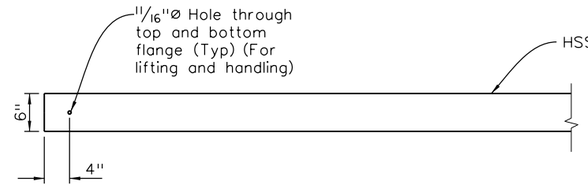
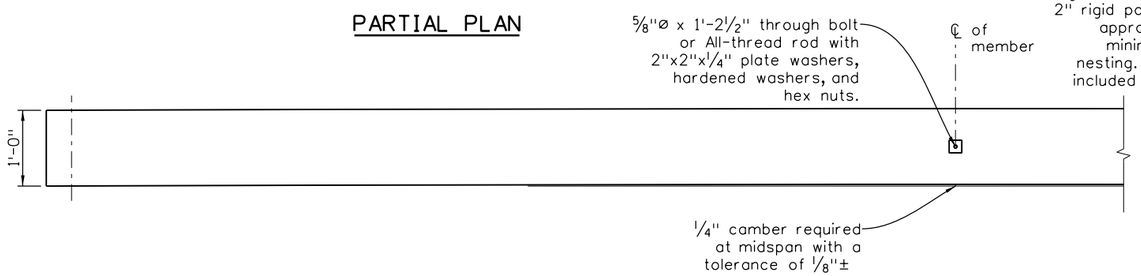


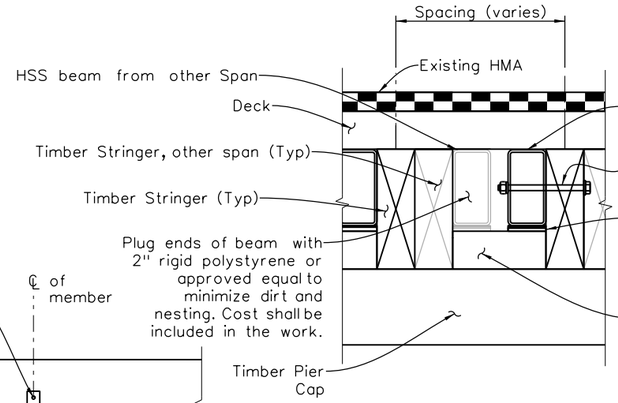
Note to Designer:

Bolt needed for stability on 23' spans.
Bolt may be deleted on 19' spans.

PARTIAL PLAN



PARTIAL ELEVATION



END SECTION

(At Pier)

DESIGN DATA:

AASHTO, Ninth Edition LRFD, 2020

Design Method:	Load and Resistance Factor Design (for sister beam)
Live Load:	HL-93 (design truck or tandem, and design lane load)
Dead Load:	Assumes 36 psf for bridge deck overlay
Structural Steel:	AASHTO M270 Grade 50 (ASTM A500 Grade C)
	fy = 50,000 psi

Note to Designer & Detailer:

This sheet is for a timber bridge with nominal span lengths of 23'.

To change to a bridge with nominal span length of 19':

- Change HSS12x6x3/8 x 24'-0" to HSS12x6x3/8 x 20'-0" in the Partial Plan
- Change the HSS10x6x5/16 bearing block to a HSS10x4x5/16 in the End Section
- Change the quantity in the Information Only table to 956 Lb per beam.

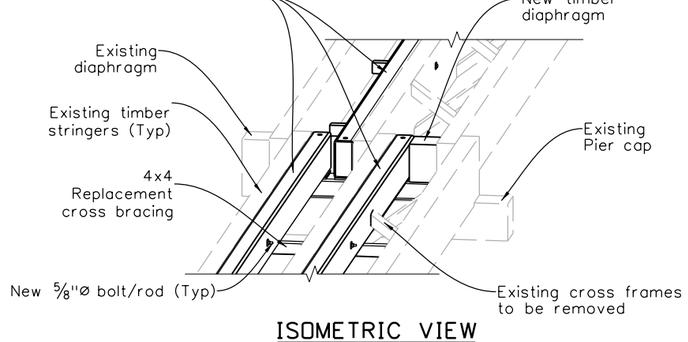
STEEL FABRICATION NOTES:

Member shall be shop bent to provide a 1/4" camber at midspan, with a tolerance of 1/8"±.

