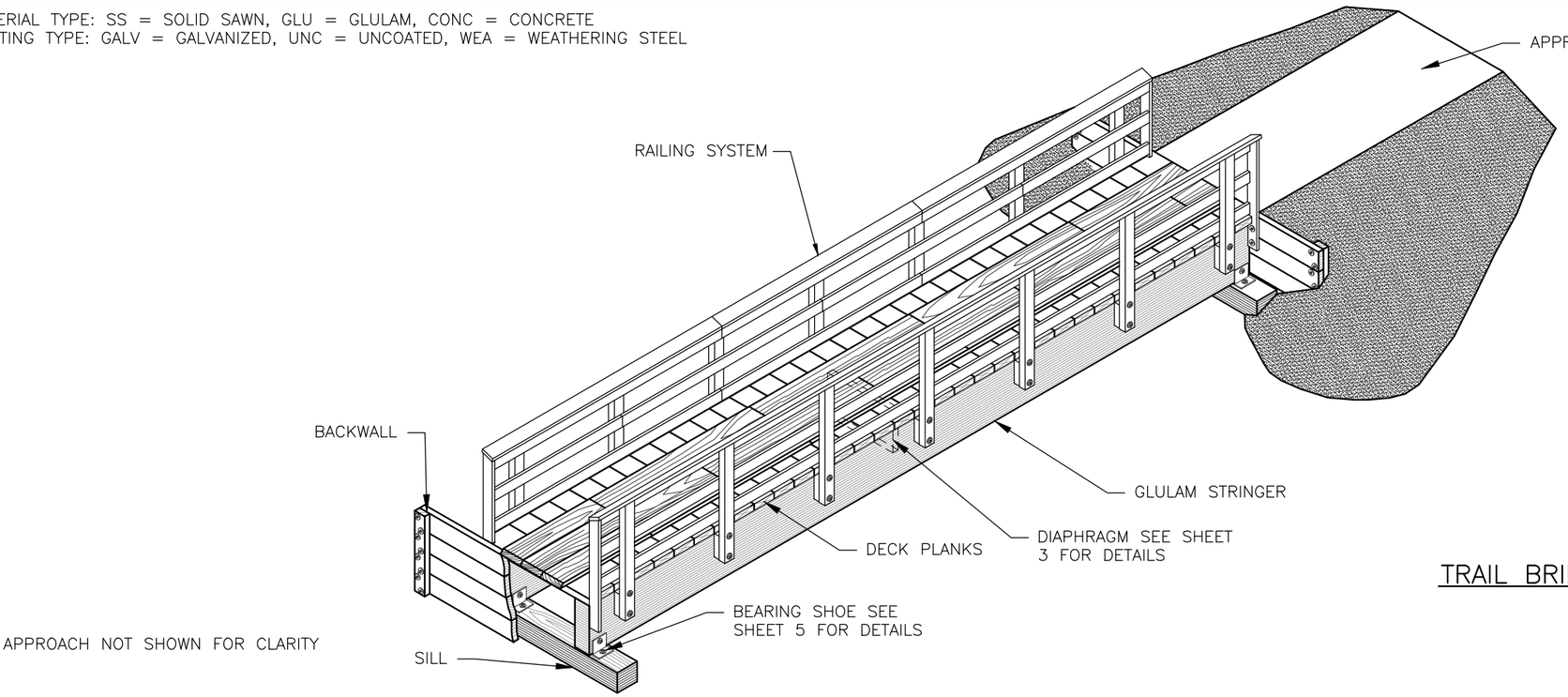
								STRINGERS				DECK			BACKWALL					
STRUCTURE NUMBER	TRAIL NO.	BRIDGE LOCATION	BRIDGE LENGTH OUT–TO–OUT	STRINGER SPAN ℄–℄ BRNG	BRIDGE CLEAR WIDTH	PEDESTRIAN LOAD	GROUND SNOW LOAD	COMBINATION SYMBOL	SPECIES	MATERIAL SIZE	TREATMENT	SPECIES	SIZE	TREATMENT	TYPE	SPECIES	SIZE	WIDTH	HEIGHT	TREATMENT

NA = NOT APPLICABLE

	RAILING SYSTEM/CURB					RUNNING PLANK				SILL			APPROACHES						HARDWARE	
STRUCTURE NUMBER	SPECIES	TYPE	HEIGHT	TREATMENT YES	TREATMENT NO	SPECIES	SIZE	WIDTH	TREATMENT TYPE	MATERIAL TYPE	SIZE	TREATMENT	LENGTH NEAR	LENGTH FAR	WIDTH	MATERIAL TYPE	MATERIAL DEPTH	GEO–SYNTHETIC TYPE	COATING	COMMENTS

ABUTMENT MATERIAL TYPE: SS = SOLID SAWN, GLU = GLULAM, CONC = CONCRETE
HARDWARE COATING TYPE: GALV = GALVANIZED, UNC = UNCOATED, WEA = WEATHERING STEEL



TRAIL BRIDGE W/RAILING SYSTEM

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
GLULAM STRINGER TRAIL BRIDGE

