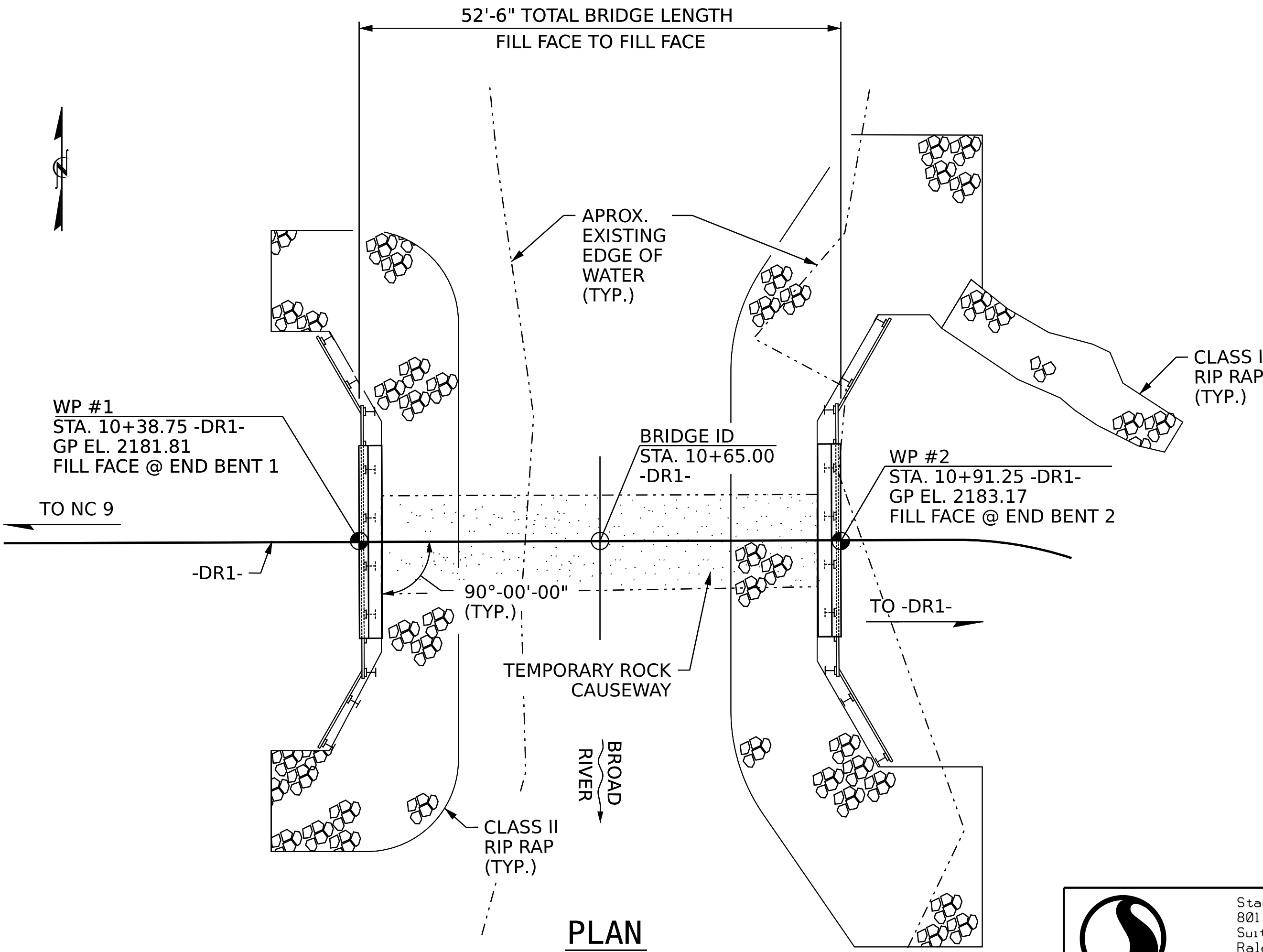


TEMPORARY ROCK CAUSEWAY DETAIL

* PIPE SPACING TO BE DETERMINED BY CONTRACTOR

FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF
TEMPORARY ACCESS AT STATION 10+65, SEE SPECIAL
PROVISIONS.

SECTION ALONG $\mathbb{C}$ -DR1-



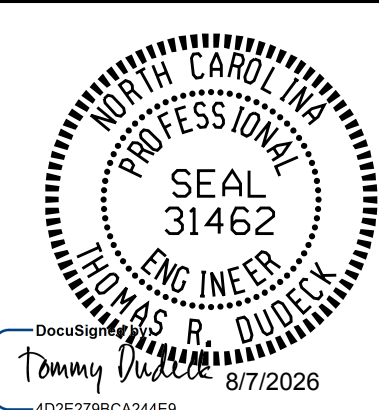
HORIZONTAL CURVE -DR1-

PI STA.= 11+13.07
 $\Delta = 26^{\circ} 03' 29.50''$
D = 143° 14' 22.00"
L = 18.19
T = 9.26
R = 40.00'

DESIGNED BY: E.REIMER DATE : FEB 2026
DRAWN BY: E.REIMER DATE : FEB 2026
CHECKED BY: T.DUDECK DATE : FEB 2026
DESIGN ENGINEER OF RECORD: T.DUDECK DATE : AUG 2026



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PROJECT ID. **011-01-9a58c**

BUNCOMBE COUNTY

STATION: **10+65.00 -DR1-**

SHEET 1 OF 3

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

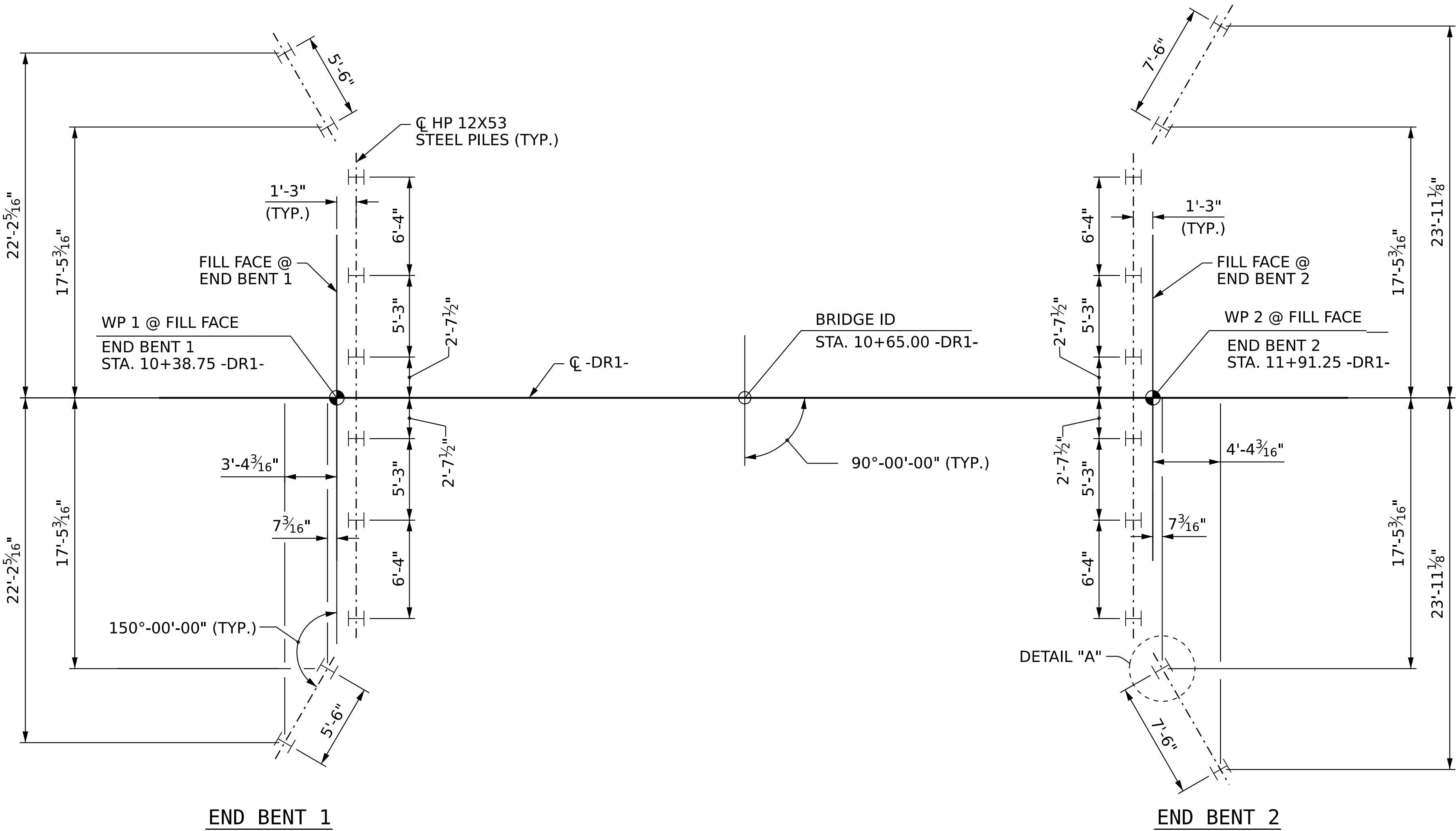
GENERAL DRAWING
PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-1
2			4			
TOTAL SHEETS						12

NOTES

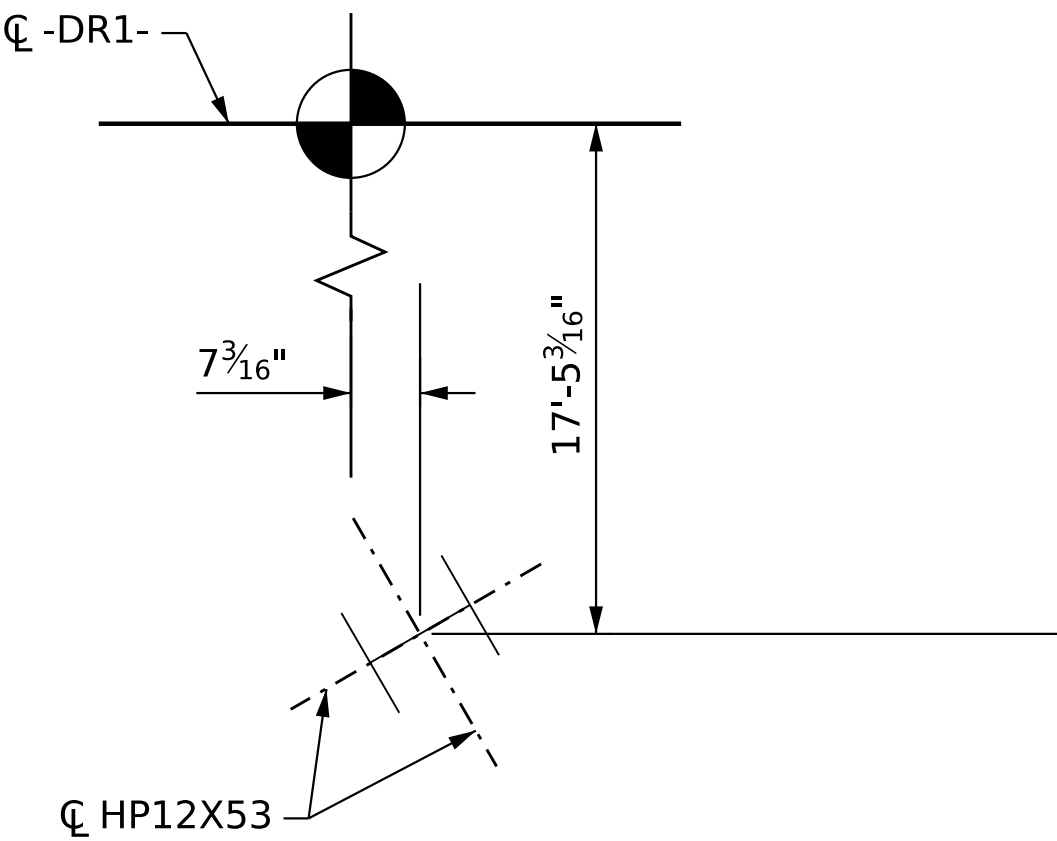
DRILLED IN PILES SHOULD BE EMBEDDED A MINIMUM OF 5 FEET IN BEDROCK OR WEATHERING ROCK TO RESIST LATERAL LOADS.

DRILLED-IN HP12X53 PILES FACTORED RESISTANCE = 150 KIPS



FOUNDATION LAYOUT

NOTE: ALL DIMENSIONS TAKEN TO THE CL OF PILE



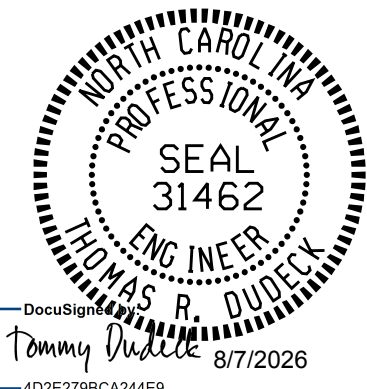
DETAIL A

WINGWALL SOLIDER PILE ORIENTATION
(OTHERS SIMILAR)

DESIGNED BY:	E.REIMER	DATE :	FEB 2026
DRAWN BY:	E.REIMER	DATE :	FEB 2026
CHECKED BY:	T.DUDECK	DATE :	FEB 2026
DESIGN ENGINEER OF RECORD:	T.DUDECK	DATE :	AUG 2026



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PROJECT ID. **011-01-9a58c**

BUNCOMBE COUNTY

STATION: **10+65.00 -DR1-**

SHEET 2 OF 3

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

GENERAL DRAWING
FRAMING PLAN

REVISIONS						SHEET NO. S-2
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 12
2			4			

NOTES

ASSUMED LIVE LOAD = HS-20 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 AND PAINTED IN ACCORDANCE WITH SYSTEM 1 OR GALVANIZED OF THE STRUCTURAL STEEL SHOP COATING PROGRAM AND ARTICLE 442-8 OF THE NCDOT STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

COATING APPLICATION FOR ALL STRUCTURAL STEEL SHALL NOT BE PERFORMED UNTIL SHOP FABRICATION INCLUDING CUTTING, DRILLING, AND WELDING HAS BEEN COMPLETED.

ALL TIMBER AND LUMBER MEMBERS SHALL BE TREATED SOUTHERN PINE AND CONFORM TO SECTION 1082 OF THE NCDOT STANDARD SPECIFICATIONS.

ALL TIMBER DIMENSIONS SHOWN ON THE PLANS ARE NOMINAL DIMENSIONS UNLESS OTHERWISE NOTED.

WHEN FIELD CUTTING TIMBER MEMBERS, TREAT NEWLY EXPOSED SURFACES WITH EITHER A BITUMINOUS ASPHALT-BASED ROOFING CEMENT, COPPER NAPHTHENATE PASTE, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING.

