North Carolina Emergency Management – Private Roads and Bridges

Site Information Form

Site Number: 044-01-3f23e

Site Address: 95 Cattle Creek Ridge, Canton, NC 28716

GPS Coordinates: 35.4162, -82.7814

County: Haywood

Bridge Type: Steel I-beam with timber decking

Span Length: 30 feet

Bridge Width: 12'-0" Clear Width

Substructure Type: Concrete Cap on Drilled-in Piles

Geotechnical Information: See Standard Bridge Plans for Notes

Additional Notes:

Timber bridge railing not required.

Wing walls not required.

The exsiting bridge is in place and must be removed prior to the start of construction.

The stream contains no debris or obstructions requiring removal.

SITE ID: 044-01-3f23e

SITE ADDRESS: 95 CATTLE CREEK RIDGE,
CANTON, NC 28716

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

NC DEPARTMENT OF EMERGENCY MANAGEMENT
PRIVATE ROADS AND BRIDGES PROGRAM

Site Number 044-01-3f23e Latitude 35.41516 Longitude -82.78080

County Haywood Address near 95 Cattle Creek Ridge

City Canton, NC Zip Code 28716

Recommended Structure 1 @ 30' Steel Girder Bridge

Recommended Width of Roadway ..... Skew .....

Recommended Location is (At) Upstream, Downstream) of Existing Crossing .....

Temporary Crossing .....

I hereby certify that that I have reviewed the existing hydraulic conveyance at this site which was a 25 ft existing bridge with the proposed conveyance provided by the proposed 30 ft. span bridge.

The proposed bridge low chord for the bridge shall be set in accordance with the the FEMA Disaster Specific Guidance for the Replacement of Private Roads and Bridges issued on 14 February 2025, "to provide bridge/culvert design plans certified (sealed, signed, and dated) by a Professional Engineer licensed in the State of North Carolina demonstrating that the newly designed and installed private bridge/culvert provides conveyance greater than or equal to the original destroyed crossing".

This certification demonstrates that the newly designed and installed private bridge/culvert provides conveyance greater than or equal to the original destroyed crossing. This is based on the best available data provided from post storm evaluations. Portions of the existing structures may have been destroyed, removed, modified or shifted from their original location or elevation.

Designed by .....

Assisted by .....

NORTH CAROLINA PROFESSIONAL SEAL 20646 ENGINEER MATTHEW D. FOSTER

Date .....

Signed by: Matthew D Foster 2/2/2026 9:43:15 AM EST
TB19328FAFC0472...

JMT *Johnson, Mirmiran, & Thompson Inc.*
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

Reviewed by ..... Date .....

SITE DATA

Drainage Area ..... Source .....

River Basin ..... Character .....

Stream Classification (e.g., Trout, High Quality Water) .....

Debris Potential: Low ☐ Moderate ☒ High ☐

Existing Structure - Source of Available Data NCEM Private Roads and Bridges Inspection Team

Existing Structure - Description 1 @ 26' Timber beams and timber deck (destroyed by Helene)

..... Estimated Waterway Opening 68.0 ft²

Design Control Elev ..... ft Source .....

Gage Station No ..... Period of Records .....

Max Discharge ..... cfs Date ..... Frequency .....

Historical Flood Information:

Date ..... Elev ..... ft Est Freq ..... yr Source ..... Period of Knowledge ..... yrs

Historical Scour Info: General ..... ft Contraction ..... ft Local ..... ft

Channel Slope ..... ft/ft Source ..... Normal Water Surface Elev ..... ft

Manning's n: Left OB ..... Channel ..... Right OB ..... Source .....

Flood Study / Status N/A

Flood Study 100-yr Discharge ..... cfs WS Elev: With Floodway ..... ft Without Floodway ..... ft River Station .....

DESIGN DATA

Hydrological Method .....

Hydraulic Design Method Disaster Specific Guidance for the Replacement of Private Roads and Bridges 2/14/2025

Floods Evaluated	Frequency (year)	Discharge (cfs)	Elevation (ft)	Backwater (ft)	Bridge Opening Velocity (fps)

Waterway Opening Provided Below: Design WS Elev ..... sf 100-yr WS Elev ..... sf Total 81.3 sf

Average Channel Velocity (Design) ..... fps Average Overbank Velocity (Design) ..... fps

Computed Scour: General ..... ft Contraction ..... ft Local ..... ft

INFORMATION TO BE SHOWN ON PLANS

HYDRAULIC DATA

DESIGN DISCHARGE	= 640	C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25	YRS.
DESIGN HIGH WATER ELEVATION	=	
DRAINAGE AREA	= 2.92	SQ. MI.
BASIC DISCHARGE (Q100)	= 1000	C.F.S.
BASIC HIGH WATER ELEVATION	=	

OVERTOPPING FLOOD DATA

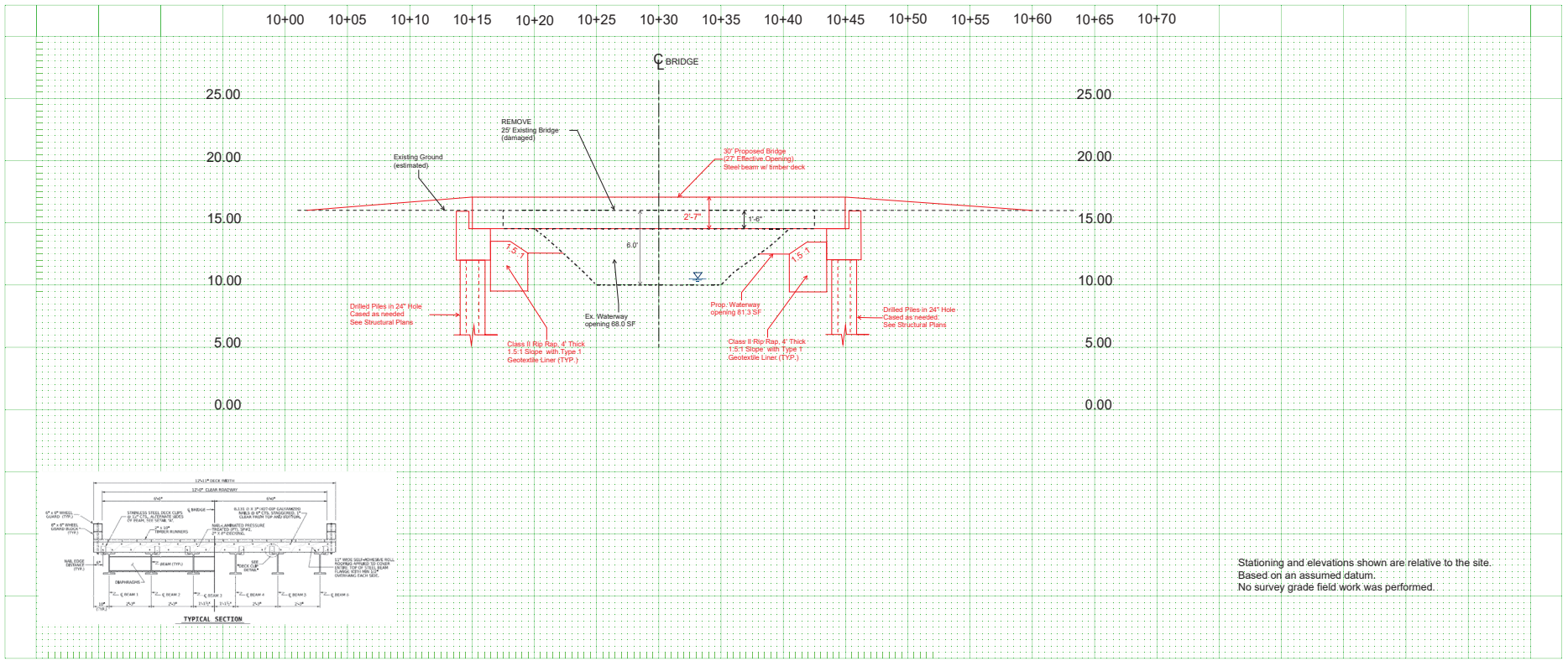
OVERTOPPING DISCHARGE	=	C.F.S.
FREQUENCY OF OVERRTOPPING FLOOD	=	YRS.
OVERTOPPING FLOOD ELEVATION	=	'

* NOTE LOCATION OF OVERTOPPING

WS EL. Taken @ River Station ?

ADDITIONAL INFORMATION AND COMPUTATIONS

Emergency Vehicle Access Possible?	No	
Number of Homes Confirmed	Yes	
Number of Homes	4	
Churches Confirmed	Yes	
Number of Churches	0	
Schools Confirmed	Yes	
Number of Schools	0	
Recreational/Business Areas Confirmed	Yes	
Number of Recreational/Business Areas	0	
General Description	QA by AA & MD 10/15/25 The existing timber bridge is temporary, and only small vehicles can cross it. (EMS) vehicles will not use it because it is not safe. As the photos show, most vehicles cross the river instead of using the bridge.	
Overall Condition	Damage	
Condition Other		
Site Repair Status	Temporary Repair	
Condition Description	Wooden bridge is old and will give way soon. Recommend more permanent structure QA note: new bridge needed for EMS Dimensions are still correct 10/15/25	
Expected Level of Effort	Full Redesign	
Other Level of Effort		
Horizontal Curve	No	
Number of Travel Lanes (LOS)	1	
Inclination	No	
Roadway Divicier	No	
Road/Bridge Width (ft)	12.00	
Span/Gap Estimate (ft)	26.00	
Surface to Water (ft)	6.00	21" W21X48 beam + 8" Deck + 2" Runner =31" (2'-7") ft structure depth)
Utility/Mechanical	No	
Utility Types		



Stationing and elevations shown are relative to the site.
Based on an assumed datum.
No survey grade field work was performed.

FOR INFORMATION ONLY

SHEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** N/A	**COUNTY** HAYWOOD	**GEOLOGIST** GRAINGER, P.	
SITE DESCRIPTION SITE 044-01-3f23e-Cattle Creek Ridge				**GROUND WTR (ft)**
BORING NO. B-1	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** 6.0
COLLAR ELEV. N/A	**TOTAL DEPTH** 21.5 ft	**NORTHING** 627,470	**EASTING** 873,774	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 89% 05/13/2024		**DRILL METHOD** H.S. Augers/NQ2 Core		**HAMMER TYPE** Automatic
DRILLER TOOTHMAN, R.	**START DATE** 12/17/25	**COMP. DATE** 12/17/25	**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. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE		0.0
		1.0	6	11	9	20		M		**ARTIFICIAL FILL** ABC STONE (0.0 TO 0.3 FT)		0.3
		3.1	13	87/0.2				M		MEDIUM DENSE, BROWN, SILTY SAND, SOME GRAVEL, MOIST (A-2-4)		3.6
		5.4				100/0.7				**ALLUVIAL** VERY DENSE, BROWN, GRVAEL, TRACE SILT, MOIST (A-1-b)		5.7
		5.7	100/0.3			100/0.3				**WEATHERED ROCK** GRAY, WHITE (GNEISS)		5.8
			60/0.0			60/0.0				**CRYSTALLINE ROCK** GRAY, WHITE, BROWN, ORANGE, GNEISS		11.5
										GRAY, WHITE, BROWN, ORANGE, MICA SCHIST		14.5
										DARK GRAY, WHITE, ORANGE, GNEISS		21.5
										Boring Terminated at Depth 21.5 ft IN CRYSTALLINE ROCK GNEISS		

BORING COLLAR ELEVATION WAS NOT OBTAINED. THE BORING ELEVATION SHOULD BE SURVEYED BY JMT.

NCDOT BORE SINGLE 71255209-CATTLE CREEK-SITE 044-01-3F23E.GPJ NC_DOT.GDT 12/24/25

FOR INFORMATION ONLY

SHEET

GEOTECHNICAL BORING REPORT
CORE LOG

WBS N/A	**TIP** N/A	**COUNTY** HAYWOOD	**GEOLOGIST** GRAINGER, P.	
SITE DESCRIPTION SITE 044-01-3f23e-Cattle Creek Ridge				**GROUND WTR (ft)**
BORING NO. B-1	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** 6.0
COLLAR ELEV. N/A	**TOTAL DEPTH** 21.5 ft	**NORTHING** 627,470	**EASTING** 873,774	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 89% 05/13/2024		**DRILL METHOD** H.S. Augers/NQ2 Core	**HAMMER TYPE** Automatic	
DRILLER TOOTHMAN, R.	**START DATE** 12/17/25	**COMP. DATE** 12/17/25	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 15.7 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
											Begin Coring @ 5.8 ft
		5.8	0.7	3:48/0.7	(0.3) 43%	(0.0) 0%		(2.6) 46%	(0.0) 0%		**CRYSTALLINE ROCK** 5.8 MODERATELY SEVERE TO MODERATE WEATHERING, SOFT TO MEDIUM HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GRAY, WHITE, BROWN, ORANGE GNEISS (GSI 35-50)
		6.5	5.0	1:49/1.0 2:32/1.0 3:26/1.0 4:11/1.0 3:15/1.0	(2.3) 46%	(0.0) 0%					
		11.5	5.0	1:40/1.0 4:00/1.0 2:59/1.0 4:19/1.0 3:49/1.0	(2.7) 54%	(0.4) 8%		(1.2) 40%	(0.4) 13%		11.5 MODERATELY SEVERE TO MODERATE WEATHERING, SOFT TO MEDIUM HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GRAY, WHITE, BROWN, ORANGE, MICA SCHIST (GSI 30-40) 14.5
		16.5	5.0	1:41/1.0 1:28/1.0 1:53/1.0 1:49/1.0 5:17/1.0	(1.8) 36%	(0.4) 8%		(3.3) 47%	(0.4) 6%		MODERATELY SEVERE TO MODERATE WEATHERING, MEDIUM HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, DARK GRAY, WHITE, ORANGE, GNEISS (GSI 30-50)
		21.5									21.5 Boring Terminated at Depth 21.5 ft IN CRYSTALLINE ROCK GNEISS BORING COLLAR ELEVATION WAS NOT OBTAINED. THE BORING ELEVATION SHOULD BE SURVEYED BY JMT.

FOR INFORMATION ONLY

Rock Core Photo
SITE 044-01-3f23e-Cattle Creek Ridge| Canton, NC
Terracon Project No. 71255209

Site Description: Site 044-01-3f23e-Cattle Creek Ridge	*County*: Haywood	*Boring Location:* B-1
Driller: R. Toothman	*Core Size*: NQ2	*Drill Machine:* CME 55
Geologist / Engineer: P. Grainger	*Total Core Length:* 15.7 feet	*Date: 12*/17/2025

Run 1: 5.8’ to 11.5’, **Run 2**: 11.5' to 16.5', **Run 3**: 16.5' to 21.5'

Notes:
1) Used NQ2 wireline core barrel
2) Refer to boring log for the result of the unconfined compressive (UC) strength test

Abandonment Method:
1) Boring backfilled with auger cuttings upon completion

FOR INFORMATION ONLY

SHEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS N/A	**TIP** N/A	**COUNTY** HAYWOOD	**GEOLOGIST** GRAINGER, P.	
SITE DESCRIPTION SITE 044-01-3f23e-Cattle Creek Ridge				**GROUND WTR (ft)**
BORING NO. B-2	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** N/A
COLLAR ELEV. N/A	**TOTAL DEPTH** 26.3 ft	**NORTHING** 627,502	**EASTING** 873,809	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 89% 05/13/2024		**DRILL METHOD** H.S. Augers/NQ2 Core		**HAMMER TYPE** Automatic
DRILLER TOOTHMAN, R.	**START DATE** 12/17/25	**COMP. DATE** 12/18/25	**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. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										GROUND SURFACE 0.0
		1.0	12	9	29	38		M		**ARTIFICIAL FILL** 0.3 ABC STONE (0.0 TO 0.3 FT)
		3.4	15	12	9	21		M		DENSE TO MEDIUM DENSE, BROWN, SILTY SAND, SOME GRAVEL, MOIST (A-2-4) 5.0
		5.7	12	6	16	22		M		**ALLUVIAL** MEDIUM DENSE, BROWN, BLACK, GRAVEL, TRACE MICA (A-1-b)
		8.2	33	15	13	28		M		12.6
		12.6	60/0.0			60/0.0				**CRYSTALLINE ROCK** 14.2 GRAY, WHITE, BROWN, ORANGE GRANITE BLACK, GRAY, BROWN, GNEISS 26.3
										Boring Terminated at Depth 26.3 ft IN CRYSTALLINE ROCK GNEISS BORING COLLAR ELEVATION WAS NOT OBTAINED. THE BORING ELEVATION SHOULD BE SURVEYED BY JMT.

NCDOT BORE SINGLE 71255209-CATTLE CREEK-SITE 044-01-3F23E.GPJ NC_DOT.GDT 12/24/25

FOR INFORMATION ONLY

SHEET

GEOTECHNICAL BORING REPORT
CORE LOG

WBS N/A	**TIP** N/A	**COUNTY** HAYWOOD	**GEOLOGIST** GRAINGER, P.	
SITE DESCRIPTION SITE 044-01-3f23e-Cattle Creek Ridge				**GROUND WTR (ft)**
BORING NO. B-2	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** N/A
COLLAR ELEV. N/A	**TOTAL DEPTH** 26.3 ft	**NORTHING** 627,502	**EASTING** 873,809	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 89% 05/13/2024		**DRILL METHOD** H.S. Augers/NQ2 Core	**HAMMER TYPE** Automatic	
DRILLER TOOTHMAN, R.	**START DATE** 12/17/25	**COMP. DATE** 12/18/25	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 13.7 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
											ELEV. (ft) / DEPTH (ft)
											Begin Coring @ 12.6 ft
		12.6	3.7	3:18/0.7 3:31/1.0 3:11/1.0 2:34/1.0	(3.4) 92%	(3.0) 81%		(1.6) 100%	(0.5) 31%		**CRYSTALLINE ROCK** MODERATELY SEVERE TO MODERATE WEATHERING, SOFT TO MEDIUM HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, GRAY, WHITE, BROWN, ORANGE GRANITE (GSI 35-50) 14.2 VERY SLIGHT TO MODERATE WEATHERING, MEDIUM HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, BLACK, GRAY, BROWN, GNEISS (GSI 70-85)
		16.3						(11.4) 94%	(10.2) 84%		
			5.0	2:59/1.0 3:00/1.0 3:12/1.0 3:41/1.0 3:18/1.0	(4.7) 94%	(4.3) 86%					
		21.3									
			5.0	2:16/1.0 2:50/1.0 3:18/1.0 3:27/1.0 4:03/1.0	(4.9) 98%	(3.4) 68%					
		26.3									26.3
											Boring Terminated at Depth 26.3 ft IN CRYSTALLINE ROCK GNEISS BORING COLLAR ELEVATION WAS NOT OBTAINED. THE BORING ELEVATION SHOULD BE SURVEYED BY JMT.

