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

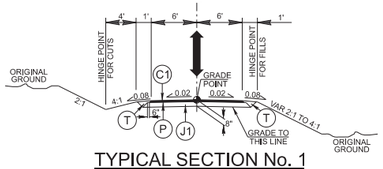
11/14/23

PAVEMENT SCHEDULE
(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH
J1	PROP. 6" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
T	EARTH MATERIAL

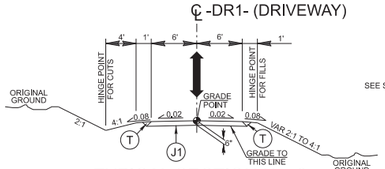
NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

℄ -DR1- (DRIVEWAY)



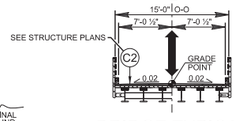
TYPICAL SECTION No. 1
FROM -DR1- STA. 10+11.00 TO STA. 10+38.75 (BEGIN BRIDGE)

℄ -DR1- (DRIVEWAY)

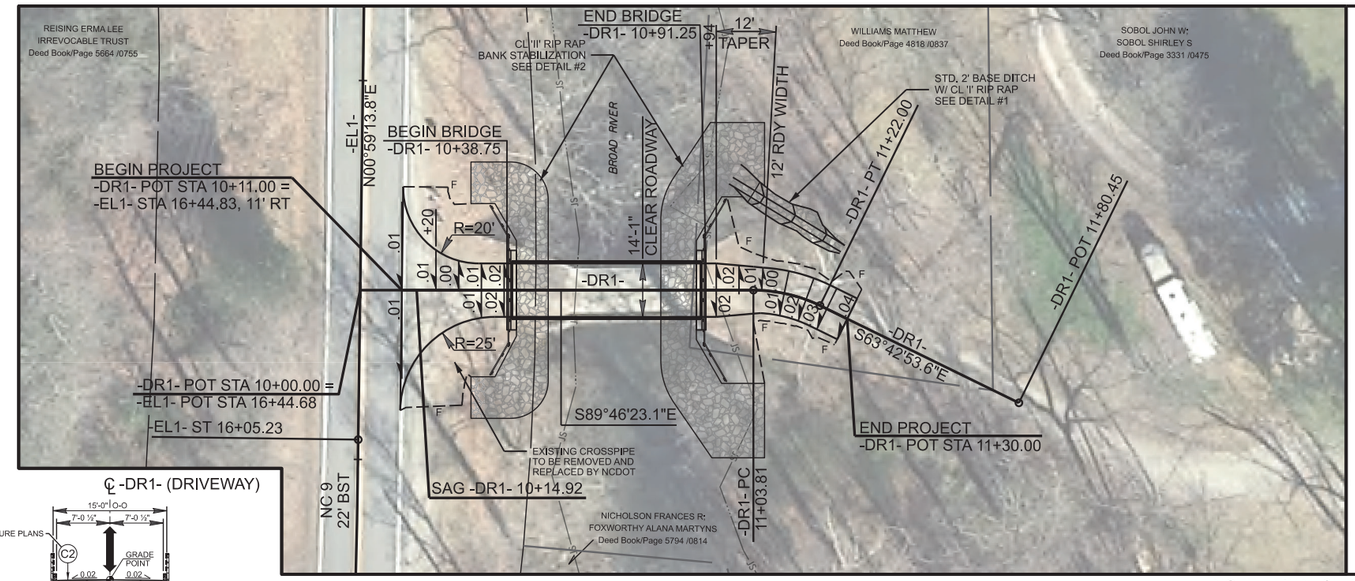


TYPICAL SECTION No. 2
FROM -DR1- STA. 10+91.25 (END BRIDGE) TO STA. 11+30.00

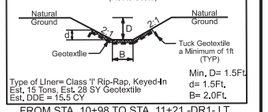
℄ -DR1- (DRIVEWAY)



BRIDGE TYPICAL
FROM -DR1- STA. 10+38.75 TO STA. 10+91.25



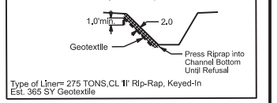
DETAIL #1
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap, Keyed-In
Est. 15 Tons, Est. 28 SY Geotextile
Est. DDE = 15.5 CY

FROM STA. 10+98 TO STA. 11+21 -DR1- LT

DETAIL #2
BANK STABILIZATION
(Not to Scale)



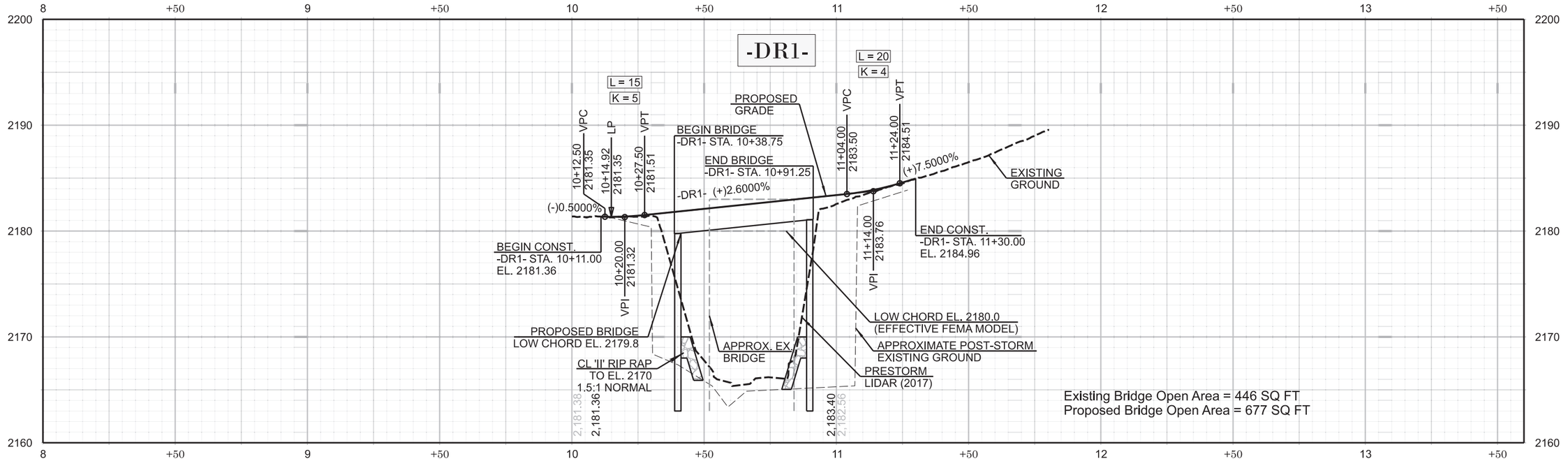
Type of Liner= 275 TONS,CL 'I' Rip-Rap, Keyed-In
Est. 365 SY Geotextile

CUR DATA -DR1-
PIc 11+13.07
Δc = 26°03'29.5" (RT)
D = 143°14'22.0"
Lc = 18.19
Tc = 9.26
R = 40

SPI DATA -EL1-
PIs 15+05.56
θs = 15°04'40.2"
Ls = 150
LT = 100.37
ST = 50.33

NOTE: FINAL SURVEYS WERE NOT PROVIDED. LIDAR DATED 2017 AND AERIALS DATED 2023 WERE USED FOR DESIGN.

NO HYDRAULIC MODELING OR THEORETICAL SCOUR ANALYSIS WERE PERFORMED IN THE DESIGN OF THE PROPOSED STRUCTURE.



011-01-9a58c
04

NORTH CAROLINA EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

ROADWAY DESIGN ENGINEER
11/24/2025
NORTH CAROLINA PROFESSIONAL SEAL 043139 ENGINEER HOLLY E. CHRISTENBURY
Signed by: Holly E. Christenbury
HOLLY E. CHRISTENBURY

HYDRAULICS ENGINEER
11/25/2025
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON
Signed by: Joshua G. Dalton
JOSHUA G. DALTON

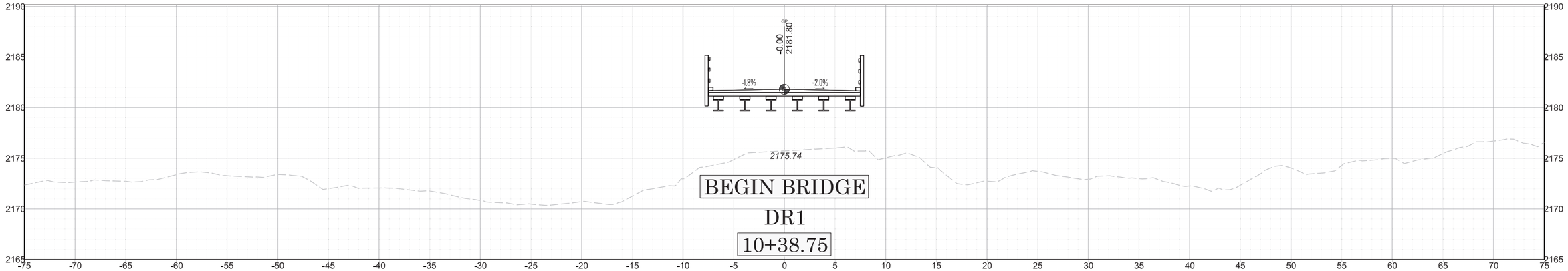
UNLESS ALL SIGNATURES COMPLETED

ROADWAY DESIGN PREPARED BY
VIAS INFRASTRUCTURE
220 HORIZON DRIVE, SUITE 117
RALEIGH, NC 27615
PHONE (727) 214-7698
LICENCE NO P-2673
WWW.VIASINFRASTRUCTURE.COM

HYDRAULIC DESIGN PREPARED BY
SUNGATE DESIGN GROUP, P.A.
930 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL: (919) 859-2243
ENGINEERING LICENSE NO. C-0460

REVISIONS

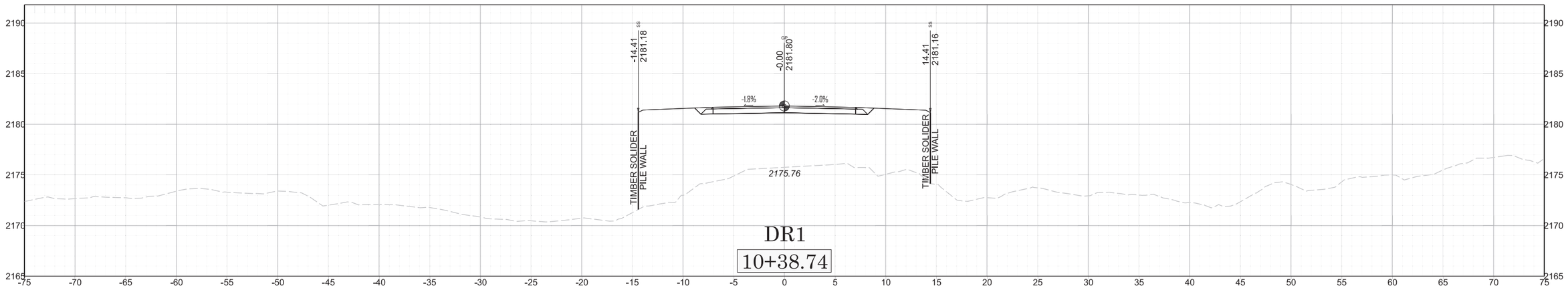
Final surveys were not provided. LIDAR dated 2017 was used for design.