TREAT ALL DRILLED OR NEWLY EXPOSED HOLES IN TIMBER MEMBERS BY PUMPING WITH BITUMINOUS ASPHALT-BASED ROOFING CEMENT, OR APPROVED PRESERVATIVE SYSTEM BEFORE INSTALLING HARDWARE.

PRE-DRILL HOLES IN TIMBER AND LUMBER MEMBERS ACCEPTING BOLTS TO ELIMINATE SPLITTING.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 10+65.

FOR POURABLE SILICONE JOINT SEALANT, SEE SPECIAL PROVISIONS.

ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATION, UNLESS OTHERWISE NOTED ON THE PLANS.

DO NOT DRIVE LAG/STRUCTURAL SCREWS WITH A HAMMER, SCREW OR TORQUE LAG/STRUCTURAL SCREWS.

SCREWS SHALL PROVIDE SUFFICIENT LENGTH SO THAT SCREW SHANK WILL PENETRATE RECEIVING MEMBERS.

FOR TIMBER BRIDGE RAIL AND TIMBER BRIDGE DECK SYSTEM INCLUDING LUMBER, DELINEATORS, HARDWARE FOR BOLT CONNECTIONS, HARDWARE FOR SCREW CONNECTIONS AND ALUMINUM DRIP EDGE, SEE TIMBER BRIDGE SUPERSTRUCTURE ON STEEL BEAMS SPECIAL PROVISION.

FOR SOLIDER PILE WALLS WITH TIMBER LAGGING SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 10+65	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMPORARY ACCESS @ STA. 10+65	CLASS A CONCRETE	REINFORCING STEEL	APPROX. 43,500 LBS. STRUCTURAL STEEL	PILE DRILLING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12 X 53 STEEL PILES		PILE EXCAVATION NOT IN SOIL	PILE EXCAVATION IN SOIL	ELASTOMERIC BEARINGS	SOLIDER PILE WALL WITH TIMBER LAGGING	POURABLE SILICONE JOINT	TIMBER DECK SYSTEM	TIMBER BRIDGE RAIL SYSTEM
	LUMP SUM	LUMP SUM	CU. YDS.	LBS.	LUMP SUM	No.	No.	LIN. FT.	LIN. FT.	LIN. FT.	LUMP SUM	SQ. FT.	LIN. FT.	LUMP SUM	LIN. FT.
SUPERSTRUCTURE					LUMP SUM						LUMP SUM		30.0	LUMP SUM	101.0
END BENT 1			6.5	1216		10	10	190.8	50.0	50.0		584			
END BENT 2			6.5	1216		10	10	226.7	50.0	50.0		817.6			
TOTAL	LUMP SUM	LUMP SUM	13	2432	LUMP SUM	20	20	417.5	100.0	100.0	LUMP SUM	1401.6	30.0	LUMP SUM	101.0

PROJECT ID. **011-01-9a58c**

BUNCOMBE COUNTY

STATION: **10+65.00 -DR1-**

SHEET 3 OF 3

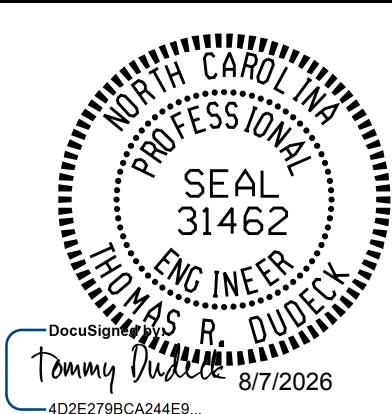
NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

GENERAL DRAWING
FOR BRIDGE OVER
BROAD RIVER ON -DR1-

DESIGNED BY: E.REIMER DATE : FEB 2026
DRAWN BY: E.REIMER DATE : FEB 2026
CHECKED BY: T.DUDECK DATE : FEB 2026
DESIGN ENGINEER OF RECORD: T.DUDECK DATE : AUG 2026



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS 12
2			4			



FOR SECTION A-A, SEE "PLAN OF SPAN DETAILS" SHEET

REVISIONS						SHEET NO. S-4
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 12
2			4			

NOTES

FOR ADDITIONAL NOTES, SEE TYPICAL SECTION AND GENERAL DRAWING SHEETS.

STAGGER TIMBER DECK PLANKS BUTT JOINTS AT 4FT MINIMUMS FROM ADJACENT RUNS.

ATTACH TIMBER DECK PLANKS TO NAILERS WITH TWO STRUCTURAL SCREWS PER TIMBER DECK PLANK.

AVOID HITTING NAILER BOLT WHEN DRIVING TIMBER DECK SCREWS.

SEE BEAM DETAILS FOR SPACING OF TIMBER BOLTS IN TOP FLANGE OF ROLLED BEAM.

COUNTERSINK TIMBER BOLT AND STRUCTURAL SCREW HEADS TO BE FLUSH WITH TIMBER SURFACE.

TRIM THE EDGE NAILER FLUSH WITH THE EDGE OF DECK.

DECK PLANK WIDTH MAY BE CUT TO 6" (MIN.) TO FIT WITHIN LIMITS OF TIMBER DECK. ALL DECK PLANKS ATTACHED TO THE EDGE NAILER SHALL BE FULL WIDTH. CUT BOARDS WILL NOT BE PERMITTED TO BE PLACED ADJACENT TO ONE ANOTHER.

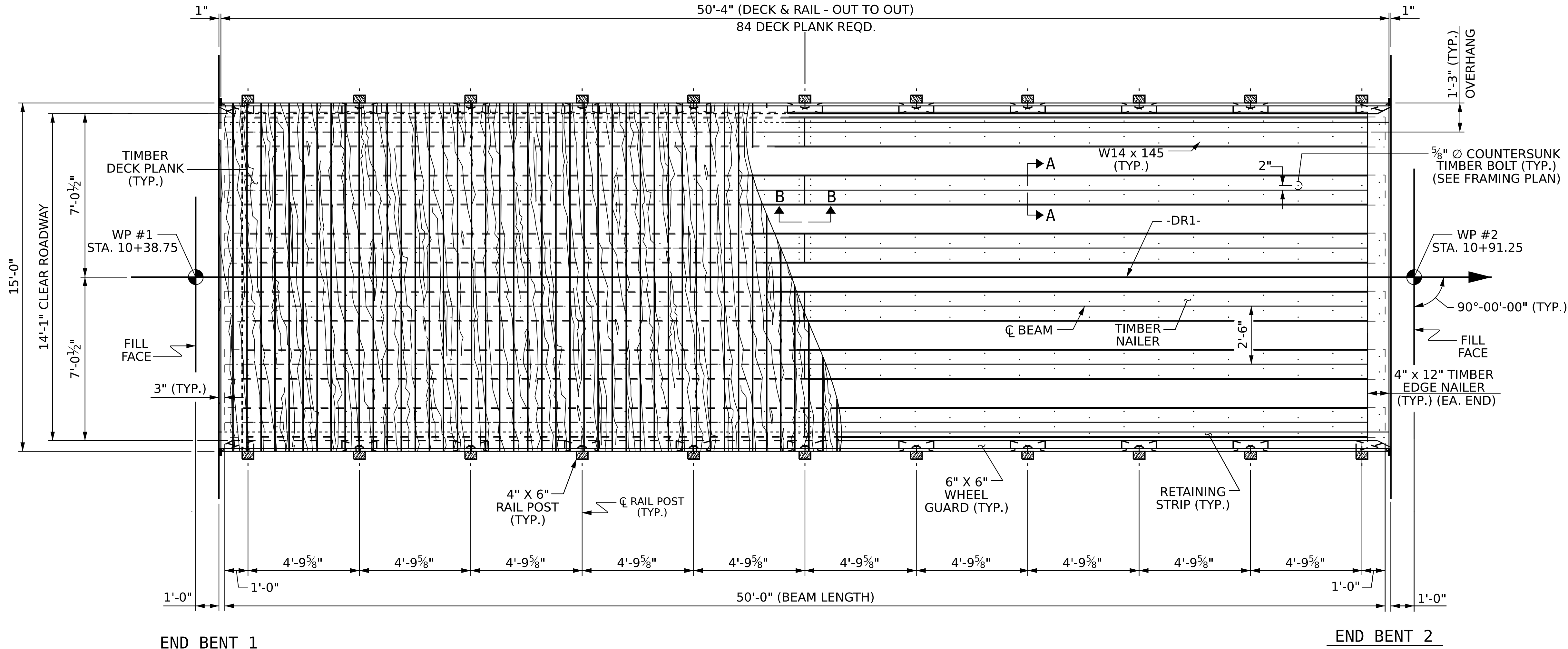
FINAL JOINT SEALS SHALL NOT BE INSTALLED UNTIL THE OVERLAY IS COMPLETE.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE BACKER ROD FOR THE SIZE OF THE OPENING ON THE PLANS AND ACCOMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

POURABLE SILICONE JOINT SEALANT SHALL BE INSTALLED AS PER THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

FOR POURABLE SILICONE JOINT SEALANT, SEE SPECIAL PROVISIONS.

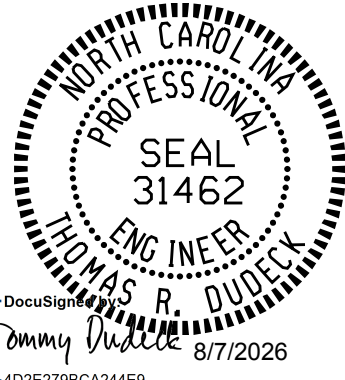


DECK LAYOUT

DESIGNED BY: E.REIMER DATE : FEB 2026
DRAWN BY: E.REIMER DATE : FEB 2026
CHECKED BY: T.DUDECK DATE : FEB 2026
DESIGN ENGINEER OF RECORD: T.DUDECK DATE : AUG 2026



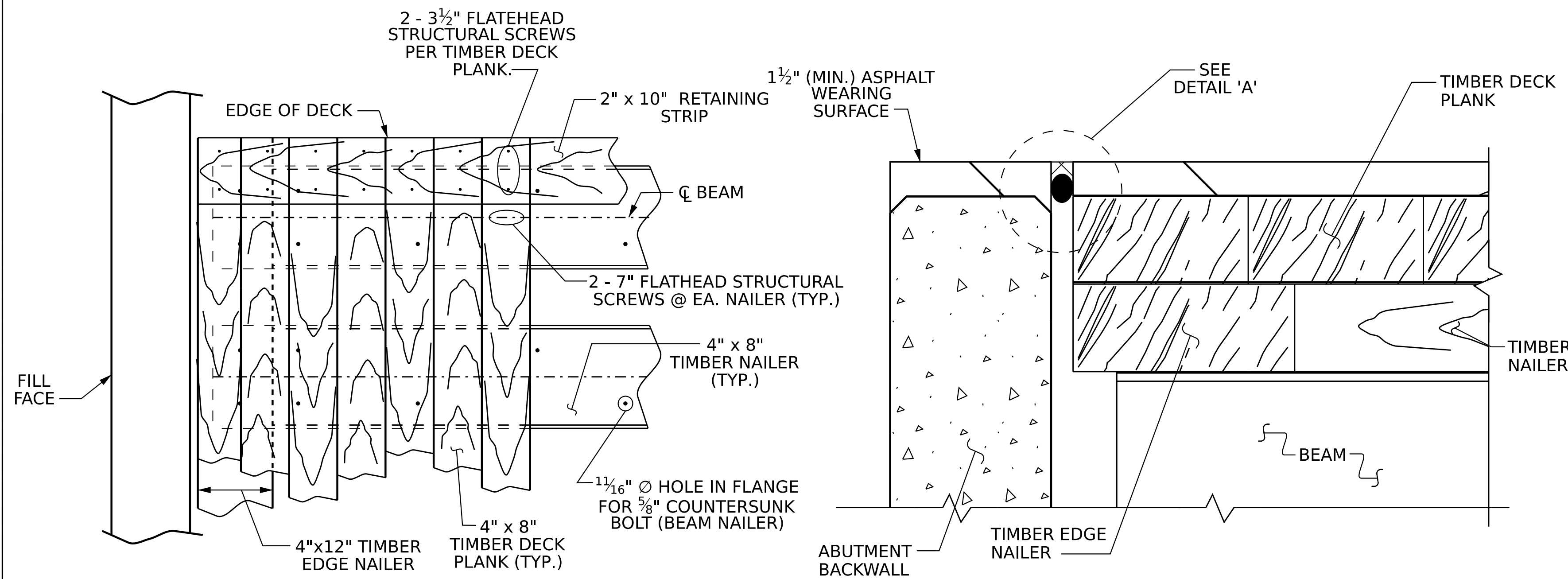
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PROJECT ID. **011-01-9a58c**
BUNCOMBE COUNTY
STATION: **10+65.00 -DR1-**

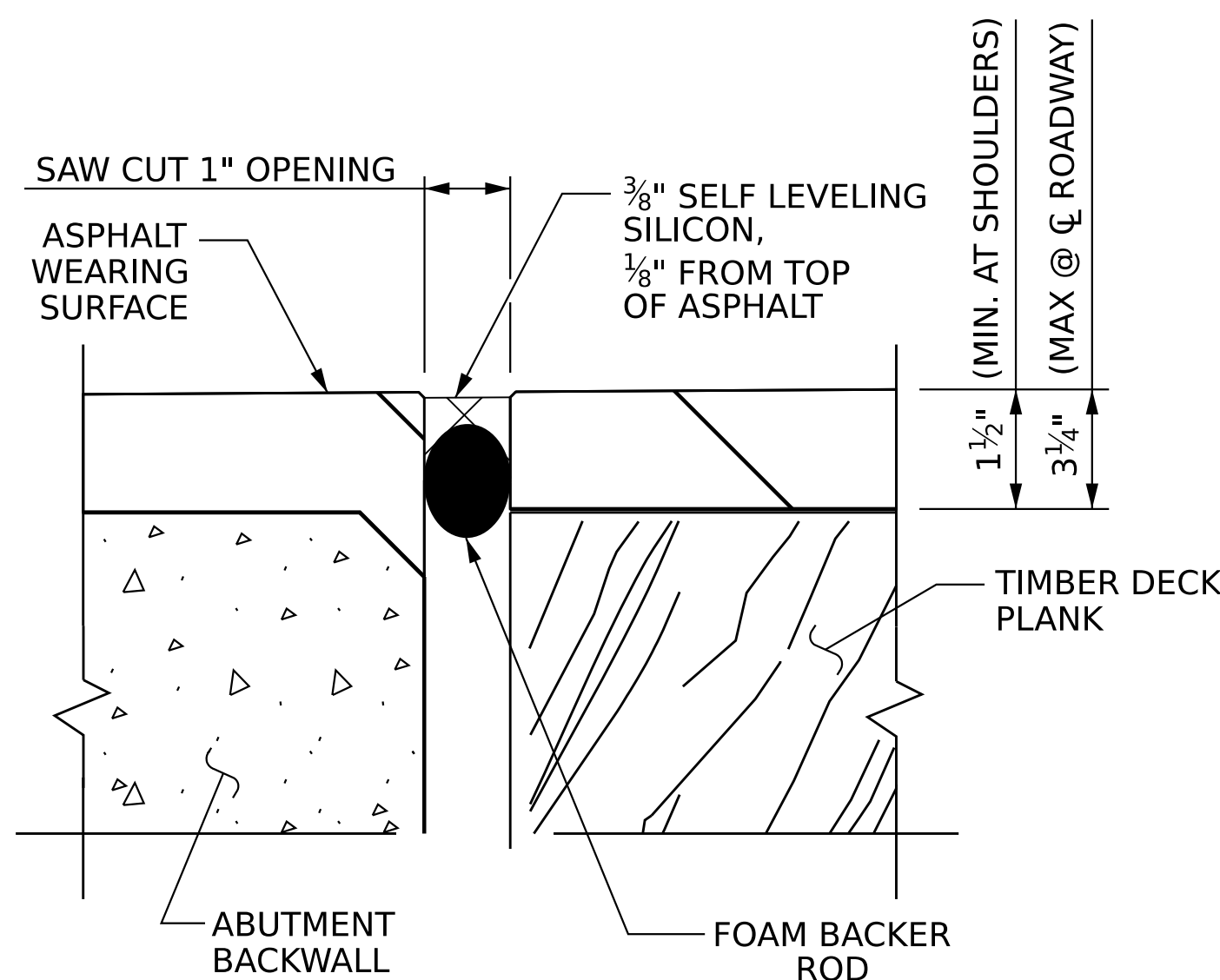
SHEET 1 OF 2

NORTH CAROLINA EMERGENCY MANAGEMENT BUNCOMBE COUNTY						
STANDARD						
SUPERSTRUCTURE						
PLAN OF 50' BEAM 14' -1" CLEAR ROADWAY 90° SKEW						
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			12