NCDOT CORE SINGLE 71255209-CATTLE CREEK-SITE 044-01-3F23E.GPJ NC_DOT.GDT 12/24/25

FOR INFORMATION ONLY

Rock Core Photo
SITE 044-01-3f23e-Cattle Creek Ridge| Canton, NC
Terracon Project No. 71255209

Site Description: Site 044-01-3f23e-Cattle Creek Ridge	*County*: Haywood	*Boring Location:* B-2
Driller: R. Toothman	*Core Size*: NQ2	*Drill Machine:* CME 55
Geologist / Engineer: P. Grainger	*Total Core Length:* 13.7 feet	*Date: 12*/17/2025 – 12/18/2025

Run 1: 12.6’ to 16.3’, **Run 2**: 16.3' to 21.3'

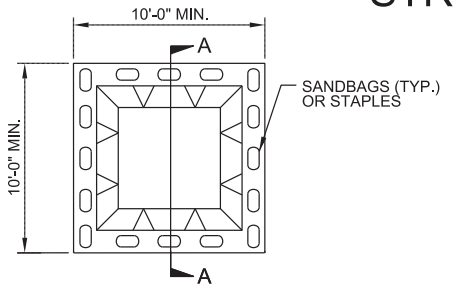
Run 3: 21.3' to 26.3'

Notes:
1) Used NQ2 wireline core barrel
2) Refer to boring log for the result of the unconfined compressive (UC) strength test

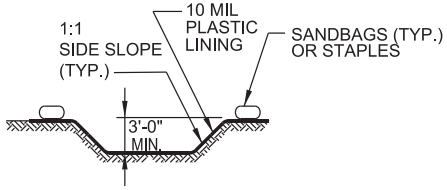
Abandonment Method:
1) Boring backfilled with auger cuttings and bentonite upon completion

PROJECT REFERENCE NO.	SHEET NO.
PRB	EC-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

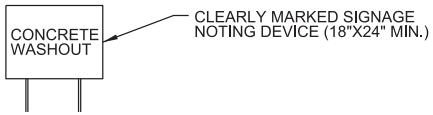
ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A



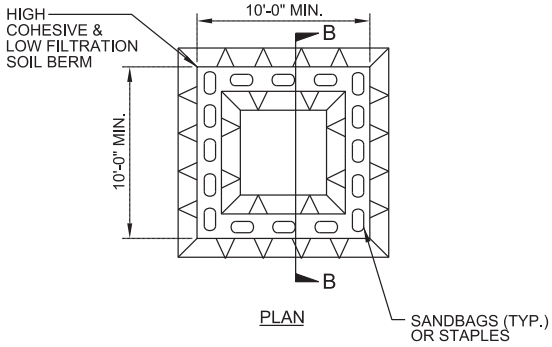
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

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.

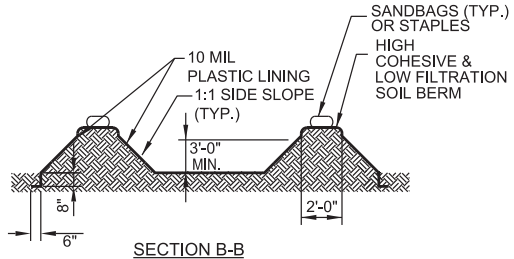
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

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 CLEARLY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
PRB	EC-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 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

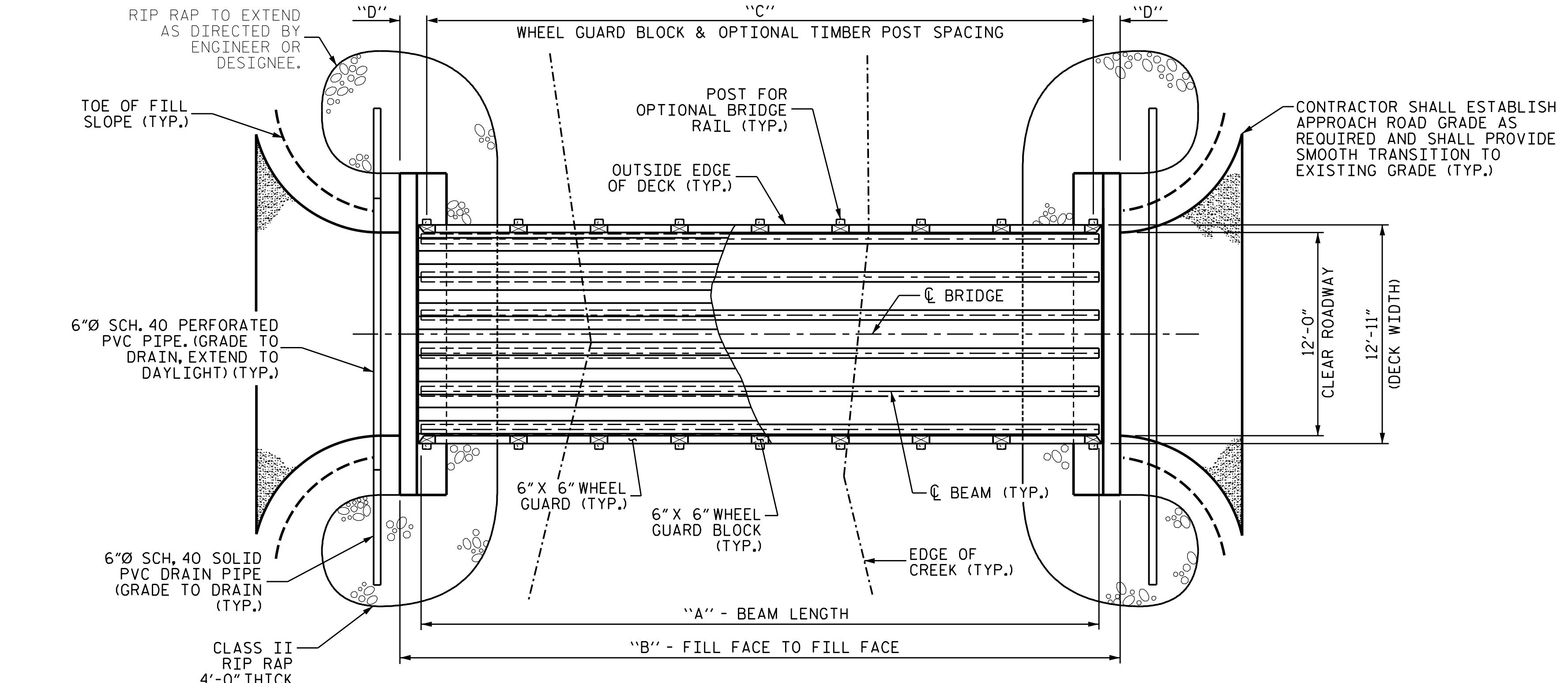
NOTES

FOR OPTIONAL TIMBER BRIDGE RAIL DETAILS, SEE "OPTIONAL TIMBER BRIDGE RAIL" SHEET.

CONTRACTOR SHALL LOCATE THE EXPANSION BEARING ON THE "UPHILL" END OF THE BRIDGE. THERE WILL BE ONLY ONE EXPANSION BEARING PER BRIDGE.

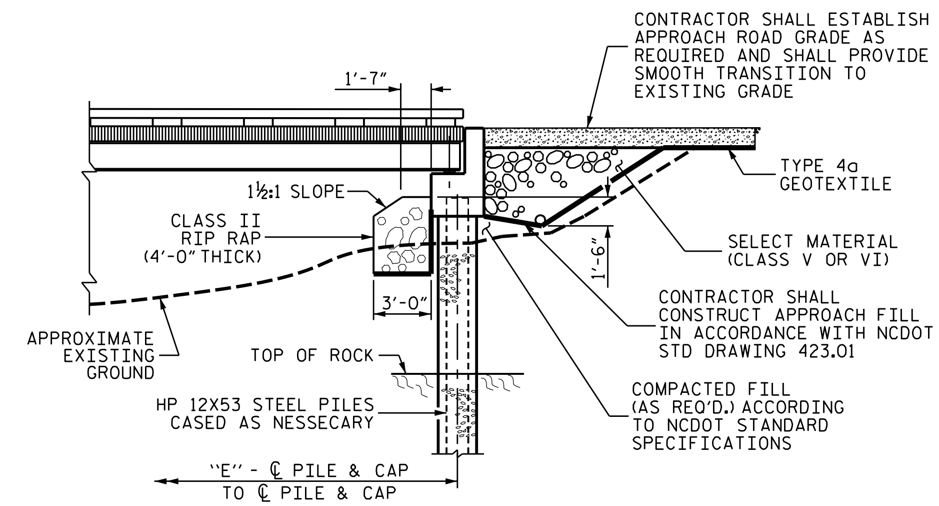
CONTRACTOR SHALL PROVIDE EROSION CONTROL MEASURES, AS REQUIRED ACCORDING TO NCDOT STANDARD SPECIFICATIONS AND THE CONTRACT DOCUMENTS.

THE CONTRACTOR SHALL SET THE LOW-CHORD ELEVATION OF THE BRIDGE BASED ON EXISTING SITE CONDITIONS AND IN COORDINATION WITH THE ENGINEER, SUCH THAT THE NEW CROSSING PROVIDES CONVEYANCE GREATER THAN OR EQUAL TO THE ORIGINAL DESTROYED CROSSING. THE CONTRACTOR SHALL REFER TO THE BSR WHEN SETTING THE LOW-CHORD ELEVATION OF THE BRIDGE. NO CONSTRUCTION ACTIVITIES SHALL COMMENCE UNTIL ALL PARTIES HAVE AGREED UPON THE LOW-CHORD ELEVATION AND THE DATED PERMIT APPLICATION IS APPROVED.



BRIDGE PLAN

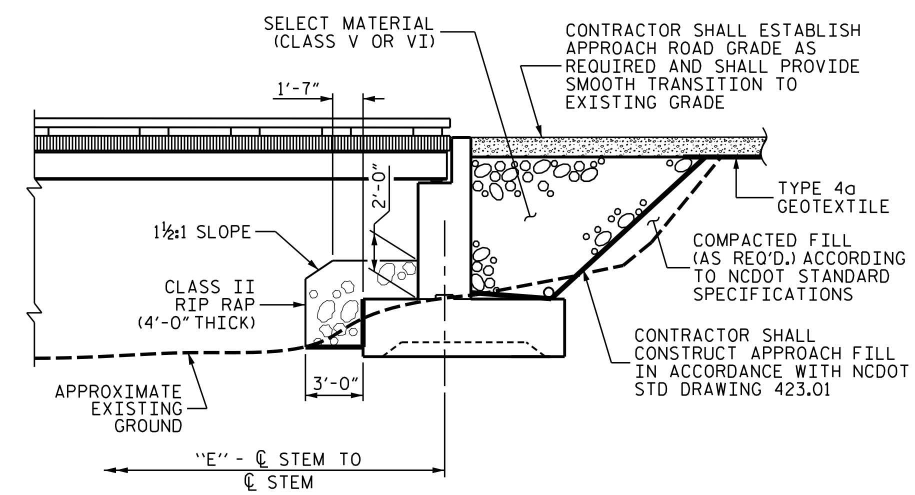
(FOUNDATION TYPE NOT SHOWN FOR CLARITY)



BRIDGE PARTIAL ELEVATION

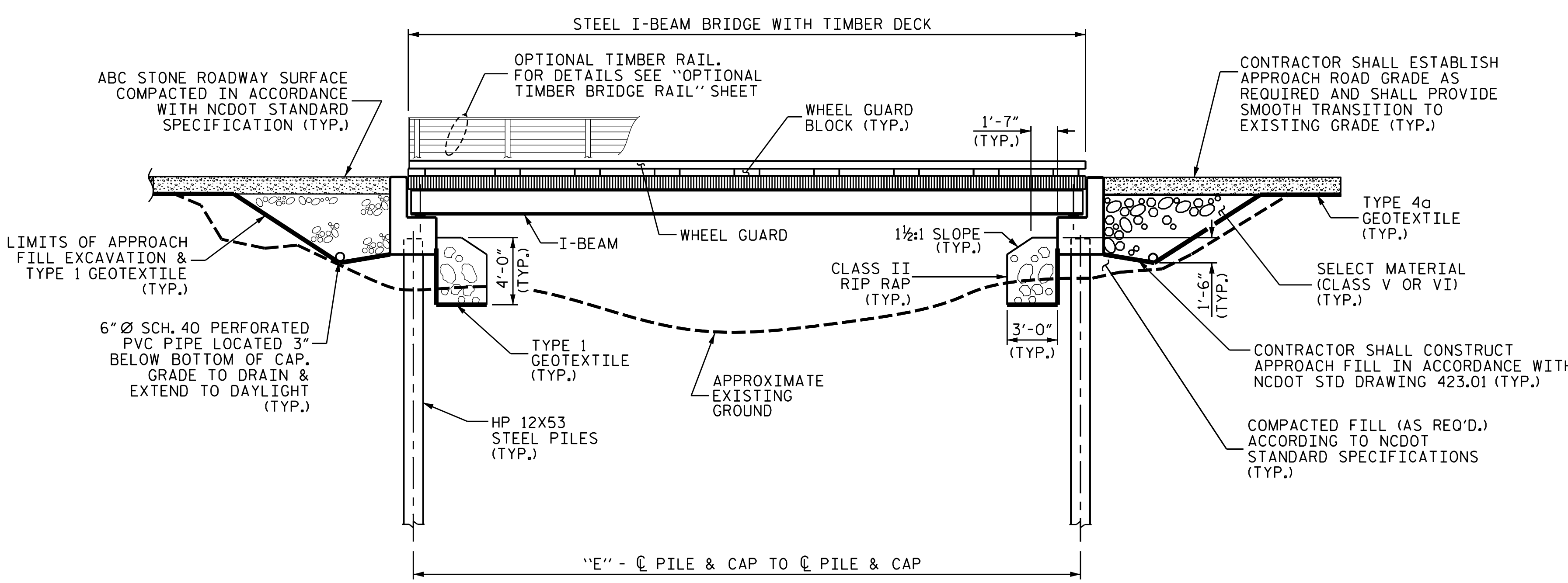
(SHOWING DRILLED-IN 12X53 STEEL PILES FOUNDATION)

DIMENSIONS TABLE					
SPAN	A	B	C	D	E
20'-0"	20'-0"	22'-6"	4 SPA. @ 4'-6"	2'-3"	19'-9"
30'-0"	30'-0"	32'-6"	7 SPA. @ 4'-0"	2'-3"	29'-9"
40'-0"	40'-0"	42'-6"	9 SPA. @ 4'-3"	2'-1½"	39'-9"
50'-0"	50'-0"	52'-6"	11 SPA. @ 4'-4"	2'-5"	49'-9"



BRIDGE PARTIAL ELEVATION

(SHOWING SPREAD FOOTING FOUNDATION)



BRIDGE ELEVATION

(SHOWING DRIVEN 12X53 STEEL PILES FOUNDATION)

Signed by: 13D... 12/9/2025
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046056 RYAN TYLER SHIPMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE TIMBER DECK

GENERAL DRAWING

JMT Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC DATE: 12/2025
CHKD. BY: RTS DATE: 12/2025
DES. EGR. OF RECORD: PCW DATE: 12/2025

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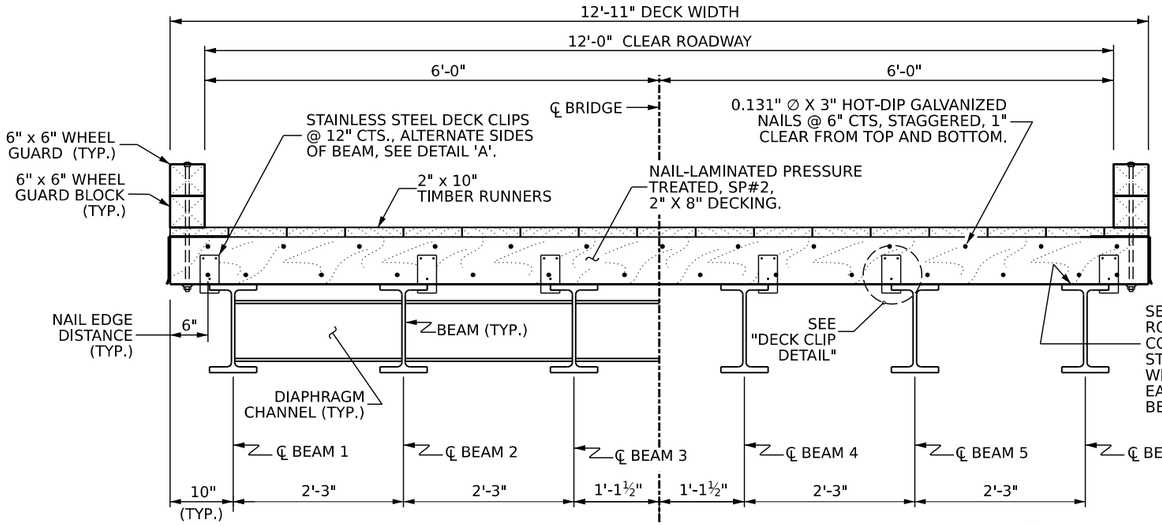
2				4			

SHEET NO. S-01
TOTAL SHEETS 12



TYPICAL SECTION

MATERIALS TABLE				
SPAN	BEAM	DIAPHRAGM CHANNEL	DECK PLANK	DECKING SQ. FT.
20'-0"	W16X36	C12X20.7	2X8	263
30'-0"	W21X48	C12X20.7	2X8	392
40'-0"	W24X76	C12X20.7	2X8	521
50'-0"	W24X104	C12X20.7	2X8	650

NOTES

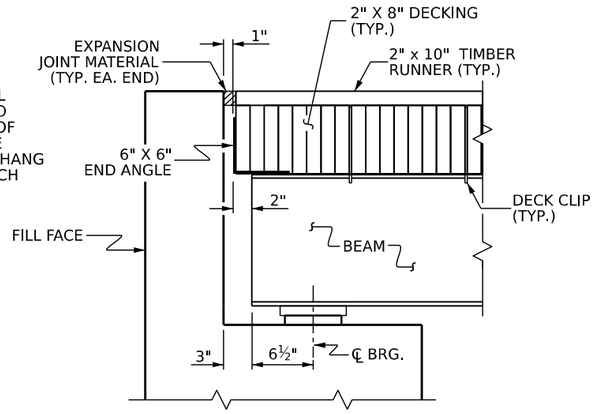
FOR TIMBER BRIDGE DECK SYSTEM DETAILS, SEE "PLAN OF SPAN" SHEET.