SECTION
963 - GLULAM TRAIL BRIDGE

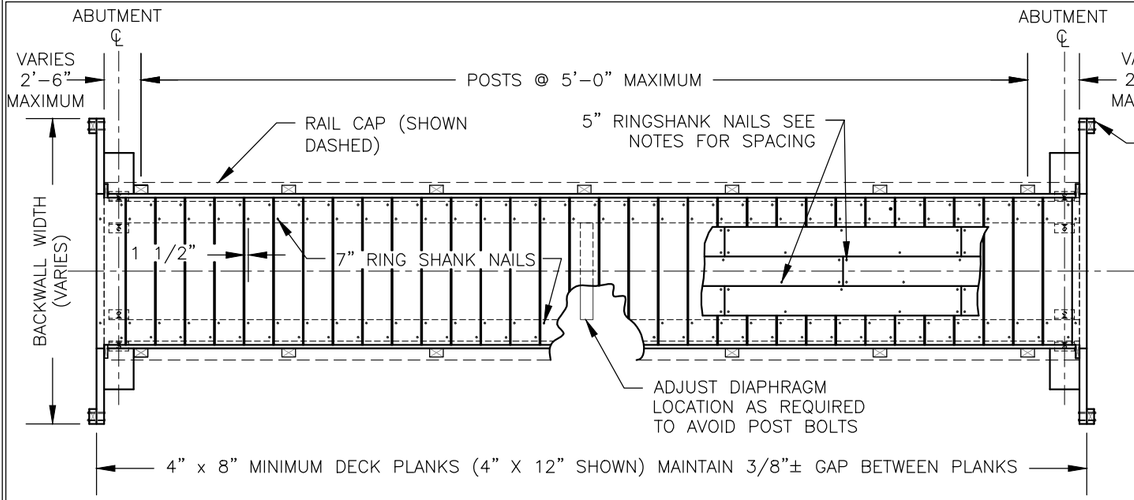
TYPICAL ID
GSB

REVISION DATE

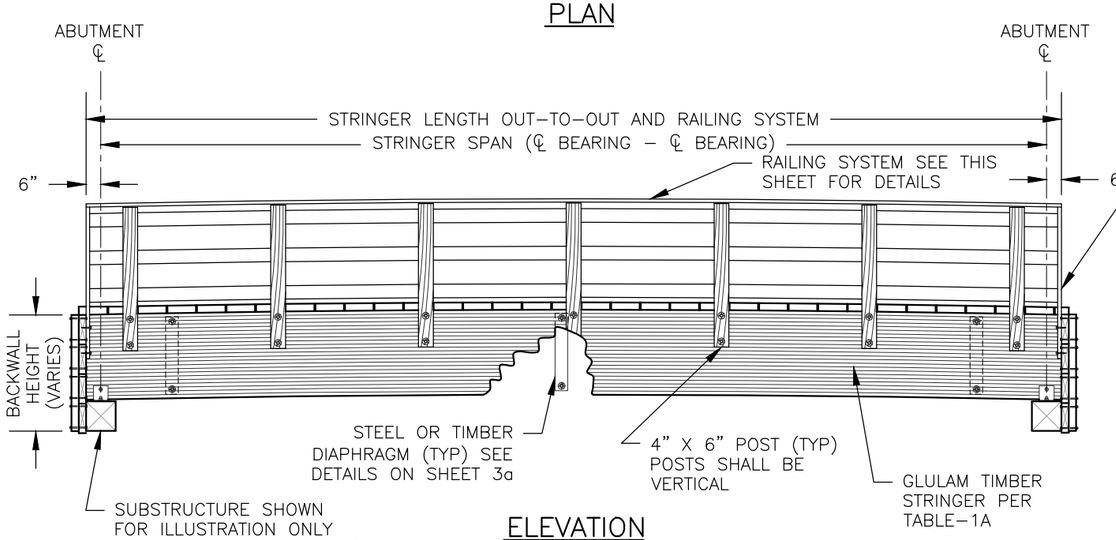
NOT TO SCALE

DRAWING NO.
STD_963-10-01

SHEET
OF



PLAN



ELEVATION

GRADE SHOWN = 0.0%

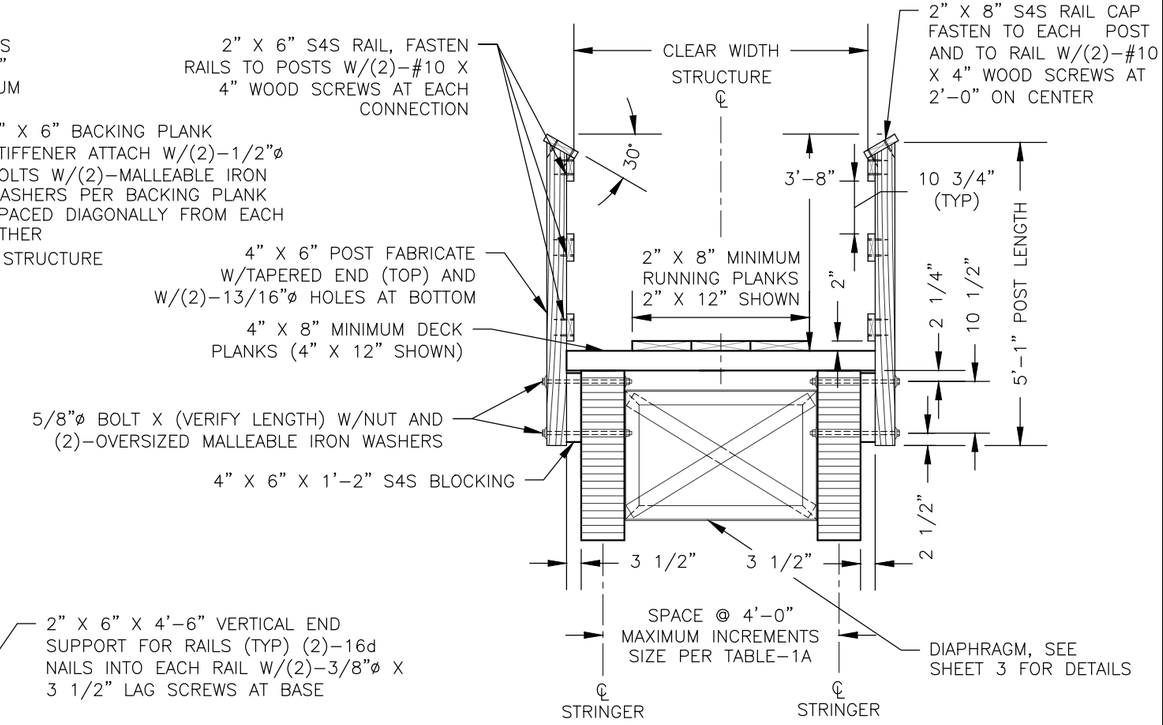
– FABRICATE GLULAM STRINGERS WITH CAMBER BASED ON A 900 FOOT RADIUS.
– RUNNING PLANKS NOT SHOWN FOR CLARITY.

NOTES:

1. FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 5/16–INCH DIAMETER X 7–INCH RING SHANK NAILS PER PLANK AT EACH STRINGER. ALTERNATE SIDES.

2. FASTEN RUNNING PLANKS TO DECK WITH 40d (5–INCH RING SHANK) NAILS AT 24–INCH SPACING. ALTERNATE SIDES WITH TWO AT EACH END.

3. SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONE RAIL SPLICE AT ANY ONE POST.



BRIDGE W/RAILING SYSTEM
DECK SECTION W/STRINGERS @ 4'–0" O.C.

*TABLE–1A: GLULAM STRINGER SIZE REQUIREMENTS – LRFD

**STRINGER SPAN (FEET)	SPECIES – DF/DF, COMBINATION SYMBOL 24F – V4				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN LIVE LOAD		GROUND SNOW LOAD		
	***65	90	120	150	200
● 25	5 1/8" x 15"	5 1/8" x 15"	5 1/8" x 15"	5 1/8" x 16 1/2"	5 1/8" x 18"
● 30	5 1/8" x 16 1/2"	5 1/8" x 18"	5 1/8" x 18"	5 1/8" x 19 1/2"	5 1/8" x 21"
▲ 35	5 1/8" x 19 1/2"	5 1/8" x 21"	5 1/8" x 21"	5 1/8" x 22 1/2"	5 1/8" x 24"
▲ 40	5 1/8" x 22 1/2"	5 1/8" x 24"	5 1/8" x 24"	5 1/8" x 25 1/2"	5 1/8" x 28 1/2"
▲ 45	5 1/8" x 25 1/2"	5 1/8" x 27"	5 1/8" x 27"	5 1/8" x 30"	6 3/4" x 28 1/2"
■ 50	6 3/4" x 27"	6 3/4" x 28 1/2"	6 3/4" x 27"	6 3/4" x 28 1/2"	6 3/4" x 31 1/2"
■ 55	6 3/4" x 30"	6 3/4" x 31 1/2"	6 3/4" x 30"	6 3/4" x 31 1/2"	6 3/4" x 34 1/2"
■ 60	6 3/4" x 31 1/2"	6 3/4" x 34 1/2"	6 3/4" x 33"	6 3/4" x 34 1/2"	6 3/4" x 39"

●INSTALL DIAPHRAGMS AT MID–SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
▲INSTALL DIAPHRAGMS AT THIRD POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
■INSTALL DIAPHRAGMS AT QUARTER POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS

* STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SHOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
** STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT
*** REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
GLULAM STRINGER TRAIL BRIDGE