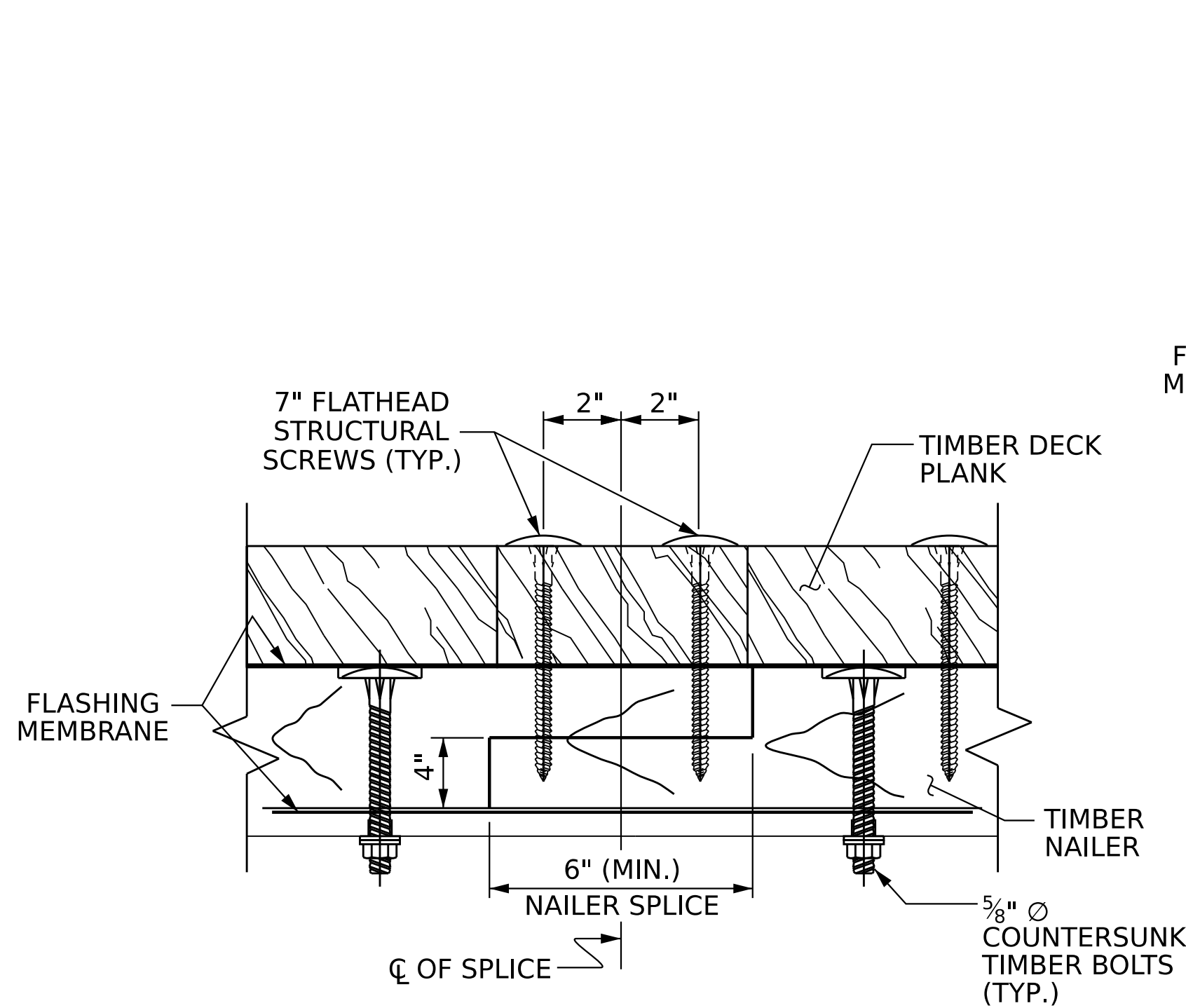


TYPICAL DECK DETAIL AT ABUTMENT

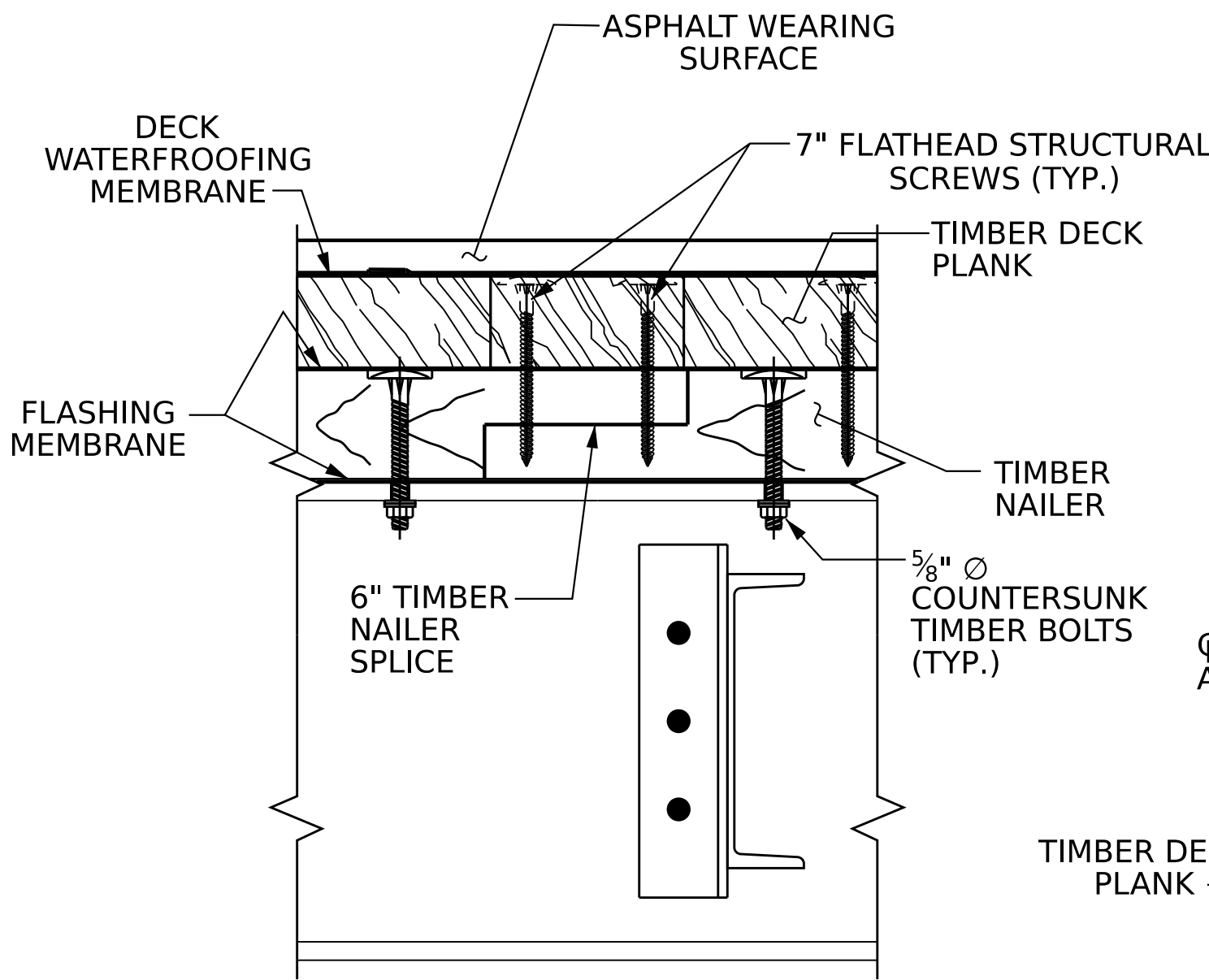
PROPOSED POURABLE SILICONE JOINT DETAIL



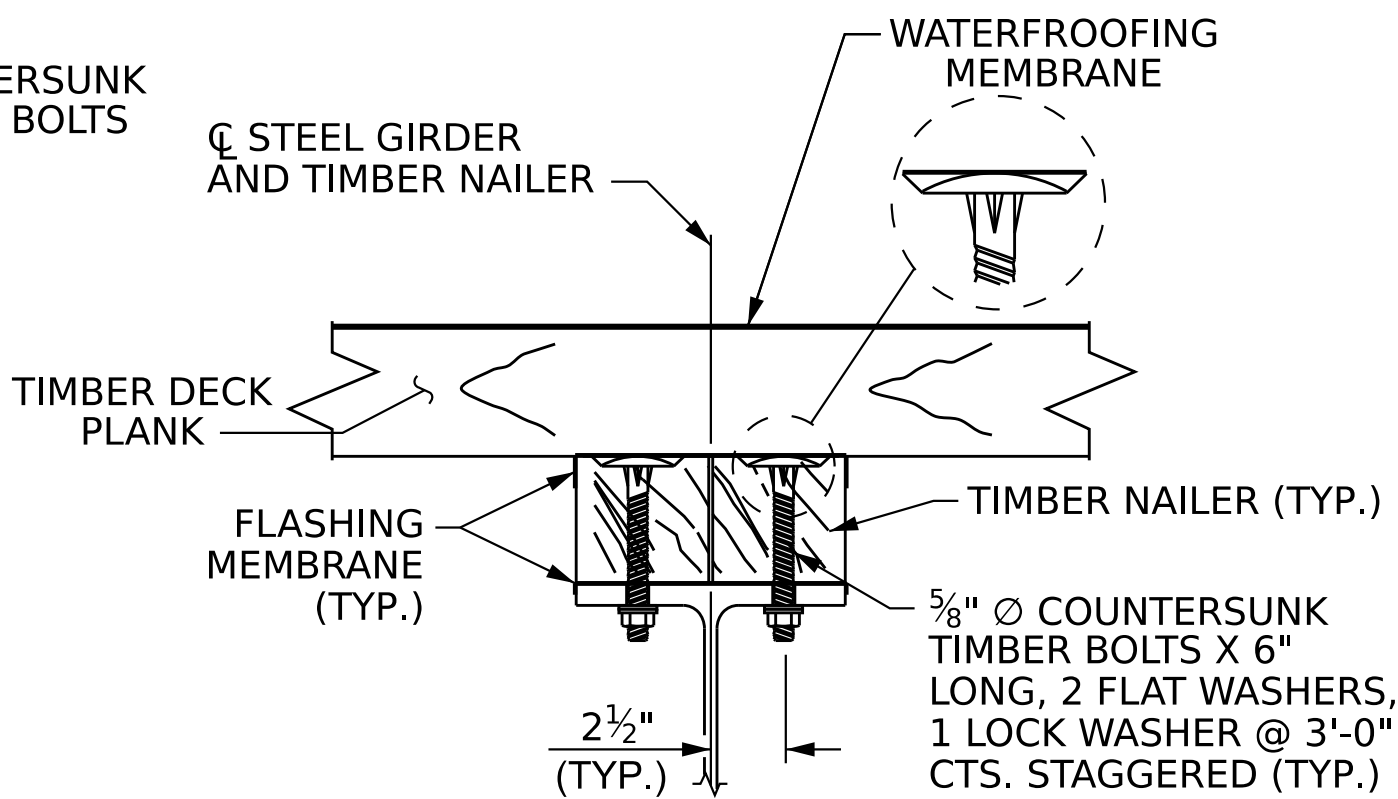
DETAIL 'A'