FOR OPTIONAL TIMBER RAILS, SEE ''OPTIONAL TIMBER BRIDGE RAIL'' SHEET.

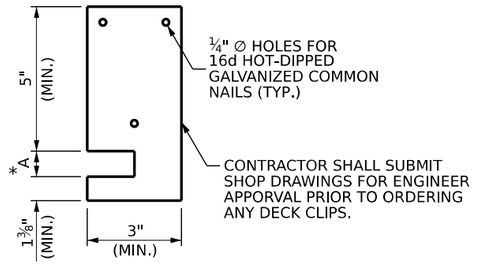
FOR BEAM AND DIAPHRAGM DETAILS, SEE "FRAMING PLAN & BEAM DETAILS" SHEET.

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.

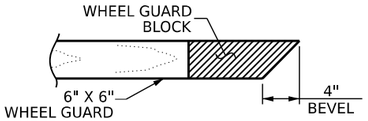
SEE ''PLAN OF SPAN'' SHEET FOR NUMBER OF WHEEL GUARDS AND WHEEL GUARD SPACING.



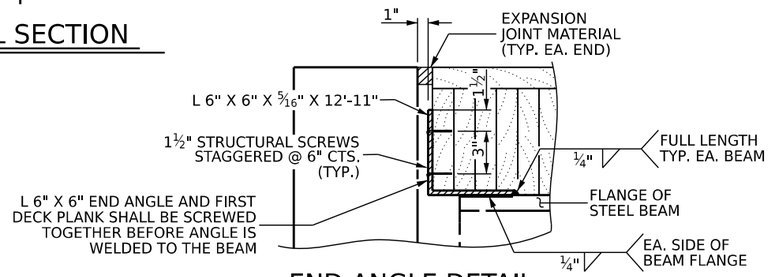
SECTION AT END BENT



DECK CLIP DETAIL



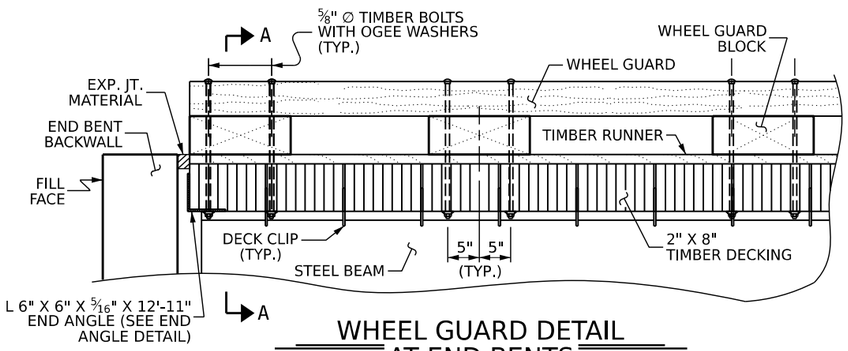
VIEW B-B



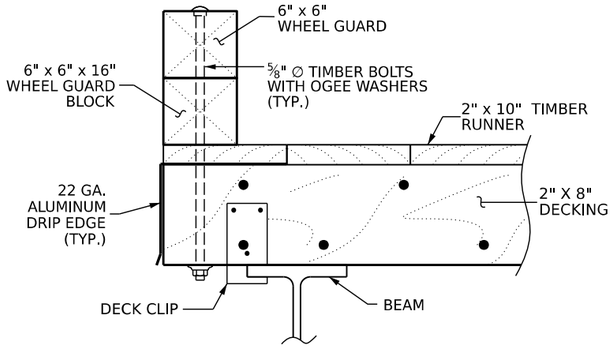
END ANGLE DETAIL

DECK CLIP DIMENSIONS		
SPAN	BEAM	*A
20'-0"	W16X36	½"
30'-0"	W21X48	½"
40'-0"	W24X76	¾"
50'-0"	W24X104	13/16"

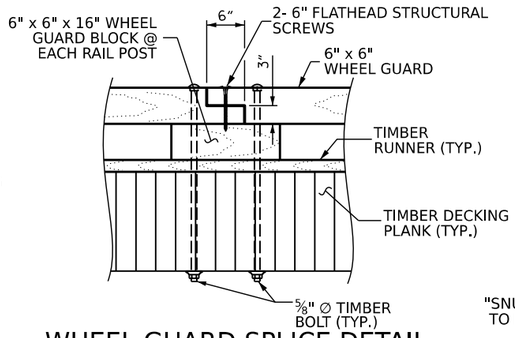
* DIMENSION A IS FOR INFORMATION ONLY. IT IS BASED ON THE FLANGE THICKNESS PLUS A 1/16" TOLERANCE. THE CONTRACTOR SHALL VERIFY THIS DIMENSION WITH DECK CLIP SUPPLIER. THE DECK CLIP SHALL HAVE A SNUG FIT TO THE BEAM FLANGE.



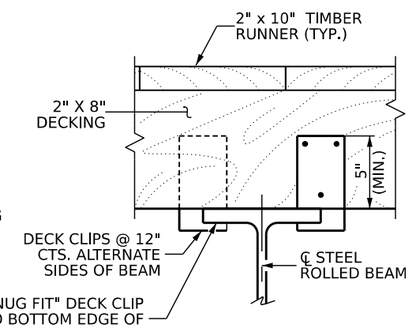
WHEEL GUARD DETAIL AT END BENTS



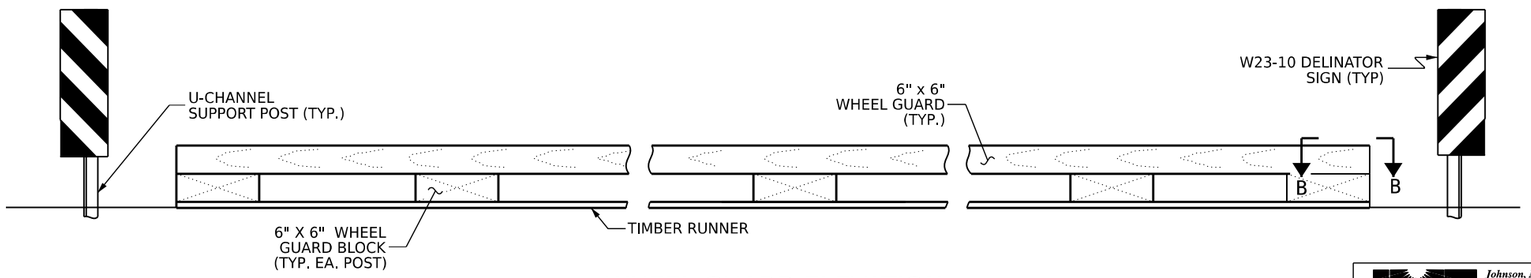
SECTION A-A



WHEEL GUARD SPLICE DETAIL



DETAIL 'A'



WHEEL GUARD ELEVATION

Signed by: Ryan Chapman
12/9/2025

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NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

TYPICAL SECTION & RAIL DETAILS

Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC DATE: 12/2025
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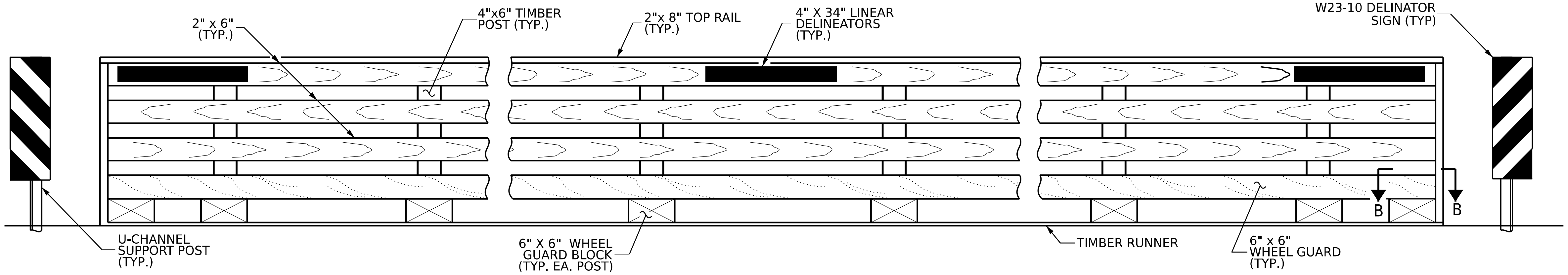
2			4			



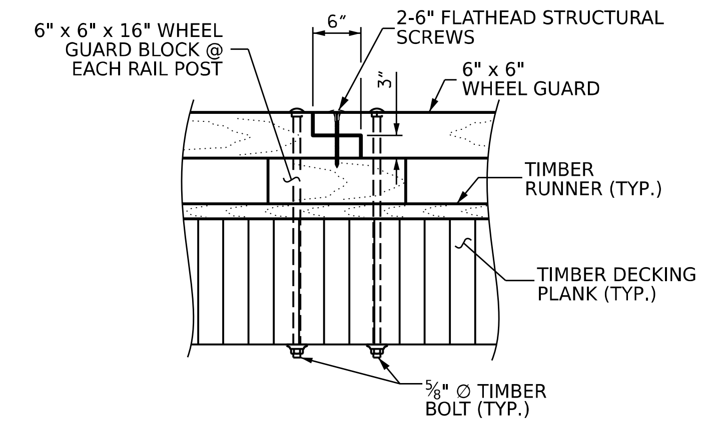
ELEVATION OF OPTIONAL BRIDGE RAIL

OPTIONAL BRIDGE RAIL NOTES

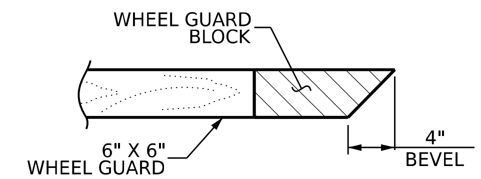
BRIDGE RAILS SHALL BE CONTINUOUS FROM END POST TO END POST WITH NO GAPS. RAIL LUMBER LENGTHS SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

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.

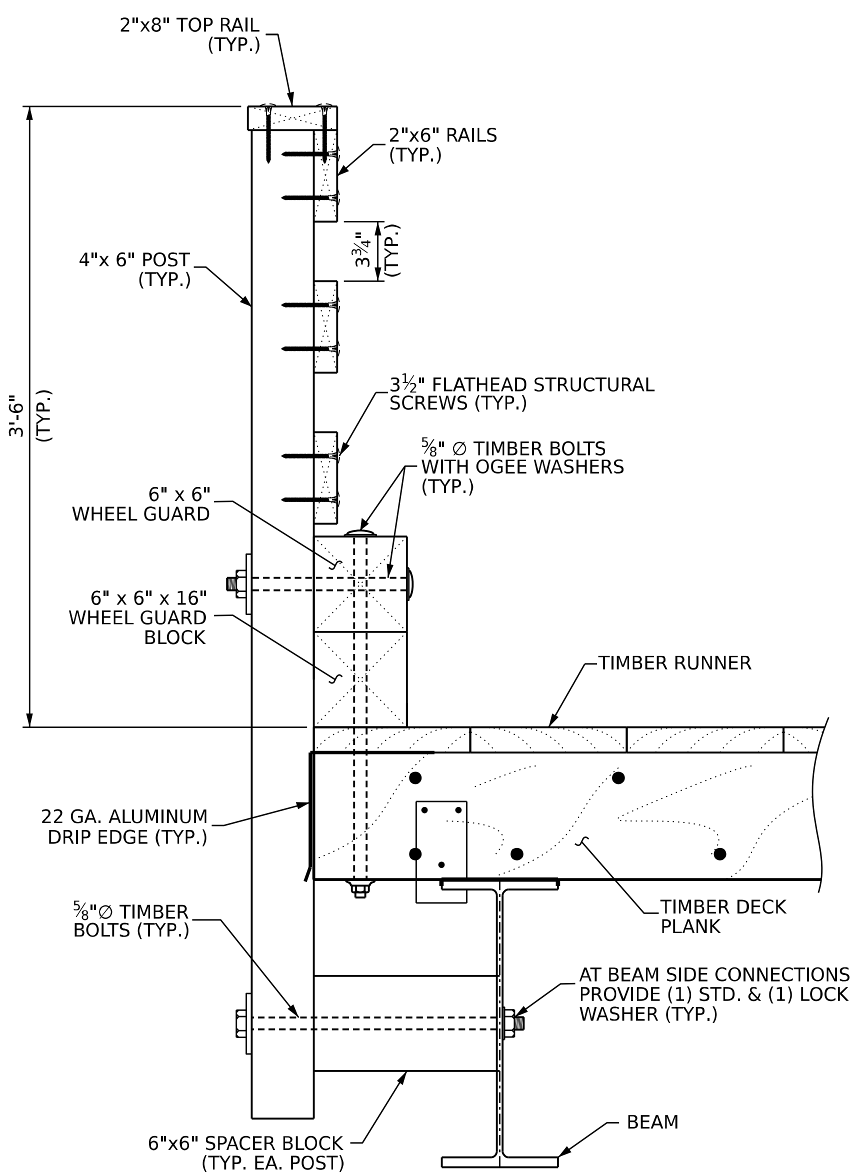
SEE "PLAN OF SPAN" SHEET FOR NUMBER OF POSTS AND POST SPACING.



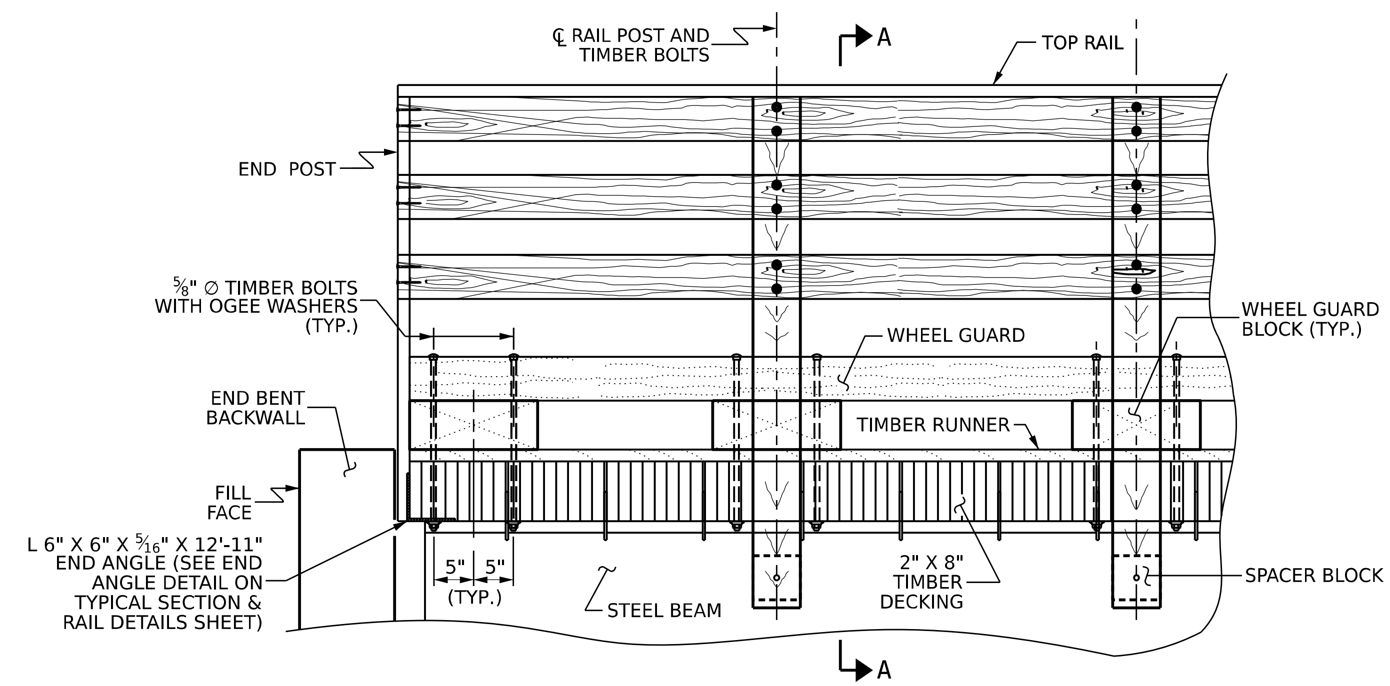
WHEEL GUARD SPLICE DETAIL



VIEW B-B



SECTION A-A



OPTIONAL RAIL DETAIL AT END BENTS

Signed by: NORTH CAROLINA PROFESSIONAL ENGINEER 046056 RYAN TYLER SHIPMAN
13DE72A…
12/9/2025

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NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