SECTION
963 - GLULAM TRAIL BRIDGE

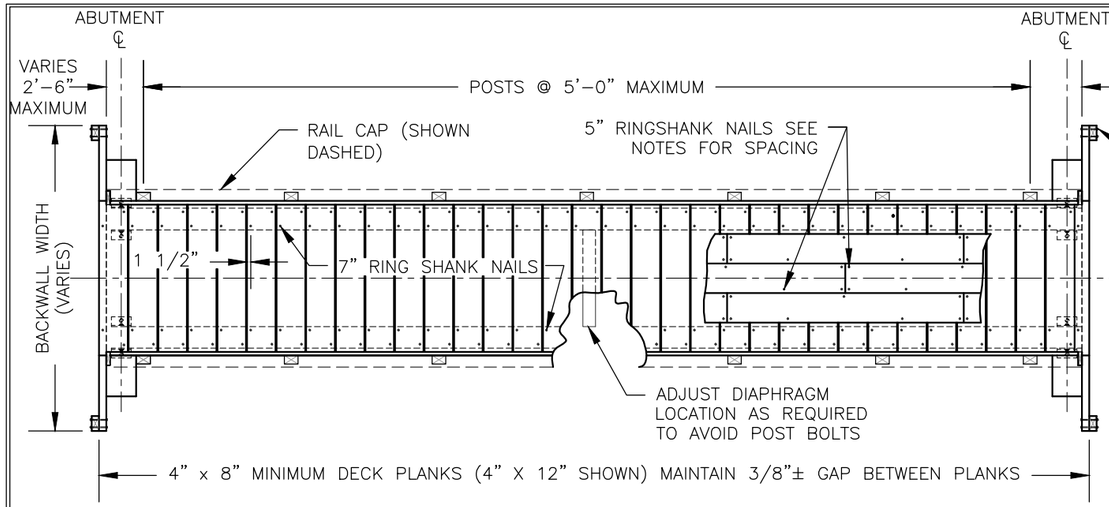
TYPICAL ID
GSB

REVISION DATE

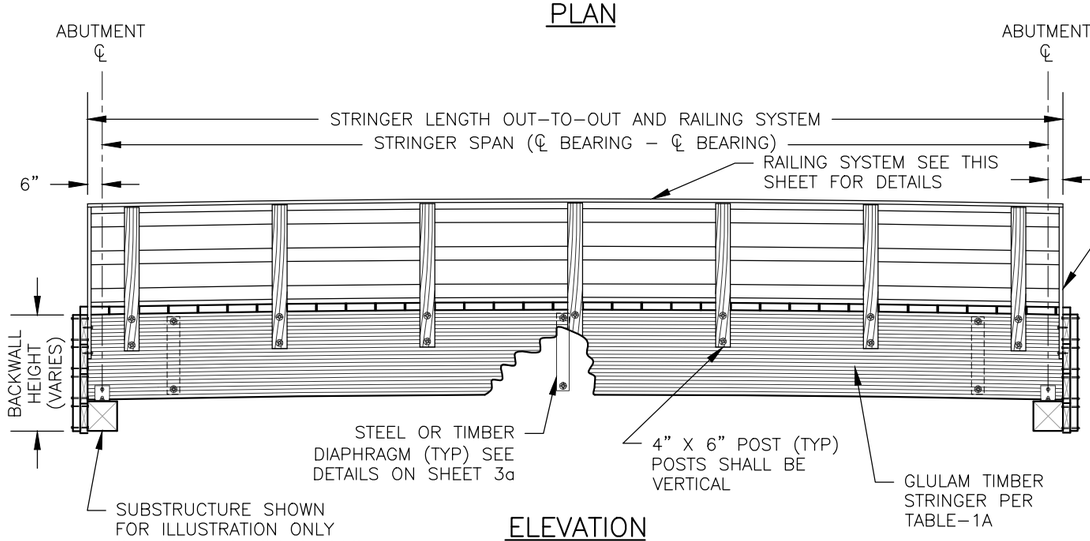
NOT TO SCALE

DRAWING NO.
STD_963-10-02a

SHEET
OF



PLAN



ELEVATION

GRADE SHOWN = 0.0%

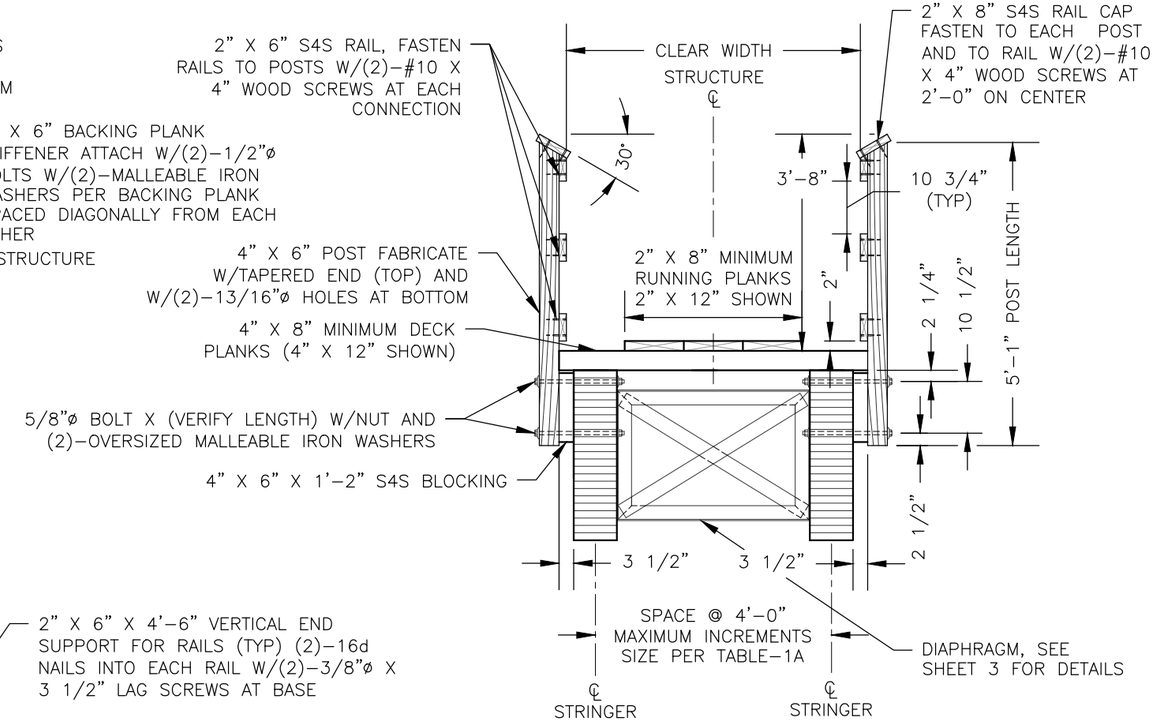
– FABRICATE GLULAM STRINGERS WITH CAMBER BASED ON A 900 FOOT RADIUS.
– RUNNING PLANKS NOT SHOWN FOR CLARITY.

NOTES:

1. FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 5/16–INCH DIAMETER X 7–INCH RING SHANK NAILS PER PLANK AT EACH STRINGER. ALTERNATE SIDES.

2. FASTEN RUNNING PLANKS TO DECK WITH 40d (5–INCH RING SHANK) NAILS AT 24–INCH SPACING. ALTERNATE SIDES WITH TWO AT EACH END.

3. SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONE RAIL SPLICE AT ANY ONE POST.



BRIDGE W/RAILING SYSTEM
DECK SECTION W/STRINGERS @ 4'–0" O.C.

*TABLE–1B: GLULAM STRINGER SIZE REQUIREMENTS – LRFD

**STRINGER SPAN (FEET)	SPECIES – SP/SP, COMBINATION SYMBOL 24F – V3				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN LIVE LOAD		GROUND SNOW LOAD		
	***65	90	120	150	200
● 25	5 1/8" x 15 1/8"	5 1/8" x 15 1/8"	5 1/8" x 15 1/8"	5 1/8" x 16 1/2"	5 1/8" x 17 7/8"
● 30	5 1/8" x 16 1/2"	5 1/8" x 17 7/8"	5 1/8" x 17 7/8"	5 1/8" x 19 1/4"	5 1/8" x 20 5/8"
▲ 35	5 1/8" x 20 5/8"	5 1/8" x 22"	5 1/8" x 20 5/8"	5 1/8" x 22"	5 1/8" x 24 3/4"
▲ 40	5 1/8" x 23 3/8"	5 1/8" x 24 3/4"	5 1/8" x 23 3/8"	5 1/8" x 24 3/4"	5 1/8" x 28 7/8"
▲ 45	5 1/8" x 26 1/8"	5 1/8" x 27"	5 1/8" x 26 1/8"	5 1/8" x 30 1/4"	6 3/4" x 28 7/8"
■ 50	5 1/8" x 28 7/8"	5 1/8" x 30 1/4"	5 1/8" x 30 1/4"	6 3/4" x 28 7/8"	6 3/4" x 31 5/8"
■ 55	6 3/4" x 28 7/8"	6 3/4" x 31 5/8"	6 3/4" x 30 1/4"	6 3/4" x 31 5/8"	6 3/4" x 34 3/8"
■ 60	6 3/4" x 31 5/8"	6 3/4" x 34 3/8"	6 3/4" x 33"	6 3/4" x 34 3/8"	6 3/4" x 37 1/8"

●INSTALL DIAPHRAGMS AT MID–SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
▲INSTALL DIAPHRAGMS AT THIRD POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
■INSTALL DIAPHRAGMS AT QUARTER POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS

* STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SHOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
** STRINGER LENGTH EQUAL TO STRINGER STRINGER PLUS ONE FOOT
*** REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
GLULAM STRINGER TRAIL BRIDGE