BEGIN BRIDGE

DR1

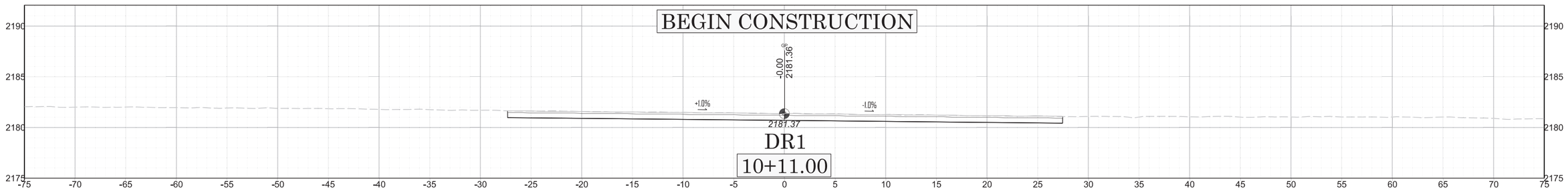
10+38.75



DR1

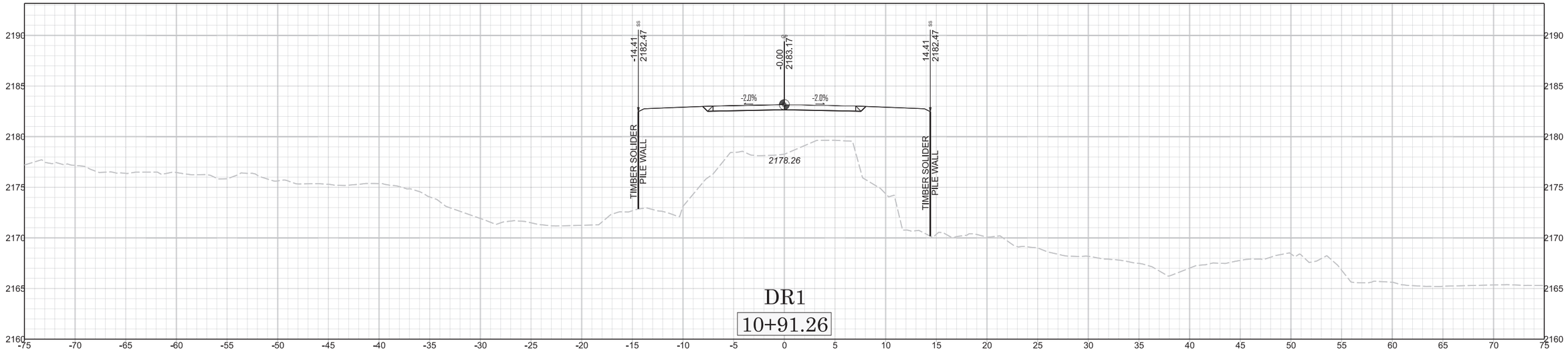
10+38.74

BEGIN CONSTRUCTION



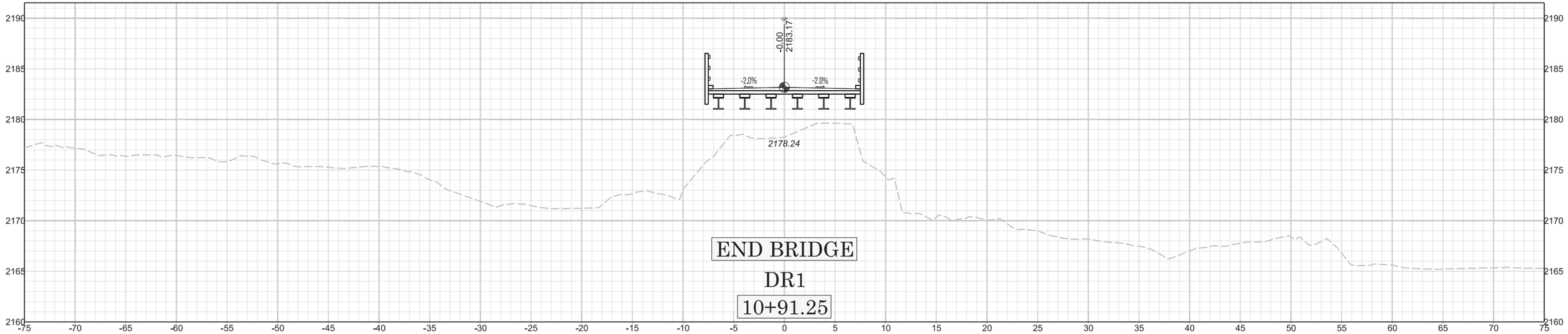
DR1

10+11.00



DR1

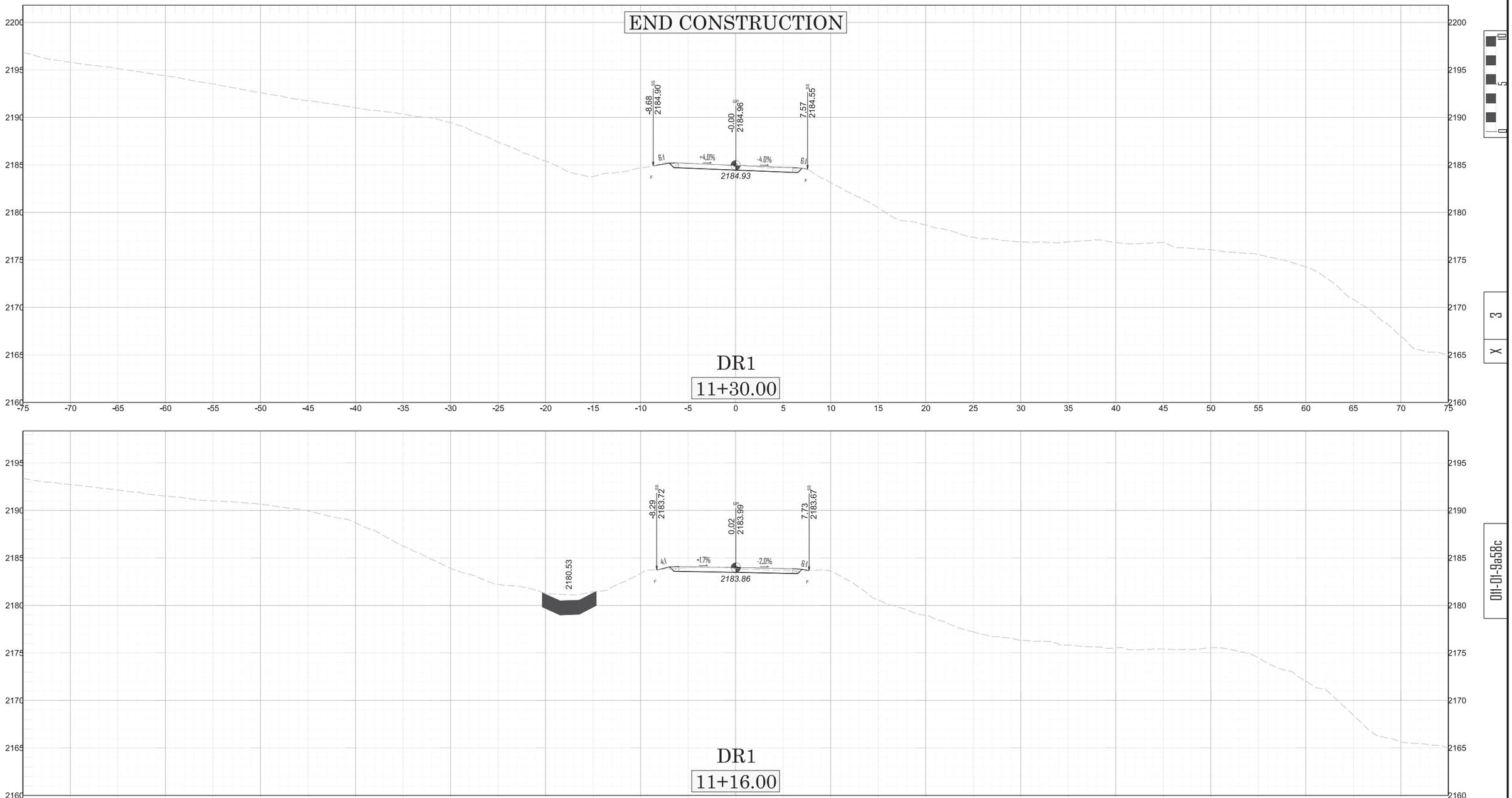
10+91.26



END BRIDGE

DR1

10+91.25



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

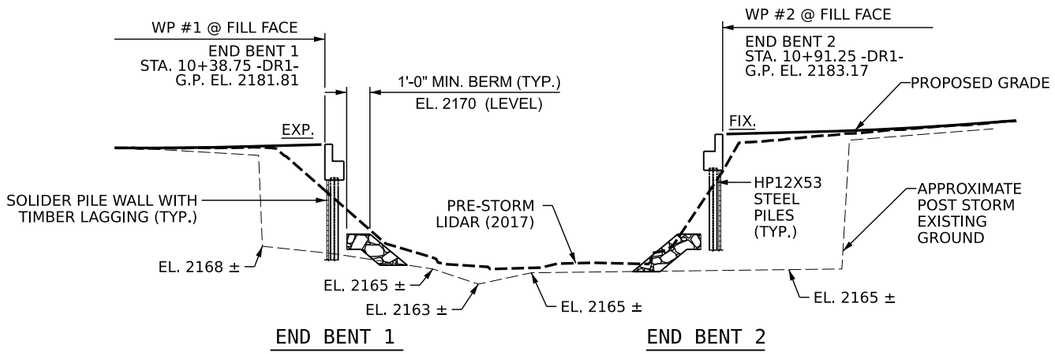
(+)2.6000% (+)7.5000%

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

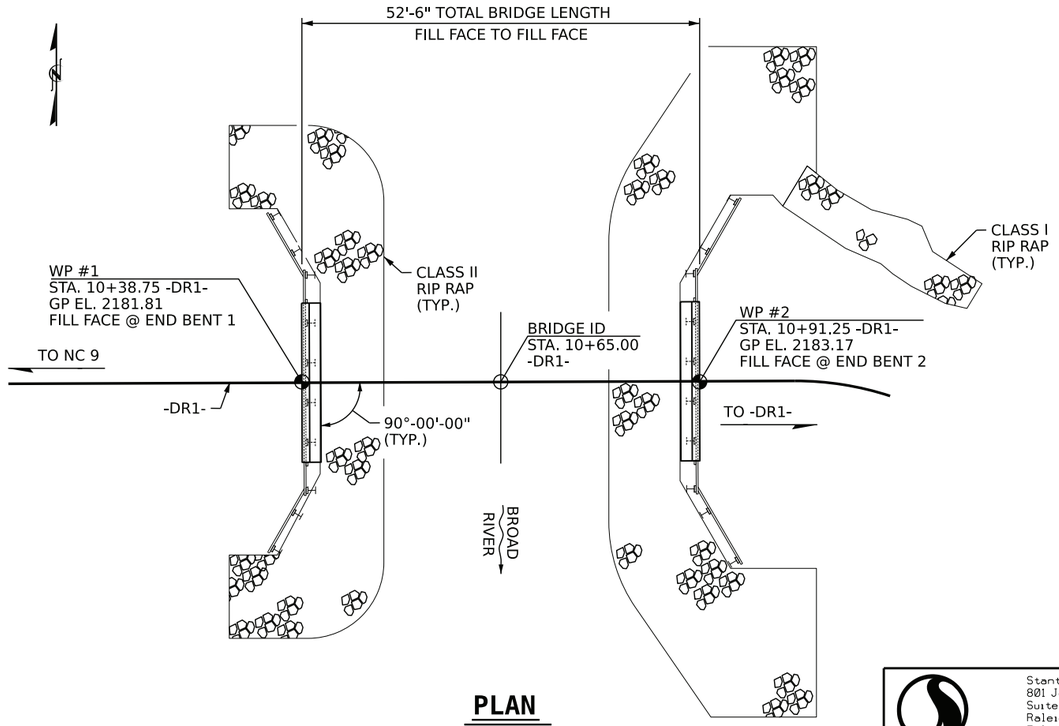
GRADE DATA ℄ -DR1-

GRADE DATA ℄ -DR1-

2210
2200
2190
2180
2170
2160



SECTION ALONG ℄ -DR1-



PLAN

HORIZONTAL CURVE -DR1-
PI STA.= 11+13.07
Δ = 26° 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 :	FEB 2026

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Fax. (919) 851-7024
www.stantec.com
License No. F-0672

NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY ALAN DUDECK
DocuSigned by: Tommy Dudeck 2/12/2026

PROJECT ID. 011-01-9a58c
BUNCOMBE COUNTY
STATION: 10+65.00 -DR1-
SHEET 1 OF 3

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

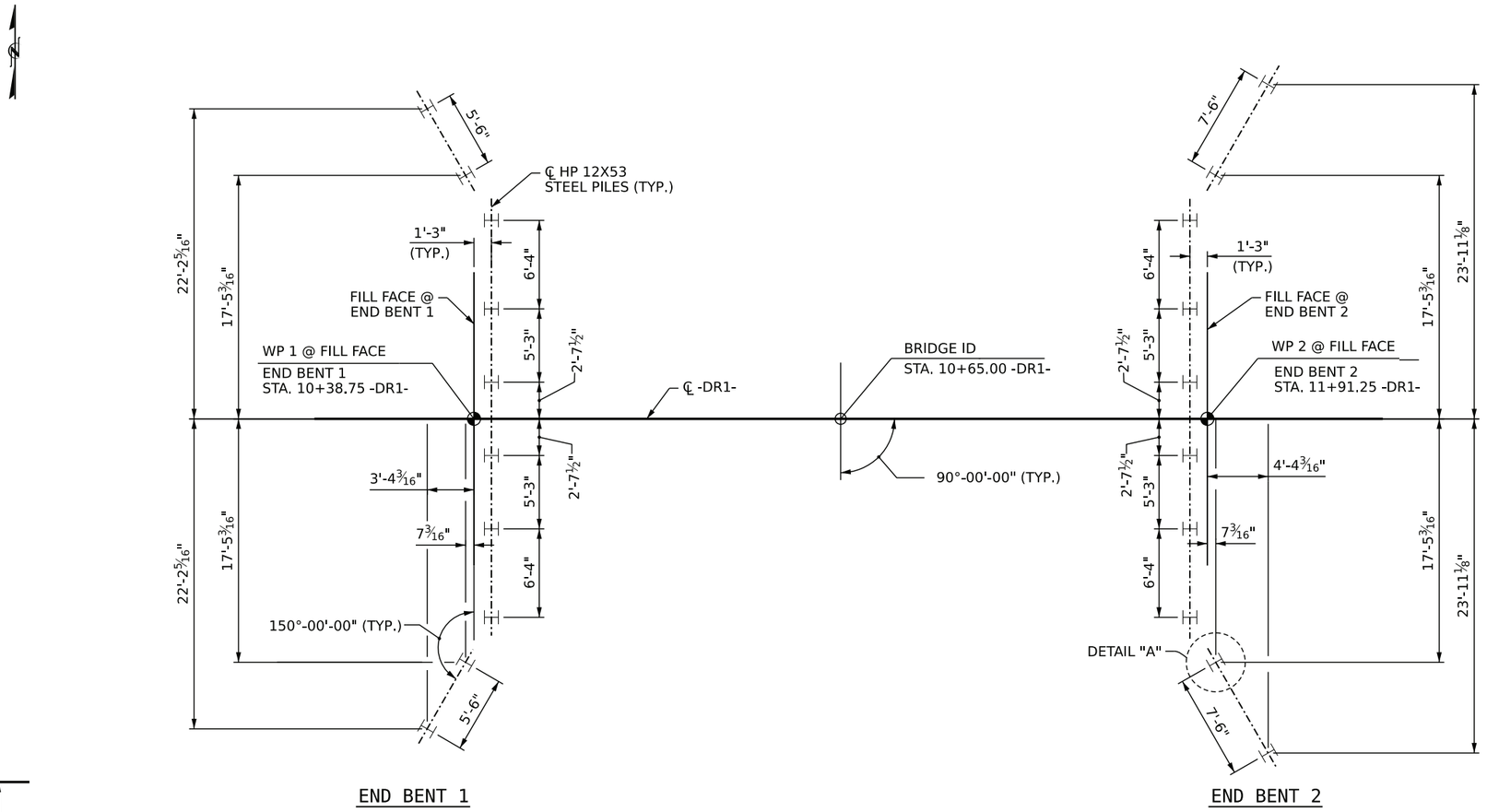
GENERAL DRAWING
PLAN AND ELEVATION

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

NOTES

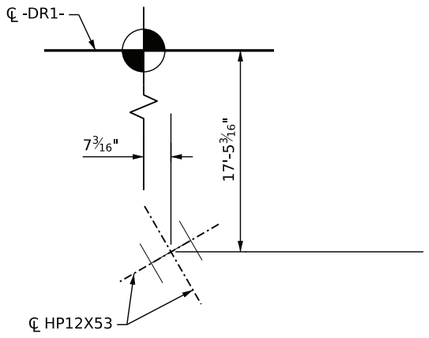
DRILLED IN PILES SHOULD BE EMBEDDED A MINIMUM OF 5 FEET IN BEDROCK OR WEATHERING ROCK TO RESIST LATERAL LOADS.