OPTIONAL TIMBER BRIDGE RAIL

JMT
Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

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SHEET NO. S-03
TOTAL SHEETS 12

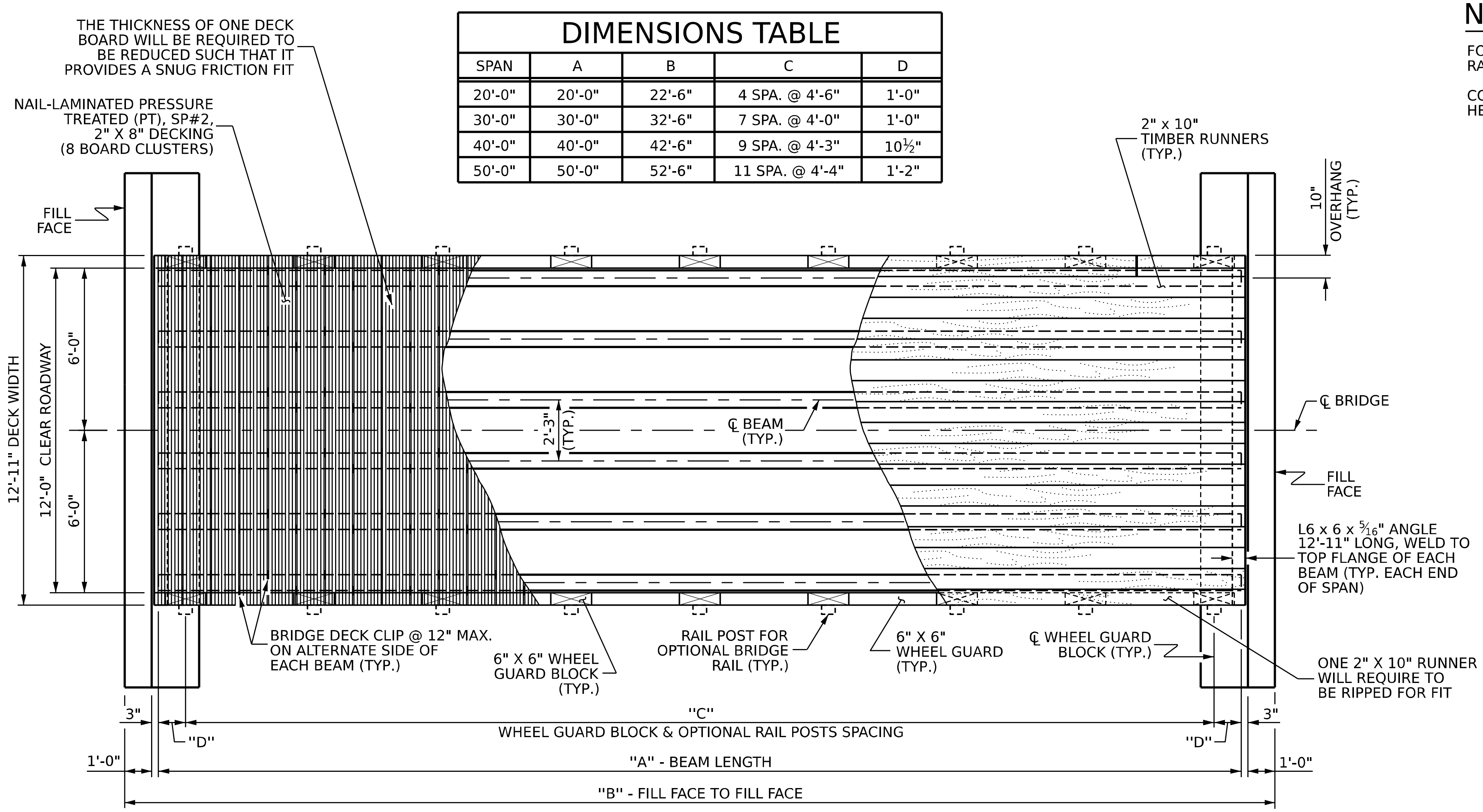
NOTES

FOR ADDITIONAL NOTES, SEE "TYPICAL SECTION & RAIL DETAILS" SHEET, AND "GENERAL NOTES" SHEET.

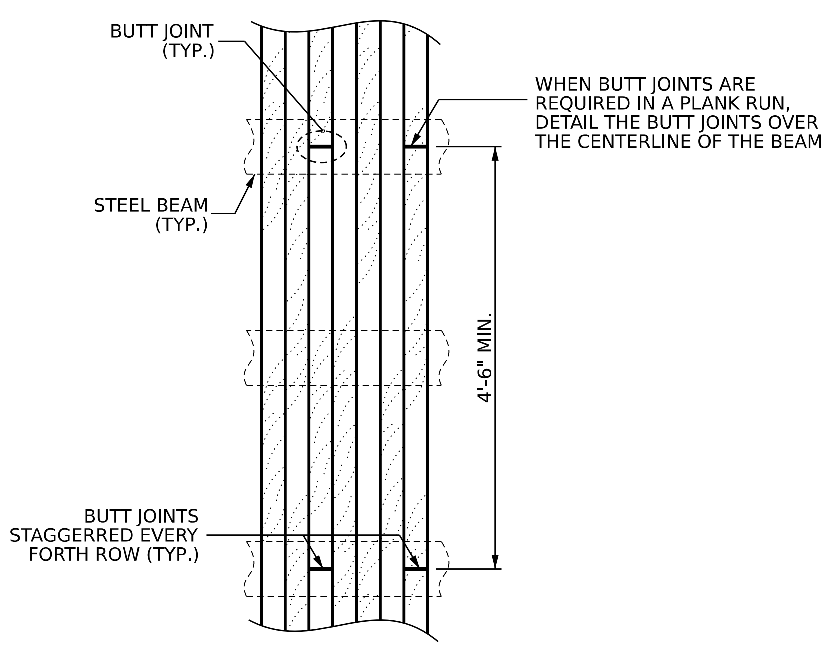
COUNTERSINK FLATHEAD STRUCTURAL TIMBER SCREW HEADS TO BE FLUSH WITH TIMBER SURFACE.

DIMENSIONS TABLE

SPAN	A	B	C	D
20'-0"	20'-0"	22'-6"	4 SPA. @ 4'-6"	1'-0"
30'-0"	30'-0"	32'-6"	7 SPA. @ 4'-0"	1'-0"
40'-0"	40'-0"	42'-6"	9 SPA. @ 4'-3"	10½"
50'-0"	50'-0"	52'-6"	11 SPA. @ 4'-4"	1'-2"

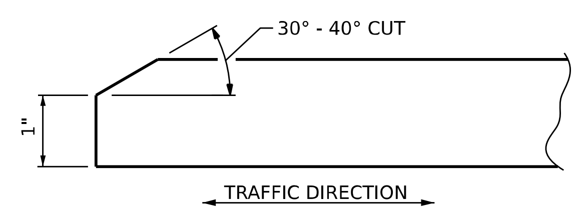


DECK LAYOUT



DECKING BOARD BUTT JOINT DETAIL

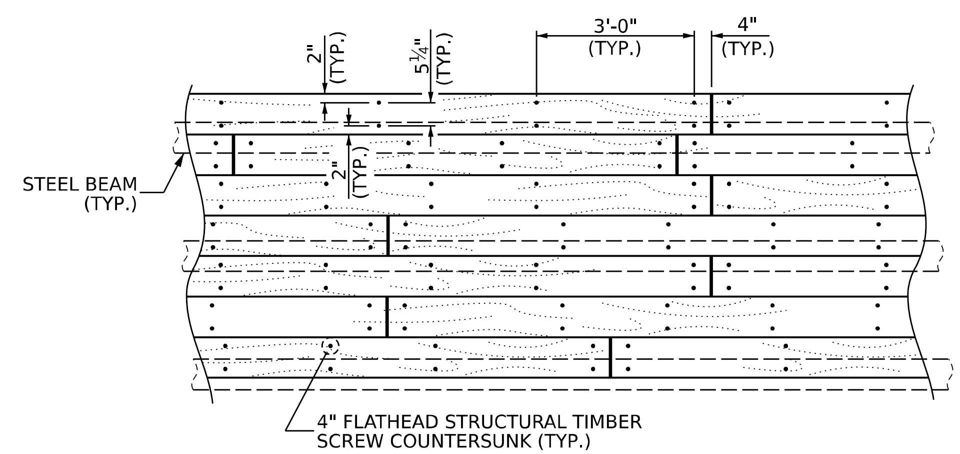
BUTT JOINTS SHALL BE OVER THE CENTERLINE OF A BEAM. JOINTS SHALL BE STAGGERED EVERY FOURTH DECK BOARD. NONE ALLOWED AT THE EXTERIOR BEAMS.



SIDE VIEW

TIMBER RUNNER BEVEL DETAIL

(TYP. AT EACH END OF BRIDGE)



TIMBER RUNNER BUTT JOINT DETAIL

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046056 RYAN TYLER SHIPMAN
Signed by: Ryan Tyler Shipman 12/9/2025

NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

PLAN OF SPAN

SHEET NO. S-04
TOTAL SHEETS 12

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JMT Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
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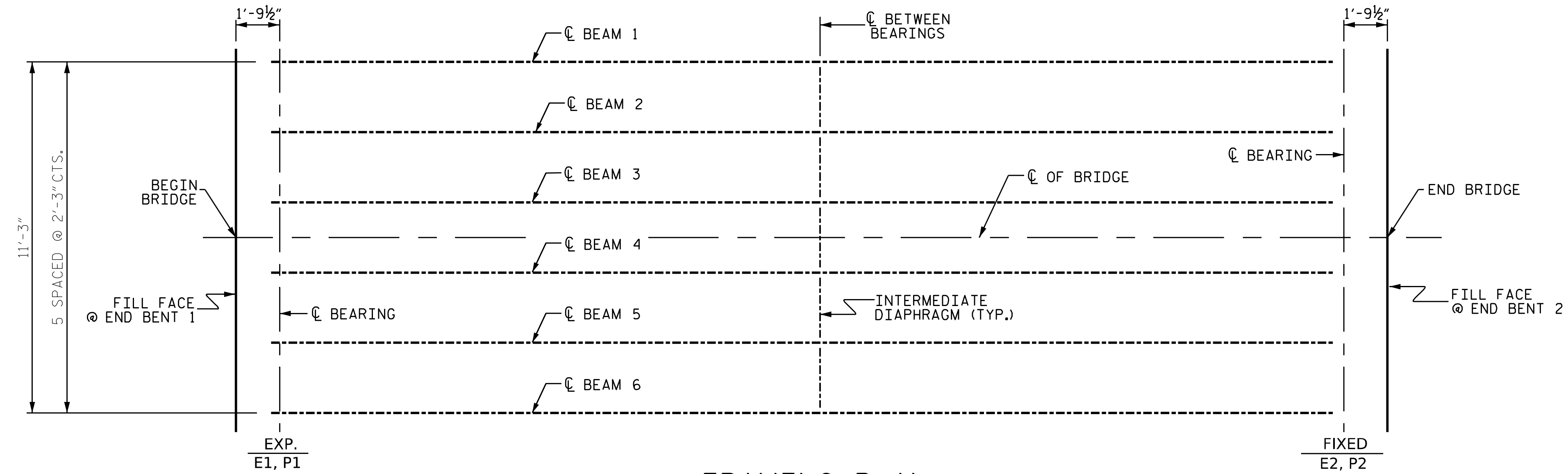
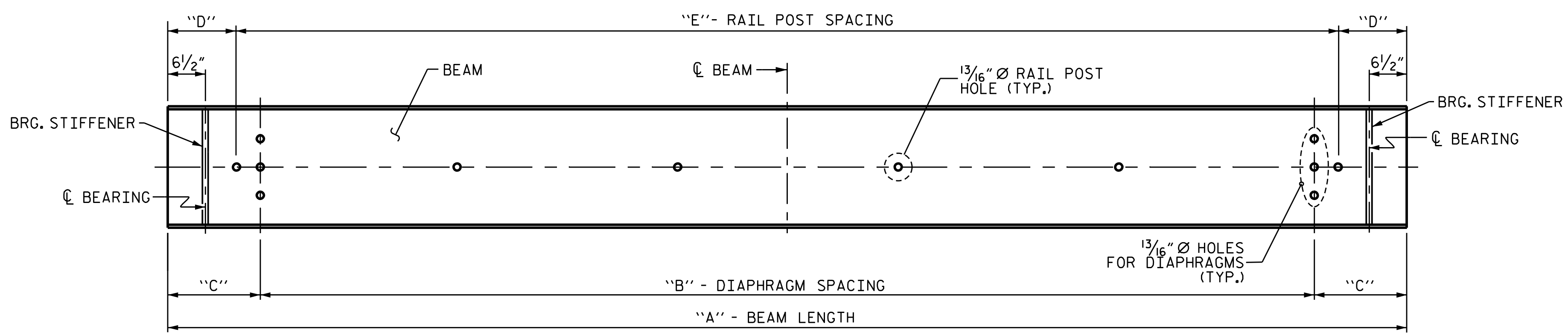
DES. EGR. OF RECORD: PCW DATE: 12/2025

wdcrutcher
DGN: pw://jmt-pw.bentley.com:jmt-pw-01/Documents/Projects/2025/25-00529/25-00529-00/Design/Structures/NC PPB-Steel Beam with Timber Deck Standards/Single Lane Steel Beam with Timber Deck Plans/2 Standard Drawings/I-Beam Bridge Plans 20-50/004-S4_Plan of Span.dgn
TIME: 12/9/2025



FRAMING PLAN

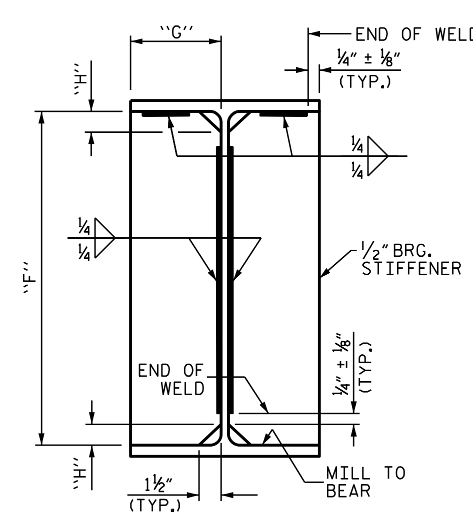
EXPANSION BEARING SHALL BE PLACED ON THE "UPHILL" END OF THE BRIDGE.



BEAM FLANGE ELEVATION

SHOWING DIAPHRAGM HOLES FOR ALL BEAMS, AND RAIL POST HOLES FOR EXTERIOR BEAMS.

BEAM DIMENSION TABLE							
SPAN	BEAM	CHANNEL	A	B	C	D	E
20'-0"	W16X36	C12X20.7	20'-0"	2 SPA. @ 7'-0"	3'-0"	1'-0"	4 SPA. @ 4'-6"
30'-0"	W21X48	C12X20.7	30'-0"	2 SPA @ 12'-0"	3'-0"	1'-0"	7 SPA. @ 4'-0"
40'-0"	W24X76	C12X20.7	40'-0"	2 SPA. @ 17'-0"	3'-0"	10½"	9 SPA. @ 4'-3"
50'-0"	W24X104	C12X20.7	50'-0"	2 SPA. @ 22'-0"	3'-0"	1'-2"	11 SPA. @ 4'-4"



SECTION VIEW - BRG. STIFFENER

STIFFENER DIMENSION			
BEAM	F	G	H
W16X36	1'-3"	3⅜"	2"
W21X48	1'-7¾"	3⅞"	2⅛"
W24X76	1'-10 9/16"	4¼"	2 7/16"
W24X104	1'-10 9/16"	6⅛"	2¾"

NOTES

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

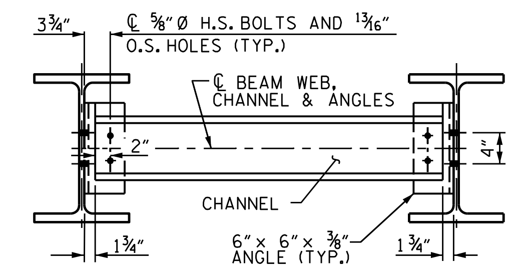
NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.

ALL STRUCTURAL STEEL FIELD CONNECTIONS SHALL BE ⅝" DIA. GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

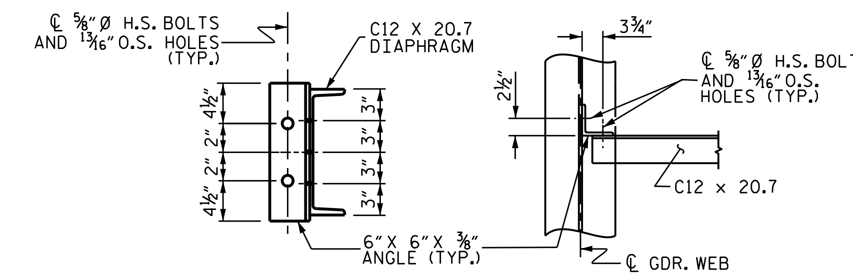
BEAMS SHALL BE PLACED PARALLEL TO THE CHORD.

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

SEE "GENERAL NOTES" SHEET FOR COATING.