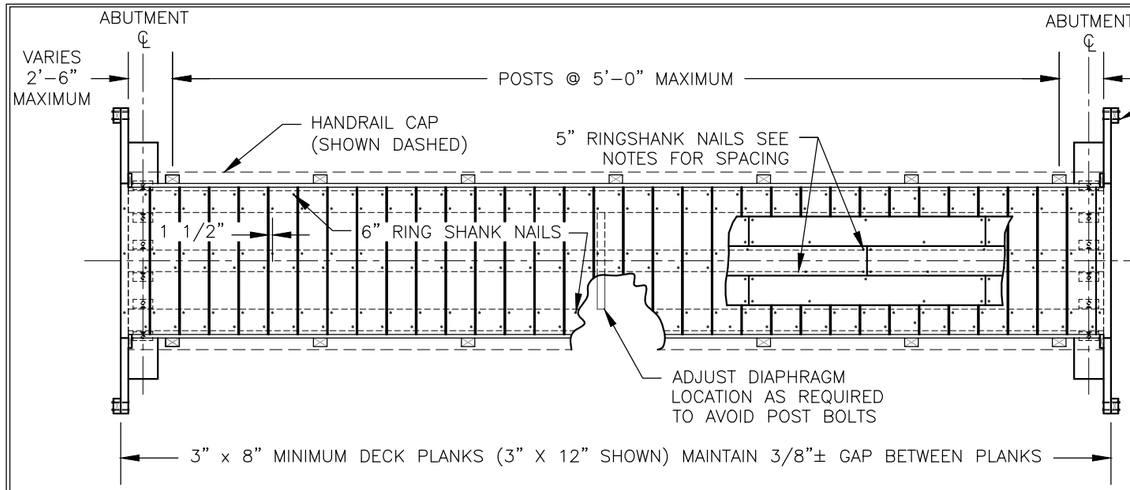
SECTION
963 - GLULAM TRAIL BRIDGE

TYPICAL ID
GSB

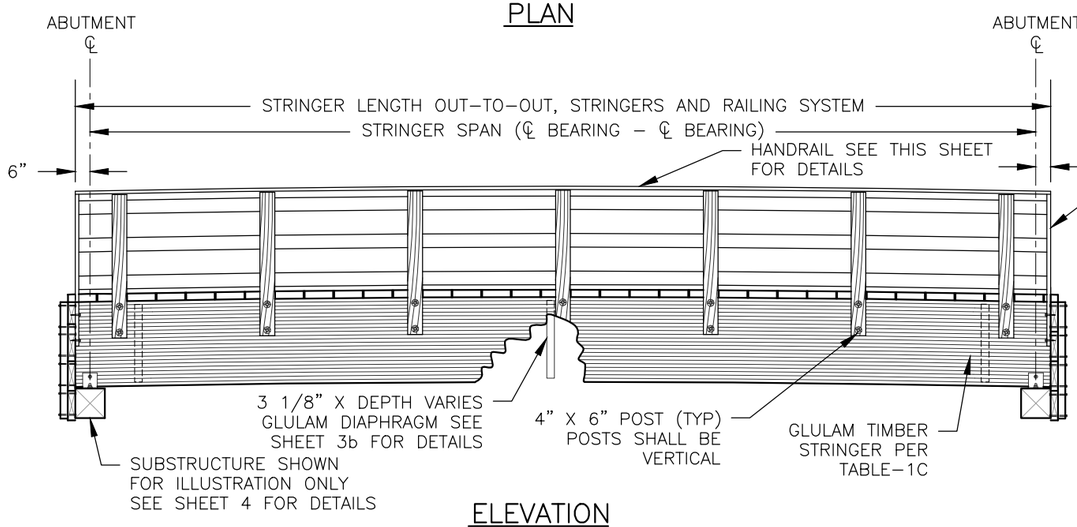
REVISION DATE
NOT TO SCALE

DRAWING NO.
STD_963-10-02b

SHEET
OF



PLAN



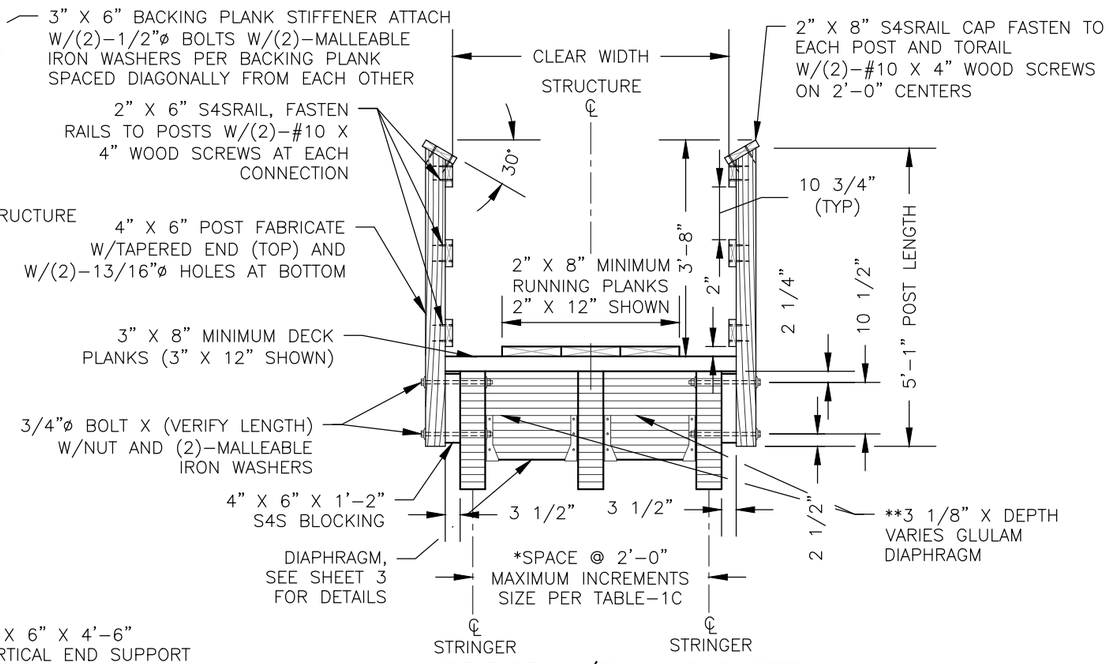
ELEVATION

GRADE SHOWN = 0.0%

– FABRICATE GLULAM STRINGERS WITH CAMBER BASED ON A 900 FOOT RADIUS.
– RUNNING PLANKS NOT SHOWN FOR CLARITY.

NOTES:

1. FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 60d (6–INCH) RING SHANK NAILS PER PLANK AT EACH STRINGER. ALTERNATE CENTERS.
2. FASTEN RUNNING PLANKS TO DECK WITH 40d (5–INCH RING SHANK) NAILS AT 24–INCHES SPACING. ALTERNATE CENTERS WITH TWO AT EACH END.
3. SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONERAIL SPLICE AT ANY ONE POST.
4. THE MINIMUM STRINGER DEPTH FOR BRIDGES WITH PEDESTRIAN RAILS IS 15–INCHES.
5. BRIDGES WITH STRINGER DEPTHS LESS THAN 15–INCHES SHALL HAVE CURBS ONLY.



BRIDGE W/RAILING SYSTEM
DECK SECTION W/STRINGERS @ 2'–0" O.C.

*MINIMUM NUMBER OF STRINGERS IS 3.DIAPHRAGM DEPTH SHALL BE
** APPROXIMATELY 70% OF STRINGER DEPTH

*TABLE–1C: GLULAM STRINGER SIZE REQUIREMENTS – LRFD

**STRINGER SPAN (FEET)	SPECIES – DF/DF, COMBINATION SYMBOL 24F – V4				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN LIVE LOAD		GROUND SNOW LOAD		
	***65	90	120	150	200
●25	5 1/8" x 15"	5 1/8" x 15"	5 1/8" x 15"	5 1/8" x 15"	5 1/8" x 16 1/2"
●30	5 1/8" x 15"	5 1/8" x 16 1/2"	5 1/8" x 16 1/2"	5 1/8" x 18"	5 1/8" x 19 1/2"
▲35	5 1/8" x 18"	5 1/8" x 19 1/2"	5 1/8" x 19 1/2"	5 1/8" x 21"	5 1/8" x 22 1/2"
▲40	5 1/8" x 21"	5 1/8" x 22 1/2"	5 1/8" x 21"	5 1/8" x 22 1/2"	5 1/8" x 25 1/2"
▲45	5 1/8" x 24"	5 1/8" X 25 1/2"	5 1/8" X 24"	5 1/8" x 25 1/2"	5 1/8" X 28 1/2"
■50	5 1/8" X 25 1/2"	5 1/8" X 28 1/2"	5 1/8" X 27"	5 1/8" x 28 1/2"	6 3/4" x 28 1/2"
■55	5 1/8" X 28 1/2"	5 1/8" X 31 1/2"	5 1/8" X 30"	5 1/8" x 31 1/2"	6 3/4" X 31 1/2"
■60	5 1/8" X 31 1/2"	6 3/4" X 31 1/2"	6 3/4" X 30"	6 3/4" X 31 1/2"	6 3/4" X 34 1/2"

●INSTALL DIAPHRAGMS AT MID–SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
▲INSTALL DIAPHRAGMS AT THIRD POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
■INSTALL DIAPHRAGMS AT QUARTER POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS

* STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SHOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
** STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT
*** REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
GLULAM STRINGER TRAIL BRIDGE