DRILLED-IN HP12X53 PILES FACTORED RESISTANCE = 150 KIPS



END BENT 1

END BENT 2



DETAIL A

WINGWALL SOLIDER PILE ORIENTATION
(OTHERS SIMILAR)

FOUNDATION LAYOUT

NOTE: ALL DIMENSIONS TAKEN TO THE ℄ OF PILE

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 :	FEB 2026

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NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY A. DUDECK

DocuSigned by: Tommy Dudeck 2/12/2026

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

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.

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	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	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	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-

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			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 : FEB 2026

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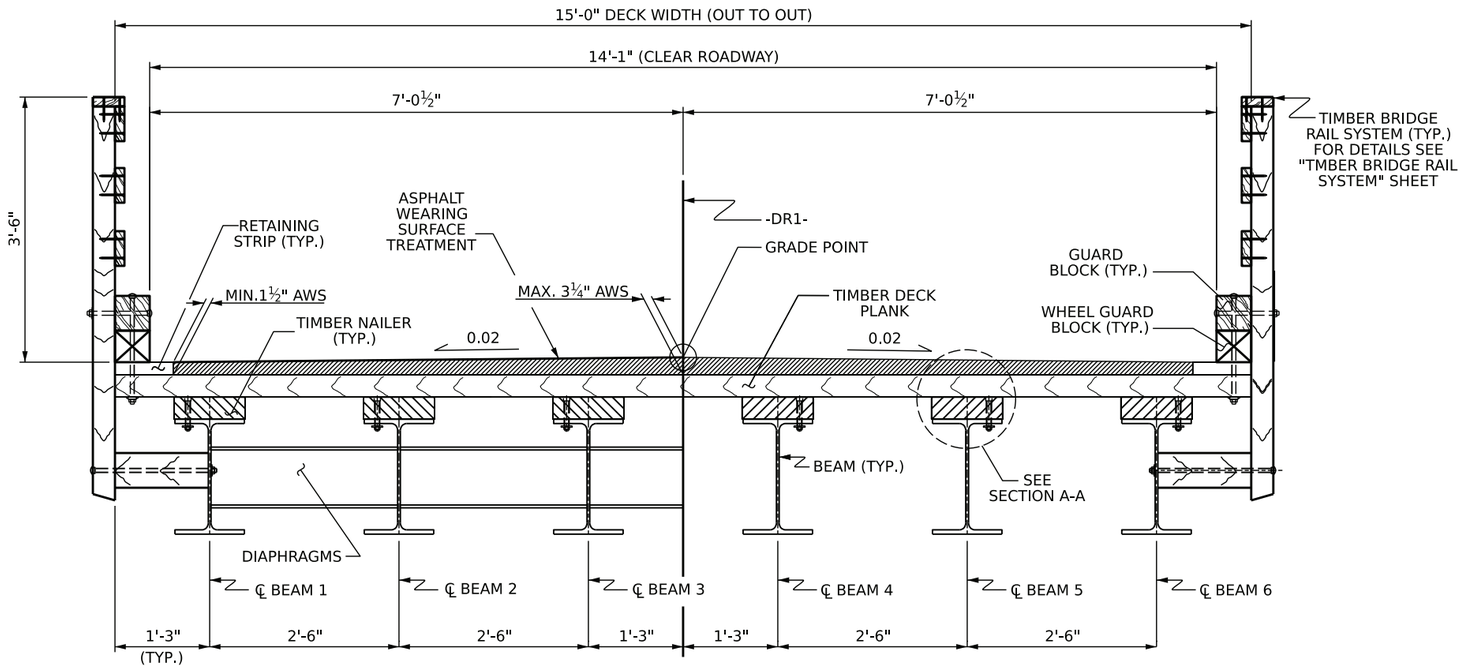
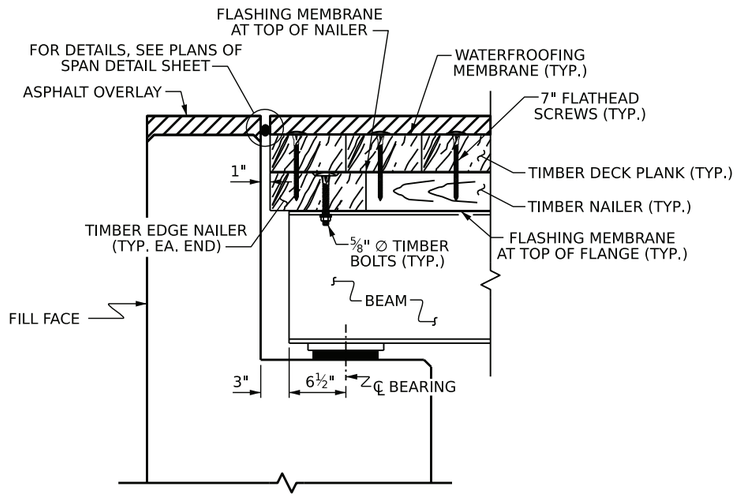
License No. F-0672

NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY ALAN DUDECK

DocuSigned by: Tommy Dudeck 2/12/2026



TYPICAL SECTION



SECTION AT ABUTMENT

NOTES

FOR TIMBER BRIDGE DECK SYSTEM DETAILS, SEE PLAN OF SPAN.

PRIOR TO PLACING TIMBER BEAM NAILER AND EDGE NAILER MEMBERS, PLACE A FLASHING MEMBRANE ON THE TOP SIDE OF THE STEEL BEAMS.

PRIOR TO PLACING TIMBER PLANK MEMBERS, PLACE A SELF-ADHERING FLASHING MEMBRANE ON THE TOP SIDE OF THE TIMBER NAILERS.

FOR BEAM AND DIAPHRAGM DETAILS, SEE FRAMING PLAN SHEET.

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

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 :	FEB 2026

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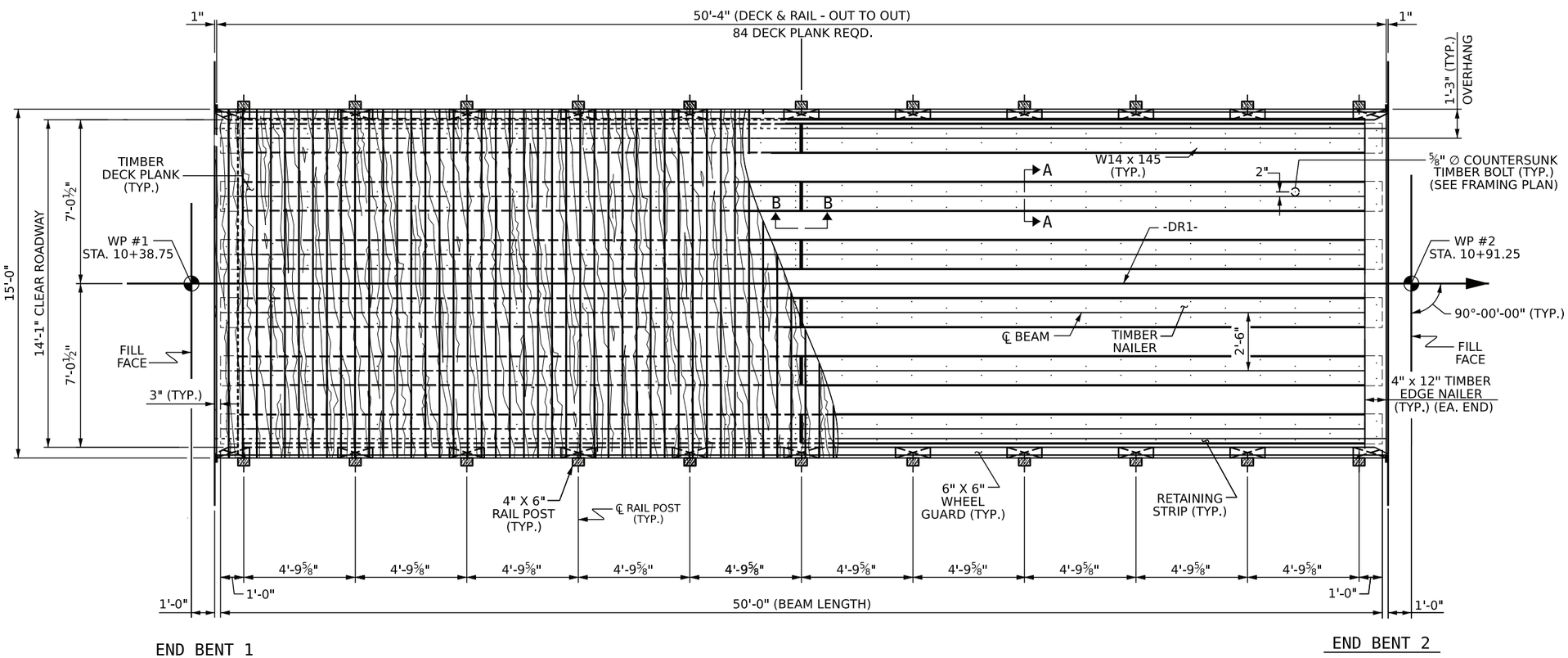
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER THOMAS DUDECK
DocuSigned by: Tommy Dudeck 2/12/2026

PROJECT ID. 011-01-9a58c
BUNCOMBE COUNTY
STATION: 10+65.00 -DR1-
SHEET 1 OF 1

NORTH CAROLINA EMERGENCY MANAGEMENT
BUNCOMBE COUNTY
STANDARD
SUPERSTRUCTURE
TYPICAL SECTION

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



DECK LAYOUT

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.

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

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 :	FEB 2026

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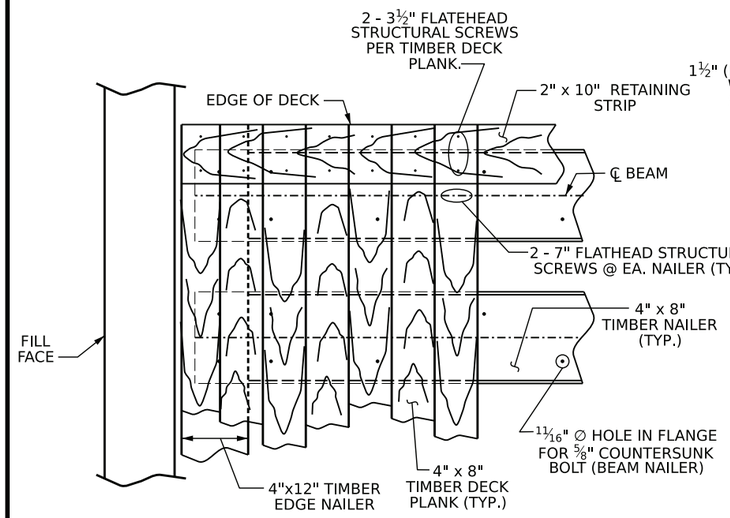
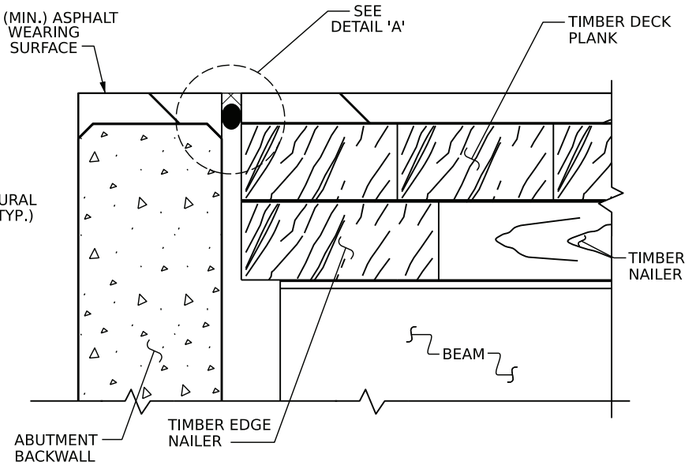
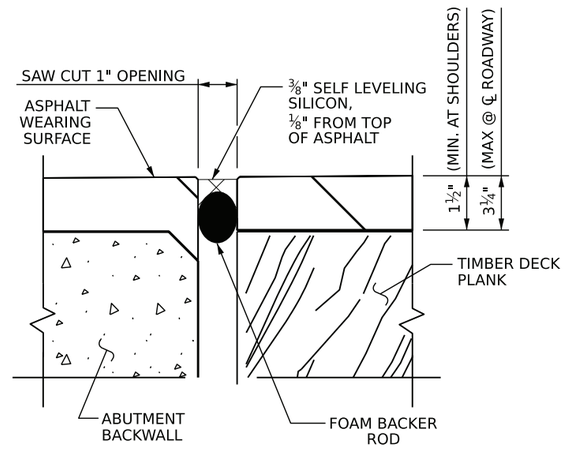
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER THOMAS DUDECK
DocuSigned by: Tommy Dudeck 1/12/2026



TYPICAL DECK DETAIL AT ABUTMENT



PROPOSED POURABLE SILICONE JOINT DETAIL



DETAIL 'A'

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" ∅ 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

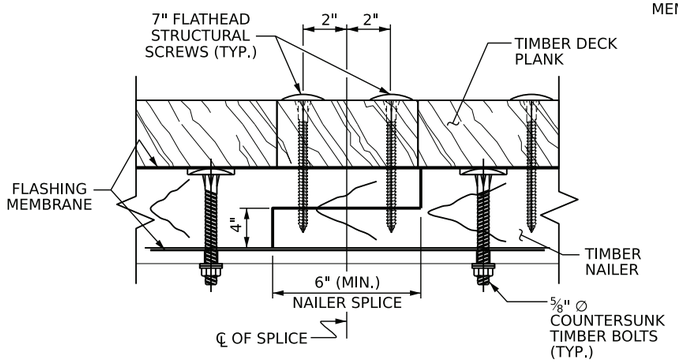
	SIZE	LIN. FT.
22 GA. ALUMINUM DRIP EDGE	1'-0"	50.50

JOINT

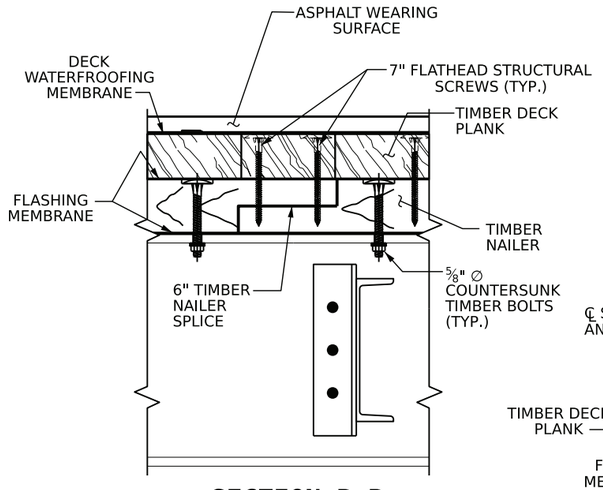
	LIN. FT.
POURABLE SILICONE JOINT	30.0

NOTE

FOR POURABLE SILICONE JOINT SEALS, SEE SPECIAL PROVISIONS.