DIAPHRAGM DETAILS



ANGLE DETAILS

12/9/2025

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NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE TIMBER DECK

FRAMING PLAN & BEAM DETAILS

Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

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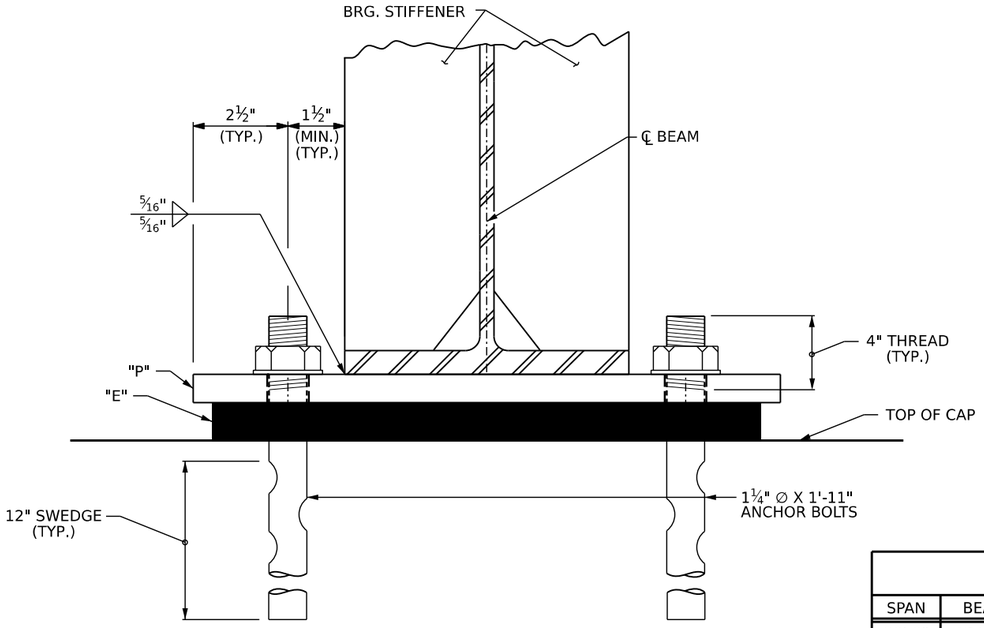
SHEET NO. S-05
TOTAL SHEETS 12

wdcrutcher
DGN: pw://jmt-pw.bentley.com:jmt-pw-01/Documents/Projects/2025/25-00529/25-00529-00/Design/Structures/NC PRB-Steel Beam with Timber Deck Standards/Single Lane Steel Beam with Timber Deck Plans/2 Standard Drawings/I-Beam Bridge Plans_20-50/005-S5_Framing Plan.dgn
TIME: 12/9/2025



SECTION AT BEARING

DIMENSIONS TABLE						
SPAN	BEAM	FLANGE WIDTH	TYPE	A	B	C
20'-0"	W16X36	6.99"	I	10"	1'-2"	1'-3"
30'-0"	W21X48	8.14"	II	1'-0"	1'-4"	1'-5"
40'-0"	W24X76	9.0"	II	1'-0"	1'-4"	1'-5"
50'-0"	W24X104	12.75"	III	1'-4"	1'-8"	1'-9"

NOTES

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

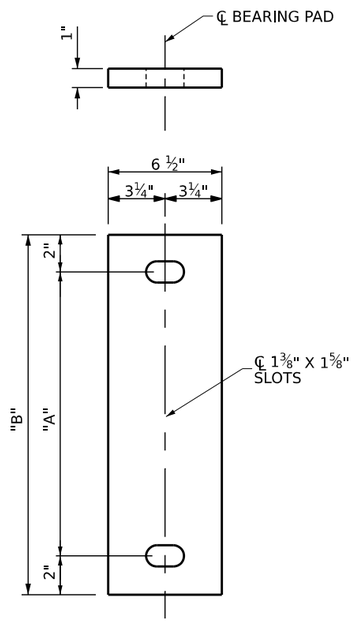
AT THE APPROVAL OF THE ENGINEER, SOLE PLATES AT THE EXPANSION END MAY BE FIELD WELDED.

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.

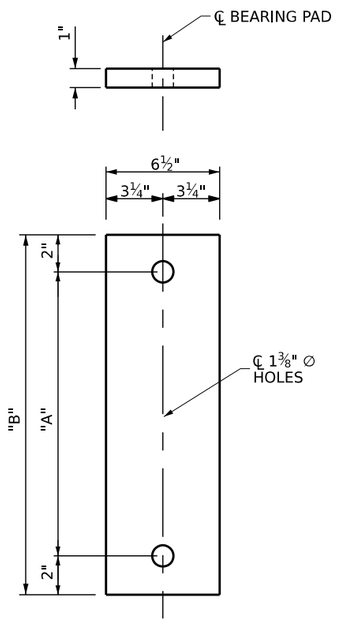
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

AT NO ADDITIONAL COST, 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 STANDARD SPECIFICATIONS.

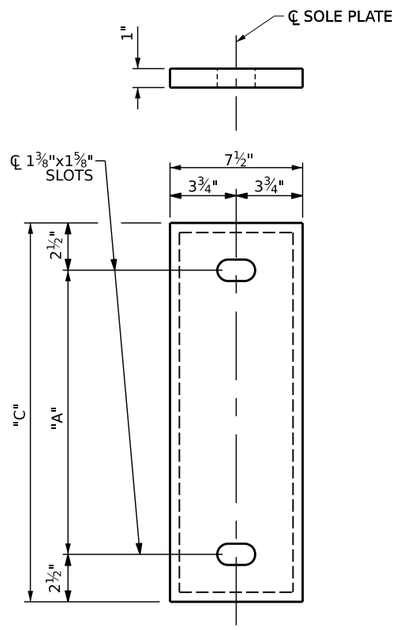
ADHESIVELY ANCHORED ANCHOR BOLTS SHALL BE THREADED FULL LENGTH.



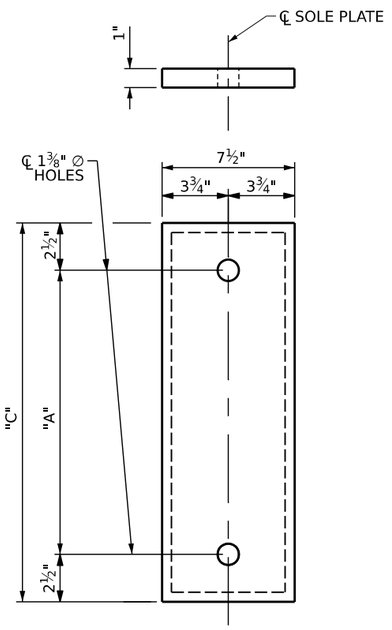
E1 ELASTOMERIC BEARING DETAILS
(6 REQ'D)
EXPANSION



E2 ELASTOMERIC BEARING DETAILS
(6 REQ'D)
FIXED



P1 SOLE PLATE DETAILS
(6 REQ'D)
EXPANSION



P2 SOLE PLATE DETAILS
(6 REQ'D)
FIXED

Signed by: Ryan Thompson SEAL 046056 NORTH CAROLINA PROFESSIONAL ENGINEER RYAN TYLER SHIPMAN
12/9/2025

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NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

BEARING DETAILS

Johnson, Mirmiran, & Thompson Inc.
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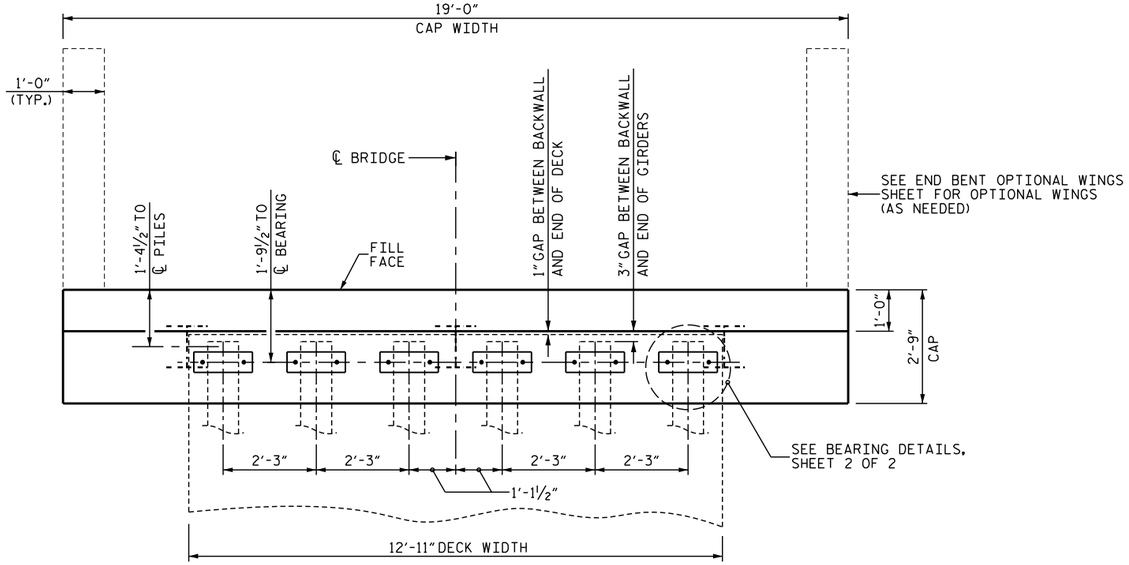
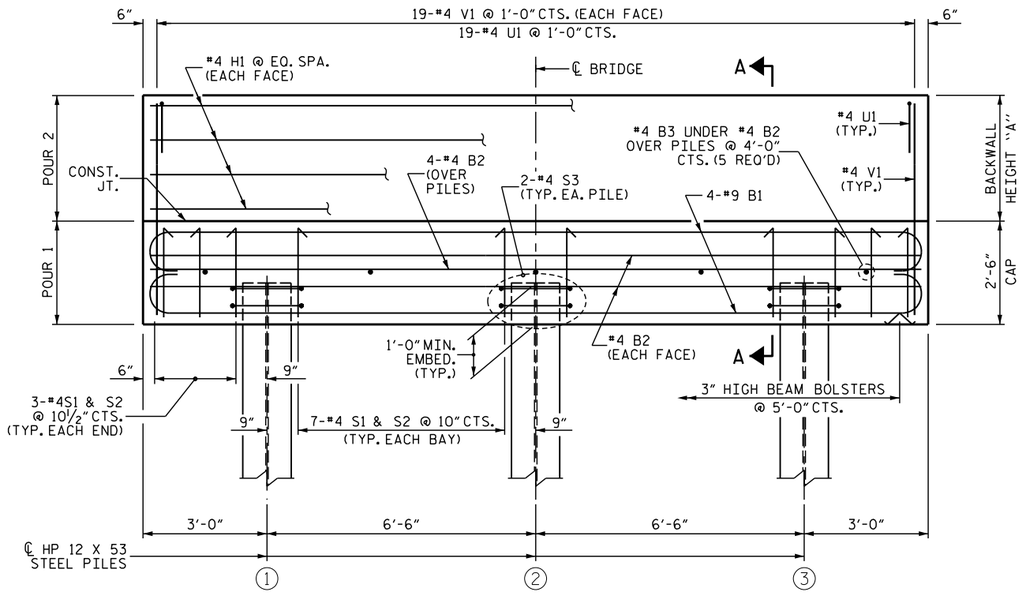
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-06
1			3			TOTAL SHEETS
2			4			12



PLAN

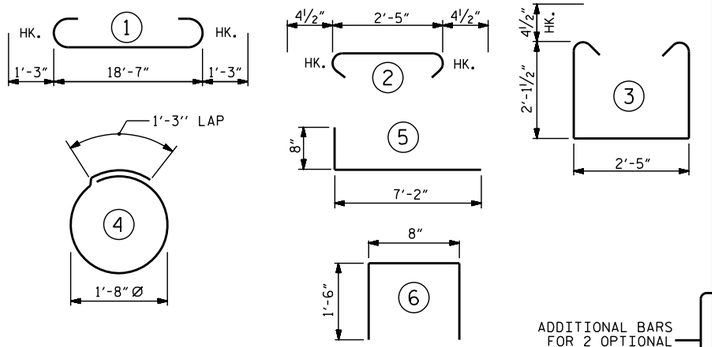
BACKWALL DIM.		
SPAN	BEAM	A
20'-0"	W16X36	2'-2⅝"
30'-0"	W21X48	2'-7⅜"
40'-0"	W24X76	2'-10⅝"
50'-0"	W24X104	2'-10¾"



ELEVATION

(OPTIONAL WINGS NOT SHOWN FOR CLARITY)

BAR TYPES



ADDITIONAL BARS FOR 2 OPTIONAL WINGS

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	①	21'-1"	573
B2	8	#4	STR	18'-8"	100
B3	5	#4	STR	2'-5"	8
H1	8	#4	STR	18'-8"	100
U1	19	#4	⑥	3'-8"	47
S1	20	#4	③	7'-5"	99
S2	20	#4	②	3'-2"	42
S3	6	#4	④	6'-6"	26
V1	38	#4	STR	4'-5"	112
H2	28	#4	⑤	7'-10"	147
V2	56	#4	STR	3'-6"	131

	W/O WINGS	WITH WINGS
REINFORCING STEEL (FOR ONE END BENT) (LBS.)	1,107	1,385
CLASS A CONCRETE (FOR ONE END BENT) (C.Y.)		
POUR 1	4.8	6.0
POUR 2 *	1.7	2.8
TOTAL	6.5	8.8

* BASED ON SHORTEST BACKWALL HEIGHT. UP TO 0.5 C.Y. EXTRA REQ'D FOR THE TALLER BACKWALLS

GENERAL NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

CONTRACTOR SHALL SLOPE TOP OF CAP TO MATCH LONGITUDINAL GRADE OF THE BRIDGE. SLOPES SHALL MATCH ON BOTH END BENT 1 AND END BENT 2 CAPS.

WINGS MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER OR DESIGNEE.

FOR OPTIONAL WINGS FOR END BENT, SEE SHEET 2 OF 2.

FOR BEARING DETAILS, SEE SHEET 2 OF 2.

FOR PILE SPLICE DETAILS, SEE SHEET 2 OF 2.

THE LENGTH OF THE "V" BARS ARE BASED ON THE SHORTEST BACKWALL CONFIGURATION. THESE BARS WILL HAVE EXTRA CLEARANCE AT THE BOTTOM OF THE CAP WHEN USING TALLER BACKWALLS.

FOUNDATION NOTES
DRIVEN PILES

INSTALL PILES IN ACCORDANCE WITH SECTION 450 OF THE STANDARD SPECIFICATIONS.

DO NOT INSTALL PILES UNTIL FILL HAS BEEN PLACED.

DRIVE PILES TO A MINIMUM PENETRATION OF AT LEAST 10 FEET INTO NATURAL GROUND OR CHANNEL BOTTOM.

DRIVE ALL PILES TO "REFUSAL" BELOW MINIMUM PENETRATION.

PREDRILLING OR SPUDDING MAY BE REQUIRED TO ACHIEVE THE MINIMUM PILE PENETRATION.

SUBMIT THE PROPOSED PILE DRIVING METHODS AND EQUIPMENT FOR ACCEPTANCE BY THE ENGINEER.

SECTION A-A

SHEET 1 OF 2

Signed by: RYAN TYLER SHIPMAN
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046056
12/9/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

END BENT
DRIVEN PILES

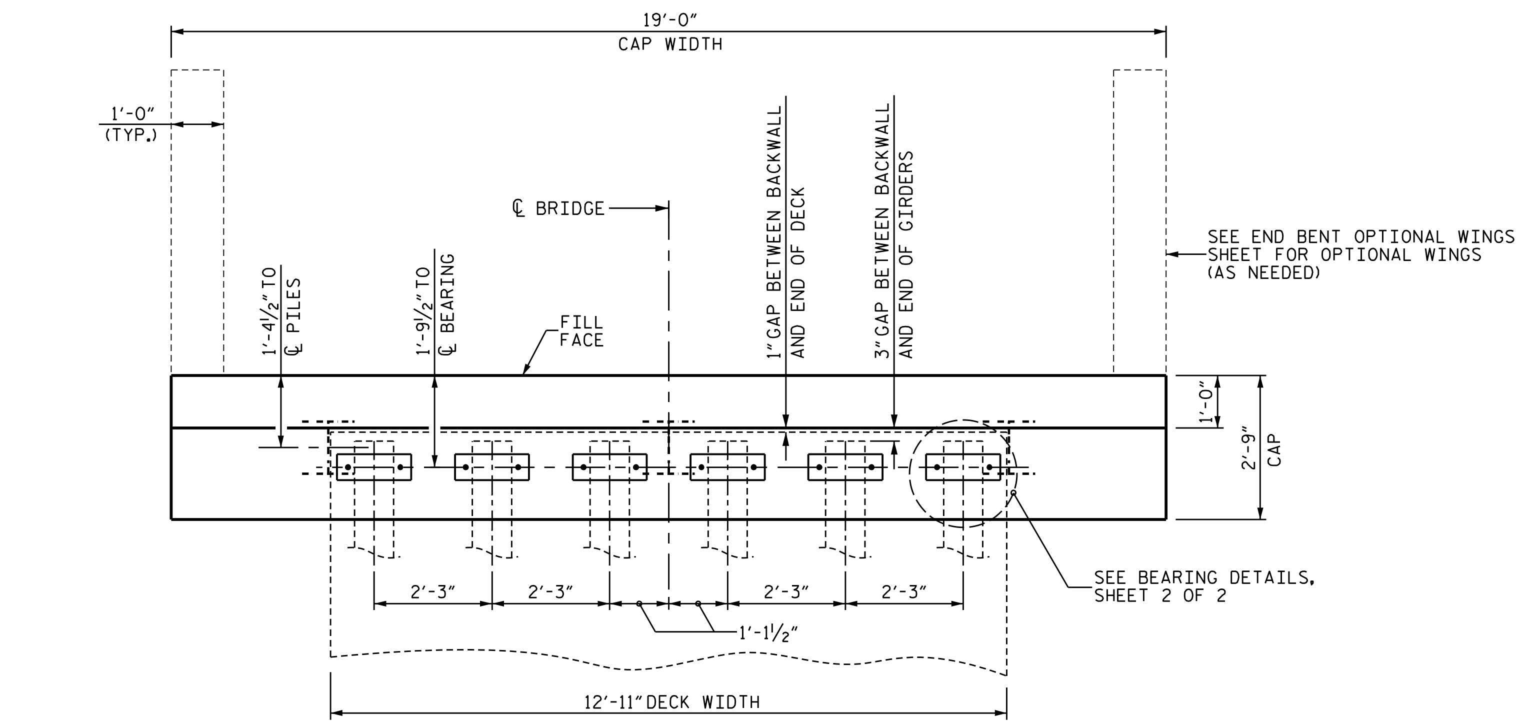
Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC DATE: 12/2025
CHKD. BY: RTS DATE: 12/2025
DES. EGR. OF RECORD: PCW DATE: 12/2025