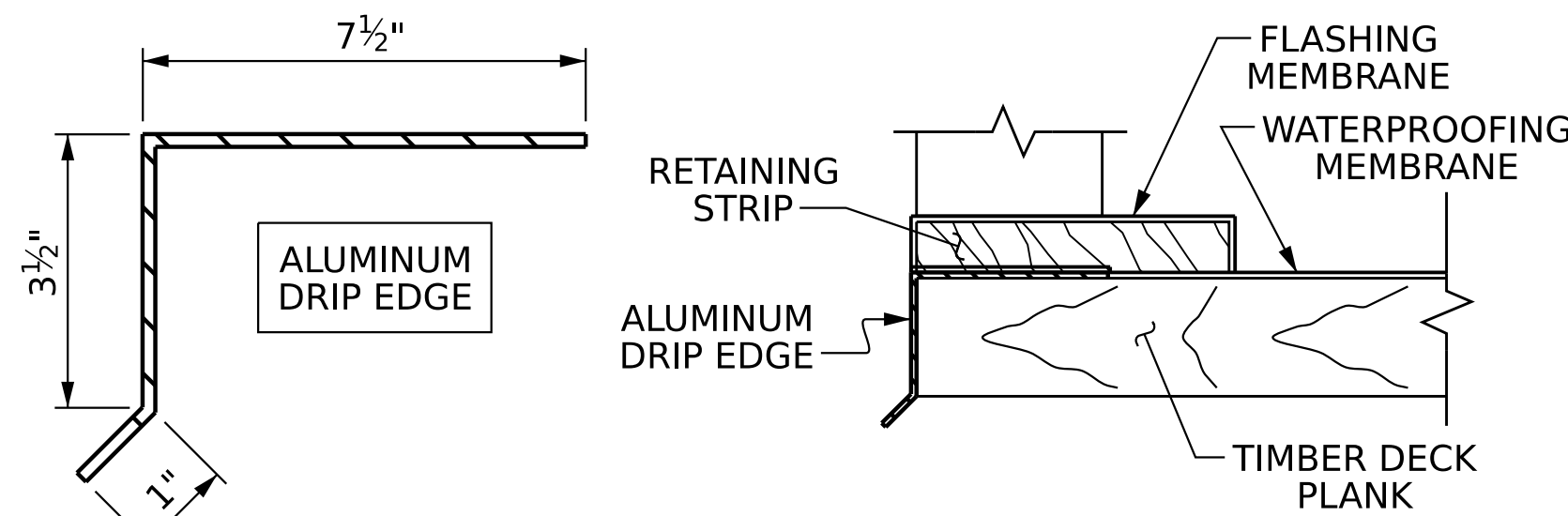
NAILER SPLICE DETAILS



SECTION B-B
NAILER SPLICE & TIMBER PLANK ATTACHMENT DETAILS



SECTION A-A
DOUBLE TIMBER NAILER ATTACHMENT DETAILS



DRIP EDGE DETAILS

POST AND BOLTS NOT SHOWN FOR CLARITY

BILL OF MATERIAL FOR 50 FT. SPAN			
TREATED LUMBER			
ITEM	SIZE	LIN. FT.	
TIMBER DECK PLANKS	4"x8"	1260.0	
TIMBER NAILERS	4"x8"	726.9	
TIMBER EDGE NAILERS	4"x12"	30.0	
TOTAL TREATED LUMBER _____ 2016.9 LIN. FT.			
FLASHING MEMBRANE			
ITEM	SIZE	LIN. FT.	
TOP OF BEAM	25 MILS	375.0	
TOP OF TIMBER NAILERS	25 MILS	726.9	
TOP OF TIMBER EDGE NAILERS	25 MILS	30.0	
FLASHING MEMBRANE _____ 1131.9 LIN. FT.			
HARDWARE			
ITEM	Nos.	SIZE	LBS.
5/8" Ø TIMBER BOLTS	570	5/8"	840
HEAVY HEX NUTS	570	5/8"	72
STANDARD WASHER	570	5/8"	47
LOCK WASHER	570	5/8"	47
FLAT HEAD STR. SCREWS	2520	7"	25
HARDWARE FOR CONNECTIONS _____ 1031 LBS.			
DECK WATERPROOFING MEMBRANE			
ITEM	SIZE	SQ. YDS	
DECK WATERPROOFING MEMBRANE	65 MILS.	84.0	
DRIP EDGE			
22 GA. ALUMINUM DRIP EDGE	SIZE 1'-0"	LIN. FT. 50.50	
JOINT			
POURABLE SILICONE JOINT		LIN. FT. 30.0	

NOTE

FOR POURABLE SILICONE JOINT SEALS, SEE SPECIAL PROVISIONS.

PROJECT ID. **011-01-9a58c**

BUNCOMBE COUNTY

STATION: **10+65.00 -DR1-**

SHEET 2 OF 2

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

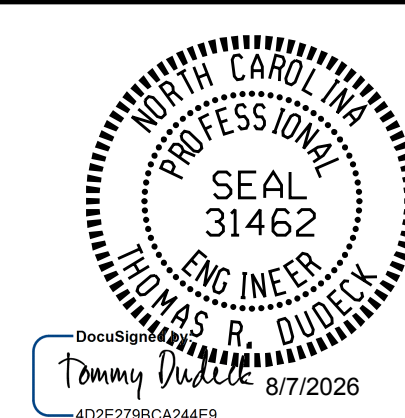
STANDARD
SUPERSTRUCTURE

PLAN OF SPAN DETAILS

DESIGNED BY: E.REIMER DATE : FEB 2026
DRAWN BY: E.REIMER DATE : FEB 2026
CHECKED BY: T.DUDECK DATE : FEB 2026
DESIGN ENGINEER OF RECORD: T.DUDECK DATE : AUG 2026



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REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-6
					TOTAL SHEETS 12

NOTES

NO SALVAGED BEAMS SHALL BE USED, UNLESS OTHERWISE NOTED ON THE PLANS.

NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.

ALL STRUCTURAL STEEL FIELD CONNECTIONS SHALL BE 5/8" DIA. GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

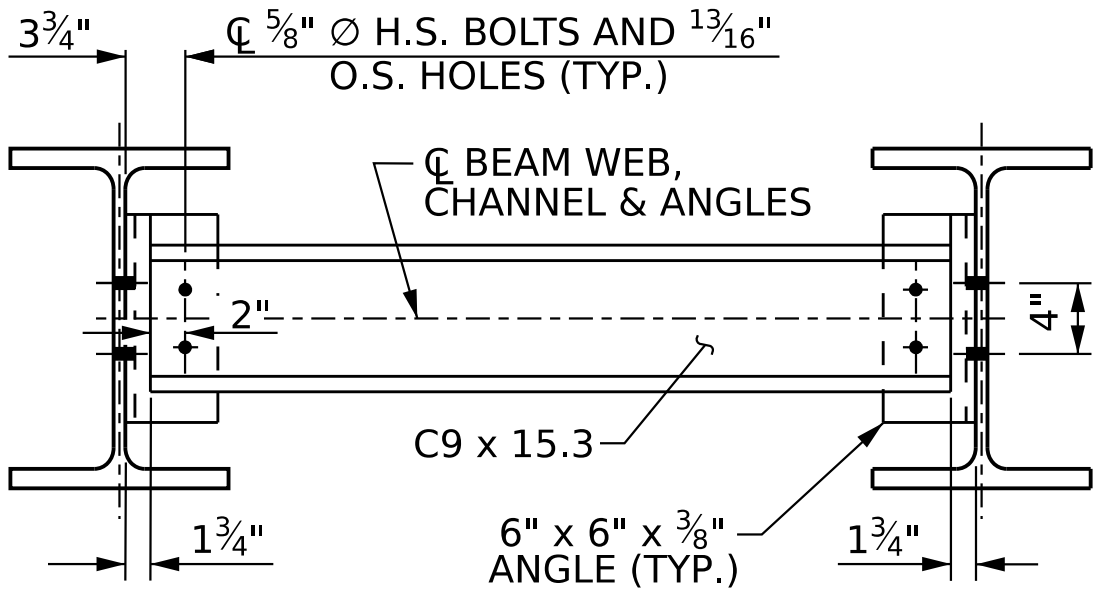
BEAMS SHALL BE PLACED PARALLEL TO THE CHORD.

CONTRACTORS OPTION TO WELD CONNECTOR TO BEAM PRIOR TO SHOP COATING.

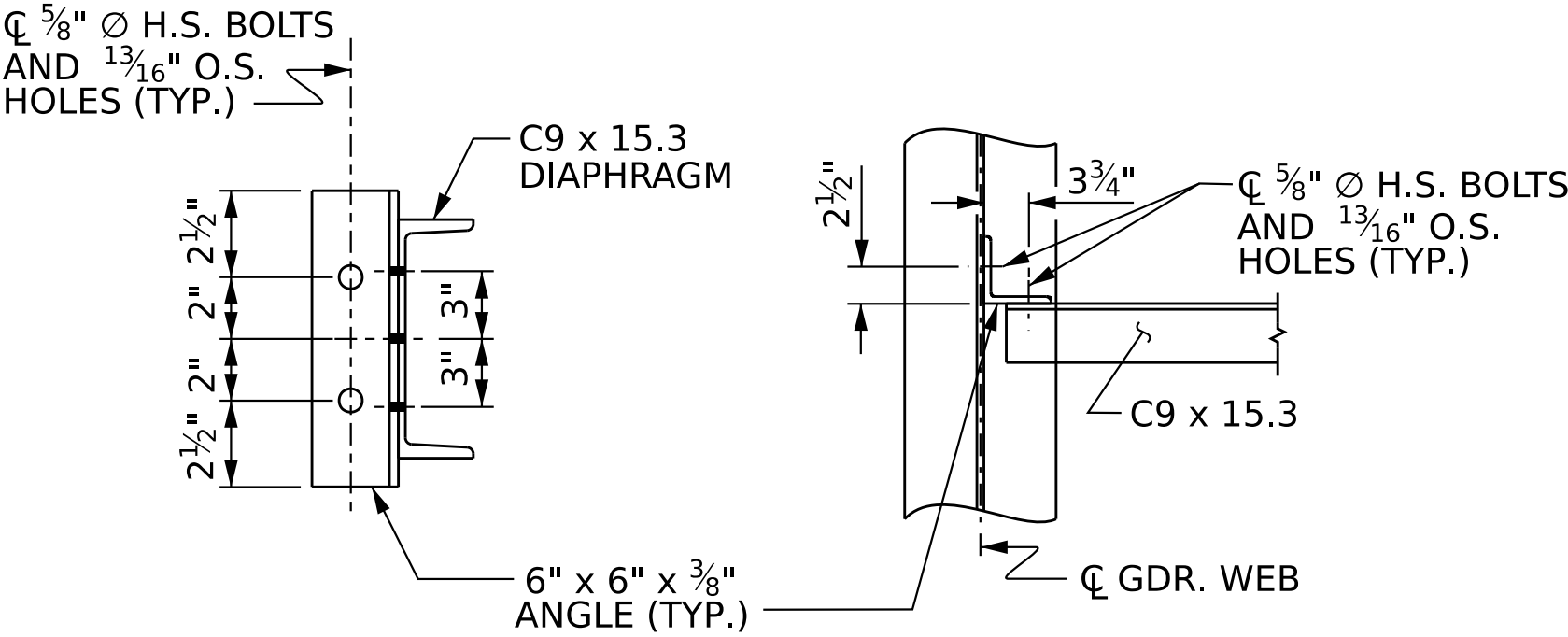
SEE GENERAL DRAWING NOTES FOR COATING.

* FOR SIZE AND LOCATION OF OPTIONAL BOLTED SOLE PLATE, SEE BEARING DETAILS SHEET.

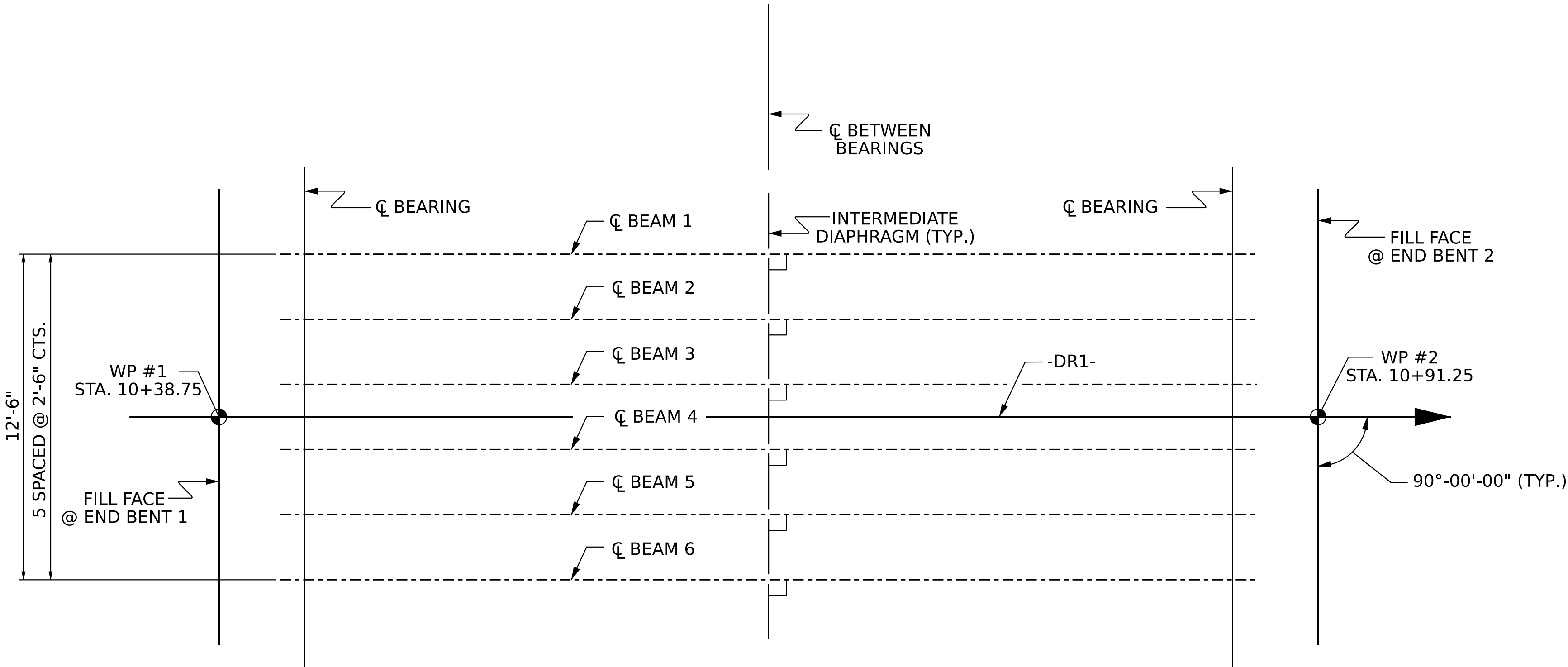
A CHARY V-NOTCH TEST IS REQUIRED ON ALL BEAM SECTIONS, AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE NCDOT STANDARD SPECIFICATIONS.