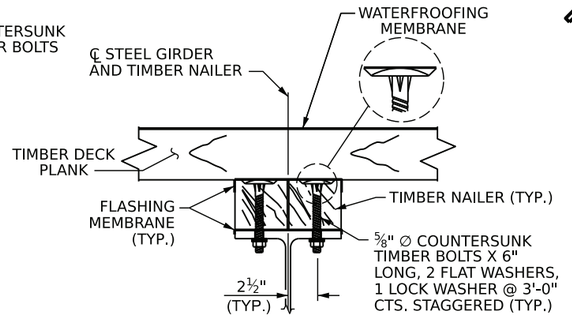


NAILER SPLICE DETAILS



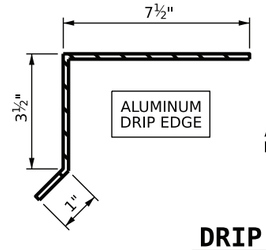
SECTION B-B

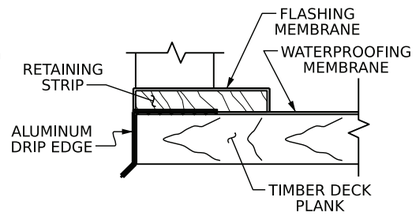
NAILER SPLICE & TIMBER PLANK ATTACHMENT DETAILS



SECTION A-A

DOUBLE TIMBER NAILER ATTACHMENT DETAILS





DRIP EDGDE DETAILS

POST AND BOLTS NOT SHOWN FOR CLARITY

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			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 :	FEB 2026

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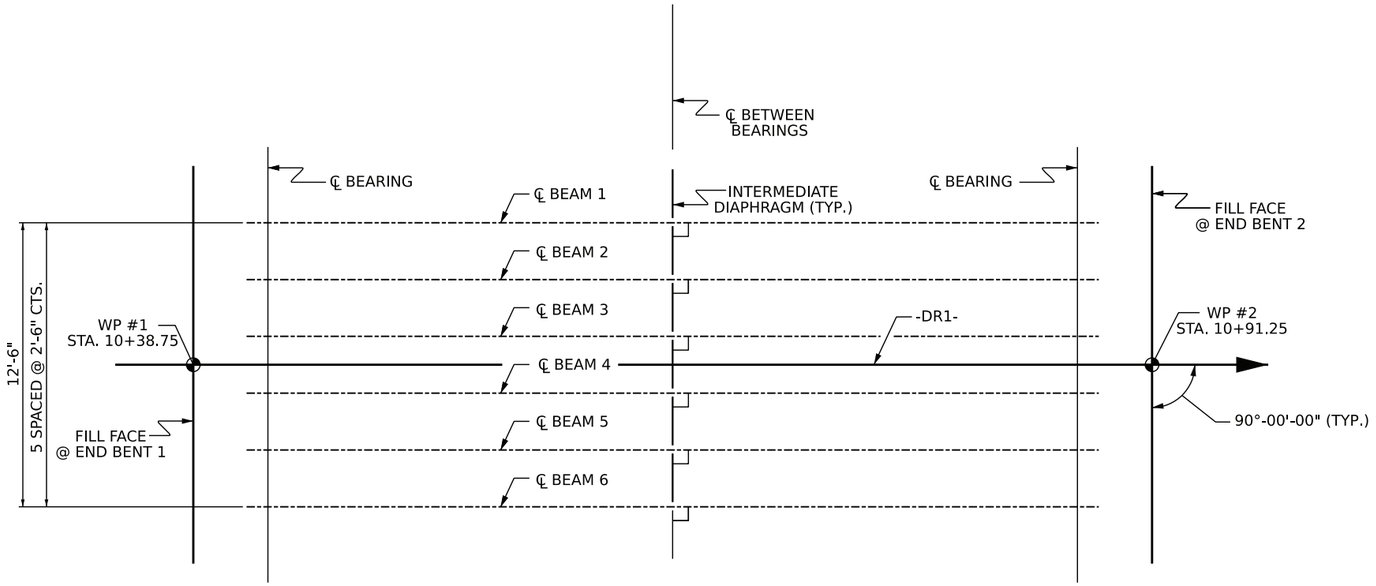
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER THOMAS P. DUDECK

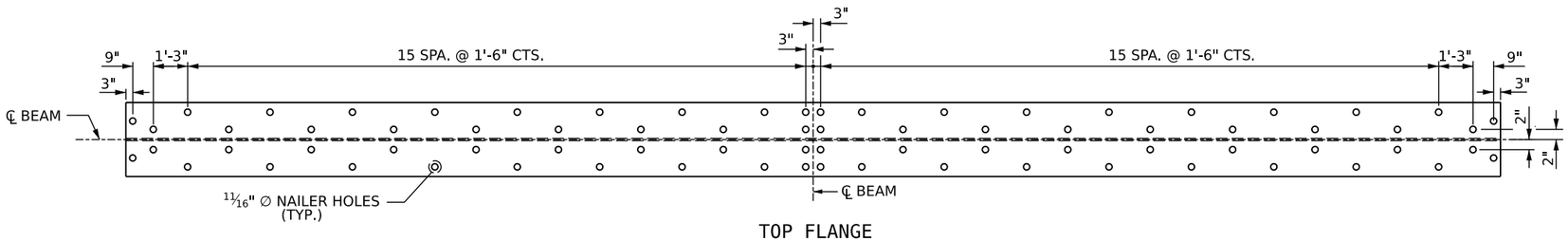
DocuSigned by: Tommy Dudeck 1/12/2026



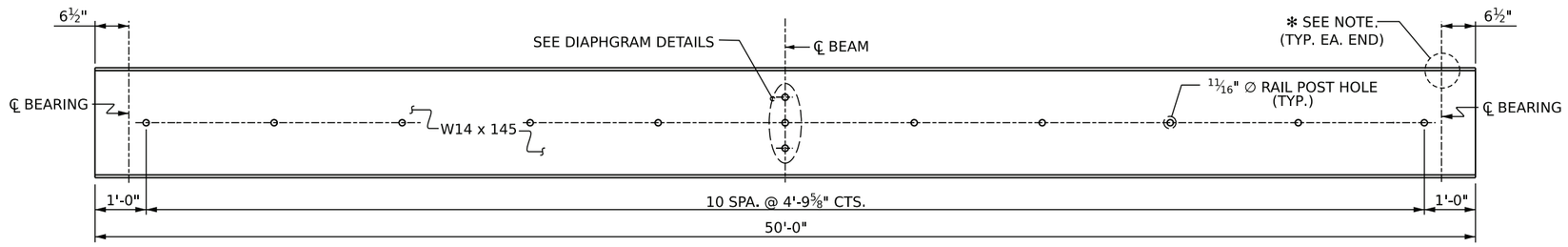
EXP.
E1, P1

FIXED
E2, P2

FRAMING PLAN



TOP FLANGE



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

BEAM DETAILS

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 ⅝" DIA. GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

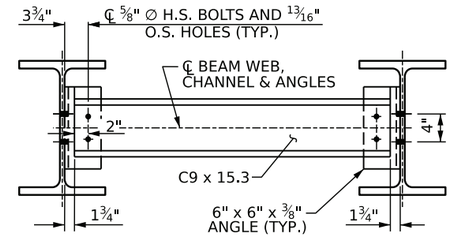
BEAMS SHALL BE PLACED PARALLEL TO THE CHORD.

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

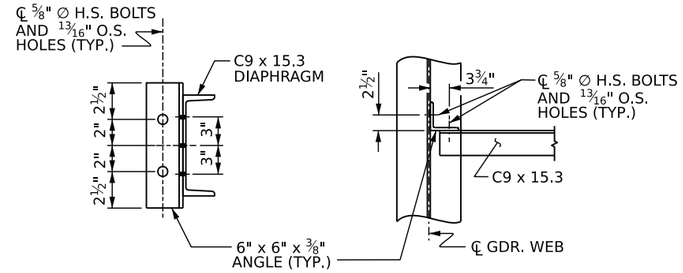
SEE GENERAL DRAWING NOTES FOR COATING.

✻ 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

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.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			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 : FEB 2026

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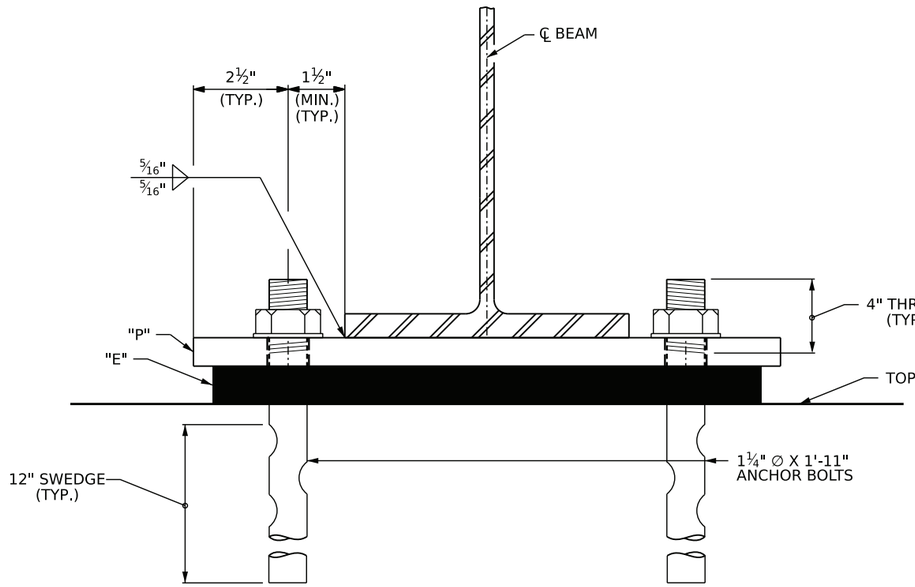
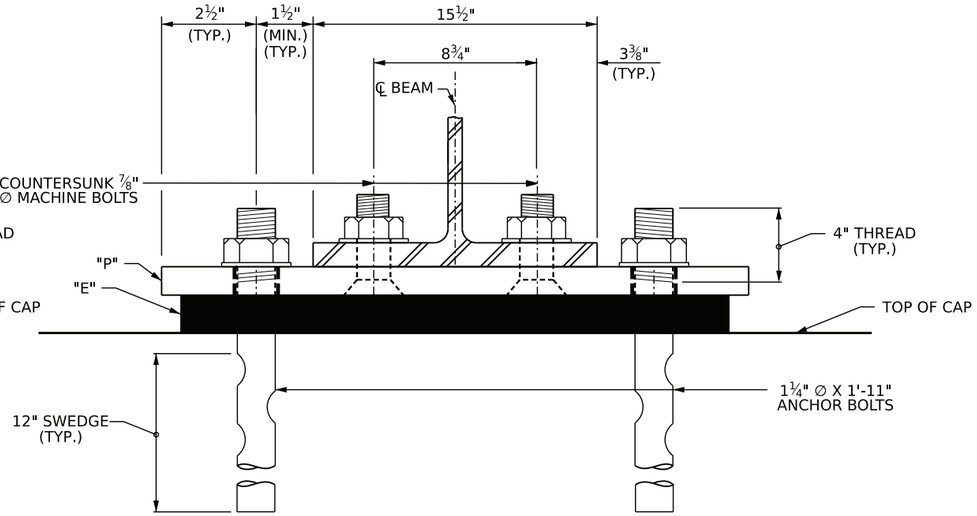
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY A. DUDECK
DocuSigned by: Timothy Dudeck 1/12/2026



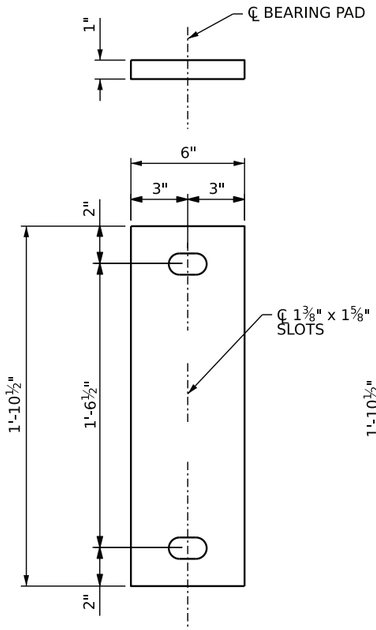
END VIEW

WELDED

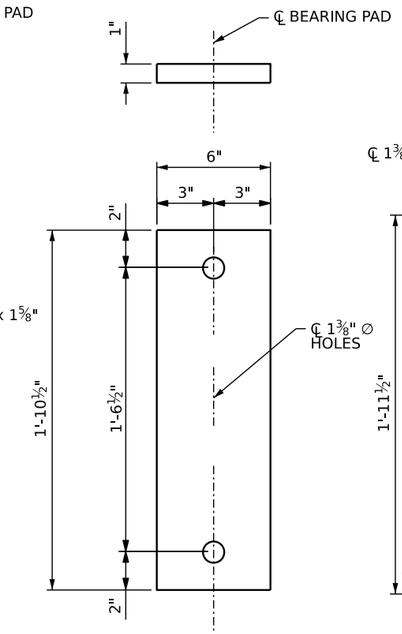


END VIEW

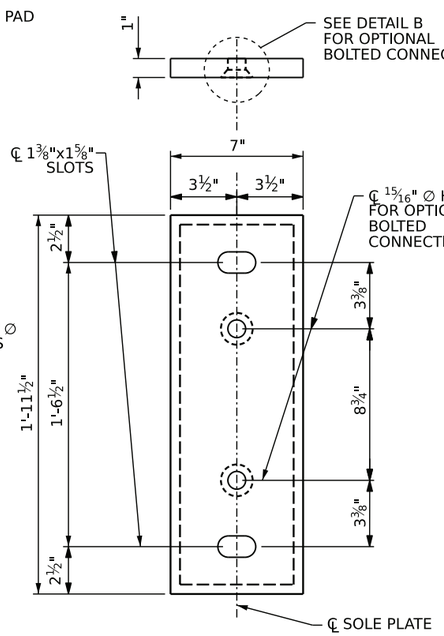
OPTIONAL BOLTED



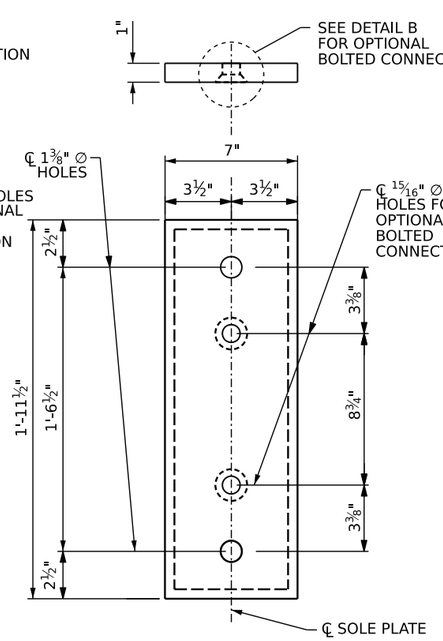
E1 ELASTOMERIC BEARING DETAILS
(6 REQ'D)
EXPANSION



E2 ELASTOMERIC BEARING DETAILS
(6 REQ'D)
FIXED



P1 SOLE PLATE DETAILS
(6 REQ'D)
EXPANSION



P2 SOLE PLATE DETAILS
(6 REQ'D)
FIXED

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 ½ 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.