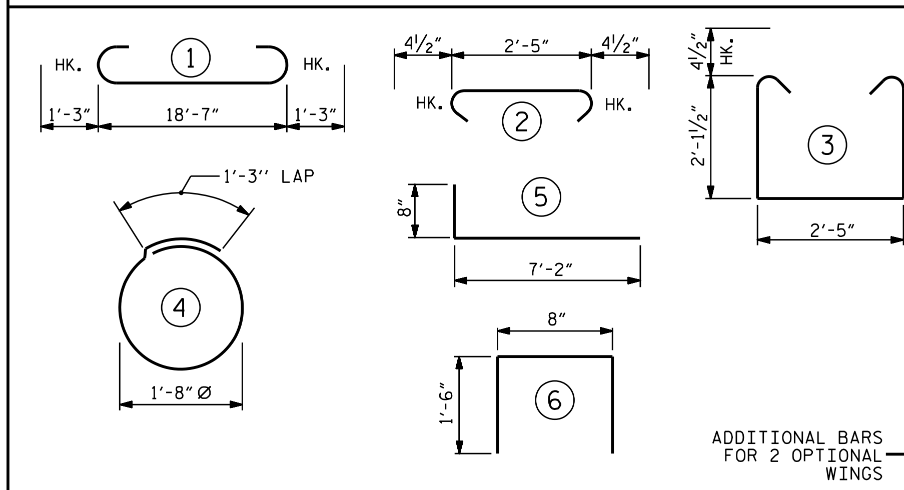
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-07
TOTAL SHEETS 12

wdcrutcher
DGN: pw://jmt-pw.bentley.com/jmt-pw-01/Documents/Projects/2025/25-00529/25-00529-100/Design/Structures/NC PRB-Steel Beam with Timber Deck Standards/Single Lane Steel Beam with Timber Deck Plans/2 Standard Drawings/1-Beam Bridge Plans_20-50/007-S7_End Bent_Driven Piles.dgn
TIME: 12/9/2025



PLAN



BAR TYPES

BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	①	21'-1"	573
B2	8	#4	STR	18'-8"	100
B3	5	#4	STR	2'-5"	8
H1	8	#4	STR	18'-8"	100
U1	19	#4	⑥	3'-8"	47
S1	20	#4	③	7'-5"	99
S2	20	#4	②	3'-2"	42
S3	6	#4	④	6'-6"	26
V1	38	#4	STR	4'-5"	112
H2	28	#4	⑤	7'-10"	147
V2	56	#4	STR	3'-6"	131

ADDITIONAL BARS FOR 2 OPTIONAL WINGS (H2, V2)

	W/O WINGS	WITH WINGS
REINFORCING STEEL (FOR ONE END BENT) (LBS.)	1,107	1,385
CLASS A CONCRETE (FOR ONE END BENT) (C.Y.)		
POUR 1	4.8	6.0
POUR 2 ✱	1.7	2.8
TOTAL	6.5	8.8

✱ BASED ON SHORTEST BACKWALL HEIGHT. UP TO 0.5 C.Y. EXTRA REQ'D FOR THE TALLER BACKWALLS

BACKWALL DIM.		
SPAN	BEAM	A
20'-0"	W16X36	2'-2⅝"
30'-0"	W21X48	2'-7⅜"
40'-0"	W24X76	2'-10⅝"
50'-0"	W24X104	2'-10¾"

GENERAL NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

CONTRACTOR SHALL SLOPE TOP OF CAP TO MATCH LONGITUDINAL GRADE OF THE BRIDGE. SLOPES SHALL MATCH ON BOTH END BENT 1 AND END BENT 2 CAPS.

WINGS MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER OR DESIGNEE.

FOR OPTIONAL WINGS FOR END BENT, SEE SHEET 2 OF 2.

FOR BEARING DETAILS, SEE SHEET 2 OF 2.

FOR PILE SPLICE DETAILS, SEE SHEET 2 OF 2.

THE LENGTH OF THE "V" BARS ARE BASED ON THE SHORTEST BACKWALL CONFIGURATION. THESE BARS WILL HAVE EXTRA CLEARANCE AT THE BOTTOM OF THE CAP WHEN USING TALLER BACKWALLS.

FOUNDATION NOTES

DRILLED-IN PILES

ROCK QUALITY DESIGNATION (RQD)
GEOLOGICAL STRENGTH INDEX (GSI)

INSTALL DRILLED-IN PILES IN ACCORDANCE WITH SECTION 450 OF THE STANDARD SPECIFICATIONS.

MINIMUM PILE PENETRATION OF 10-FT INTO NATURAL GROUND OR CHANNEL BOTTOM IS REQUIRED.

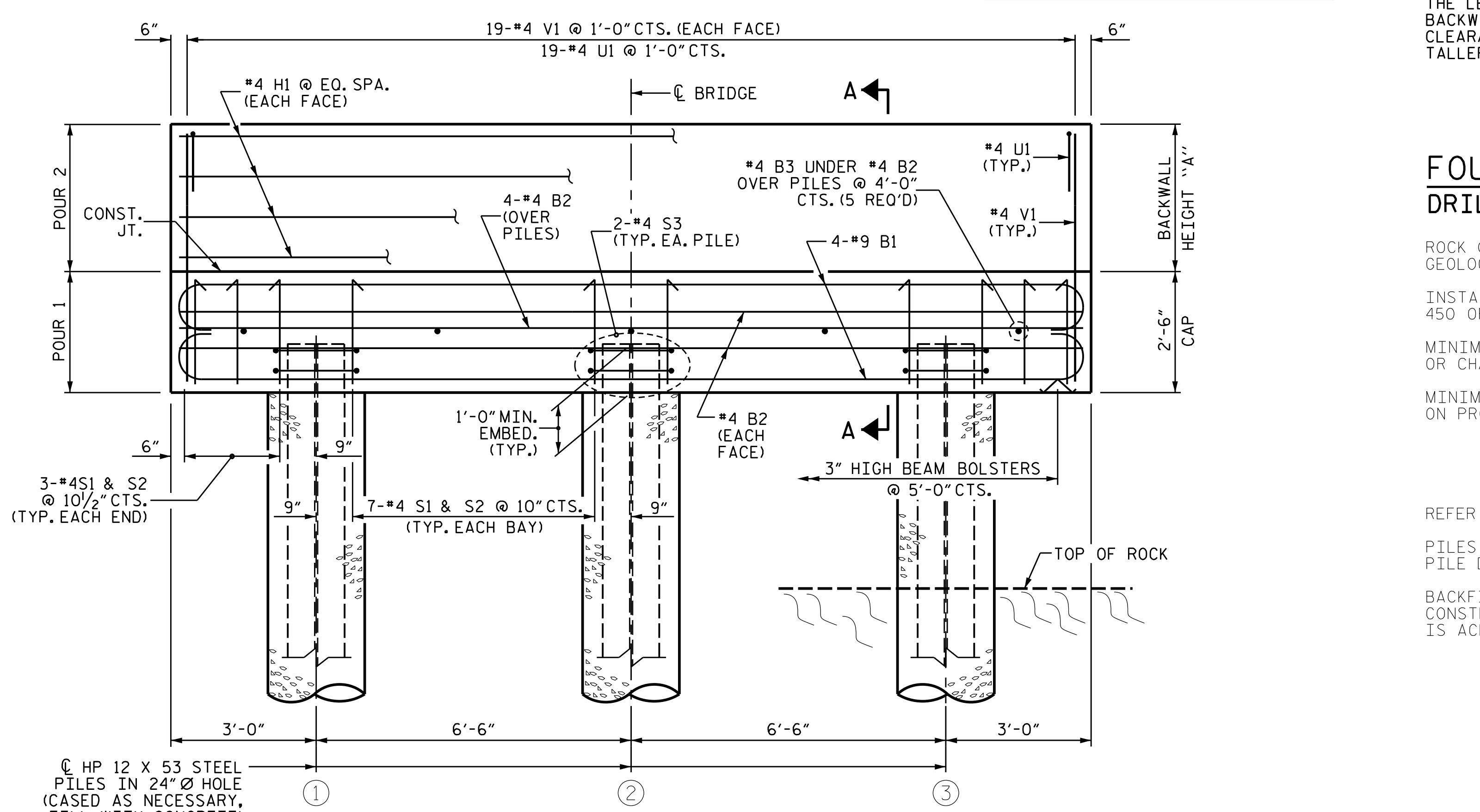
MINIMUM ROCK SOCKET DEPTHS, UNLESS OTHERWISE INDICATED ON PROJECT SPECIFIC DATA SHEET:

- 4' MINIMUM (RQD >70, GSI >50)
- 6' MINIMUM (RQD 30-70, GSI 30-50)
- 8' MINIMUM (RQD <30, GSI <30)

REFER TO BORING LOGS FOR RQD AND GSI DATA.

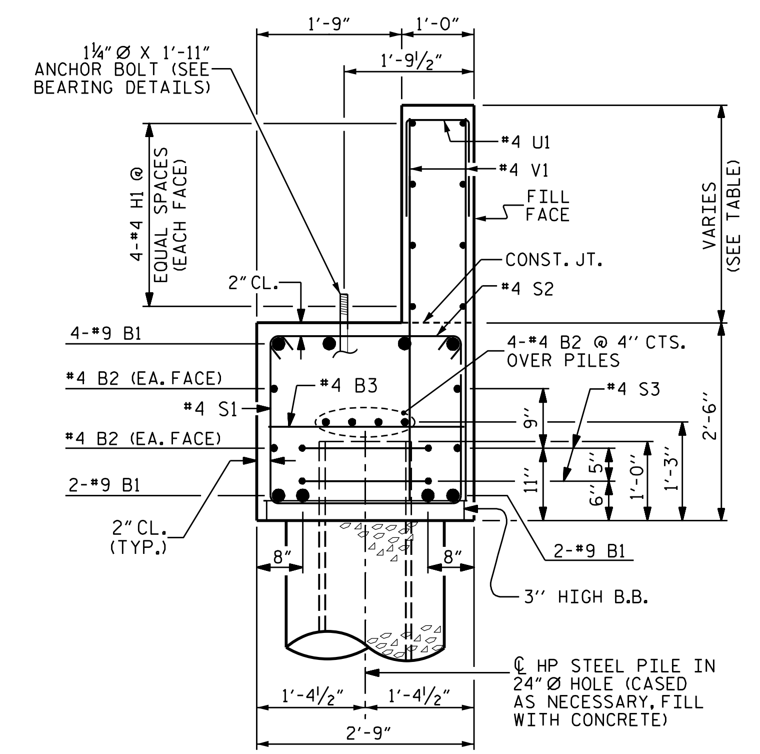
PILES SHALL BE SEATED IN THE BOTTOM OF THE EXCAVATION. PILE DRIVING IS NOT REQUIRED.

BACKFILL WITH CONCRETE ONLY. DO NOT PROCEED WITH CONSTRUCTION ACTIVITIES UNTIL THE 28 DAY STRENGTH IS ACHIEVED.



ELEVATION

(OPTIONAL WINGS NOT SHOWN FOR CLARITY)



SECTION A-A

SHEET 1 OF 2

Signed by:
Ryan Tyler Shipman
13DB7A896E443A...
12/9/2025
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046056 RYAN TYLER SHIPMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA OFFICE OF EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE TIMBER DECK

END BENT DRILLED-IN PILES

JMT Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

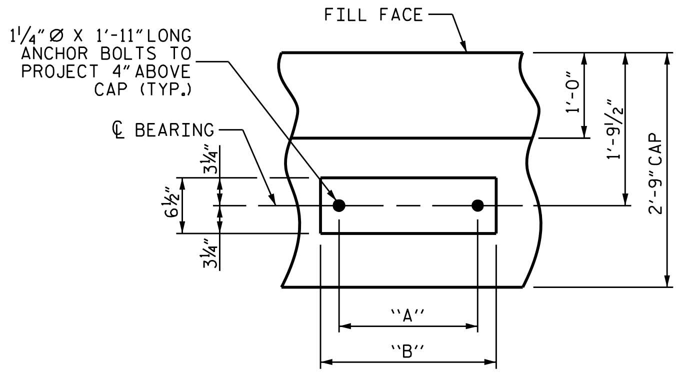
DWN. BY: WDC	DATE: 12/2025
CHKD. BY: RTS	DATE: 12/2025
DES. EGR. OF RECORD: PCW	DATE: 12/2025

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-08

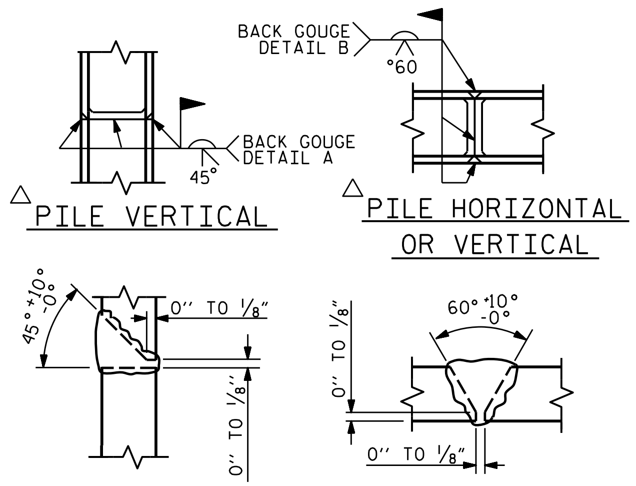
TOTAL SHEETS 12

wdcutcher
DGN: pw://jmt-pw.bentley.com:jmt-pw-01/Documents/Projects/2025/25-00529/25-00529-00/Design/Structures/NC PRB-Steel Beam with Timber Deck Standards/Single Lane Steel Beam with Timber Deck Plans/2 Standard Drawings/I-Beam Bridge Plans-20-50/008-S8_End Bent_Drilled-in Piles.dgn
TIME: 12/9/2025

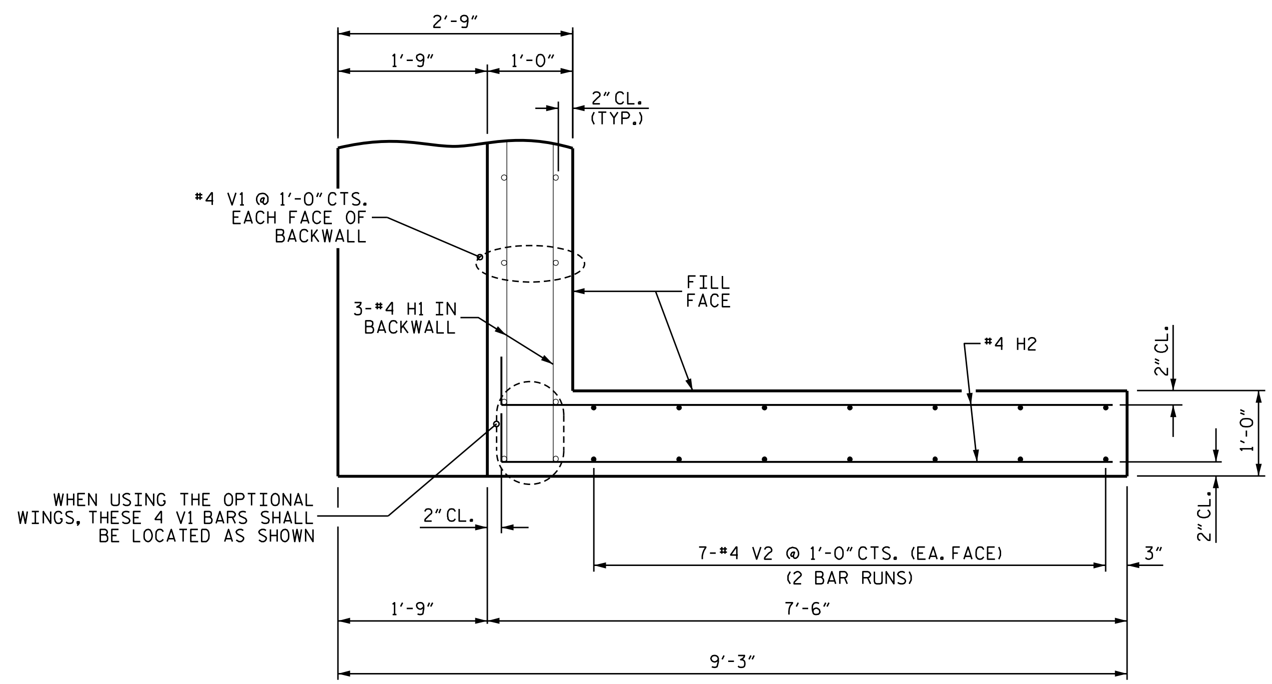


BEARING DETAIL
(TYP. EACH BEARING LOCATION)

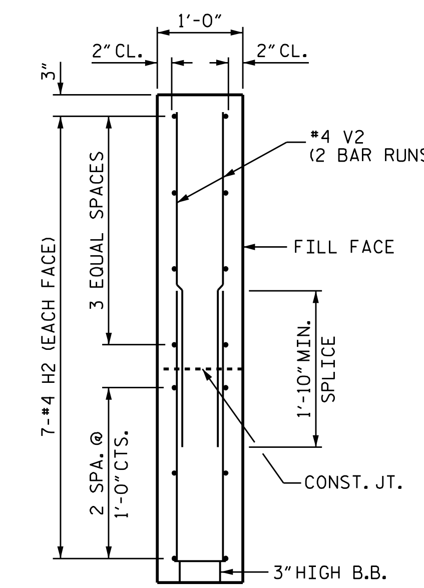
BEARING TABLE					
SPAN	BEAM	FLANGE WIDTH	TYPE	A	B
20'-0"	W16X36	6.99"	I	10"	1'-2"
30'-0"	W21X48	8.14"	II	1'-0"	1'-4"
40'-0"	W24X76	9.0"	II	1'-0"	1'-4"
50'-0"	W24X104	12.75"	III	1'-4"	1'-8"