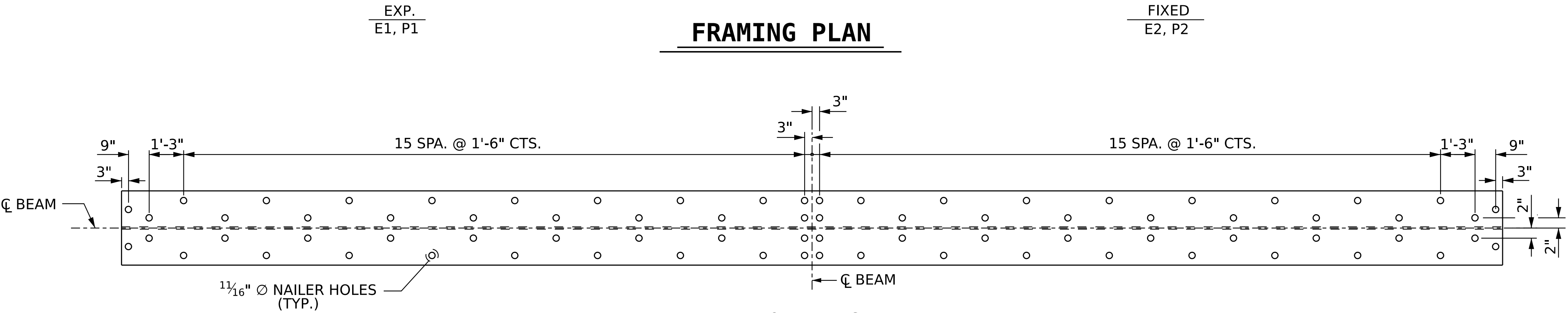
INTERIOR DIAPHRAGM DETAIL



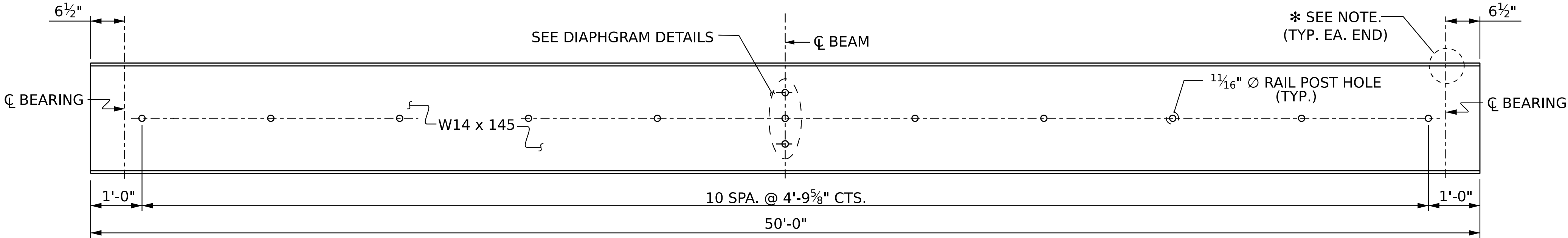
ANGLE DETAIL



FRAMING PLAN



TOP FLANGE



ELEVATION

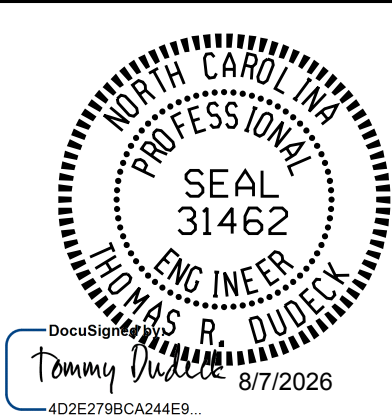
(SHOWING RAIL POST HOLES FOR EXTERIOR BEAMS
INTERIOR BEAMS ARE SIMILAR BUT WITHOUT RAIL POST HOLES)

BEAM DETAILS

DESIGNED BY:	E.REIMER	DATE :	FEB 2026
DRAWN BY:	E.REIMER	DATE :	FEB 2026
CHECKED BY:	T.DUDECK	DATE :	FEB 2026
DESIGN ENGINEER OF RECORD:	T.DUDECK	DATE :	AUG 2026



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PROJECT ID. **011-01-9a58c**

BUNCOMBE COUNTY

STATION: **10+65.00 -DR1-**

SHEET 1 OF 1

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY
STANDARD
SUPERSTRUCTURE
**FRAMING PLAN FOR
50' BEAM LENGTH
90° SKEW**

REVISIONS					SHEET NO. S-7
NO.	BY:	DATE:	NO.	BY:	
1			3		TOTAL SHEETS
2			4		12

NOTES

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS IN ACCORDANCE WITH THE NCDOT STANDARD SPECIFICATIONS.

AT ALL SUPPORTS, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF $\frac{1}{2}$ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE NCDOT STANDARD SPECIFICATIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS, AND WASHERS. SHOP INSPECTION IS REQUIRED.

AT THE APPROVAL OF THE ENGINEER, SOLE PLATES AT THE EXPANSION END MAY BE FIELD WELDED.

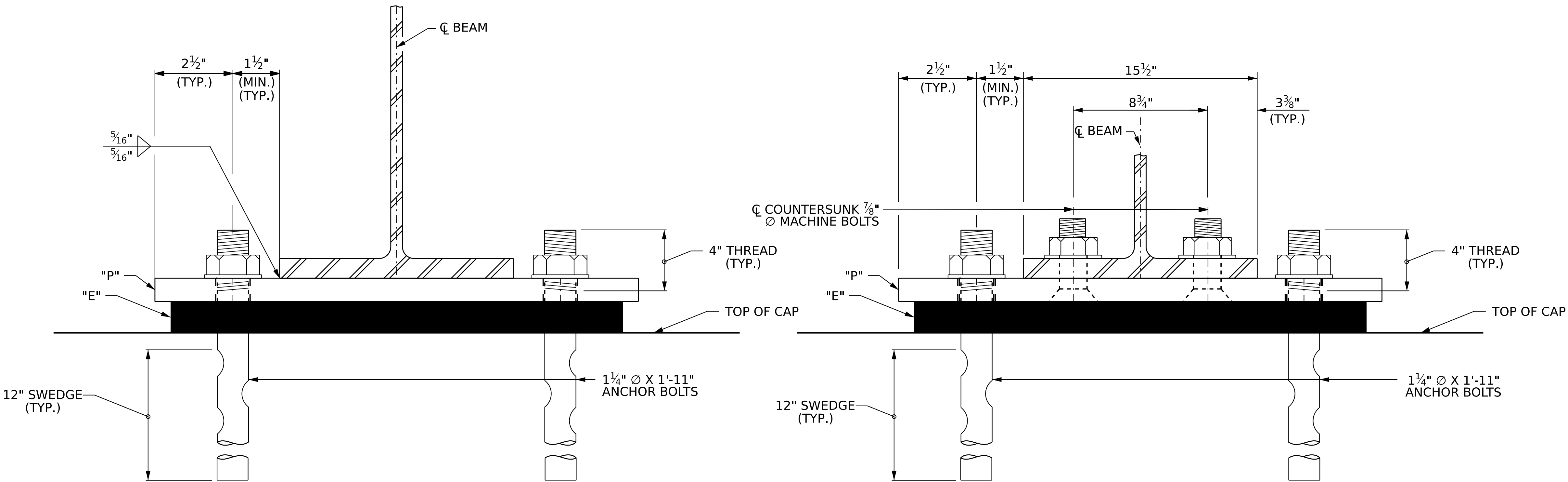
WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300° F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

AT NO ADDITIONAL COST TO THE DEPARTMENT, THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CAST-IN-PLACE ANCHORS. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ANCHOR BOLT IS 30 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE NCDOT STANDARD SPECIFICATIONS.

ADHESIVELY ANCHORED ANCHOR BOLTS SHALL BE THREADED FULL LENGTH.

AT THE APPROVAL OF THE ENGINEER, THE OPTIONAL BOLTED SOLE PLATE MAY BE USED AT NO ADDITIONAL COST.