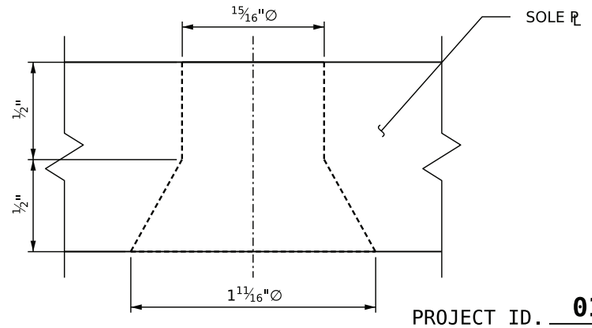
WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300° F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

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.



DETAIL B

PROJECT ID. 011-01-9a58c

BUNCOMBE COUNTY

STATION: 10+65.00 -DR1-

SHEET 1 OF 1

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 :	FEB 2026

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NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY DUDECK

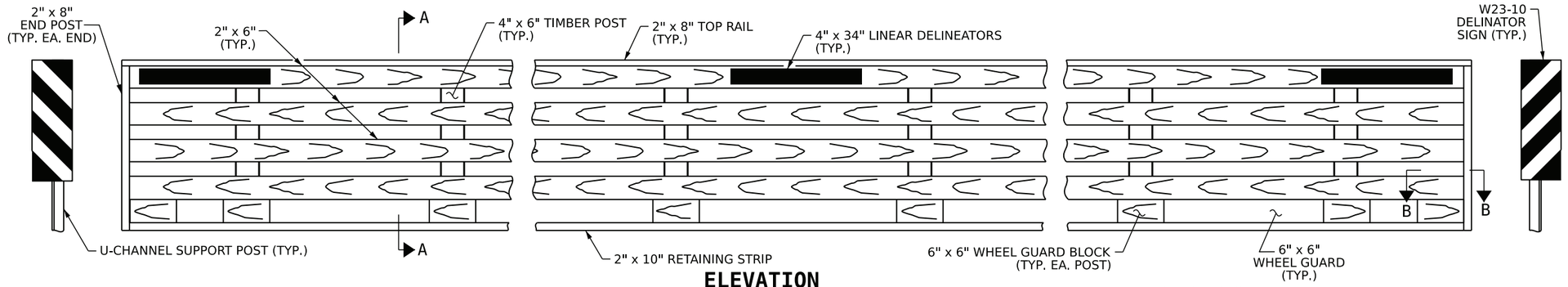
DocuSigned by: Timothy Dudeck 1/12/2026

NORTH CAROLINA EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

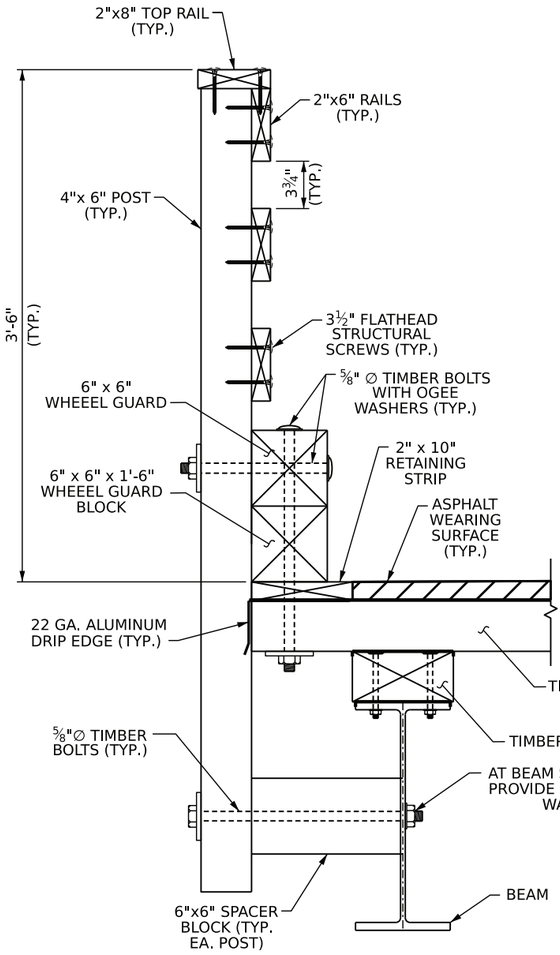
STANDARD

BEARING DETAILS TYPE V

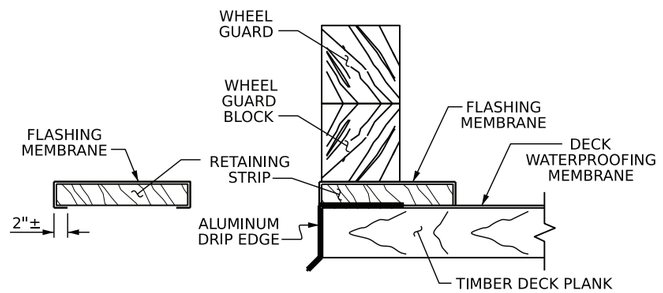
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			12



ELEVATION

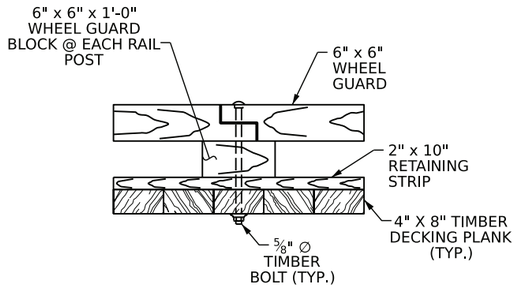


SECTION A-A

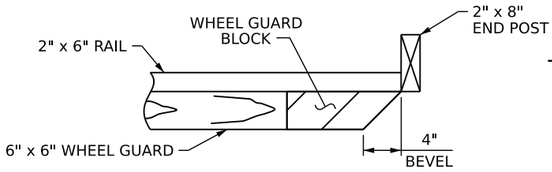


RETAINING STRIP DETAILS

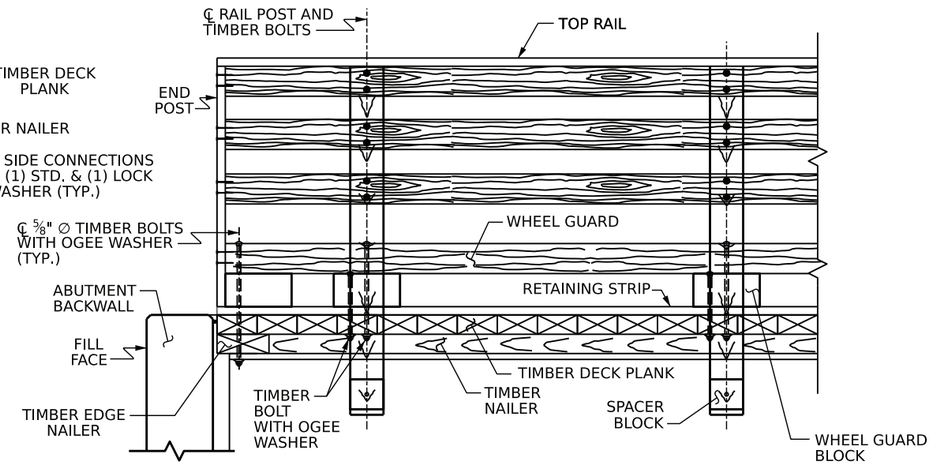
POST AND BOLTS NOT SHOWN FOR CLARITY



WHEEL GUARD SPLICE DETAIL



VIEW B-B



RAIL DETAIL AT ABUTMENTS

BILL OF MATERIAL FOR ONE RAIL 50 FT (2 REQ.D)

TREATED LUMBER

ITEM	SIZE	LIN. FT.
RAILS	2"x 6"	150.00
RAIL POSTS	4"x6"	66.00
TOP RAIL	2"x8"	50.50
WHEEL GUARD	6"x6"	50.50
WHEEL GUARD BLOCK	6"x6"	16.50
RETAINER STRIP	2"x10"	50.50
END POSTS	2"x8"	12.00
SPACER BLOCK	6"x6"	11.00

FLASHING MEMBRANE

ITEM	SIZE	LIN. FT.
MEMBRANE FOR RETAINER STRIP	1'-6"	50.50

HARDWARE

ITEM	Nos.	SIZE	LBS.
TIMBER BOLTS (WHEEL GUARD)	11	⅜" ∅	15.40
TIMBER BOLTS (SPACE BLOCK)	11	⅜" ∅	15.40
TIMBER BOLTS (RAIL)	11	⅝" ∅	25.30
HEAVY HEX NUTS	33	⅜" ∅	3.96
FLATHEAD STR. SCREWS	256	3½"	3.00
STANDARD WASHER	11	⅝" ∅	1.00
LOCK WASHER	11	⅜" ∅	1.00
OGEE WASHERS	22	⅝" ∅	13.64

HARDWARE FOR CONNECTIONS_____ APPROX. 78.70 LBS.

ACCESSORIES

ITEM	Nos.
4 X 34 LINEAR DELINEATOR	6
W23-10 12x36 DELINEATOR	2
U-CHANNEL SUPPORT POST	2

PAY LENGTH = 50.5 LIN. FT.

NOTES

THE TIMBER BRIDGE RAIL SYSTEM SHALL NOT BE ATTACHED TO THE TIMBER BRIDGE DECK SYSTEM PRIOR TO THE TIMBER DECK WATERPROOFING MEMBRANE BEING INSTALLED.

BRIDGE RAILS SHALL BE CONTINUOUS FROM END POST TO END POST WITH NO GAPS. RAIL LUMBER LENGTHS SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

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.

SEE PLAN OF SPAN SHEET FOR NUMBER OF POSTS AND POST SPACING.

PROJECT ID. 011-01-9a58c

BUNCOMBE COUNTY

STATION: 10+65.00 -DR1-

SHEET 1 OF 1

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

STANDARD

TIMBER BRIDGE RAIL SYSTEM

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 :	FEB 2026

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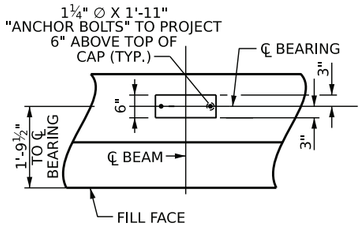
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY A. DUDECK

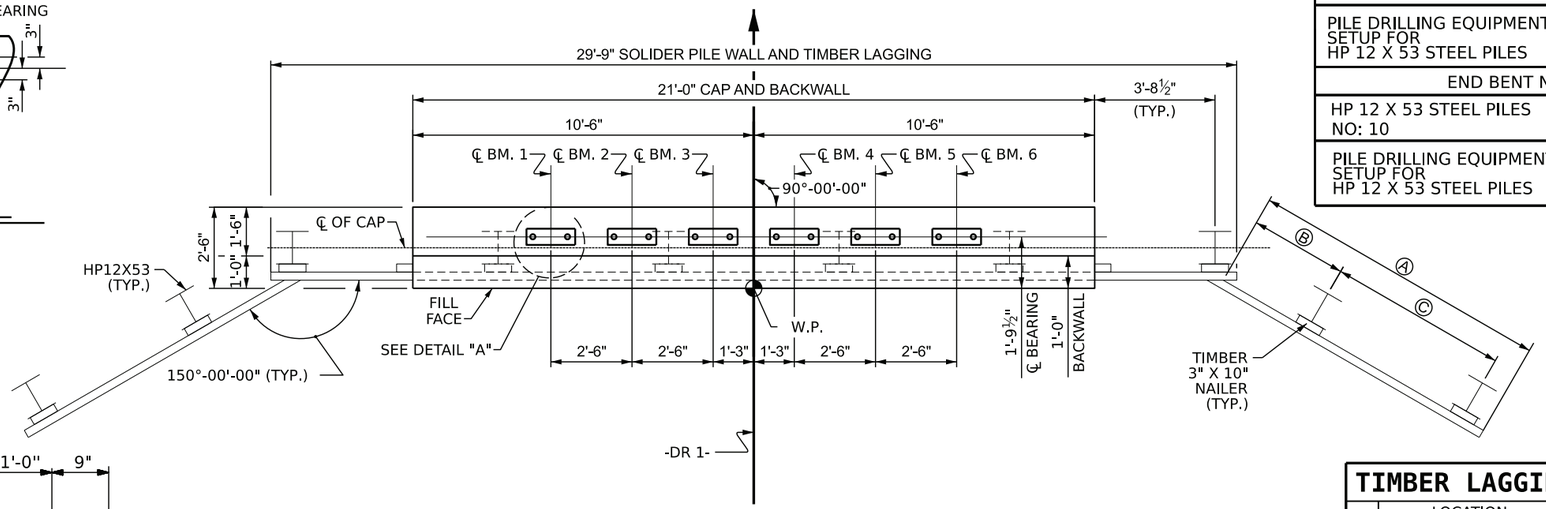
DocuSigned by: Timothy Dudeck 1/12/2026

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			12



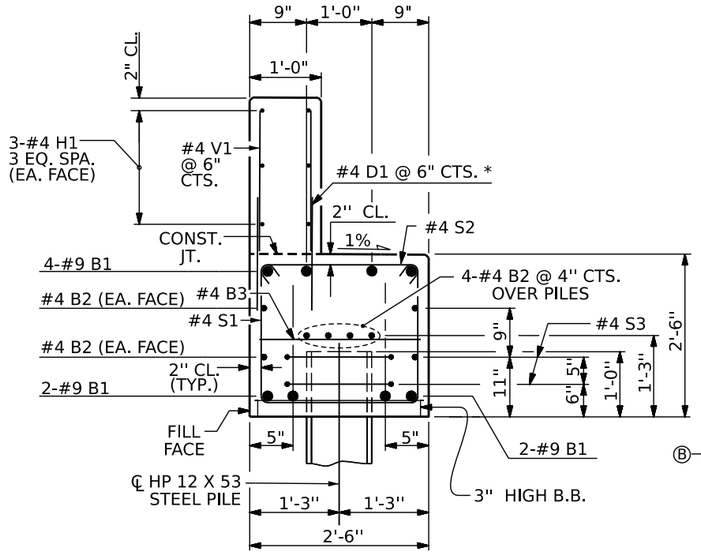
DETAIL "A"