SECTION
963 - GLULAM TRAIL BRIDGE

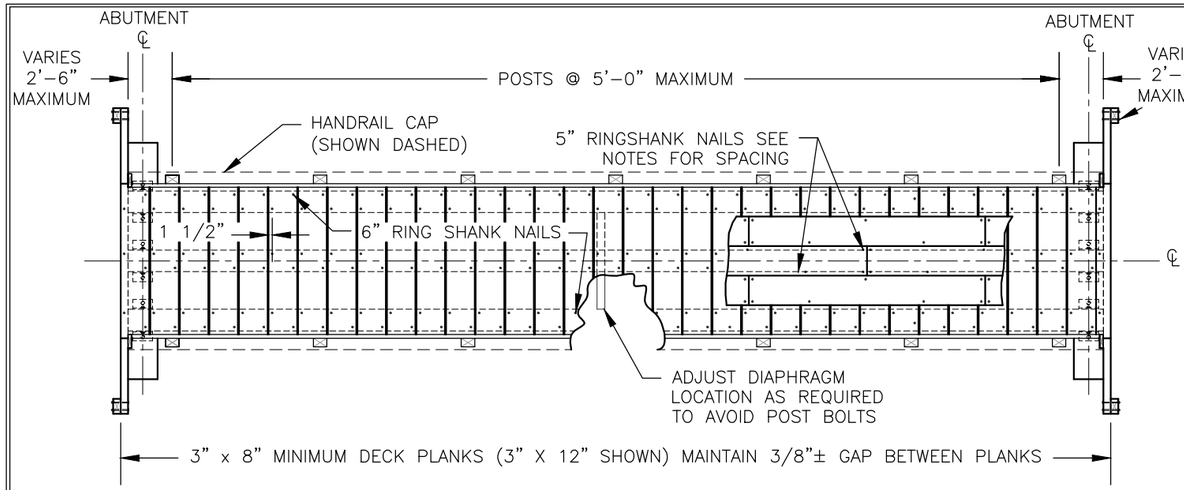
TYPICAL ID
GSB

REVISION DATE

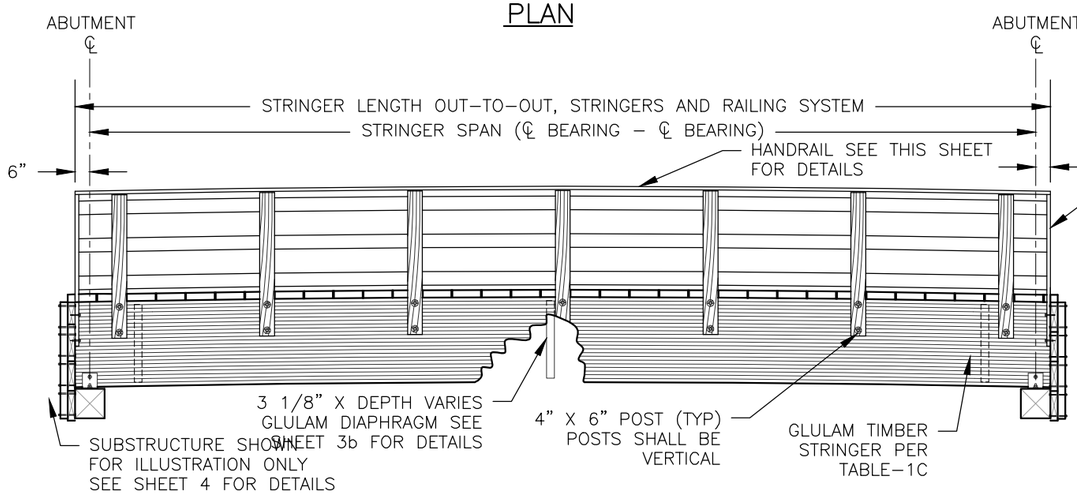
NOT TO SCALE

DRAWING NO.
STD_963-10-02c

SHEET
OF



PLAN



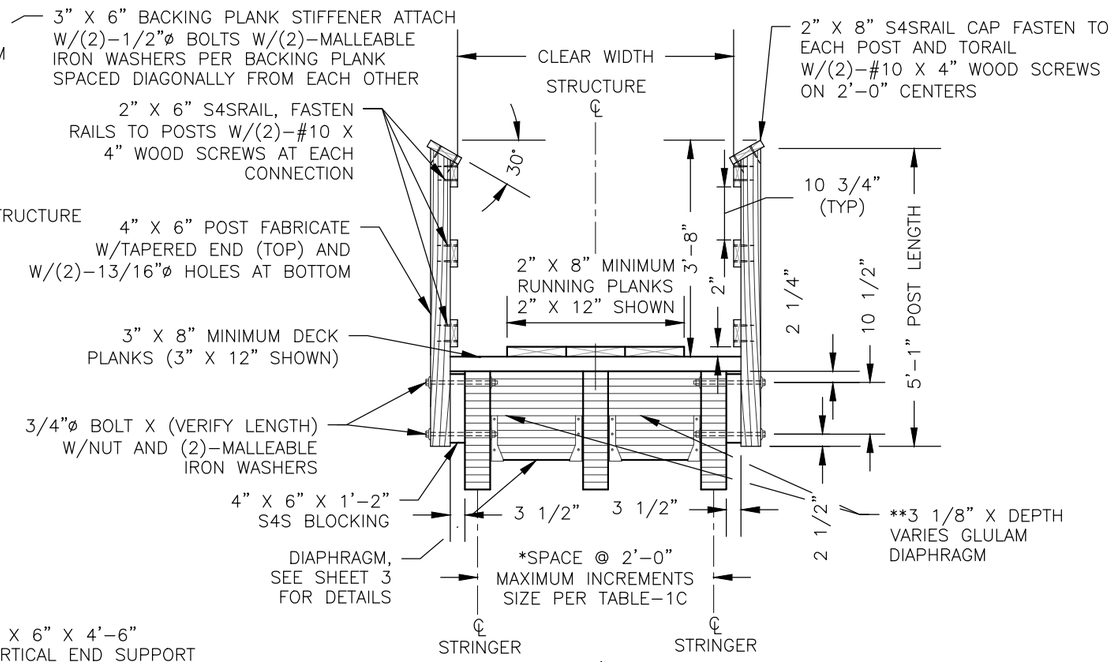
ELEVATION

GRADE SHOWN = 0.0%

– FABRICATE GLULAM STRINGERS WITH CAMBER BASED ON A 900 FOOT RADIUS.
– RUNNING PLANKS NOT SHOWN FOR CLARITY.

NOTES:

1. FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 60d (6–INCH) RING SHANK NAILS PER PLANK AT EACH STRINGER. ALTERNATE CENTERS.
2. FASTEN RUNNING PLANKS TO DECK WITH 40d (5–INCH RING SHANK) NAILS AT 24–INCHES SPACING. ALTERNATE CENTERS WITH TWO AT EACH END.
3. SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONERAIL SPLICE AT ANY ONE POST.
4. THE MINIMUM STRINGER DEPTH FOR BRIDGES WITH PEDESTRIAN RAILS IS 15–INCHES.
5. BRIDGES WITH STRINGER DEPTHS LESS THAN 15–INCHES SHALL HAVE CURBS ONLY.



BRIDGE W/RAILING SYSTEM

DECK SECTION W/STRINGERS @ 2'–0" O.C.

*MINIMUM NUMBER OF STRINGERS IS 3.DIAPHRAGM DEPTH SHALL BE
** APPROXIMATELY 70% OF STRINGER DEPTH

*TABLE–1D: GLULAM STRINGER SIZE REQUIREMENTS – LRFD

**STRINGER SPAN (FEET)	SPECIES – SP/SP, COMBINATION SYMBOL 24F – V3				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN LIVE LOAD		GROUND SNOW LOAD		
	***65	90	120	150	200
●25	5 1/8" x 15 1/8"	5 1/8" x 15 1/8"	5 1/8" x 15 1/8"	5 1/8" x 15 1/8"	5 1/8" x 16 1/2"
●30	5 1/8" x 15 1/8"	5 1/8" x 16 1/2"	5 1/8" x 16 1/2"	5 1/8" x 17 7/8"	5 1/8" x 19 1/4"
▲35	5 1/8" x 17 7/8"	5 1/8" x 19 1/4"	5 1/8" x 19 1/4"	5 1/8" x 20 5/8"	5 1/8" x 22"
▲40	5 1/8" x 20 5/8"	5 1/8" x 22"	5 1/8" x 22"	5 1/8" x 23 3/8"	5 1/8" x 24 3/4"
▲45	5 1/8" x 23 3/8"	5 1/8" x 24 3/4"	5 1/8" x 24 3/4"	5 1/8" x 26 1/8"	5 1/8" x 28 7/8"
■50	5 1/8" x 26 1/8"	5 1/8" x 27 1/2"	5 1/8" x 27 1/2"	5 1/8" x 28 7/8"	6 3/4" x 28 7/8"
■55	5 1/8" x 28 7/8"	5 1/8" x 30 1/4"	5 1/8" x 30 1/4"	5 1/8" x 31 5/8"	6 3/4" x 31 5/8"
■60	5 1/8" x 31 5/8"	6 3/4" x 31 5/8"	6 3/4" x 30 1/4"	6 3/4" x 31 5/8"	6 3/4" x 34 3/8"

●INSTALL DIAPHRAGMS AT MID–SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
▲INSTALL DIAPHRAGMS AT THIRD POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS
■INSTALL DIAPHRAGMS AT QUARTER POINTS OF SPAN AND WITHIN A DISTANCE OF THE DEPTH FROM THE ABUTMENTS

* STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SHOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
** STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT
*** REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL

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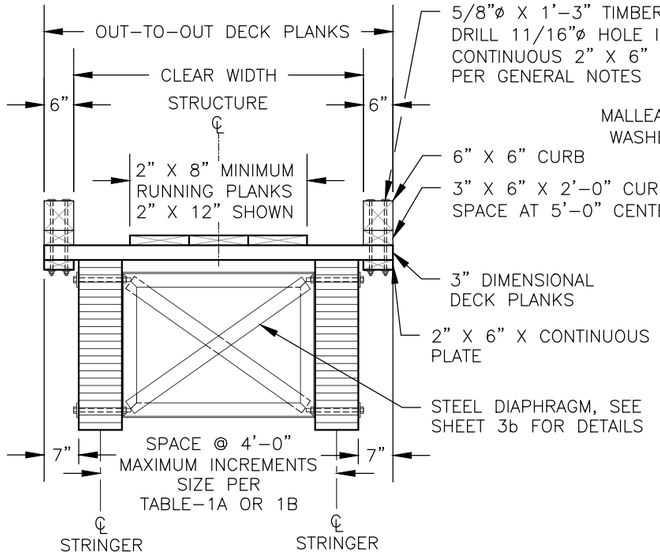
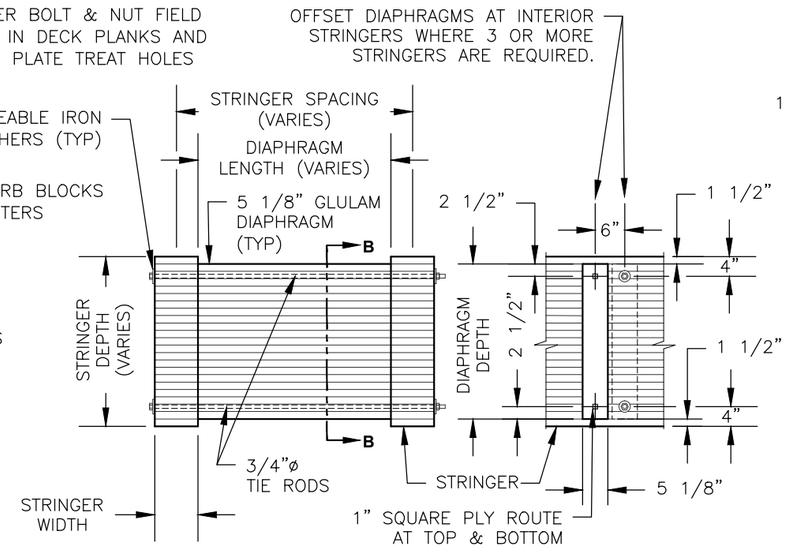
STD_963-10-02d

SHEET
OF

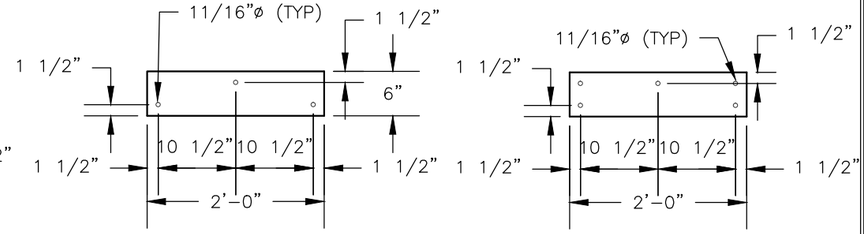


BRIDGE W/CURBS ONLY DECK SECTION W/STRINGERS @ 4'-0" O.C.



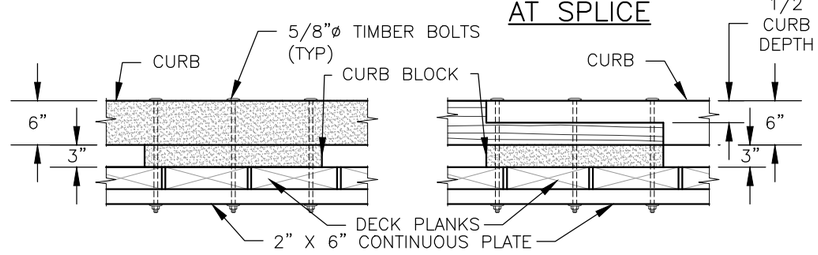
ELEVATION-SECTION B-B GLULAM DIAPHRAGM ALTERNATE

GLULAM DIAPHRAGM ALTERNATE IS APPLICABLE FOR ALL STRINGER DEPTHS.



PLAN-CURB BLOCK

PLAN-CURB BLOCK AT SPLICE



ELEVATION-TYPICAL CONNECTION SOLID SAWN CURB CONNECTION DETAILS

ELEVATION-CONNECTION AT SPLICE

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

TIMBER & LUMBER: SOLID SAWN TIMBER MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF THE GRADING RULES AGENCY FOR THE SPECIES, TYPE, AND GRADE SPECIFIED BELOW. GLULAM MEMBERS SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD, STANDARD SPECIFICATIONS FOR STRUCTURAL GLUED LAMINATED TIMBER OF SOFTWOOD SPECIES (ANSI 117) FOR THE COMBINATION, SPECIES, USE, AND APPEARANCE SPECIFIED BELOW.