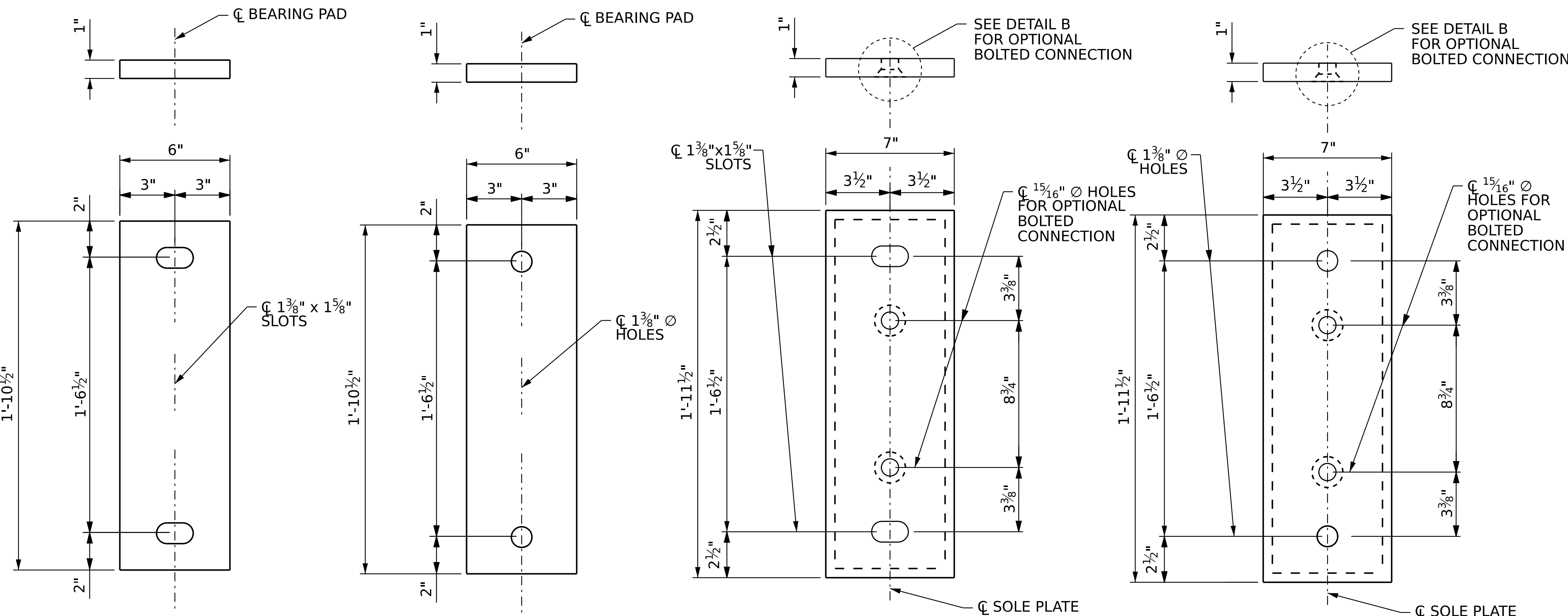


END VIEW

WELDED

END VIEW

OPTIONAL BOLTED



E1 ELASTOMERIC BEARING DETAILS

(6 REQ'D)
EXPANSION

E2 ELASTOMERIC BEARING DETAILS

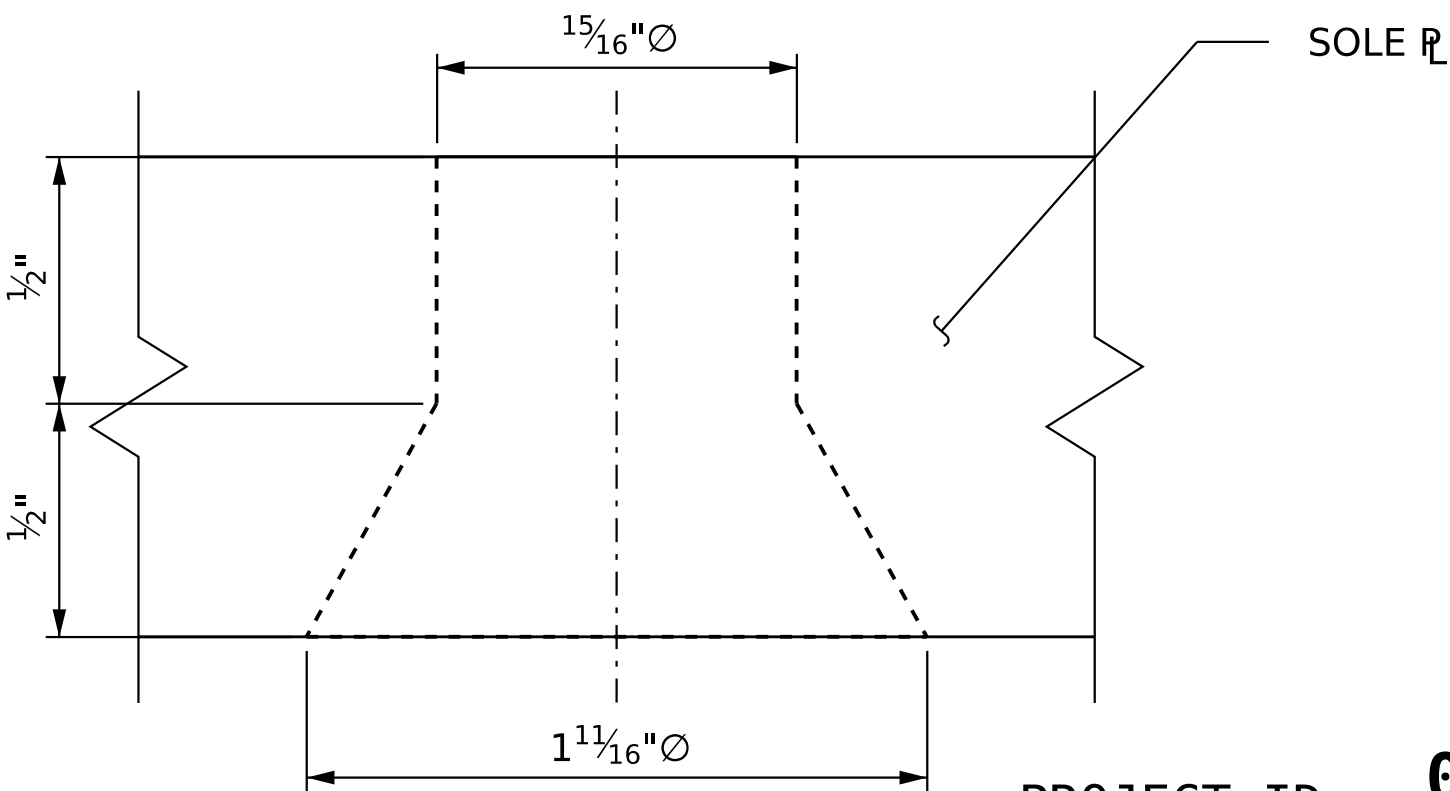
(6 REQ'D)
FIXED

P1 SOLE PLATE DETAILS

(6 REQ'D)
EXPANSION

P2 SOLE PLATE DETAILS

(6 REQ'D)
FIXED



DETAIL B

PROJECT ID. **011-01-9a58c**

BUNCOMBE COUNTY

STATION: **10+65.00 -DR1-**

SHEET 1 OF 1

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

STANDARD

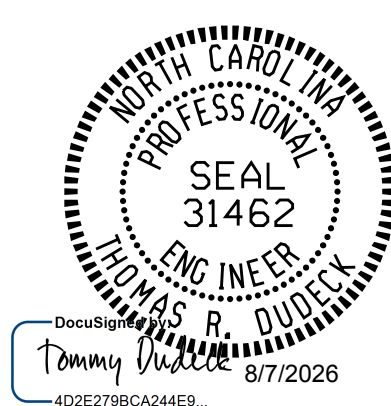
**BEARING DETAILS
TYPE V**

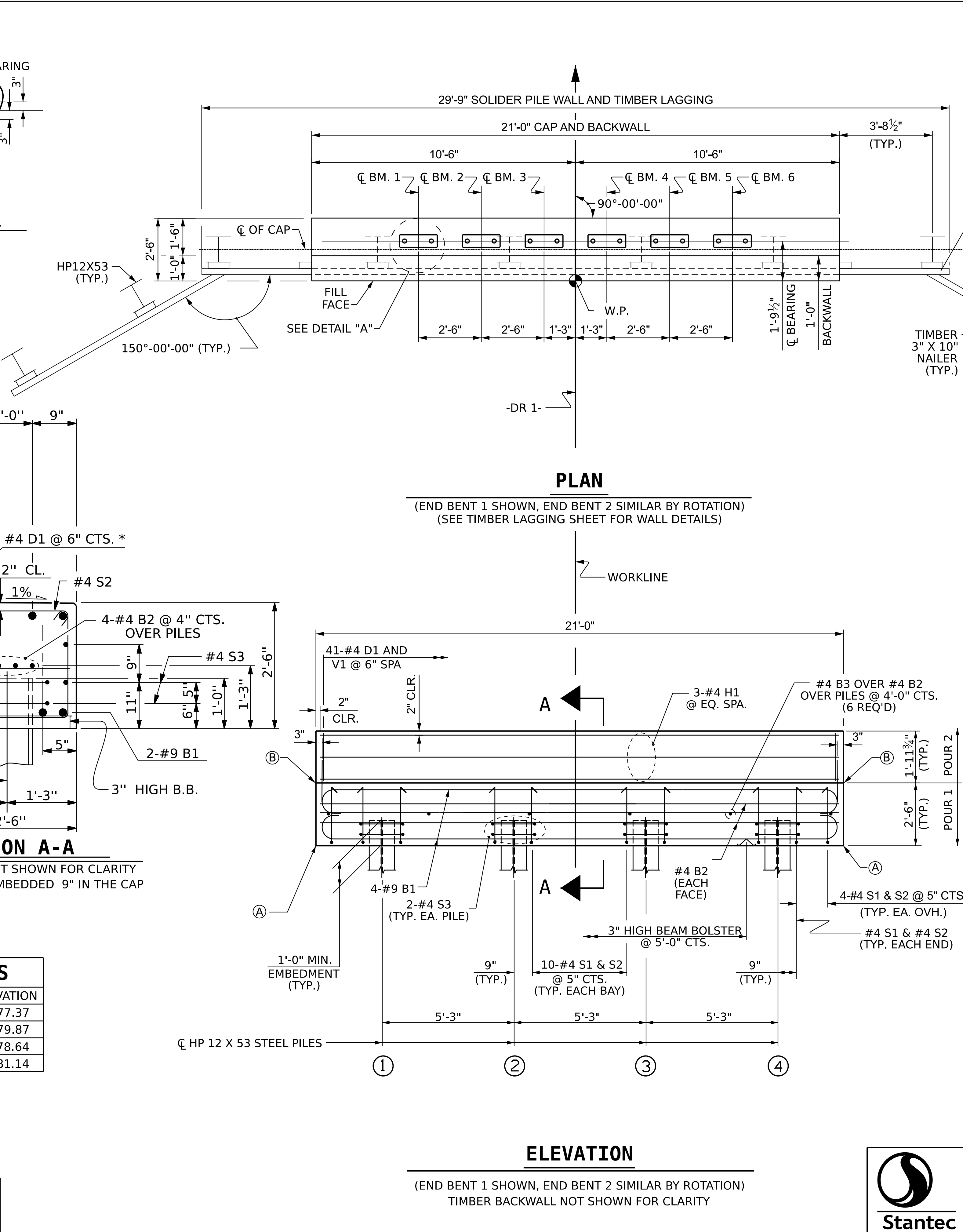
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 12

DESIGNED BY: E.REIMER DATE : FEB 2026
DRAWN BY: E.REIMER DATE : FEB 2026
CHECKED BY: T.DUDECK DATE : FEB 2026
DESIGN ENGINEER OF RECORD: T.DUDECK DATE : AUG 2026



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END BENT No. 1	
HP 12 X 53 STEEL PILES NO: 10	LIN. FT.= 190.8
PILE DRILLING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 10	
END BENT No. 2	
HP 12 X 53 STEEL PILES NO: 10	LIN. FT.= 226.7
PILE DRILLING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 10	

	LOCATION	LENGTH
"A"	END BENT 1	9'-3"
"B"	END BENT 1	3'-0"
"C"	END BENT 1	5'-6"
"A"	END BENT 2	11'-3"
"B"	END BENT 2	3'-0"
"C"	END BENT 2	7'-6"

	LOCATION	STATION
1	END BENT 1	10+38.75
2	END BENT 2	10+91.25

TOP OF PILE ELEVATIONS		
	LOCATION	ELEVATION
①	END BENT 1	2178.37
②	END BENT 1	2178.37
③	END BENT 1	2178.37
④	END BENT 1	2178.37
①	END BENT 2	2179.64
②	END BENT 2	2179.64
③	END BENT 2	2179.64
④	END BENT 2	2179.64

BILL OF MATERIAL					
FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	23'-2"	631
B2	8	#4	STR	20'-8"	111
B3	6	#4	STR	2'-2"	9
S1	38	#4	2	7'-3"	185
S2	38	#4	3	2'-11"	75
S3	8	#4	4	6'-6"	35
D1	41	#4	STR	1'-6"	41
H1	6	#4	STR	20'-8"	83
V1	41	#4	STR	1'-8"	46

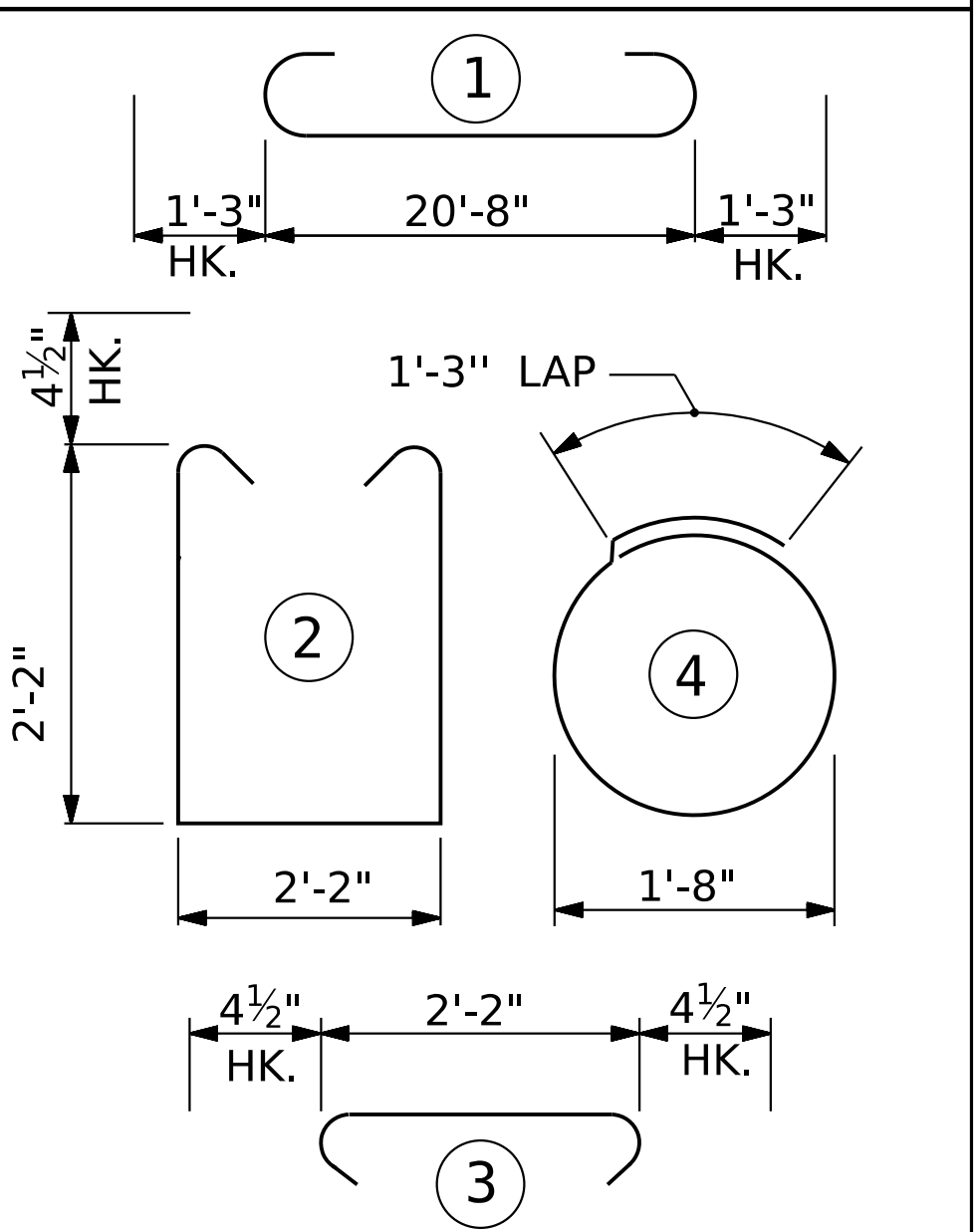
REINFORCING STEEL (FOR ONE END BENT)	1216 LBS.
---	-----------

CLASS A CONCRETE
BOUR 1 4.8 CY

POUR 2	1.6 C.Y.
--------	----------

TOTAL CLASS A CONCRETE	6.5 C.Y.
------------------------	----------

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT ID. 011-01-9a58c

BUNCOMBE

COUNTY

STATION: 10+65.00 -DR1-

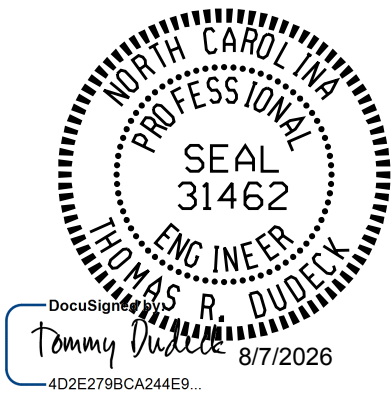
SHEET 1 OF 3

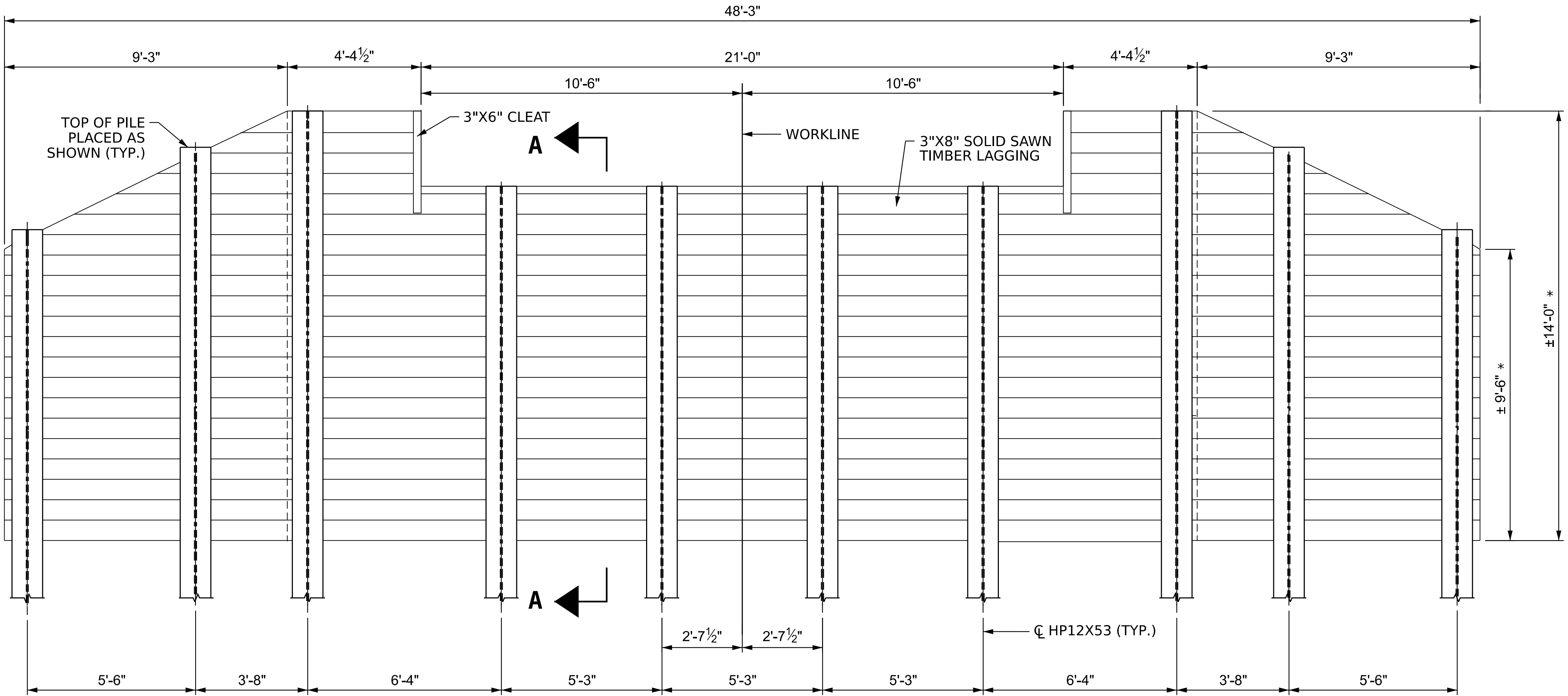
NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

SUBSTRUCTURE
END BENT 1 AND 2

REVISIONS						SHEET NO. S-10 TOTAL SHEETS 12
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

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END BENT 1 ELEVATION
(LOOKING BACK)

NOTES:

FOR TIMBER MEMBERS, ALL TIMBER AND LUMBER SHALL BE AWPA CATEGORY UC4C TREATED NO. 1 SOUTHERN PINE OR APPROVED EQUIVALENT.

ALL TIMBER AND LUMBER IS REQUIRED TO BE TREATED WITH A PRESERVATIVE TREATMENT IN ACCORDANCE WITH AASHTO M 133 OR AWPA STANDARDS U1, SECTION 4, TABLE 1.

PRESERVATIVE TREATED WOOD PRODUCTS WILL NOT BE ACCEPTED FOR USE UNLESS THEY HAVE BEEN INSPECTED AND FOUND SATISFACTORY, BOTH BEFORE AND AFTER TREATMENT IS PROVIDED.

LUMBER FOR BRIDGES OR FENDER SYSTEMS THAT IS 2 INCHES TO 4 INCHES THICK AND 6 INCHES WIDE OR WIDER SHALL CONFRM TO STRUCTURAL JOISTS AND PLANS, GRADE NO. 1 DENSE.