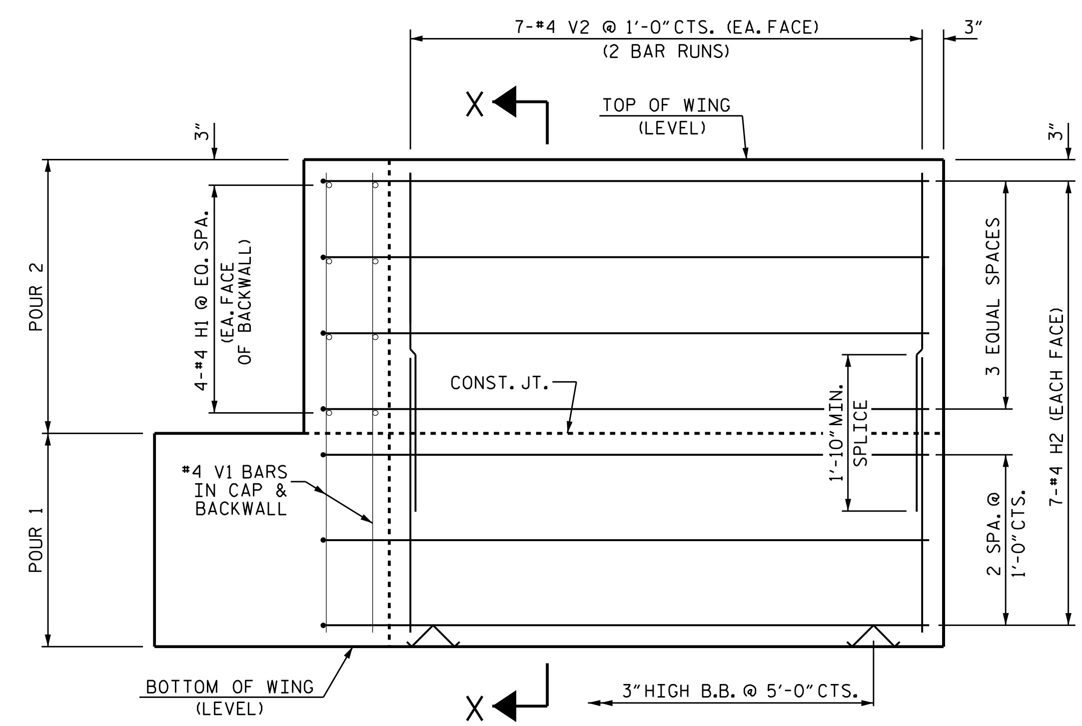
PILE SPLICE DETAILS
△ POSITION OF PILE DURING WELDING.



ELEVATION OF WING
(OPTIONAL)



SECTION X-X
(OPTIONAL)



PLAN OF WING
(OPTIONAL)

RIGHT SIDE WING SHOWN, LEFT SIDE WING SIMILAR.

WING HEIGHT DEPENDENT ON BACKWALL HEIGHT.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET 2 OF 2

NORTH CAROLINA OFFICE OF EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE TIMBER DECK

OPTIONAL WINGS FOR DRIVEN OR DRILLED-IN PILES

Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC DATE: 12/2025
CHKD. BY: RTS DATE: 12/2025
DES. EGR. OF RECORD: PCW DATE: 12/2025

REVISIONS						
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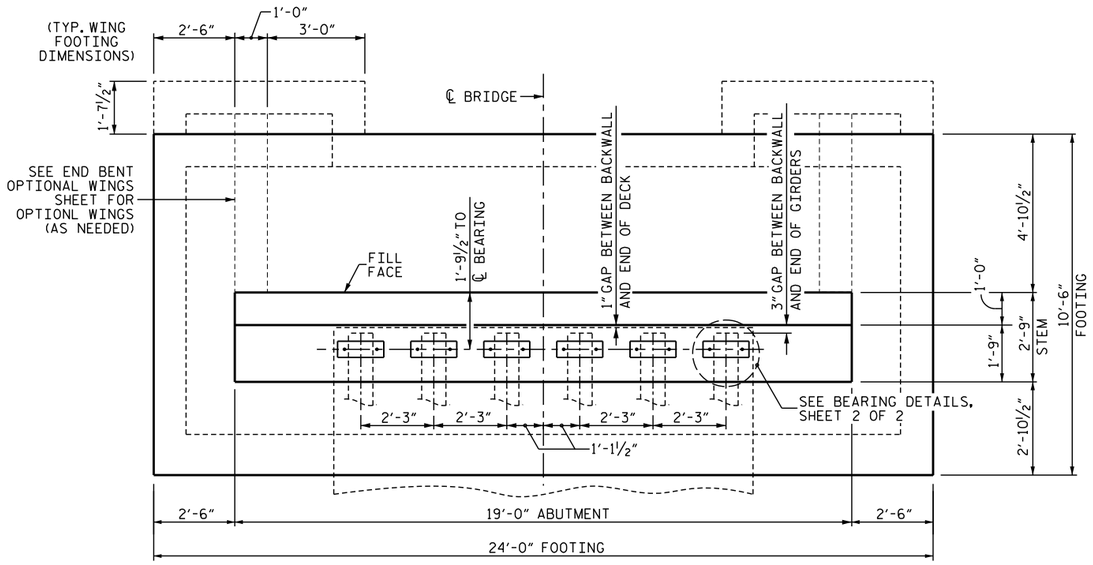
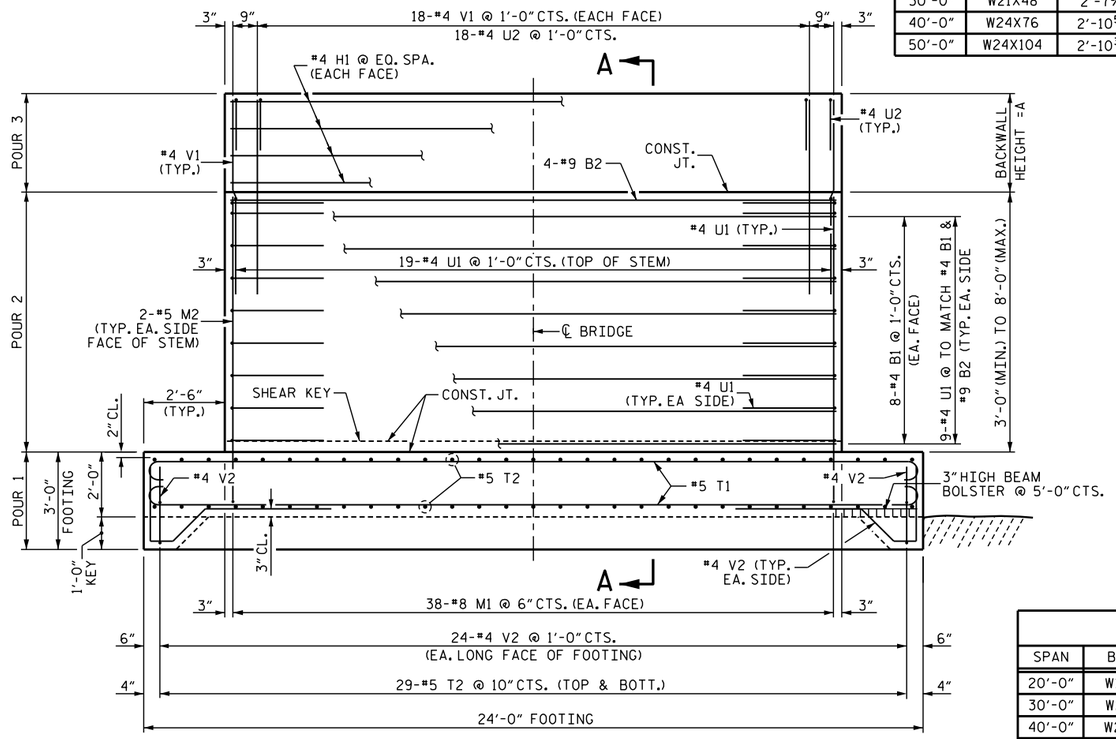
SHEET NO. S-09
TOTAL SHEETS 12



PLAN

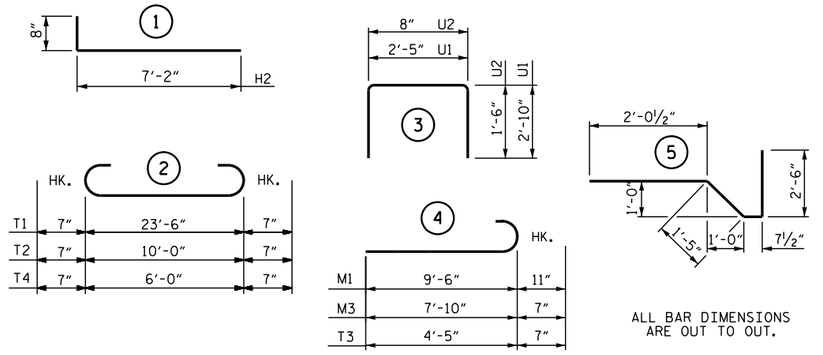
BACKWALL DIM.		
SPAN	BEAM	A
20'-0"	W16X36	2'-2⅝"
30'-0"	W21X48	2'-7⅜"
40'-0"	W24X76	2'-10⅝"
50'-0"	W24X104	2'-10⅜"



ELEVATION

(OPTIONAL WINGS NOT SHOWN FOR CLARITY)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

GENERAL NOTES

U1 BARS IN STEM MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

CONTRACTOR SHALL SLOPE TOP OF CAP TO MATCH LONGITUDINAL GRADE OF THE BRIDGE. SLOPES SHALL MATCH ON BOTH END BENT 1 AND END BENT 2 CAPS.

WINGS MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER OR DESIGNEE.

FOR OPTIONAL WINGS FOR END BENT, SEE SHEET 2 OF 2.

FOR SECTION A-A, SEE SHEET 2 OF 2.

THE FINAL STEM WALL HEIGHT SHALL BE DETERMINED IN THE FIELD BASED ON EXISTING ROCK ELEVATIONS. THE STEM WALL HEIGHT SHALL NOT BE LESS THAN 3'-0" OR GREATER THAN 8'-0.

STEM WALL REINFORCEMENT AND DETAILS ARE BASED ON A MAXIMUM STEM WALL HEIGHT OF 8'-0". THE CONTRACTOR SHALL ADJUST THE HORIZONTAL REINFORCEMENT LAYOUT TO ACCOMMODATE FIELD-VERIFIED STEM WALL HEIGHTS WHILE MAINTAINING REBAR SIZES, SPACING, LAP LENGTHS, AND THE OVERALL REINFORCING CONFIGURATION SHOWN IN THE STRUCTURAL PLANS AND DETAILS.

FOUNDATION NOTES

SPREAD FOOTING

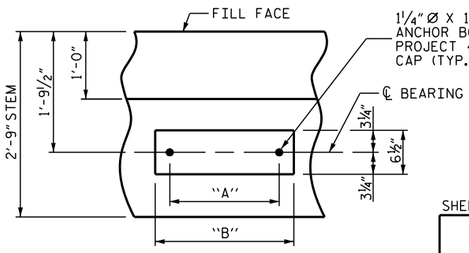
FOUNDATION EXCAVATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH SECTION 410 OF THE SPECIFICATIONS.

A GEOTECHNICAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA SHALL OBSERVE THE BEARING SURFACE AND CONFIRM THE FOOTING IS CONSTRUCTED ON ROCK. THE ENGINEER SHALL PROVIDE A LETTER VERIFYING ACCEPTANCE OF THE BEARING SURFACE.

CLEAN ALL ROCK OF LOOSE MATERIAL AND CUT TO A FIRM SURFACE, AS DIRECTED BY THE ENGINEER AND FILL WITH CONCRETE, MORTAR OR GROUT. LEAVE ROCK SURFACE IN A ROUGH CONDITION.

BEARING SURFACE MUST RESIST A MAXIMUM APPLIED BEARING PRESSURE OF 3.0 TSF.

KEY IN FOOTINGS AT LEAST 1 FT INTO ROCK.



BEARING DETAIL

(TYP. EACH BEARING LOCATION)

BEARING TABLE					
SPAN	BEAM	FLANGE WIDTH	TYPE	A	B
20'-0"	W16X36	6.99"	I	10"	1'-2"
30'-0"	W21X48	8.14"	II	1'-0"	1'-4"
40'-0"	W24X76	9.0"	II	1'-0"	1'-4"
50'-0"	W24X104	12.75"	III	1'-4"	1'-8"

**BILL OF MATERIAL FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#4	STR	18'-8"	200
B2	4	#9	STR	18'-8"	254
M1	76	#8	④	10'-5"	2,114
M2	4	#5	STR	7'-6"	31
T1	26	#5	②	24'-8"	669
T2	58	#5	②	7'-6"	31
H1	8	#4	STR	18'-8"	100
U1	37	#4	③	8'-1"	200
U2	20	#4	③	3'-8"	49
V1	40	#4	STR	6'-0"	160
V2	70	#4	⑤	6'-7"	308
H2	52	#4	①	7'-10"	272
M3	40	#5	④	8'-5"	351
M4	40	#5	STR	7'-10"	327
T3	32	#5	④	5'-0"	167
T4	8	#5	②	7'-2"	60
V2	22	#4	⑤	6'-7"	97

ADDITIONAL BARS FOR 2 OPTIONAL WINGS WITH FOOTINGS

REINFORCING STEEL (W/O WINGS)	4761 LBS.
REINFORCING STEEL (WITH WINGS)	6035 LBS.

CLASS A CONCRETE BREAKDOWN	
POUR #1 FOOTING	22.5 C.Y.
POUR #2 END BENT STEM	15.5 C.Y.
POUR #3 BACKWALL	1.6 C.Y.
WINGWALLS (OPTIONAL)	7.5 C.Y.
TOTAL CLASS A CONCRETE (W/O WINGS)	39.6 C.Y.
TOTAL CLASS A CONCRETE (WITH WINGS)	47.1 CY

** THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE QUANTITIES AND REINFORCING BARS SHOWN IN THE BILL OF MATERIAL ARE BASED ON AN 8'-0" MAXIMUM STEM WALL HEIGHT. THE CONTRACTOR IS RESPONSIBLE FOR THE FINAL QUANTITIES BASED ON THE ACTUAL STEM WALL HEIGHT.

Signature by: Ryan T. Shipman
12/9/2025

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046056 RYAN TYLER SHIPMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET 1 OF 2

NORTH CAROLINA OFFICE OF EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE TIMBER DECK

END BENT

SPREAD FOOTING

Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC DATE: 12/2025
CHKD. BY: RTS DATE: 12/2025
DES. EGR. OF RECORD: PCW DATE: 12/2025

