State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Due Date: April 15

Motorized Recreation Grant Application

For: (choose all that apply)

☒ ATV/UTV Trail Aid
☒ Snowmobile Trail Aid

Form 8700-159 (R 02/2024)

Notice: Completion of this form is required under Wisconsin Statutes 23.09(26) and 23.33. Failure to complete this form will result in denial of financial assistance. Personally identifiable information found on this form is not intended to be used for any other purpose. The Department of Natural Resources (DNR) may provide this information to requesters as required by Wisconsin's Public Records law {ss. 19.31 – 19.39, Wis. Stats.}.

Instructions: Applications may combine more than one source of funds. They may be submitted for consideration of traditional ATV, UTV, Snowmobile and Motorized Stewardship funding. Submit one copy of all forms and attachments. See Page 2 for necessary attachments. Send applications to your Community Services Specialist.

DNR Use Only	
Category	Number

Section 1: Applicant Information

Applicant / Organization Name			Check Recipient: Individual other than authorized individual to act on behalf of the applicant. ☐ Select if the same as applicant.		
Oconto County					
Individual Authorized to Act on Behalf of Applicant per Resolution			**Check Recipient Name** (Name to Appear on Check)		
Chris Firgens			Oconto County Treasure		
Title			Title		
Forest, Parks, and Recreation Administrator			Treasure		
Address			Address		
4921 Cty NN			301 Washington St		
City	State	ZIP Code	City	State	ZIP Code
Oconto	WI	54153	Oconto	WI	54153
Telephone Number	Email Address				
(920) 834-6995	chris.firgens@ocontocountywi.gov				

Section 2: Project Information Required for all Projects

Project Title	**Current Funded Miles**	New Miles (if applicable)
Hay Creek Bridge	111.43	

County	Township	Range	Section	¼ ¼	¼	GPS Coordinates:
Oconto	32 N	17 ◉E ○W	10	UN	UN	Lat. 45.274 Long. -88.365

Project Description Summary

Oconto County is looking to replace the bridge crossing Hay Creek. Inspections in 2024 indicated several cracks in the vertical members of the truss integrated railings. A load rating inspection was performed in June 2025 and placed a weight restriction on the bridge which prevents clubs to be able to cross the bridge with groomers.

Total project cost estimate: $275,000

RTP application: $100,000
ATV 50%: $87,500
Snow 50%: $87,500

☒ I certify that all maintenance land use agreements are on file.

Estimated Cost

Maintenance	Acquisition	Insurance	Development	Bridge Rehab.	Trail Rehab.	Total Estimated Cost
				$275,000.00		$275,000.00

Leave Blank – DNR Use Only						

Applicant Certification

Printed Name of Authorized Official	Official's Title
Chris Firgens	Forest, Parks, and Recreation Adminstrator

As the applicant's authorized official, I certify that, to the best of my knowledge, the information in this application is true and correct.

Signature of Authorized Official _____ Date Prepared _____

Appendix A – Required for Bridge Rehab/Replace, New, or Reroute with New Bridge

☒ Bridge Rehab/Replace ☐ New Bridge ☐ Reroute with new bridge

County	Township	Range	Section	¼ ¼	¼	GPS Coordinates:
Oconto	32 N	17 ◉E ○W	10	UN	UN	Lat. 45.274 Long. -88.365

Water Body Name	Bridge Name	County Inventory Number
Hay Creek	Hay Creek Bridge	

Funded Trail Name or Number (SNARS if applicable)	Has this bridge site ever received development or rehabilitation funds in the past?
USFS 55555	○ Yes ◉ No Year:_____ $_____

Bridge is located on:	Old Bridge/Culvert Size	New Bridge/Culvert Size
○ Private property ◉ Public property	30'x12'	35'x12'

Landowner Where Bridge is Located	Telephone Number	Length of Trail Use Agreement (5 year minimum)
United States Forest Service	(715) 674-4481	perpetual

Current maximum load	Proposed maximum load	Age of Bridge	Bridge Material
12,000 lbs.	25,000 lbs.	unknown	Steel,Timber

Sponsoring Club Name	Club Contact	Telephone Number
Crooked Trails	Chad Roskopf	(414) 745-8519

Do you have your trail bridges posted as to maximum load? ◉ Yes ○ No

What is the maximum load of the other bridges on the system if groomed with this bridge?
unknown

What is the weight of your puller & drag/grading equipment?
23,030

What other recreational trail uses are planned for this bridge?
ATV, Snowmobile, Non-Motorized - hiking, biking, horseback riding

If there are other Recreational uses planned, how much of the bridge cost will be paid for by non-snowmobile or non-ATV users?
RTP- $100,000

◉ Yes ○ No Have you contacted your local DNR Water Management Specialist (WMS) regarding a permit?
◉ Yes ○ No Is a permit needed? (Please provide any written correspondence from WMS.)
○ Yes ◉ No Have you contacted your County Zoning Dept. regarding a floodplain determination?
◉ Yes ○ No Will an H & H (hydrologic and hydraulic) study be required?

Bridge Project Detailed Description

Oconto County is proposing to hire engineering to design a new bridge, construct a replacement, remove the existing bridge, and install the new bridge at the location for Summer ATV and Winter Snow use.