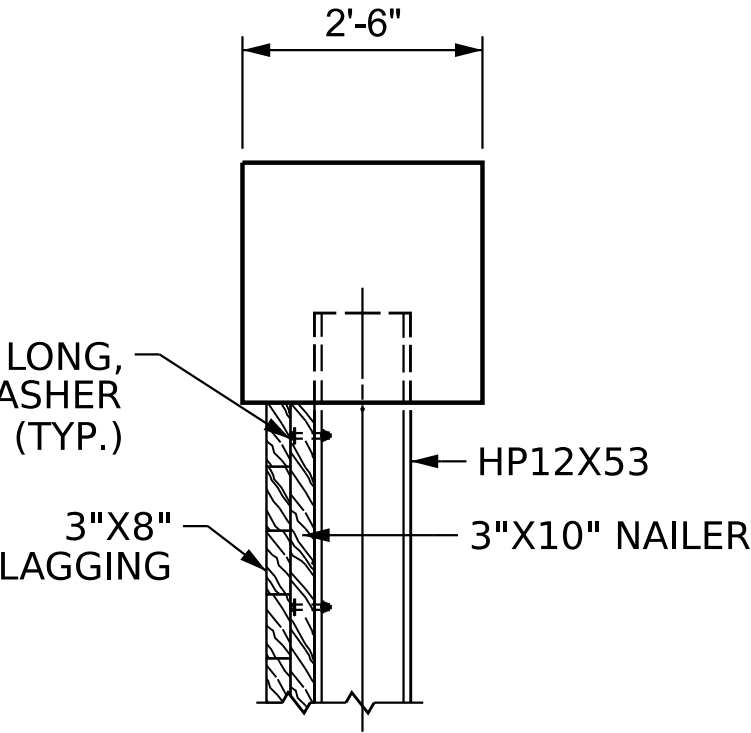
THE CONTRACTOR SHALL USE 5" LONG EXTERIOR WOOD SCREWS TO CONNECT THE 3"X 8" TIMBER LAGGING TO THE 3"X 10" NAILER.

HARDWARE IS CONSIDERED INCIDENTAL TO THE COST OF THE WALL.

STEEL H-PILES SHALL MEET ASTM A572 GRADE 50 OR ASTM A588.

* TIMBER PLACED AS SHOWN TO RETAIN EARTH EMBANKMENT

5/8" Ø TIMBER BOLTS (TYP.) X 4" LONG,
2 FLAT WASHERS, 1 LOCK WASHER
@ 5'-0" CTS. (TYP.)



SECTION A-A

PROJECT ID. **011-01-9a58c**
BUNCOMBE COUNTY
STATION: **10+65.00 -DR1-**

SHEET 2 OF 3

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

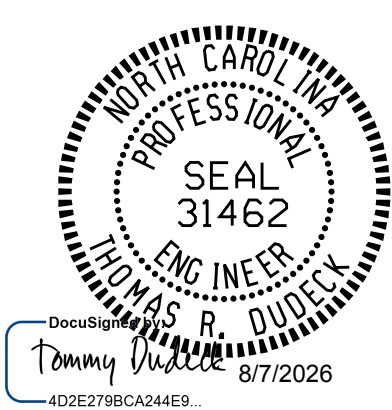
SUBSTRUCTURE
END BENT 1
SOLIDER PILE WALL
WITH TIMBER LAGGING

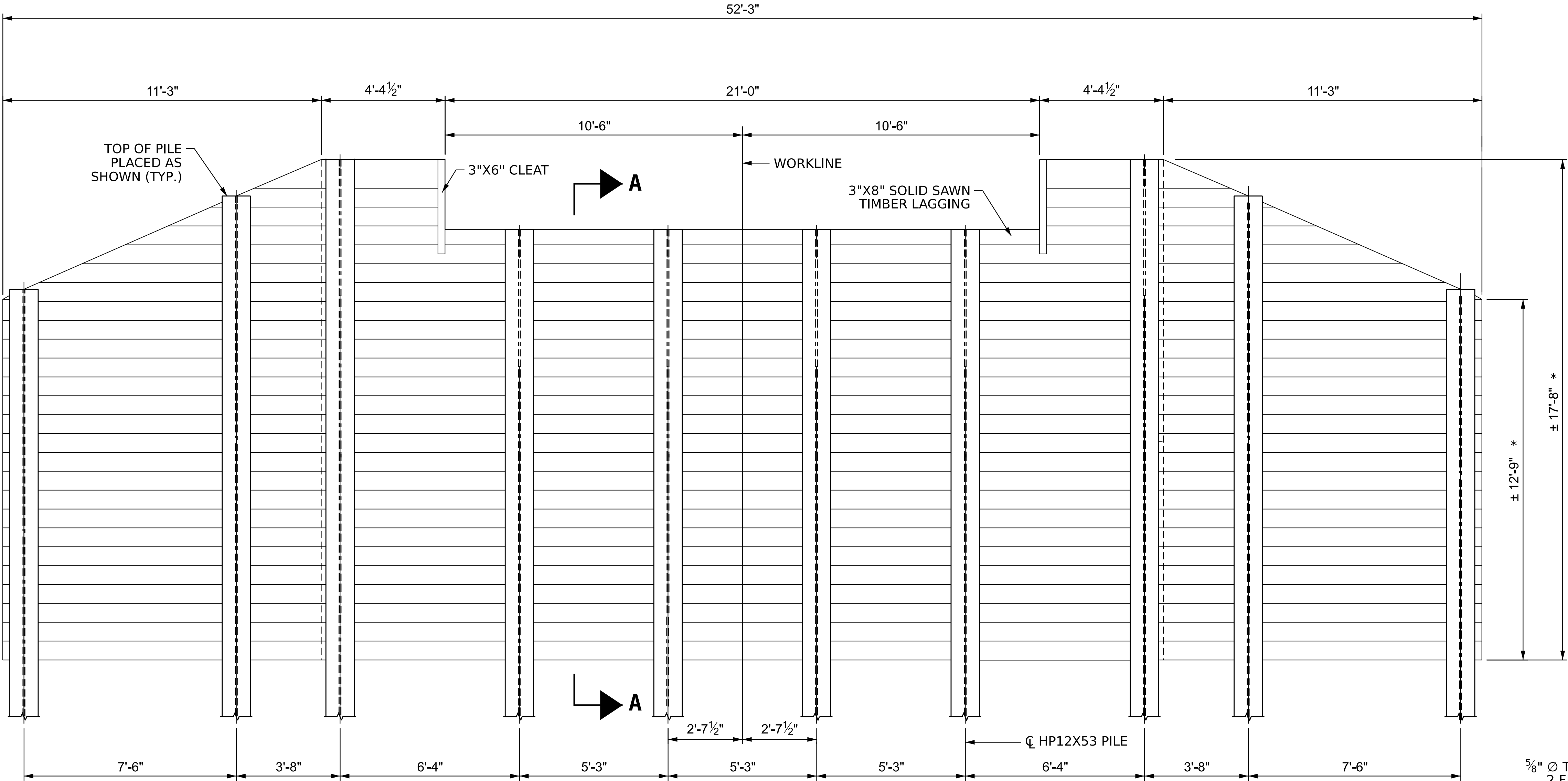
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-11
2			4			
TOTAL SHEETS						12

DESIGNED BY:	E.REIMER	DATE :	FEB 2026
DRAWN BY:	E.REIMER	DATE :	FEB 2026
CHECKED BY:	T.DUDECK	DATE :	FEB 2026
DESIGN ENGINEER OF RECORD:	T.DUDECK	DATE :	AUG 2026



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END BENT 2 ELEVATION
(LOOKING AHEAD)

NOTES:

FOR TIMBER MEMBERS, ALL TIMBER AND LUMBER SHALL BE AWPA CATEGORY UC4C TREATED NO. 1 SOUTHERN PINE OR APPROVED EQUIVALENT.

ALL TIMBER AND LUMBER IS REQUIRED TO BE TREATED WITH A PRESERVATIVE TREATMENT IN ACCORDANCE WITH AASHTO M 133 OR AWPA STANDARDS U1, SECTION 4, TABLE 1.

PRESERVATIVE TREATED WOOD PRODUCTS WILL NOT BE ACCEPTED FOR USE UNLESS THEY HAVE BEEN INSPECTED AND FOUND SATISFACTORY, BOTH BEFORE AND AFTER TREATMENT IS PROVIDED.

LUMBER FOR BRIDGES OR FENDER SYSTEMS THAT IS 2 INCHES TO 4 INCHES THICK AND 6 INCHES WIDE OR WIDER SHALL CONFRM TO STRUCTURAL JOISTS AND PLANS, GRADE NO. 1 DENSE.

THE CONTRACTOR SHALL USE 5" LONG EXTERIOR WOOD SCREWS TO CONNECT THE 3"X 8" TIMBER LAGGING TO THE 3"X 10" NAILER.

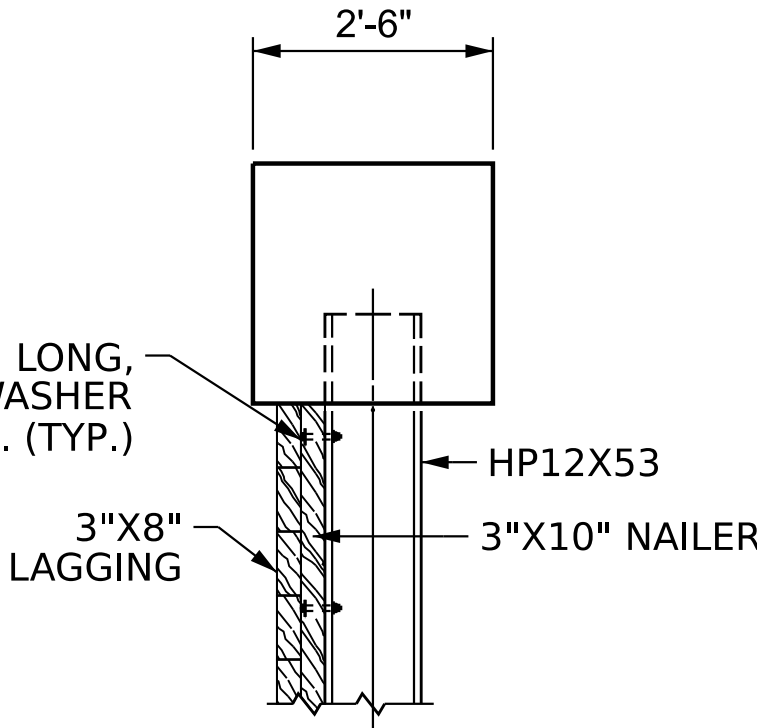
HARDWARE IS CONSIDERED INCIDENTAL TO THE COST OF THE WALL

STEEL H-PILES SHALL MEET ASTM A572 GRADE 50 OR ASTM A588.

* TIMBER PLACED AS SHOWN TO RETAIN EARTH EMBANKEMENT.

BILL OF MATERIAL
END BENT 2
SOLIDER PILE WALL
WITH TIMBER LAGGING

ITEM	SQ. FT.
SOLIDER PILE WALL WITH TIMBER LAGGING	817.6
TOTAL SOLIDER PILE WALL WITH TIMBER LAGGING	817.6 SQ. FT.



SECTION A-A

PROJECT ID. 011-01-9a58c

BUNCOMBE COUNTY

STATION: 10+65.00 -DR1-

SHEET 3 OF 3

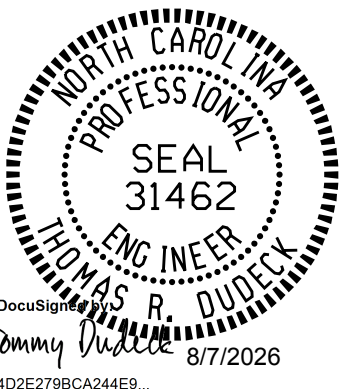
NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

SUBSTRUCTURE
END BENT 2
SOLIDER PILE WALL
WITH TIMBER LAGGING

DESIGNED BY:	E.REIMER	DATE :	FEB 2026
DRAWN BY:	E.REIMER	DATE :	FEB 2026
CHECKED BY:	T.DUDECK	DATE :	FEB 2026
DESIGN ENGINEER OF RECORD:	T.DUDECK	DATE :	AUG 2026



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-12
2			4			
TOTAL SHEETS						12

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	HS-20
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
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 2024 "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 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.

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".

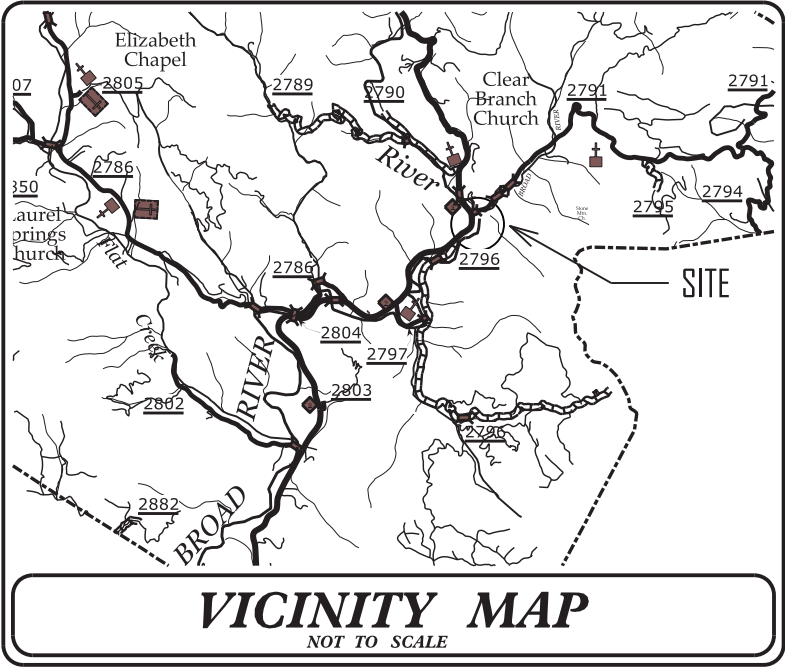
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST ⅝₁₆" IN THICKNESS AND DO NOT EXCEED 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 ⅛₁₆" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE NCDOT SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE NCDOT SPECIFICATIONS ARTICLE 105-4.

11/14/23

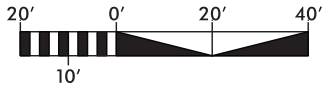
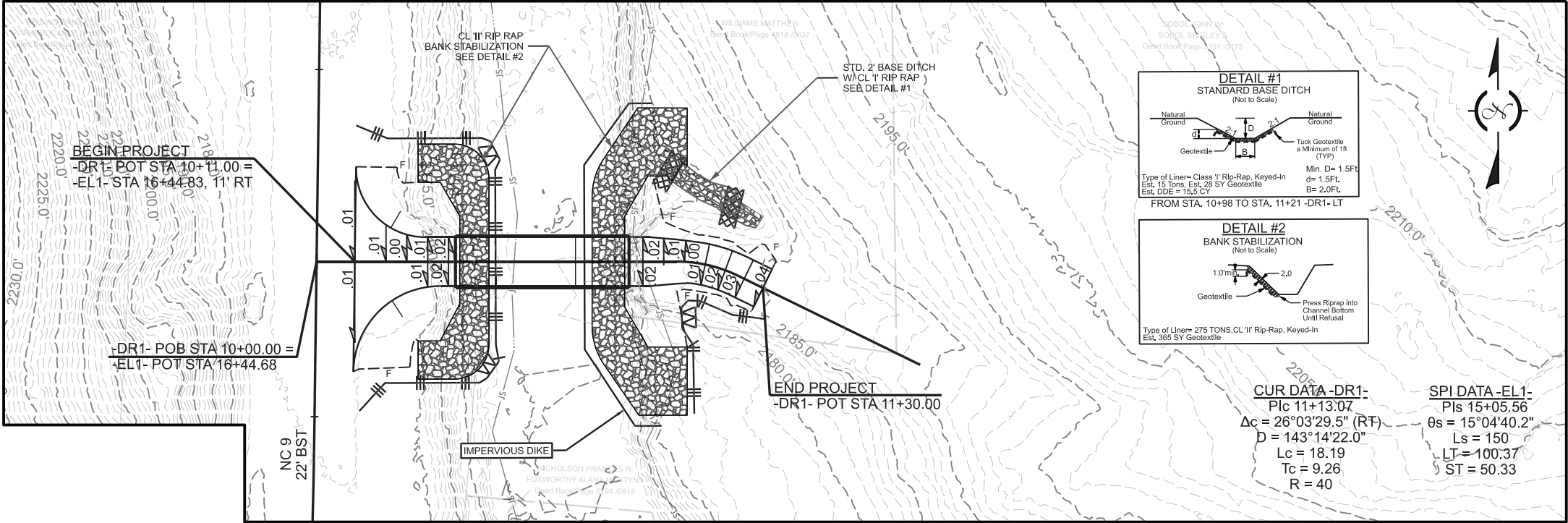


SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HOW) 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 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HOW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HOW ZONES

EROSION & SEDIMENT CONTROL LEGEND

- Temporary Silt Fence.....
- Temporary Rock Silt Check Type A
- Impervious Dike.....
- Special Sediment Control Fence.....