GLULAM STRINGERS
- COMBINATION SYMBOL 24F-V4, SPECIES – DF/DF DRY CONDITION USE AND INDUSTRIAL APPEARANCE

CURB MEMBERS, SILLS, AND BACKING PLANKS
- COASTAL REGION DOUGLAS FIR – LARCH ROUGH SAWN NO.1 GRADE, GRADING RULES AGENCY – WWPA, WCLIB

RUNNING PLANKS
- COASTAL REGION DOUGLAS FIR – LARCH ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY – WWPA, WCLIB

RAILS & POSTS (SEE PROJECT CRITERIA)

UNTREATED
- REDWOOD, S4S, NO.1 GRADE GRADING RULES AGENCY – RIS
- WESTERN RED CEDAR, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY – WWPA, WCLIB

TREATED
- HEM – FIR/DOUGLAS FIR, S4S, NO.1 GRADE GRADING RULES AGENCY – WWPA, WCLIB

TREATMENT: SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVERS INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

GLULAM STRINGER
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

SILLS, BACKING PLANKS, CRIBS, TIMBER WALLS, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT – HEAVY DUTY (UC4B)
- PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
- COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

FIELD TREATMENT: COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OD WOOD. ALL ABRASIONS AND FIELD CUTS –APPROVED BY THE C.O.R.– SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
GLULAM STRINGER TRAIL BRIDGE

SECTION
963 - GLULAM TRAIL BRIDGE

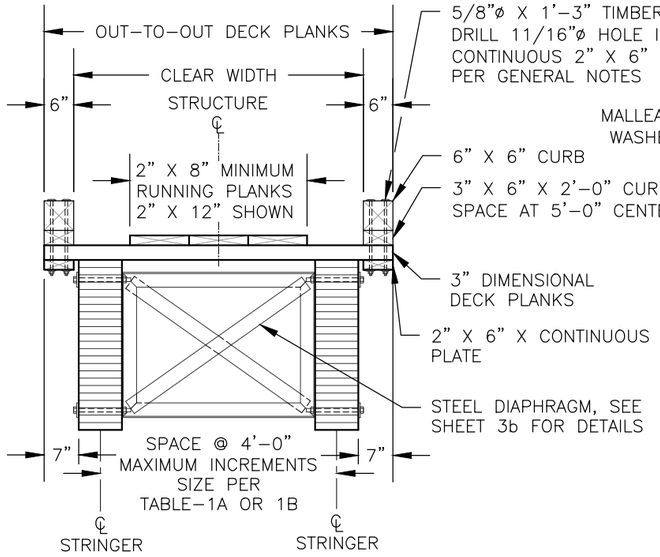
TYPICAL ID
GSB

REVISION DATE

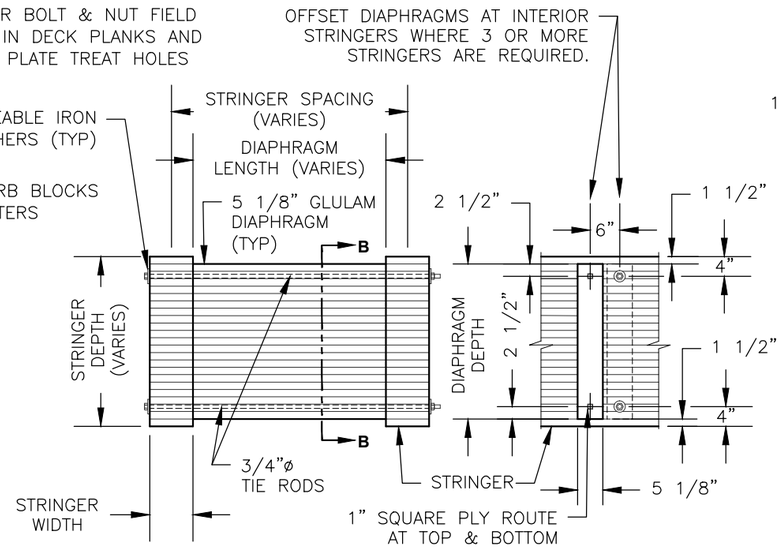
NOT TO SCALE

DRAWING NO.
STD_963-10-03a

SHEET
OF

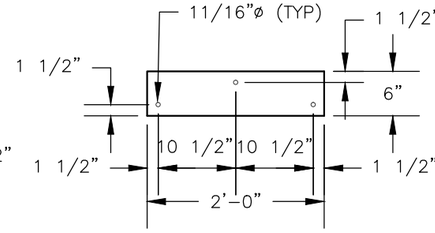


BRIDGE W/CURBS ONLY DECK SECTION W/STRINGERS @ 4'-0" O.C.

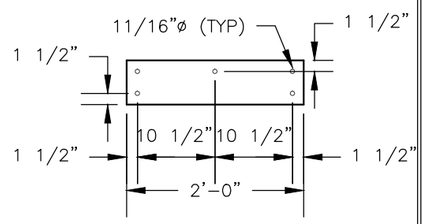


ELEVATION-SECTION B-B GLULAM DIAPHRAGM ALTERNATE

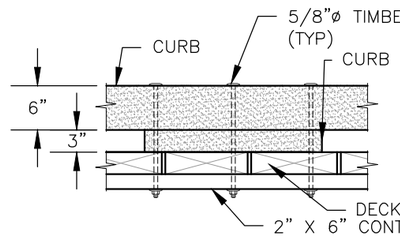
GLULAM DIAPHRAGM ALTERNATE IS APPLICABLE FOR ALL STRINGER DEPTHS.



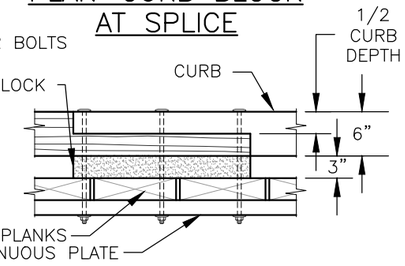
PLAN-CURB BLOCK



PLAN-CURB BLOCK AT SPLICE



ELEVATION-TYPICAL CONNECTION SOLID SAWN CURB CONNECTION DETAILS



ELEVATION-CONNECTION AT SPLICE

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

TIMBER & LUMBER: SOLID SAWN TIMBER MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF THE GRADING RULES AGENCY FOR THE SPECIES, TYPE, AND GRADE SPECIFIED BELOW. GLULAM MEMBERS SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD, STANDARD SPECIFICATIONS FOR STRUCTURAL GLUED LAMINATED TIMBER OF SOFTWOOD SPECIES (ANSI 117) FOR THE COMBINATION, SPECIES, USE, AND APPEARANCE SPECIFIED BELOW.

GLULAM STRINGERS
- COMBINATION SYMBOL 24F-V3, SPECIES – SP/SP DRY CONDITION USE AND INDUSTRIAL APPEARANCE

CURB MEMBERS, SILLS, AND BACKING PLANKS
- SOUTHERN PINE ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY – SPIB

RUNNING PLANKS
- SOUTHERN PINE ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY – SPIB

RAILS & POSTS (SEE PROJECT CRITERIA)

UNTREATED
- BALDCYPRESS, S4S, NO.1 GRADE GRADING RULES AGENCY – SPIB
- WHITE OAK, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY – NELMA

TREATED
- SOUTHERN PINE, S4S, NO.2 GRADE GRADING RULES AGENCY – SPIB

TREATMENT: SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVERS INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

GLULAM STRINGER
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

SILLS, BACKING PLANKS, CRIBS, TIMBER WALLS, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT – HEAVY DUTY (UC4B)
- PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
- COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

FIELD TREATMENT: COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OD WOOD. ALL ABRASIONS AND FIELD CUTS –APPROVED BY THE C.O.R.– SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.

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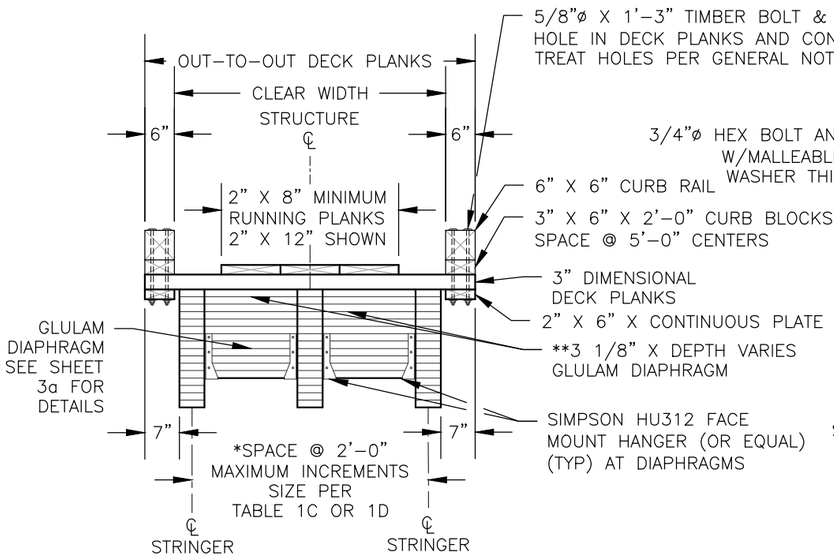
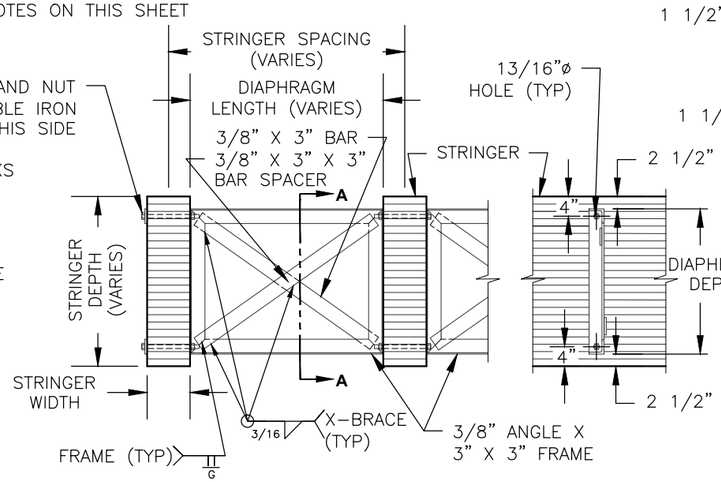
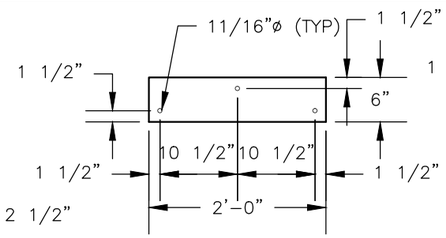


BRIDGE W/RAILING SYSTEMS
DECK SECTION W/STRINGERS @ 2'–0" O.C.