REVISIONS					
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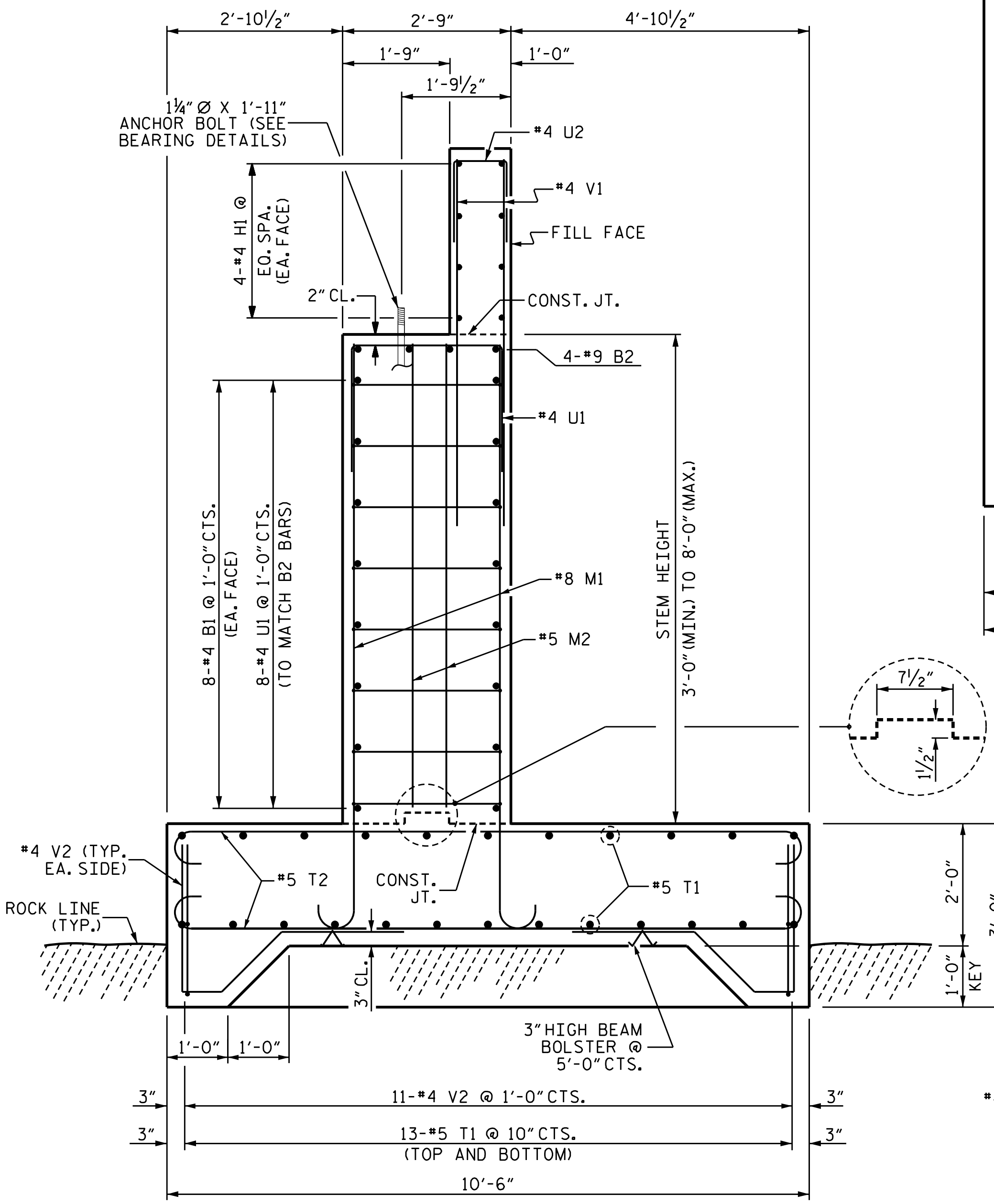
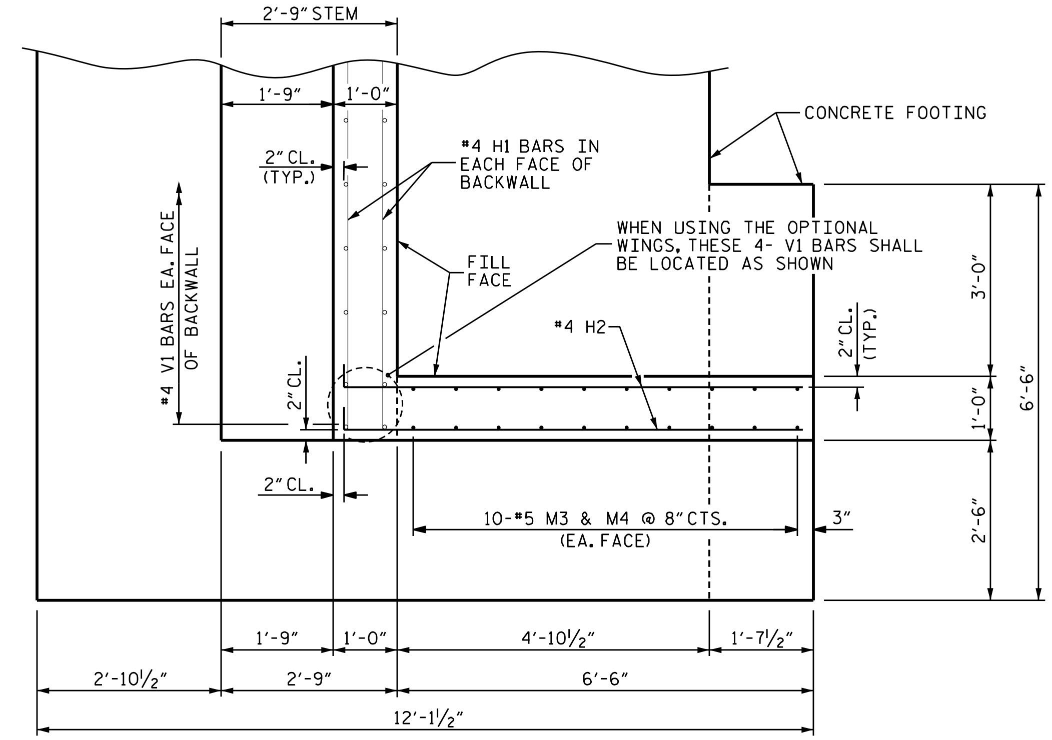
SHEET NO. S-10

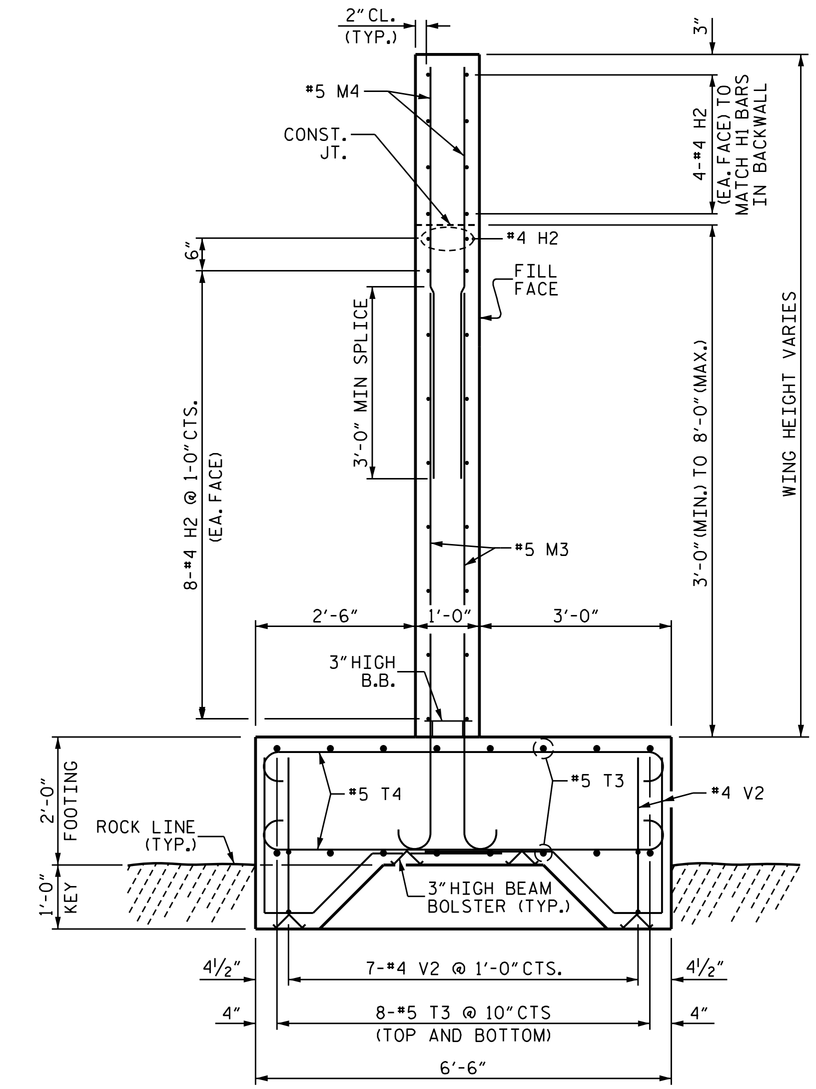
TOTAL SHEETS 12



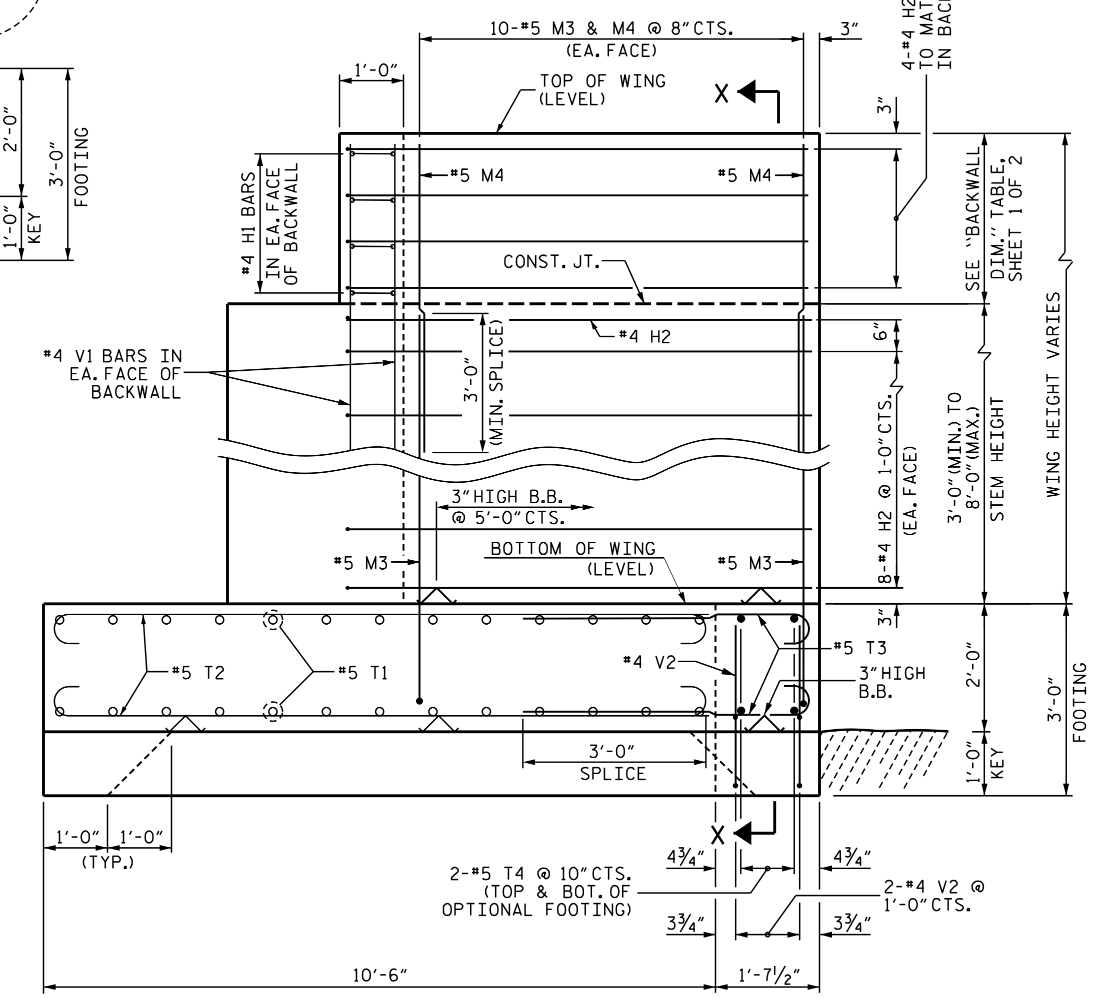
SECTION A-A



PLAN OF WING
(OPTIONAL)



SECTION X-X
(OPTIONAL)



ELEVATION OF WING
(OPTIONAL)

Signed By: 12/9/2025

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046056 RYAN TYLER SHIPMAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET 2 OF 2

NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

END BENT
OPTIONAL WINGS & FOOTINGS

JMT
Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC		DATE: 12/2025
CHKD. BY: RTS		DATE: 12/2025
DES. EGR. OF RECORD: PCW		DATE: 12/2025

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

SHEET NO. S-11
TOTAL SHEETS 12

STRUCTURAL STEEL / HARDWARE NOTES:

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 AND PAINTED IN ACCORDANCE WITH SYSTEM 1 OF THE STRUCTURAL STEEL SHOP COATING PROGRAM AND ARTICLE 442-8 OF THE 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 HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE 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.

REPAIR ANY DAMAGED GALVANIZED SURFACES IN ACCORDANCE WITH STANDARD SPECIFICATION ARTICLE 1076-7.

REPAIR ANY DAMAGED PAINTED SURFACES IN ACCORDANCE WITH SECTION 422 OF THE STANDARD SPECIFICATIONS

TIMBER / LUMBER NOTES:

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

ALL TIMBER DIMENSIONS SHOWN ON THE PLANS ARE NOMINAL DIMENSIONS.

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

DESIGN LOADS:

LIVE LOAD:

TRUCK LOAD:

THIS BRIDGE WAS DESIGNED FOR:

HS20
GVWR = 72,000 LBS
NUMBER OF AXLES: 3
AXLE WEIGHTS:
GAWR FRONT = 8,000 LBS
GAWR INTERMEDIATE = 32,000 LBS
GAWR REAR = 32,000 LBS

EV2
GVWR = 57,500 LBS
NUMBER OF AXLES: 2
AXLE WEIGHTS:
GAWR FRONT = 24,000 LBS
GAWR REAR = 33,500 LBS

EV3
GVWR = 86,000 LBS
NUMBER OF AXLES: 3
AXLE WEIGHTS:
GAWR FRONT = 24,000 LBS
GAWR INTERMEDIATE = 31,000 LBS
GAWR REAR = 31,000 LBS

LIVE LOAD FACTORS:

HS-20 = 1.75
EV2 = 1.3
EV3 = 1.3

LIVE LOAD FACTORS LOAD RATING:

HS-20 = 1.35
EV2 = 1.0
EV3 = 1.0

MULTIPLE PRESENCE FACTOR:

MPF = 1.0

LANE LOAD:

NO LANE LOAD WAS APPLIED.

IMPACT:

DYNAMIC IMPACT FOR WOOD/TIMBER COMPONENTS IS ZERO. DYNAMIC IMPACT FACTOR FOR ALL OTHER COMPONENTS IS 33%.

DEAD LOADS:

WEARING SURFACES SHALL NOT BE ALLOWED.

WEIGHT OF TIMBER = 40 PCF.

DESIGN ASSUMPTIONS/PARAMETERS:

SUPERSTRUCTURE WILL BE SIX LINES OF I-BEAMS.

BRIDGE IS SINGLE SPAN.

BRIDGE WIDTH = 12'-11" OUT TO OUT.

DESIGN VEHICLES	
REF.#	SCHEMATIC
HS-20	8K, 32K, 32K; 14', 14'; 28'; 72K 36 TON
EV2	24K, 33.5K; 15'; 57.5K 28.75 TON
EV3	24K, 31K, 31K; 15', 4'; 19'; 86K 43 TONS

GENERAL NOTES:

THIS BRIDGE IS DESIGNED IN ACCORDANCE WITH THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) "STRUCTURES MANAGEMENT UNIT MANUAL", DATED 6/15/23, AND THE AASHTO "LRFD BRIDGE DESIGN SPECIFICATIONS", 9th EDITION.

THESE DRAWINGS ARE INTENDED ONLY FOR USAGE IN THE INSTALLATION OF SINGLE SPAN I-BEAM BRIDGES FOR PRIVATE DRIVEWAYS IN COUNTIES AS LISTED IN THE CONTRACT DOCUMENTS BY NORTH CAROLINA OFFICE OF EMERGENCY MANAGEMENT IN RESPONSE TO THE DAMGE CAUSED BY HURRICANE HELENE.

BRIDGE CONSTRUCTION, WORKMANSHIP, AND MATERIALS SHALL BE IN ACCORDANCE WITH THE NCDOT "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES", 2024 EDITION.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

IT IS ASSUMED THAT THERE ARE NO UTILITY CONFLICTS. THE CONTRACTOR SHALL INVESTIGATE THE PRESENCE OF UTILITIES BEFORE COMMENCING WORK.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

CONTRACTOR SHALL SET BRIDGE ELEVATIONS SUCH THAT WATER WILL DRAIN AND NOT POND ON THE BRIDGE DECK AND MINIMUM LONGITUDINAL GRADE SHALL BE 0.5% AND MAXIMUM GRADE SHALL BE 6%.

WORK ON END BENTS SHALL NOT BE STARTED UNTIL APPROACH ROCK EMBANKMENT AND CORE MATERIAL IN THE AREA OF END BENT PILES HAVE BEEN PLACED.

THIS BRIDGE HAS BEEN DESIGNED FOR ADTT < 100.

MATERIAL PROPERTIES:

CONCRETE: MINIMUM COMPRESSIVE STRENGTH, f'c = 3,000 psi (CLASS A)'

STRUCTURAL STEEL: AASHTO M270, GRADE 50.

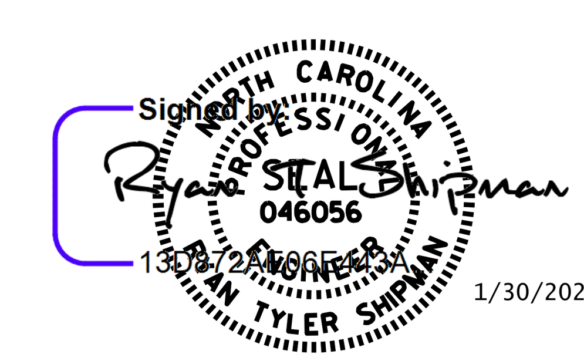
WELDS: SMAW, 70 KSI ELECTRODES PER NCDOT STANDARD SPECIFICATIONS.

ANCHOR BOLTS: ASTM F1554, GRADE 55.

BOLTS/NUTS/WASHER: ALL BOLTS/NUTS/WASHER SHALL BE ASTM F3125, GRADE A325 AND SHALL BE GALVANIZED.

TIMBER: ALL TIMBER & DIMENSIONAL LUMBER SHALL BE NO. 2 VISUALLY GRADED, MIXED SOUTHERN PINE WITH REFERENCE DESIGN VALUES OF: Fbo = .925 ksi AND Fvo = 0.175 ksi OR GREATER.

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS WITH A SHEAR MODULUS OF 0.110 KSI.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA OFFICE OF
EMERGENCY MANAGEMENT

PRIVATE DRIVEWAY BRIDGE STANDARDS

SINGLE LANE STEEL BEAM BRIDGE
TIMBER DECK

GENERAL NOTES

Johnson, Mirmiran, & Thompson Inc.
108 Asheville Commerce Parkway
Candler, NC, 28715
License No: C-3097

DWN. BY: WDC DATE: 12/2025
CHKD. BY: RTS DATE: 12/2025
DES. EGR. OF RECORD: PCW DATE: 12/2025

REVISIONS							
NO.	BY:	DATE:		NO.	BY:	DATE:	
1				3			
2				4			

SHEET NO. S-12
TOTAL SHEETS 12

BCardoso
DGN: pw://jmt-pw.bentley.com:jmt-pw-01/Documents/Projects/2025/25-00529/25-00529-00/Design/Structures/NC PRB-Steel Beam with Timber Deck Standards/Single Lane Steel Beam with Timber Deck Plans/2 Standard Drawings/I-Beam Bridge Plans_20-50/012-S12_General Notes.dgn
TIME: 1/30/2026