(FOR BEARING TYPE
SEE BEARING SHEET)



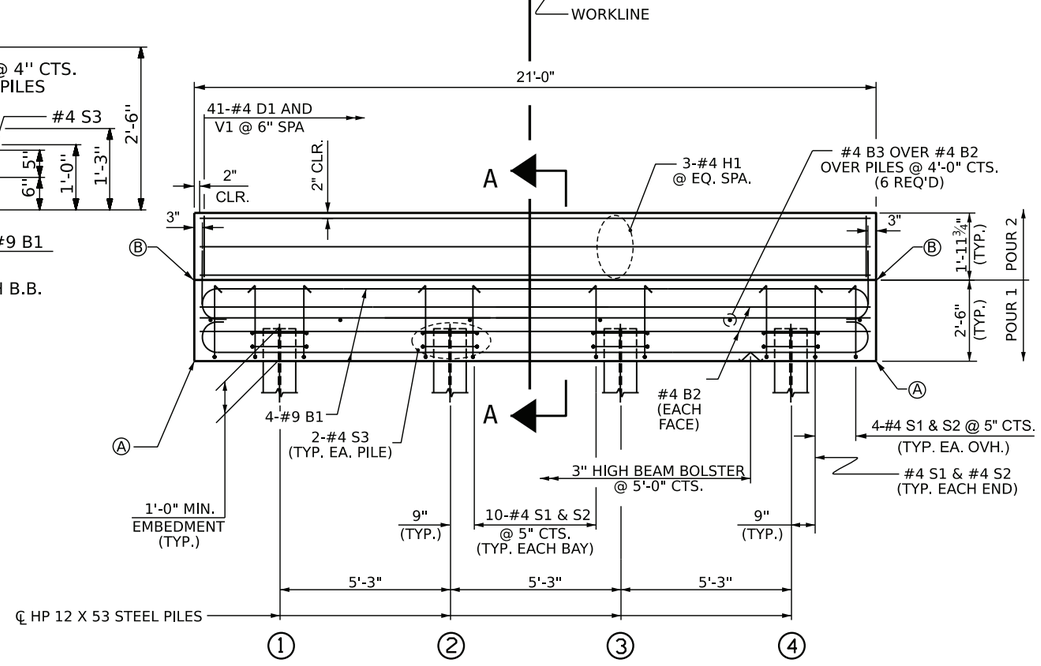
PLAN

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)
(SEE TIMBER LAGGING SHEET FOR WALL DETAILS)



SECTION A-A

TIMBER LAGGING NOT SHOWN FOR CLARITY
* D1 BAR SHALL BE EMBEDDED 9" IN THE CAP



ELEVATION

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)
TIMBER BACKWALL NOT SHOWN FOR CLARITY

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

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	
POUR 1	4.9 C.Y.
POUR 2	1.6 C.Y.
TOTAL CLASS A CONCRETE	6.5 C.Y.

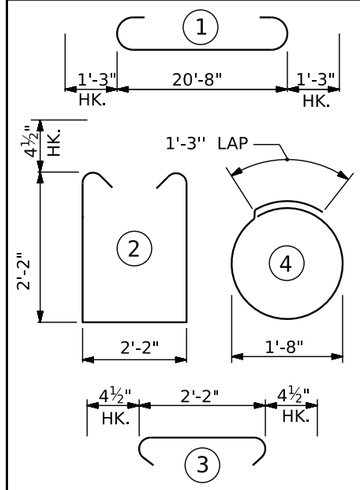
TIMBER LAGGING DIM.

	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"

WP STATIONS

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

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

CAP ELEVATIONS

	LOCATION	ELEVATION
"A"	END BENT 1	2177.37
"B"	END BENT 1	2179.87
"A"	END BENT 2	2178.64
"B"	END BENT 2	2181.14

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

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 :	FEB 2026

Stantec
Stantec Consulting Services Inc.
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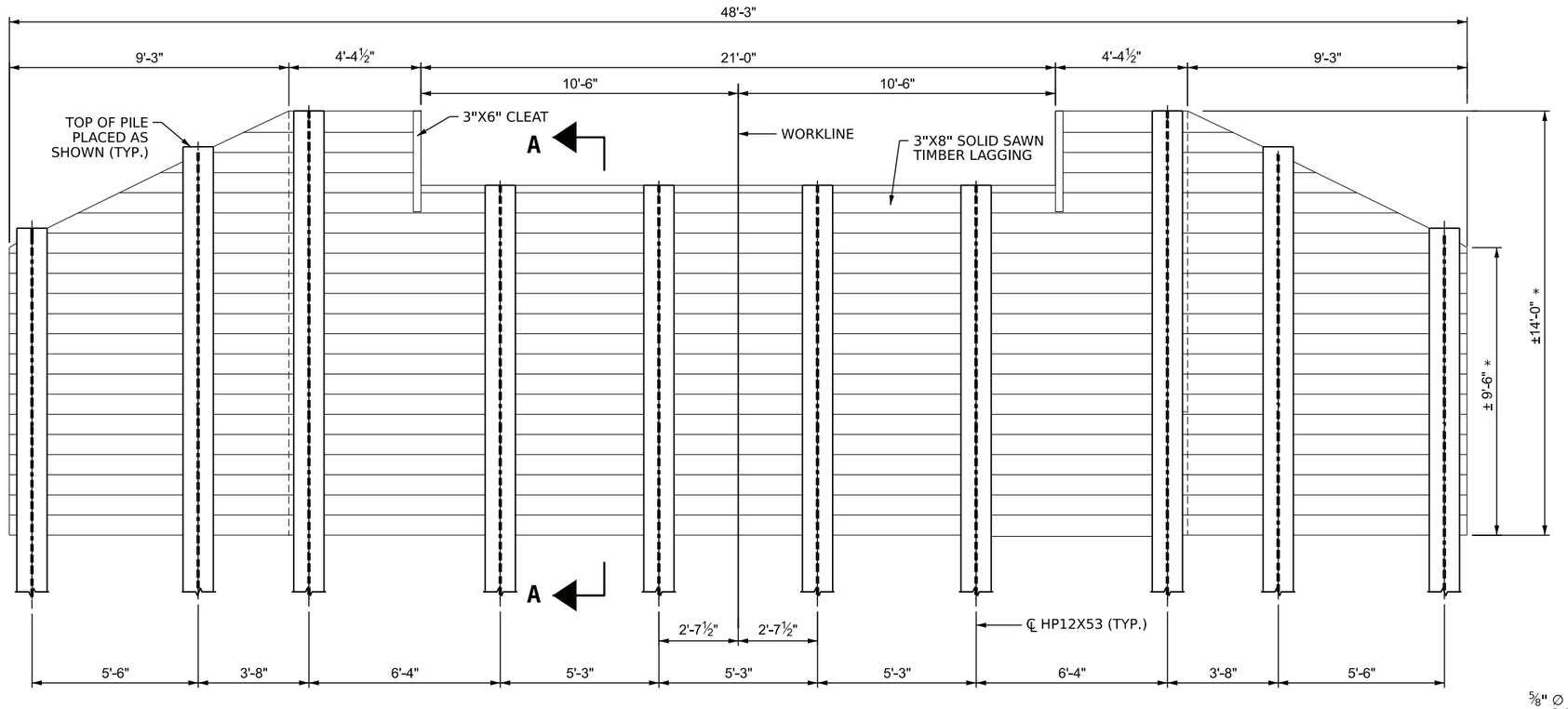
www.stantec.com
License No. F-0672

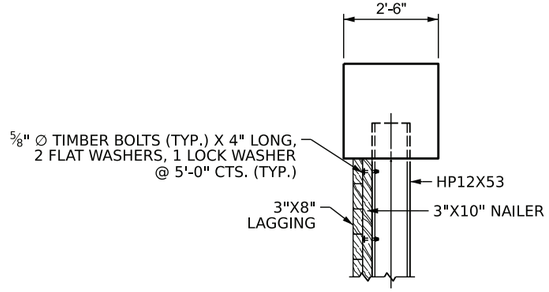
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER THOMAS DUDECK
DocuSigned by: Tommy Dudeck 12/12/2026

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



END BENT 1 ELEVATION

(LOOKING BACK)



SECTION A-A

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

BILL OF MATERIAL
END BENT 1
SOLIDER PILE WALL WITH TIMBER LAGGING

ITEM	SQ. FT.
SOLIDER PILE WALL WITH TIMBER LAGGING	584.0
TOTAL SOLIDER PILE WALL WITH TIMBER LAGGING ___ 584 SQ. FT.	

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

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 :	FEB 2026

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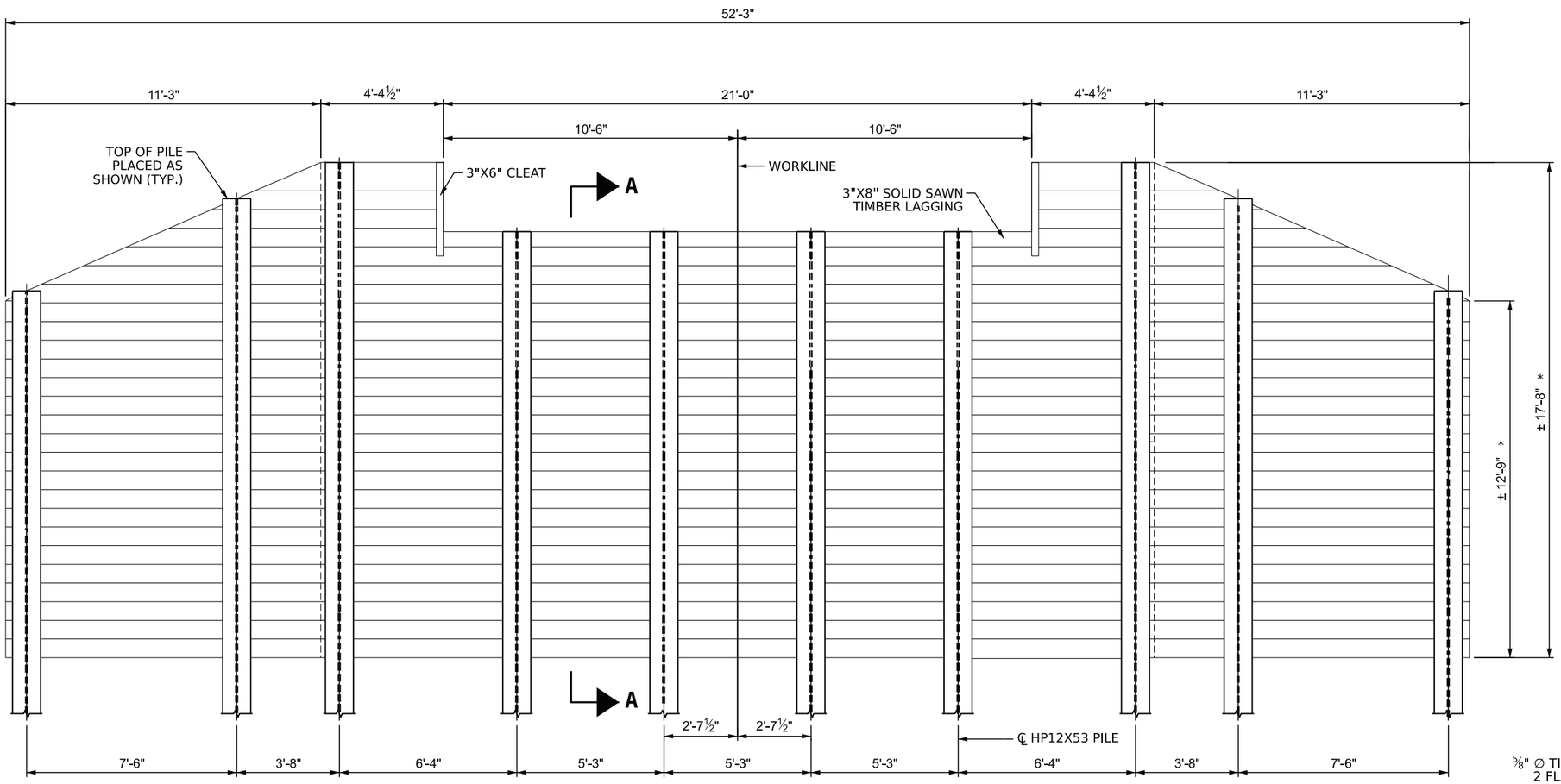
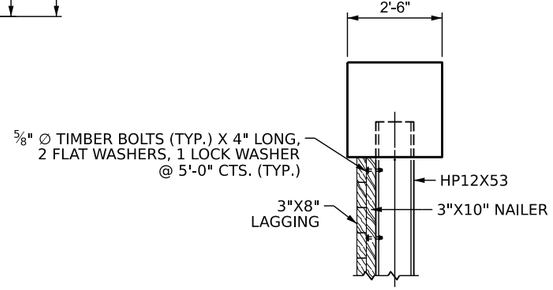
NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER TIMOTHY A. DUDECK
DocuSigned by: Tommy Dudeck 2/12/2026

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



END BENT 2 ELEVATION

(LOOKING AHEAD)



SECTION A-A

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.