011-01-9a58c

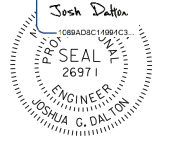
ECOI/CONST.04

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY



HYDRAULICS
ENGINEER

Signed by:



11/25/2025

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.



REVISIONS

**STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.**

**ENGLISH STANDARD DRAWING FOR
TEMPORARY SILT FENCE**

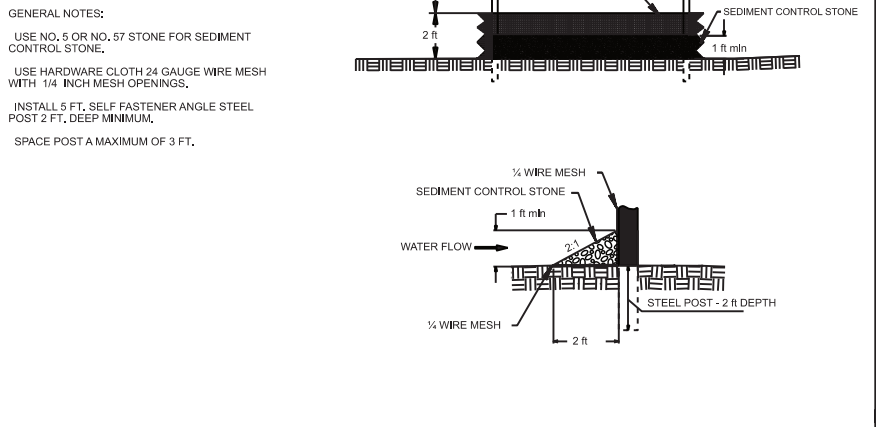
NOTES

- USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
- USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRE AS DIRECTED BY THE ENGINEER.
- PROVIDE 5'-0" STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.

Diagram Labels:

- 8" MAX. WITH WIRE (6" MAX. WITHOUT WIRE)
- MIDDLE AND VERTICAL WIRES SHALL BE 12" GAUGE MIN.
- TOP AND BOTTOM STRAND SHALL BE 10 GAUGE MIN.
- WIRE
- FILTER FABRIC
- EXTENSION OF FABRIC AND WIRE INTO TRENCH
- 8"
- 4"
- STEEL POST - 2'-0" DEPTH
- FILTER FABRIC
- COMPACTED FILL

1605.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH STANDARD DRAWING FOR SPECIAL SEDIMENT CONTROL FENCE	 GENERAL NOTES: - USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE. - USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH 1/4" INCH MESH OPENINGS. - INSTALL 5 FT. SELF FASTENER ANGLE STEEL POST 2 FT. DEEP MINIMUM. - SPACE POST A MAXIMUM OF 3 FT. Diagram labels: VARIABLE DIMENSION, 3 ft, 1/4 WIRE MESH, SEDIMENT CONTROL STONE, 1 ft min, 2 ft.	 Diagram labels: 1/4 WIRE MESH, SEDIMENT CONTROL STONE, 1 ft min, WATER FLOW, 2 ft, 1/4 WIRE MESH, STEEL POST - 2 FT DEPTH.	STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH STANDARD DRAWING FOR SPECIAL SEDIMENT CONTROL FENCE SHEET OF 1 1606.01
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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH STANDARD DRAWING FOR TEMPORARY ROCK SILT CHECK TYPE 'A'	PLAN SECTION A-A SECTION B-B NOTE USE CLASS 'B' EROSION CONTROL STONE FOR STRUCTURAL STONE. USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE. STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH STANDARD DRAWING FOR TEMPORARY ROCK SILT CHECK TYPE 'A'
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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.
ENGLISH STANDARD DRAWING FOR SPECIAL STILLING BASIN	Note: Provide Stabilized Outlet to Streambank Not To Scale	ENGLISH STANDARD DRAWING FOR SPECIAL STILLING BASIN
SHEET 502-1 1630.06	SHEET 502-1 1630.06	SHEET 502-1 1630.06

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH STANDARD DRAWING FOR GRAVEL CONSTRUCTION ENTRANCE	STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
	1607.01	

NOTES:

1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS.
2. LOCATE ENTRANCE(S) TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. LOCATE GRAVEL CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE.
6. NUMBER AND LOCATION OF CONSTRUCTION ENTRANCES TO BE DETERMINED BY THE ENGINEER.
7. USE CLASS "A" STONE OR OTHER COARSE AGGREGATE APPROVED BY THE ENGINEER.

NOTE: PLACE FILTER FABRIC BENEATH STONE

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER

10'-0" MIN.

10'-0" MIN.

SANDBAGS (TYP.) OR STAPLES

A

PLAN

1:1 SIDE SLOPE

10 ML PLASTIC LINING

SANDBAGS (TYP.) OR STAPLES

SECTION A-A

NOTES:

1. OPTIMAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LINER AND/OR SOIL REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3. CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARLY MARKED WITH SKIDAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE

HIGH COHESIVE & LOW FILTRATION SOIL BERM

10'-0" MIN.

10'-0" MIN.

SANDBAGS (TYP.) OR STAPLES

B

PLAN

1:1 SIDE SLOPE

10 ML PLASTIC LINING

SANDBAGS (TYP.) OR STAPLES

HIGH COHESIVE & LOW FILTRATION SOIL BERM

SECTION B-B

NOTES:

1. OPTIMAL LOCATION DETERMINED IN FIELD

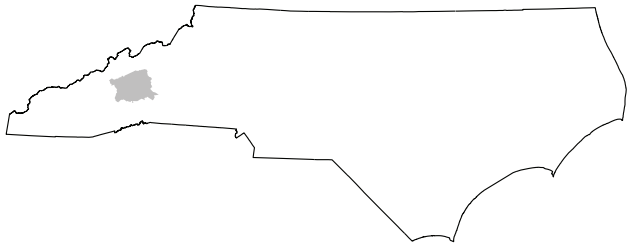
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LINER AND/OR SOIL REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3. CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARLY MARKED WITH SKIDAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

011-01-9a58c	
EC02	
NORTH CAROLINA EMERGENCY MANAGEMENT BUNCOMBE COUNTY	
	
HYDRAULICS ENGINEER	
Signed by: 	
(C)BADA08C14091C3 	
11/25/2025	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SUNGATE DESIGN GROUP, P.A.	
 901 JOHN F. PRINCE LANE ROAD FOLLYBUSH NORTH CAROLINA 27018 TEL: 719-778-7000 FAX: 719-778-7001	

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY



PRIVATE DRIVEWAY OVER BROAD RIVER, INTERSECTING
NC 9 ROUGHLY 340'+/- SOUTH OF OLD FORT RD

PHASING

STEP 1
USING NCDOT RSD 1101.01, SHEET 3, INSTALL WORK ZONE ADVANCE
WARNING SIGNS ON NC 9.

USING NCDOT RSD 1101.03, SHEET 3, PLACE TYPE 3 BARRICADES ON
EACH APPROACH OF THE EXISTING BRIDGE CLOSING ALL ACCESS TO
BRIDGE.

STEP 2
AWAY FROM TRAFFIC, REMOVE ALL REMAINING POTIONS OF EXISTING
BRIDGE UNNECESSARY FOR RECONSTRUCTION.

STEP 3
AWAY FROM TRAFFIC CONSTRUCT PROPOSED BRIDGE.

STEP 4
USING NCDOT RSD 1101.02, SHEET 1, CONSTRUCT PROPOSED APPROACHES

STEP 5
REMOVE ALL TRAFFIC CONTROL DEVICES AND ALLOW TRAFFIC ON NEWLY
CONSTRUCTED BRIDGE AND APPROACHES

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.

LANE AND SHOULDER CLOSURE REQUIREMENTS

- A) 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.
- B) 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.
- C) 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.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF
TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING
TO THE TRANSPORTATION MANAGEMENT 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.

TRAFFIC CONTROL DEVICES

- E) WHEN LANE CLOSURES ARE NOT IN EFFECT, SPACE CHANNELIZING DEVICES
IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT
(MPH), 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.
- F) PLACE TYPE III BARRICADES WITH "ROAD CLOSED" SIGN R11-2 ATTACHED,
OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.
- G) PLACE ADDITIONAL SETS OF THREE CHANNELIZING DEVICES (DRUMS, CONES
OR SKINNY DRUMS) PERPENDICULAR TO THE EDGE OF TRAVELWAY ON (XXX FT)
CENTERS WHEN UNOPENED LANES ARE CLOSED TO TRAFFIC.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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PLANS PREPARED BY:

JAY WOOLARD, PE
SENIOR TRANSPORTATION ENGINEER

DONNIE RICHARDSON
SENIOR TRANSPORTATION DESIGNER

PROJECT : 011 - 01 - 09a58c

SHEET NO.
TMP-1

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DGN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$



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Wilmington, NC 28405
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Fax: (910) 452-7563
www.catlinusa.com

October 31, 2025

MEMORANDUM TO: Wanda H. Payne, PE
Senior PM – Transportation
STANTEC

FROM: Yinhui Liu, PhD, PE
Senior Geotechnical Engineer
CATLIN Engineers and Scientists

COUNTY: Buncombe

DESCRIPTION: Private Driveway Bridge at 2511 NC Hwy. 9, Black Mountain, NC

SUBJECT: Preliminary Bridge Foundation Recommendations

Richard Catlin and Associates (DBA: CATLIN Engineers and Scientists) (CATLIN) has completed the subsurface investigation at the end bents of the proposed bridge and presents the following recommendations:

The proposed work consists of constructing a private driveway bridge at 2155 NC Hwy 9 Black Mountain, NC.

The subsurface soils present beneath the proposed end bent locations consist of embankment fill, residual soils, and alluvial soils consisting of silty sand (A-2-4) and sandy silt (A-4). Underlying these surficial soils, low grade metamorphic (schist) basement rock was encountered at elevation 2,167.9 feet above sea level at End Bent 1 and 2,157.5 feet above sea level at End Bent 2. A thick interval of colluvial deposits comprised of boulders, cobbles, and weathered rock was identified between elevations 2,170.9 and 2,159.2 feet above sea level at End Bent 2.

The replacement bridge is proposed as a 52’ 6” x 14’ 1”, timber framed structure with 8” timber decking supported by steel I-beams.

Considering the subgrade conditions present at the project site and the proposed replacement structure, if the bents are fully supported, CATLIN recommends driven steel HP 12×53 piles at each end bent. They should be driven to a depth of two (2) feet into weathered rock or to driving refusal. Driving refusal is defined as 120 blows per foot, utilizing a hammer with an equivalent rated energy in the range of 40 to 60 kips-ft.

The HP 12×53 piles sitting on bedrock or 2 feet into weathered rock will have a factored resistance of 90 kips per pile.

If the end bents are partially supported, CATLIN recommends drilled-in pile foundations. The drilled-in piles should be embedded at least five (5) feet into the bedrock or weathered rock to provide resistance to lateral loading.

	Foundation Type	Factored Resistance
Fully Supported End Bents	Driven HP 12×53 Piles	90 kips
Partially Supported End Bents	Drilled-In HP 12×53 Piles	150 kips

Prepared By:



Signed by:
Yinhui Liu
673A8A76BCF14BE...
10/31/2025

Yinhui Liu, Ph.D., P.E.
CATLIN Senior Geotechnical Engineer

Attachments: SPT and Rock Core Logs

225226	CATLIN Engineers and Scientists	<i>PROJECT REFERENCE</i>	<i>SHEET</i>
		225226	1

WBS: N/A			TIP: N/A			COUNTY: BUNCOMBE			GEOLOGIST: A. Jensen																				
SITE DESCRIPTION: NCEM Private Driveway Bridge at 2511 NC Hwy. 9, Black Mountain, NC											GROUND WTR (ft)																		
BORING NO.: EB-2			STATION: 10+90			OFFSET: N/A			ALIGNMENT: DR1			0 HR. 14.2																	
COLLAR ELEV.: 2,185.0 ft			TOTAL DEPTH: 27.5 ft			NORTHING: 660,910			EASTING: 1,033,541			24 HR. FIAD																	
DRILL RIG/HAMMER EFF./DATE: CAT CME45C 90.4% 3/17/25							DRILL METHOD: HSA w/SPT and Core			HAMMER TYPE: AUTOMATIC																			
DRILLER: T. Jason White			START DATE: 10/07/25			COMP. DATE: 10/07/25			SURFACE WATER DEPTH: N/A																				
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. #	LOG	SOIL AND ROCK DESCRIPTION																
			0.5ft	0.5ft	0.5ft	0	25	50	75	100	RESULT			MOI															
2185	2,185.0	0.0	5	7	6	13						M		2,185.0	GROUND SURFACE		0.0												
	2,183.0	2.0	9	3	4									7						M									
2,181.0	4.0	7	9	9	18						D		2,181.0									ARTIFICIAL FILL		4.0					
2180	2,179.0	6.0	4	3									4	7						M		2,179.0	ARTIFICIAL FILL		6.0				
	2,177.0	8.0	3	5	6	11							SS-2 A-2-4									22%							
2175																													
	2,171.5	13.5	60/0.1										M		2,171.5	WEATHERED ROCK	13.5												
2170	2,170.9	14.1													60/0.0												2,170.9	COLLUVIAL	14.1
2165																													
2160																													
	2,159.2	25.8	34	60/0.0									M		2,159.2	WEATHERED ROCK	25.8												
	2,157.5	27.5	60/0.0										M		2,157.5		27.5												
															SPT terminated WITH SPT REFUSAL at Elevation 2,157.5 ft On Crystalline Rock														

225226 **CATLIN**
Engineers and Scientists

SHEET

2