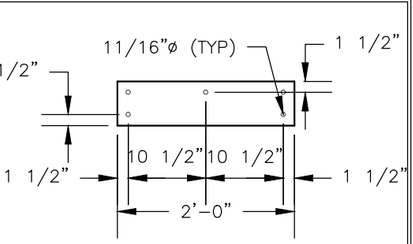


ELEVATION– SECTION A–A STEEL DIAPHRAGM ALTERNATE

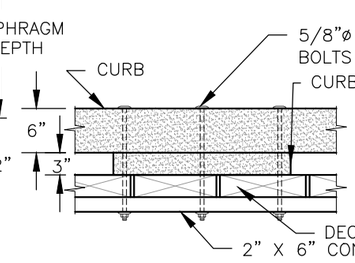
STEEL DIAPHRAGM ALTERNATE IS APPLICABLE ONLY FOR STRINGER DEPTHS OF 21" OR GREATER.



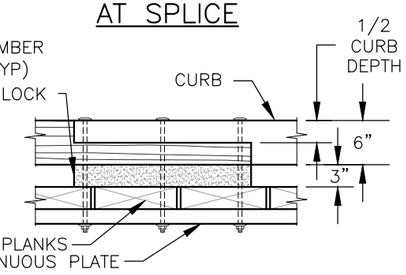
PLAN–CURB BLOCK



PLAN–CURB BLOCK AT SPLICE



ELEVATION– TYPICAL CONNECTION SOLID SAWN CURB CONNECTION DETAILS



ELEVATION– CONNECTION AT SPLICE

* MINIMUM NUMBER OF STRINGERS IS 3.
** DIAPHRAGM DEPTH SHALL BE A MINIMUM OF 70% OF STRINGER DEPTH

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

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GLULAM STRINGERS
- COMBINATION SYMBOL 24F–V4, SPECIES – DF/DF DRY CONDITION USE AND INDUSTRIAL APPEARANCE

CURB MEMBERS, SILLS, AND BACKING PLANKS
- COASTAL REGION DOUGLAS FIR – LARCH ROUGH SAWN NO.1 GRADE, GRADING RULES AGENCY – WWPA, WCLIB

RUNNING PLANKS
- COASTAL REGION DOUGLAS FIR – LARCH ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY – WWPA, WCLIB

RAILS & POSTS (SEE PROJECT CRITERIA)

UNTREATED
- REDWOOD, S4S, NO.1 GRADE GRADING RULES AGENCY – RIS
- WESTERN RED CEDAR, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY – WWPA, WCLIB

TREATED
- HEM – FIR/DOUGLAS FIR, S4S, NO.1 GRADE GRADING RULES AGENCY – WWPA, WCLIB

TREATMENT: SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVERS INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

GLULAM STRINGER
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

SILLS, BACKING PLANKS, CRIBS, TIMBER WALLS, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT – HEAVY DUTY (UC4B)
- PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
- COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

FIELD TREATMENT: COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OD WOOD. ALL ABRASIONS AND FIELD CUTS –APPROVED BY THE C.O.R.– SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.

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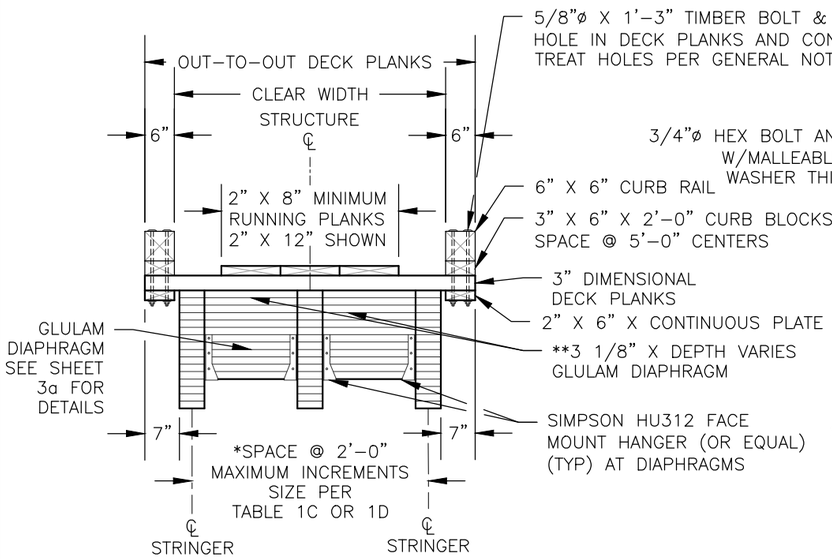
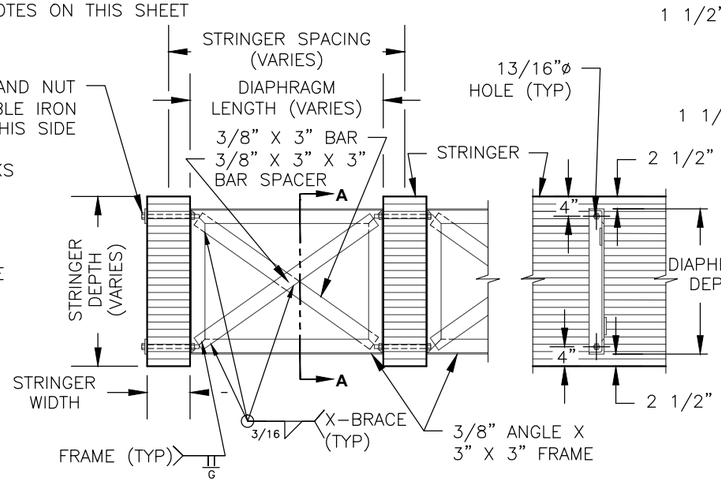
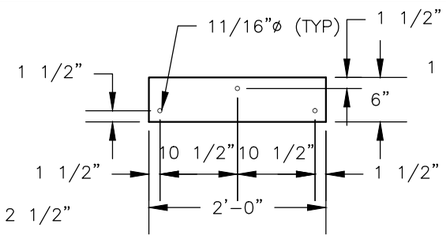


BRIDGE W/RAILING SYSTEMS
DECK SECTION W/STRINGERS @ 2'–0" O.C.

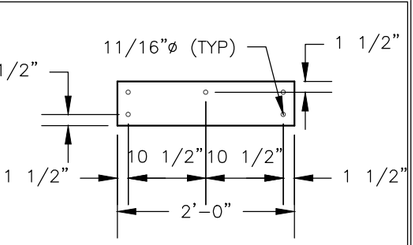


ELEVATION– SECTION A–A STEEL DIAPHRAGM ALTERNATE

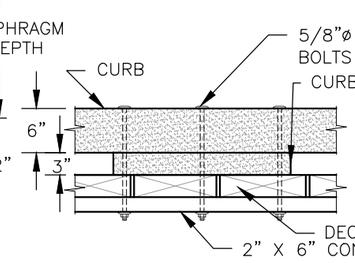
STEEL DIAPHRAGM ALTERNATE IS APPLICABLE ONLY FOR STRINGER DEPTHS OF 21" OR GREATER.



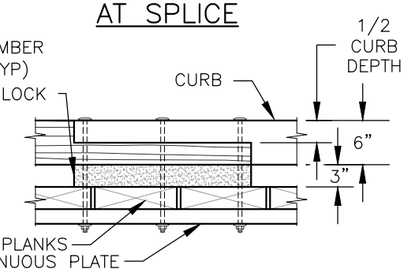
PLAN–CURB BLOCK



PLAN–CURB BLOCK AT SPLICE



ELEVATION– TYPICAL CONNECTION SOLID SAWN CURB CONNECTION DETAILS



ELEVATION– CONNECTION AT SPLICE

* MINIMUM NUMBER OF STRINGERS IS 3.
** DIAPHRAGM DEPTH SHALL BE A MINIMUM OF 70% OF STRINGER DEPTH

GENERAL NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

TIMBER & LUMBER: SOLID SAWN TIMBER MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF THE GRADING RULES AGENCY FOR THE SPECIES, TYPE, AND GRADE SPECIFIED BELOW. GLULAM MEMBERS SHALL CONFORM TO THE AMERICAN NATIONAL STANDARD, STANDARD SPECIFICATIONS FOR STRUCTURAL GLUED LAMINATED TIMBER OF SOFTWOOD SPECIES (ANSI 117) FOR THE COMBINATION, SPECIES, USE, AND APPEARANCE SPECIFIED BELOW.