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.

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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.

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			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 : FEB 2026

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NORTH CAROLINA PROFESSIONAL SEAL 31462 ENGINEER THOMAS DUDECK

DocuSigned by: Tommy Dudeck 2/12/2026

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" ∅ SHEAR STUDS FOR THE ¾" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" ∅ STUDS FOR 4 - ¾" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" ∅ STUDS ALONG THE BEAM AS SHOWN FOR ¾" ∅ STUDS BASED ON THE RATIO OF 3 - ⅞"∅ STUDS FOR 4 - ¾" ∅ STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

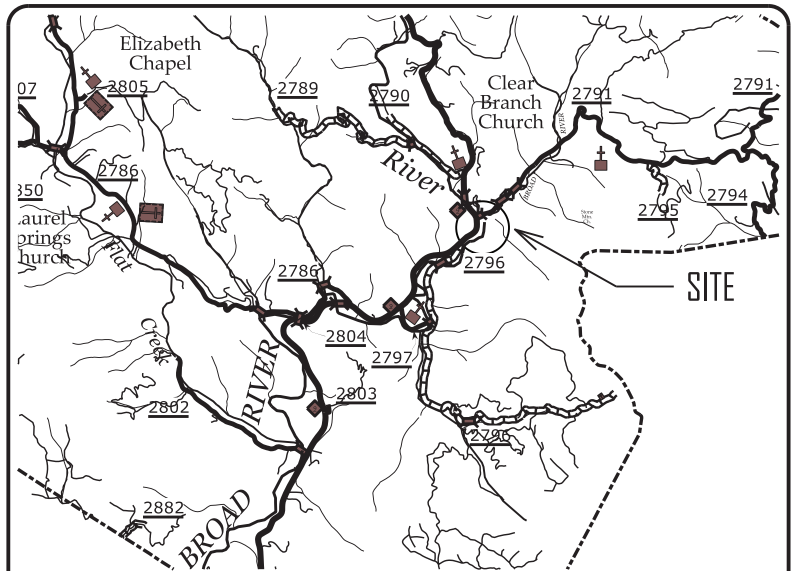
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED 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" 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



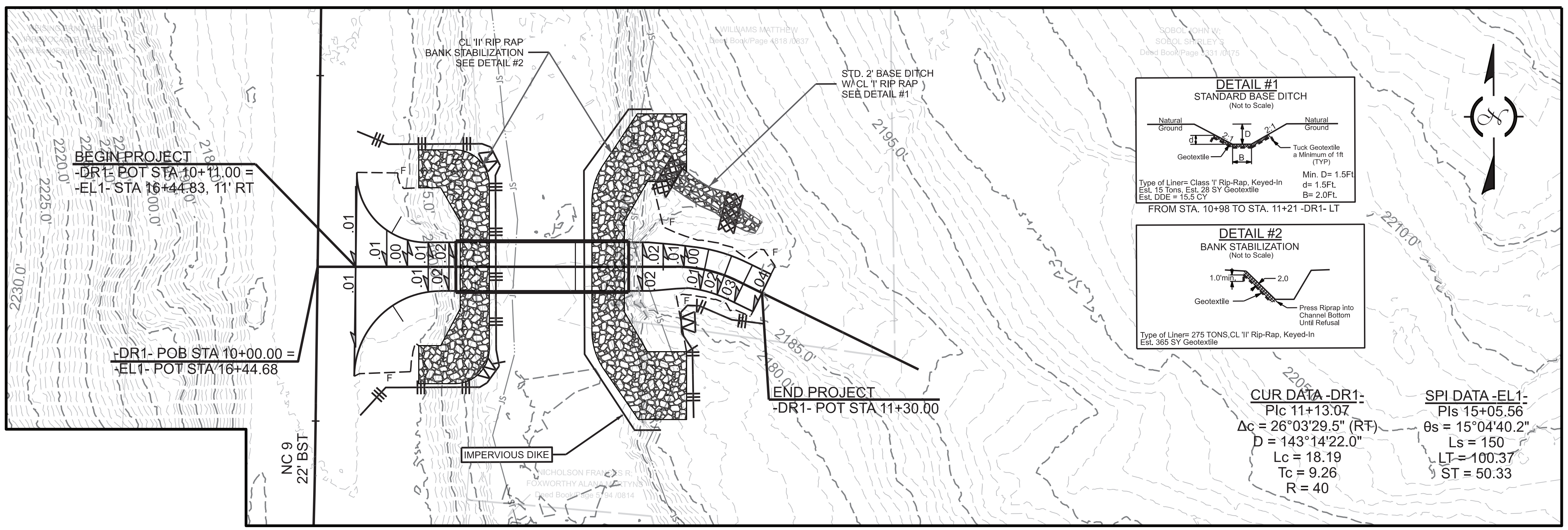
VICINITY MAP
NOT TO SCALE

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 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 HQW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES

EROSION & SEDIMENT CONTROL LEGEND

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



011-01-9a58c

ECO1/CONST.04

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

HYDRAULICS ENGINEER

Signed by: Josh Dalton
1089AD8C14991C3...

SEAL 26971 PROFESSIONAL ENGINEER JOSHUA G. DALTON

11/25/2025

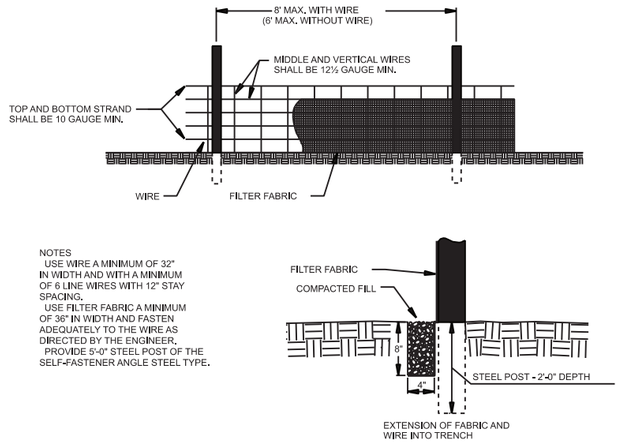
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

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.

SHEET 1OF 1
1605.01

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

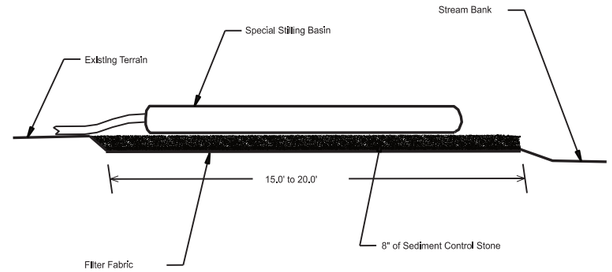
ENGLISH STANDARD DRAWING FOR
TEMPORARY SILT FENCE

SHEET 1OF 1
1605.01

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

1630.06

ENGLISH STANDARD DRAWING FOR
SPECIAL STILLING BASIN



Note: Provide Stabilized Outlet to Streambank

Not To Scale

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

1630.06

ENGLISH STANDARD DRAWING FOR
SPECIAL STILLING BASIN

SHEET 1OF 1
1630.06

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

ENGLISH STANDARD DRAWING FOR
SPECIAL SEDIMENT CONTROL FENCE

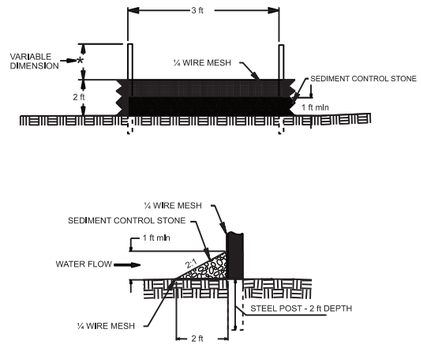
GENERAL NOTES:

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.



SHEET 1OF 1
1606.01

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

ENGLISH STANDARD DRAWING FOR
SPECIAL SEDIMENT CONTROL FENCE

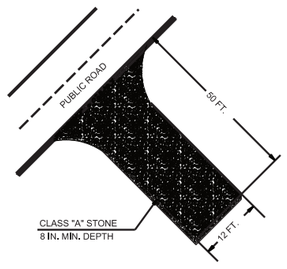
SHEET 1OF 1
1606.01

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

1607.01

ENGLISH STANDARD DRAWING FOR
GRAVEL CONSTRUCTION ENTRANCE

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

SHEET 1OF 1
1607.01

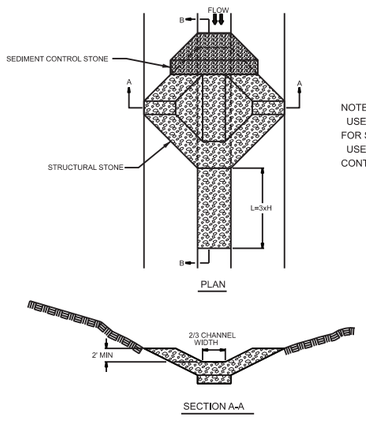
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
GRAVEL CONSTRUCTION ENTRANCE

SHEET 1OF 1
1607.01

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

ENGLISH STANDARD DRAWING FOR
TEMPORARY ROCK SILT CHECK TYPE 'A'



NOTE
USE CLASS 'B' EROSION CONTROL STONE FOR STRUCTURAL STONE.
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE.

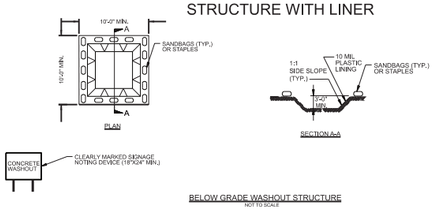
SHEET 1OF 1
1633.01

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

ENGLISH STANDARD DRAWING FOR
TEMPORARY ROCK SILT CHECK TYPE 'A'

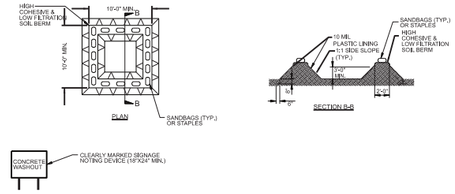
SHEET 1OF 1
1633.01

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



BELOW GRADE WASHOUT STRUCTURE
NOT TO SCALE

NOTES:
1. INITIAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID 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 SIGNAGE NOTING DEVICE.



ABOVE GRADE WASHOUT STRUCTURE

NOTES:
1. INITIAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID 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 SIGNAGE NOTING DEVICE.

011-01-9a58c
EC02

NORTH CAROLINA EMERGENCY MANAGEMENT
BUNCOMBE COUNTY

HYDRAULICS ENGINEER

Signed by:
Josh Dalton
10B9AD8C1498413...

PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

11/25/2025

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RALEIGH, NORTH CAROLINA 27606
TEL (919) 852-1567
ENGINEERING LICENSE NO. C-4151

REVISIONS

11/14/23

Date:

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes

Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10 feet or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
· Temporary grass seed covered with straw or other mulches and tackifiers. · Hydroseeding · Rolled erosion control products with or without temporary grass seed · Appropriately applied straw or other mulch · Plastic sheeting	· Permanent grass seed covered with straw or other mulches and tackifiers · Geotextile fabrics such as permanent soil reinforcement matting · Hydroseeding · Shrubs or other permanent plantings covered with mulch · Uniform and evenly distributed ground cover sufficient to restrain erosion · Structural methods such as concrete, asphalt or retaining walls · Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

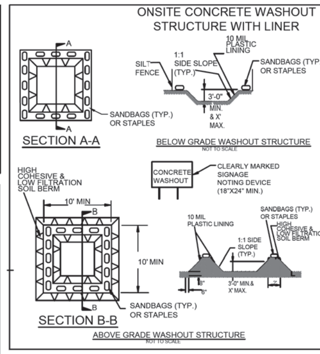
1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

Page:

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY.
3. CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID 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 CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

NORTH CAROLINA *Environmental Quality*

EFFECTIVE DATE: 11/12/2020

NCG-01 GROUND COVER & MATERIALS HANDLING

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.

SPECIAL SEDIMENT CONTROL FENCE:

Description

This work consists of furnishing materials, and the construction, maintenance, and removal of *Special Sediment Control Fence*. Place special sediment control fence as shown on the plans or as directed.

Materials

(A) Posts

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire in the desired position without displacement.

(B) ¼" Hardware Cloth

Hardware cloth shall have ¼" openings constructed from #24 gauge wire. Install hardware cloth in accordance with Standard Drawing No. 1606.01.

(C) Sediment Control Stone

Sediment Control Stone shall meet the requirements of Section 1005 of the *Standard Specifications*. Install stone in accordance with Standard Drawing No. 1606.01.

Construction Methods

The Contractor shall maintain the special sediment control fence until the project is accepted or until the fence is removed, and shall remove and dispose of silt accumulations at the fence when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

¼"Hardware Cloth will be measured and paid for in accordance with Article 1632-5 of the *Standard Specifications*.

Sediment Control Stone will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

SPECIAL STILLING BASIN:

Description

This work consists of furnishing, placing, and removing special stilling basin(s) as directed. The special stilling basin can be used to filter pumped water during construction of drilled piers, footing excavation, and/or culvert construction. The special stilling basin can also be used for sediment storage at the outlet of temporary slope drain pipe(s).

Materials

Refer to Division 10

Item	Section
Filter Fabric for Drainage, Type 2	1056
Sediment Control Stone	1005

The filter fabric and sediment control stone shall be clean and shall not contain debris.

The special stilling basin shall be a water permeable fabric bag that traps sand, silt, and fines as sediment-laden water is pumped into it, or as runoff flows into it through the temporary slope drain pipe(s).