Drill holes at end of girder and at midspan prior to hot dip galvanizing.

Member shall be hot dip galvanized after fabrication.

Plate washers shall be ASTM A36. Bolts shall be ASTM A325 and nuts shall be per ASTM A563. All-thread rod per ASTM F1554 grade 55 may be substituted for bolts. All materials including bolts, nuts, and washers shall be galvanized. Zinc plating may be used in lieu of hot dipped galvanizing.



ISOMETRIC VIEW

CONSTRUCTION NOTES:

1. Timber structures contain creosote and other hazardous substances. Follow requirements in Section 250 for proper handling and safety of workers.
2. Installation of steel sister beams is considered a safety critical procedure. All relevant safety protocols shall be followed.
3. Remove end diaphragm lumber and cross bracing lumber.
4. Place a steel member next to stringer 1C, 1F, 1G, 1H, 1L, 2C, 2F, 2J, 3C, 3F, and 3J.
5. Drill an 11/16"Ø hole through the timber stringer at midspan and place the all-thread rod through the steel member and timber stringer. Add plate washers, washers, and nuts. Tighten nuts to snug tight.
6. Place steel HSS10x6x5/16 bearing block. Field cut to a snug fit between timber stringers. Add steel shims, and if needed, add additional 1/8" steel shims above the bearing block until the member is snug tight to deck. Next, jack the ends of the steel member and place an additional 1/8" steel shim underneath the member at each end.
7. Replace cross bracing with a nominal 4"x4" Select Structural No. 2 lumber horizontal diaphragm. Field cut to a snug fit between the timber stringers and connect to the timber stringers by toe nailing each end with two 30d nails or 4" deck screws.
8. Replace end diaphragms. Field cut to a snug fit between the timber stringer and steel member, and connect to timber stringer with two 30d nails or 4" deck screws. The replacement of timber diaphragms are required at the Abutment. Replacement diaphragms may utilize existing material, but proper safety precautions must be followed.
9. All work including timber diaphragms connection hardware, steel quantities, and installation shall be included in the cost of 509 Structural Steel (Galvanized).

INFORMATION ONLY

DESCRIPTION	UNIT	PER BEAM
Structural Steel (Galvanized)	Lb	1138

NOTE: Quantity includes sister beam, shims, bearing blocks, All-thread rod/bolts, washers and hex nuts.

Note to Designer & Detailer:

This sheet is for timber bridges with two or more spans and a minimum stringer spacing of 2'-1".
Note this sheet will need to be modified for timber bridges with concrete decks.

Update note #4 in the Construction Notes with the required stringers.

To determine which stringers need a steel member, use the process below:

1. Place a steel beam at stringers that have a current split or lag screw repair.
2. Place a steel beam at stringers that are under wheel lines. This helps load distribution and protects stringers that are not split. If a stringer with a split is adjacent to a wheel line location (with a steel beam called out at that location), then a steel beam is not to be placed at the wheel line stringer.
3. Do not place a steel beam at the exterior two stringers on each side, even if there is a split or lag screw repair. This avoids conflicts with the Type 10 rail, and is outside the wheel lines.
4. New rating is required for this repair. Rating should be done prior to repair to ensure issues are addressed.

Revision Dates: 11/21 | 3/23 | 11/23 | 9/24

INITIALS | DESIGN | DATE | DETAIL | DATE | QUANTITY | DATE
By
Checked By

All seals for this set of drawings are applied to the cover page(s)

Print Date: $DATE$
File Name: Sheet_B-509-SB.dgn
Horiz. Scale: None Vert. Scale: As Noted
Unit Information Unit Leader Initials

Sheet Revisions

Date:	Comments	Init.

Colorado Department of Transportation
2829 West Howard Place, 3rd Floor
Denver, CO 80204
Phone: 303-757-9309
FAX: 303-757-9197
Staff Bridge Branch Initials

As Constructed
No Revisions:
Revised:
Void:

TIMBER STRINGER REPAIR
STEEL SISTER BEAM

Designer: XXXXXXXX
Detailer: XXXXXXXX
Sheet Subset: BRIDGE
Structure Numbers: X-XX-XX, X-XX-XX
Subset Sheets: BXX of XXX

Project No./Code
Project Number
Code
Sheet Number

$PLOT_INFO$