GLULAM STRINGERS
- COMBINATION SYMBOL 24F–V3, SPECIES – SP/SP DRY CONDITION USE AND INDUSTRIAL APPEARANCE

CURB MEMBERS, SILLS, AND BACKING PLANKS
- SOUTHERN PINE ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY – SPIB

RUNNING PLANKS
- SOUTHERN PINE ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY – SPIB

RAILS & POSTS (SEE PROJECT CRITERIA)

UNTREATED
- BALDCYPRESS, S4S, NO.1 GRADE GRADING RULES AGENCY – SPIB
- WHITE OAK, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY – NELMA

TREATED
- SOUTHERN PINE, S4S, NO.2 GRADE GRADING RULES AGENCY – SPIB

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GLULAM STRINGER
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- PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
- COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)

DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED
- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND – EXPOSED (UC3B)
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- AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT – HEAVY DUTY (UC4B)
- PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
- COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

FIELD TREATMENT: COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OD WOOD. ALL ABRASIONS AND FIELD CUTS –APPROVED BY THE C.O.R.– SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

HARDWARE AND STRUCTURAL STEEL: SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

FABRICATION: SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.

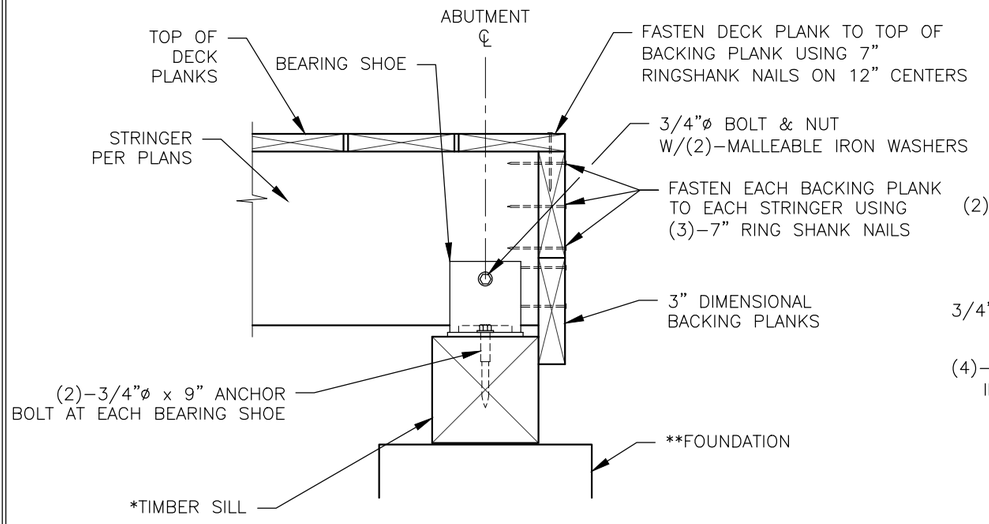
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
STANDARD TRAIL PLAN

PROJECT NAME & LOCATION

DRAWING NAME
GLULAM STRINGER TRAIL BRIDGE
SECTION
963 - GLULAM TRAIL BRIDGE
TYPICAL ID
GSB

REVISION DATE
NOT TO SCALE

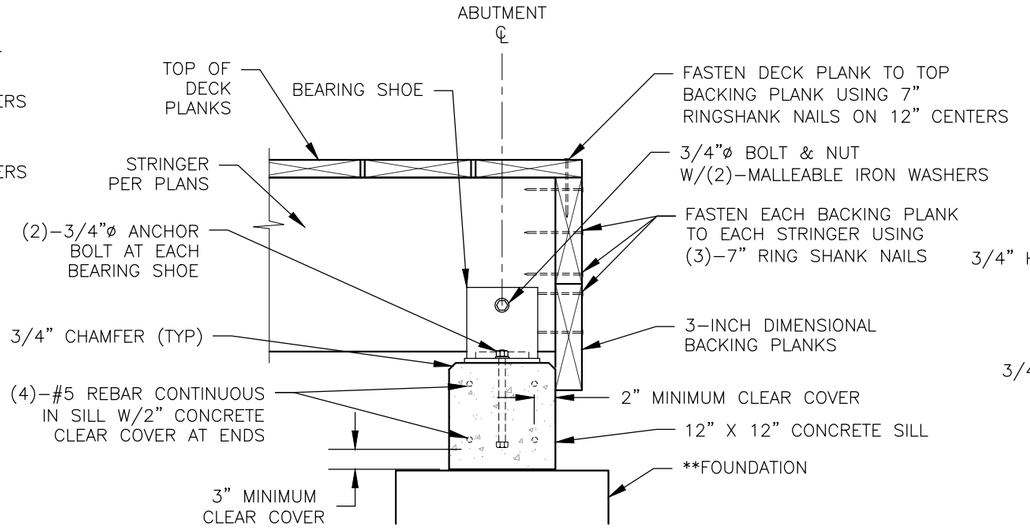
DRAWING NO.
STD_963-10-03d
SHEET
OF



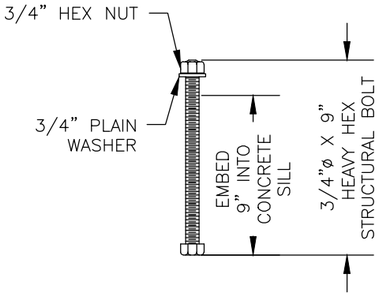
TIMBER SILL CONNECTION DETAIL

* TIMBER SILL CAN BE EITHER 12" X 12" SOLID SAWN 10 3/4" X 12" GLUE–LAMINATED, BUILT–UP 3" X 12", 4" X 12", & 6" X 12" TREATED MEMBERS.

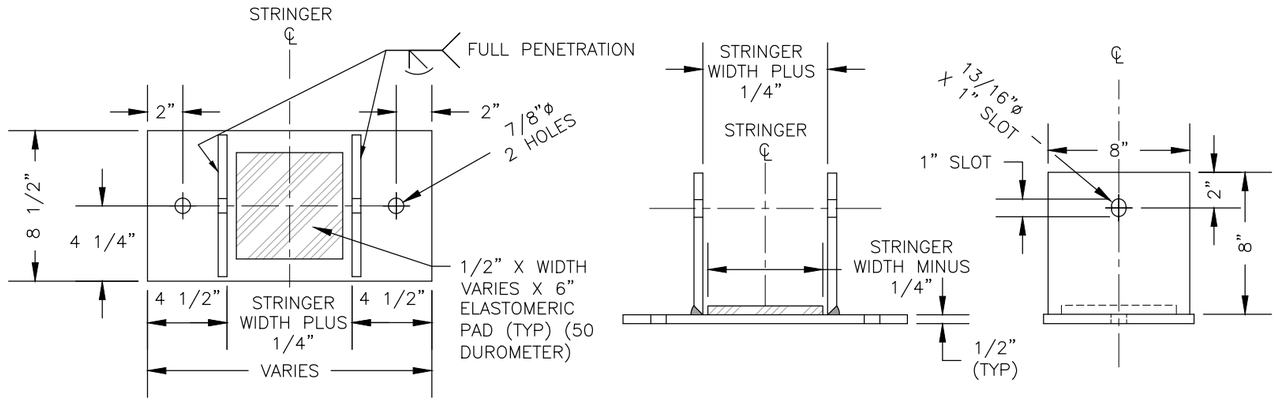
** SEE STANDARD DRAWINGS 965–10, 965–20, 965–30, & 965–40 FOR FOUNDATION ALTERNATIVES



CONCRETE SILL CONNECTION DETAIL



CONCRETE SILL ANCHOR BOLT DETAIL



PLAN | END VIEW | SIDE VIEW

BEARING SHOE DETAIL

MATERIAL = 1/2" STEEL PLATE A36

NOTES:

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP–03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS,

CONCRETE: USE STRUCTURAL CONCRETE WITH 7 SACK MINIMUM MIX APPROVED BY THE C.O., CONCRETE SHALL RECEIVE A TOWELED SURFACE FINISH. CONCRETE SHALL HAVE 4%–6% ENTRAINED AIR. MAXIMUM SIZE AGGREGATE SHALL BE 3/4–INCH AND CONCRETE SLUMP SHALL NOT EXCEED 4–INCHES.

REINFORCING STEEL: PROVIDE REINFORCING STEEL THAT CONFORMS TO ASTM A615 (AASHTO M31), GRADE 40 OR 60. PROVIDE 2–INCH CLEAR CONCRETE COVER FOR ALL REBAR, UNLESS NOTED OTHERWISE ON THE PLANS.

HARDWARE AND STRUCTURAL STEEL: SEE SUPERSTRUCTURE DRAWINGS FOR PROJECT DESIGN CRITERIA AND GENERAL NOTES.

TREATED TIMBER & LUMBER: REFER TO THE GENERAL NOTES ON THE SUBSTRUCTURE DRAWINGS FOR TREATED TIMBER & LUMBER SPECIFICATIONS AND FIELD TREATING OF WOOD

LAG SCREW INSTALLATION: PRE–BORE LAG SCREW HOLES USING TWO DIAMETERS, ONE FOR THE SHANK AND ONE FOR THE THREADS. THE LEAD HOLE FOR THE SHANK IS TO BE 1/16–INCH LARGER THAN THE SHANK DIAMETER AND IS TO BE BORED TO THE DEPTH OF PENETRATION OF THE SHANK. THE LEAD HOLE FOR THE THREADED PORTION IS TO BE 70 PERCENT OF THE BOLT DIAMETER AS SHOWN ON THE PLANS AND IS TO BE BORED AT LEAST TO THE LENGTH OF THE THREADS. **DO NOT DRIVE LAG SCREWS WITH A HAMMER.**

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