The special stilling basin shall be a bag constructed to a minimum size of 10' x 15' made from a nonwoven fabric. It shall have a sewn-in 8" (maximum) spout for receiving pump discharge. The bag seams shall be sewn with a double needle machine using a high strength thread. The seams shall have a minimum wide width strength as follows:

Test Method	Minimum Specifications
ASTM D-4884	60 lb/in

The fabric used to construct the bag shall be stabilized to provide resistance to ultra-violet degradation and meet the following specifications for flow rates, strength, and permeability:

Property	Test Method	Minimum Specifications
Weight	ASTM D-3776	8.0 oz/yd
Grab tensile	ASTM D-4632	200.0 lb
Puncture	ASTM D-4833	130.0 lb
Flow rate	ASTM D-4491	80.0 gal/min/sf
Permittivity	ASTM D-4491	1.2 1/sec
UV Resistance	ASTM D-4355	70.0%

Construction Methods

The Contractor shall install the special stilling basin(s), filter fabric, and stone in accordance with Standard Drawing No. 1630.06 and at locations on the plans and as directed. The special stilling basin(s) shall be placed on level ground.

The special stilling basin(s) shall be constructed such that it is portable and can be used adjacent to each drilled pier, footing and/or culvert, as required by the project commitments. If needed, temporary slope drain pipe(s) or pump discharge hoses will be attached to the special stilling basin(s) to divert runoff or pumped effluent directly into the special stilling basin(s). The special stilling basin may be cut to allow slope drain pipe to be inserted if needed and tied off tightly. The remaining sleeve or spout of the bag, if present, may be used to connect more than one special stilling basin in series as directed. If not used in this manner, the sleeve shall be tied off tightly to allow the bag to contain the effluent and force it to filter through the sides of the special stilling basin. The special stilling basin(s) shall be placed so the incoming runoff or pumped effluent flows into and through it without causing erosion to adjacent slopes or streambanks. In areas of turbidity and water quality concern, the special stilling basin(s) shall be placed up grade and its runoff directed into a sediment control measure before being allowed to discharge into jurisdictional waters.

The special stilling basin(s) shall be replaced and disposed of when it is ¾ full of sediment or when it is impractical for the bag to filter the sediment out at a reasonable flow rate. Prior approval from the Engineer shall be received before removal and replacement.

The Contractor shall be responsible for providing a sufficient quantity of bags to contain silt from pumped effluent during construction of drilled piers, footing excavation, and/or culvert construction. A sufficient quantity of special stilling basins shall be provided to contain sediment from temporary slope drain runoff.

Measurement and Payment

Special Stilling Basin will be measured and paid as the actual number of bags used during temporary slope drain installation, drilled pier construction, footing excavation, and/or culvert construction as specified and accepted.

Filter Fabric for Drainage will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications.*

Sediment Control Stone will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications.*

Such price and payment will be full compensation for all work covered by this section, including but not limited to, furnishing all materials, placing and maintaining the special stilling basin(s), and removal and disposal of silt accumulations and bag.

Date:

Page:

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

SEEDING MIXTURE

Species	Rate
Centipede	5 lbs/acre
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Coastal or Eastern Piedmont for Centipede- Sept. 1 - May 1
Coastal and Piedmont for Indian Woodoats and Virginia Wild Rye- Feb 15 - April 1
Mountains for Indian Woodoats and Virginia Wild Rye- March 1 - May 15

Maintenance:
Significant maintenance may be required to obtain desired cover once centipede is planted. Acceptable for sodding.

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR SUMMER

SEEDING MIXTURE

Species	Rate
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Mountains - July 15- Aug 15
Piedmont - Aug 15 - Oct 15

Maintenance:
Indian Woodoats and Virginia Wild Rye are both sun and shade tolerant.

NON-INVASIVE PERMANENT SEEDING RECOMMENDATIONS FOR FALL

SEEDING MIXTURE

Species	Rate
Hard Fescue	15 lbs/acre
Switchgrass	2.5-3.5 lbs/acre*
Indian Grass	5-7 lbs/acre*
Big Bluestem	5-7 lbs/acre*
Indian Woodoats	1.5-2.5 lbs/acre*
Virginia Wild Rye	4-6 lbs/acre*

*Depending upon mix with other species. See table 6.11.d from Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual.

Seeding Dates
Mountains - Hard Fescue- Aug 1 - June 1
Mountains- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 15
Piedmont and Coastal- Switchgrass, Indian Grass, Big Bluestem- Dec 1 - April 1
Coastal- Indian Woodoats and Virginia Wild Rye- Sept 1 - Nov 1

Maintenance:
Hard Fescue is not recommended for slopes > 5%. Prefers shade.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1 to 1 $\frac{1}{2}$ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.
FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.
SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

NOTES:
1. Permanent seeding, sodding or other means of stabilization are required when all construction work is completed according to the NPDES timeframe's table.
2. A North Carolina Department of Agriculture soils test (or equal) is highly recommended to be obtained for all areas to be seeded, sprigged, sodded or planted.
3. Use a seeding mix that will produce fast growing nurse crops and includes non-invasive species that will eventually provide a permanent groundcover. Soil blankets may be used in lieu of nurse crops. Mat, tack or crimp mulch, as needed to stabilize seeded areas until root establishment. Mulch must be applied uniformly over the soil with a cover density of at least 80%.
4. Ground cover shall be maintained until permanent vegetation is established and stable against accelerated erosion.

NORTH CAROLINA *Environmental Quality*

EFFECTIVE DATE: 11/12/2020

PERMANENT SEEDING RECOMMENDATIONS

DATE:

PAGE:

TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding Dates
Mountains—Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER

Seeding Mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding Dates
Mountains — May 15 - Aug. 15
Piedmont — May 1 - Aug. 15
Coastal Plain — Apr. 15 - Aug. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding Dates
Mountains — Aug. 15 - Dec. 15
Coastal Plain and Piedmont — Aug. 15 - Dec. 31

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1-1$\frac{1}{2}$ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.
FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700 - 1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.
SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

DEQ

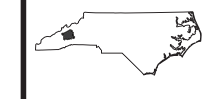
TEMPORARY SEEDING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

011-01-9a58c

EC03

NORTH CAROLINA
EMERGENCY MANAGEMENT
BUNCOMBE COUNTY



HYDRAULICS ENGINEER

Signed by: Josh Dalton
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SEAL 26971 PROFESSIONAL ENGINEER JOSHUA G. DALTON

11/25/2025

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SUNGATE DESIGN GROUP, P.A.
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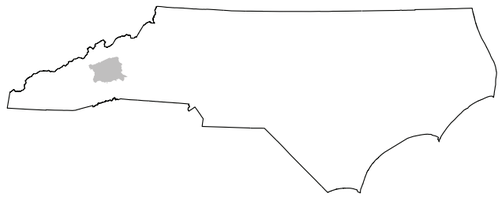
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

REVISIONS

SUNGATE/belam - $$$-DATE-$$$

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 DEVCES 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.

SHEET NO.
TMP-1

PROJECT:011-01-09a58c

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PLANS PREPARED BY:

JAY WOOLARD, PE
SENIOR TRANSPORTATION ENGINEER

DONNIE RICHARDSON
SENIOR TRANSPORTATION DESIGNER

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Signed by: Jay Woolard
11/24/2025
NORTH CAROLINA PROFESSIONAL SEAL 19862 ENGINEER J. W. WOOLARD JR.

$$$$$$$SYSTIME$$$$$
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$$$USERNAME$$$$

CATLIN
Engineers and Scientists

220 Old Diary Road
Wilmington, NC 28405

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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
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10/31/2025

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

Attachments: SPT and Rock Core Logs

GEOTECHNICAL BORING REPORT
BORE LOG

225226 CATLIN Engineers and Scientists | PROJECT REFERENCE: 225226 | SHEET: 1

WBS: N/A	**TIP:** N/A	**COUNTY:** BUNCOMBE	**GEOLOGIST:** A. Jessen	
SITE DESCRIPTION: NCEM Private Driveway Bridge at 2511 NC Hwy. 9, Black Mountain, NC				**GROUND WTR (ft)**
BORING NO.: EB-1	**STATION:** 10+40	**OFFSET:** N/A	**ALIGNMENT:** DR1	**0 HR.** 27.2
COLLAR ELEV.: 2,184.0 ft	**TOTAL DEPTH:** 16.1 ft	**NORTHING:** 660,919	**EASTING:** 1,033,450	**24 HR.** Dry
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 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. # / RESULT	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2185										
	2,184.0	0.0	2	9	7	16	SS-1 A-6(7)	21%		2,184.0 GROUND SURFACE 0.0 **ROADWAY EMBANKMENT** Dark brown to gray, Sandy CLAY with gravel
	2,182.0	2.0	3	6	5	11		M		
2180	2,180.0	4.0	9	11	3	14		D		2,180.0 4.0 **ROADWAY EMBANKMENT** Gray, GRAVEL (Roadway Riprap)
	2,178.0	6.0	7	2	3	5		M		2,178.0 6.0 **ALLUVIAL** Redddish brown, SILT with gravel
	2,176.0	8.0	2	2	2	4		M		
2175										
	2,170.5	13.5	2	2	3	5		M		2,170.5 13.5 **ALLUVIAL** Gray, Silty SAND with quartz fragments
2170										2,167.9 16.1 SPT Terminated BY AUGER REFUSAL at Elevation 2,167.9 ft On Crystalline Rock

WBS: N/A	**TIP:** N/A	**COUNTY:** BUNCOMBE	**GEOLOGIST:** A. Jessen	
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 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. # / RESULT	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2185										2,185.0 GROUND SURFACE 0.0
	2,185.0	0.0	5	7	6	13		M		**ARTIFICIAL FILL** Brown, Sandy SILT with gravel and wood fragments
	2,183.0	2.0	9	3	4	7		M		2,181.0 4.0
2180	2,181.0	4.0	7	9	9	18		D		**ARTIFICIAL FILL** Granite GRAVEL
	2,179.0	6.0	4	3	4	7		M		2,179.0 6.0 **RESIDUAL** Tan to brown, Silty SAND with gravel
	2,177.0	8.0	3	5	6	11	SS-2 A-2-4	22%		
2175										
	2,171.5	13.5	60/0.1			60/0.1		M		2,171.5 13.5
	2,170.9	14.1	60/0.0			60/0.0				**WEATHERED ROCK** 2,170.9 14.1 **COLLUVIAL** Silt, Sand, Boulders & Cobbles
2170										
2165										
2160	2,159.2	25.8	34	60/0.0		60/0.0		M		2,159.2 25.8 **WEATHERED ROCK**
	2,157.5	27.5	60/0.0			60/0.0		M		2,157.5 27.5 SPTTerminated WITH SPT REFUSAL at Elevation 2,157.5 ft On Crystalline Rock

GEOTECHNICAL BORING REPORT
BORE LOG

225226 CATLIN Engineers and Scientists | PROJECT REFERENCE: 225226 | SHEET: 2

WBS: N/A | **TIP:** N/A | **COUNTY:** BUNCOMBE | **GEOLOGIST:** A. Jessen

SITE DESCRIPTION: NCEM Private Driveway Bridge at 2511 NC Hwy. 9, Black Mountain, NC | **GROUND WTR (ft)**

BORING NO.: EB-1 | **STATION:** 10+40 | **OFFSET:** N/A | **ALIGNMENT:** DR1 | **0 HR.** 27.2

COLLAR ELEV.: 2,184.0 ft | **TOTAL DEPTH:** 30.3 ft | **NORTHING:** 660,919 | **EASTING:** 1,033,450 | **24 HR.** Dry

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

CORE SIZE: NQ | **TOTAL RUN:** 13.9 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
2167.6											Begin Coring @ 16.4 ft
	2,167.6	16.4	3.9	2:10/1.0 2:07/1.0 2:08/1.0 1:54/0.9	(3.9) 100%	(3.5) 90%	RC-1	(13.6) 98%	(11.6) 83%		ELEV. (ft) 2,167.6 DEPTH (ft) 16.4 **CRYSTALLINE ROCK** Bluish gray, Hard, Wide fracture spacing, Minimal discoloration, Feldpatic SCHIST Compressive Strength = 9,530 psi
2165	2,163.7	20.3	5.0	2:51/1.0 2:11/1.0 2:52/1.0 2:52/1.0 3:22/1.0	(4.8) 96%	(4.0) 80%					
2160	2,158.7	25.3	5.0	2:54/1.0 2:50/1.0 2:52/1.0 2:53/1.0 3:24/1.0	(4.9) 98%	(4.1) 82%					
2155	2,153.7	30.3									2,153.7 30.3 Boring Terminated at Elevation 2,153.7 ft In Crystalline Rock

WBS: N/A | **TIP:** N/A | **COUNTY:** BUNCOMBE | **GEOLOGIST:** A. Jessen

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:** 38.1 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

CORE SIZE: NQ | **TOTAL RUN:** 21.8 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
2170.4											Begin Coring @ 14.6 ft
2170	2,170.4	14.6	1.2	0:23/1.0 0:10/0.2	(0.1) 8%	(0.0) 0%		(2.7) 24%	(0.7) 6%		**COLLUVIAL** Silt, Sand, Boulders and Cobbles Compressive Strength = 16,620 psi
	2,169.2	15.8	5.0	2:20/1.0 1:10/1.0 0:31/1.0 1:15/1.0 3:10/1.0	(2.4) 48%	(0.7) 13%	RC-2				
2165	2,164.2	20.8	5.0	2:14/1.0 0:48/1.0 2:12/1.0 2:04/1.0 2:05/1.0	(0.3) 6%	(0.0) 0%					
2160	2,159.2	25.8		*N=100*							2,159.2 25.8 **WEATHERED ROCK**
	2,157.5	27.5	3.4	1:53/1.0 1:48/1.0 1:52/1.0 0:53/0.4	(3.3) 97%	(3.3) 97%		(9.7) 92%	(8.1) 76%		2,157.5 27.5 Bluish gray, hard to medium hard, wide to medium close fracture spacing, SCHIST, with iron staining
2155	2,154.1	30.9	4.2	1:35/1.0 2:38/1.0 2:46/1.0 2:20/1.0 /0.2	(3.7) 88%	(2.1) 50%					
2150	2,149.9	35.1	3.0	2:43/1.0 2:39/1.0 2:41/1.0	(2.7) 90%	(2.7) 90%					
	2,146.9	38.1									2,146.9 38.1 Boring Terminated at Elevation 2,146.9 ft In Crystalline Rock