Appendix A (continued)

Summarize Costs in Appropriate Categories:

Bridge Structure

		Quote 1	Quote 2
		◉ Steel ○ Wooden	○ Steel ○ Wooden
Bridge Dimensions:		35'x12'	
Bridge Manufacturer:			
Design Weight Load		25,000 lbs.	lbs.
Cost of Structure:	1. Engineering	$ 50,000	$
	2. Structure	$ 200,000	$
	Subtotal	$ 250,000	$

Installation Costs:	Quote 1 ○ Contractor or ○ Sponsor Estimate	Quote 2 ○ Contractor or ○ Sponsor Estimate
1. Engineering	$	$
2. Site Preparation	$ 12,000	$
3. Abutments	$ 6,000	$
4. Pilings/Piers	$	$
5. Approaches	$ 2,500	$
6. Riprap	$ 3,000	$
7. Labor	$	$
8. Equipment Rental	$	$
9. Culverts	$	$
10. H & H Study	$ 1,500	$
11. Wetland Delineation	$	$
12. Other	$	$
Subtotal	$ 25,000	$
Total Cost	$ **275,000**	$

For the application grant, you must take the lowest of the two quotes.

Entire Deck and Railing Projects ○ Contractor ○ Sponsor ○ Club

Bridge Dimensions:		
Design Weight Load		lbs.
1. Materials	$	
2. Labor	$	
Total	$	

Guidelines for Applicant

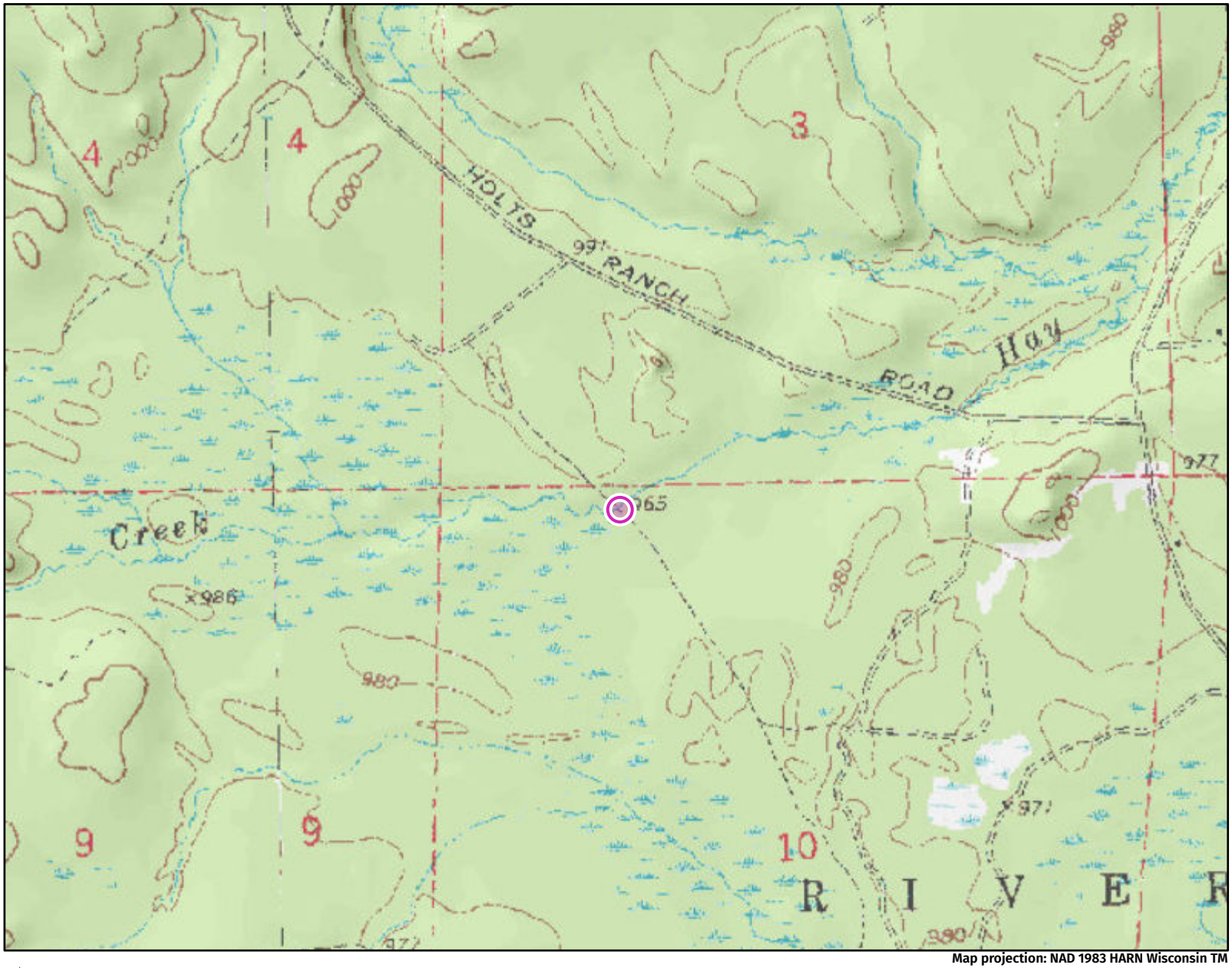
Complete this form for each bridge structure you are submitting a grant application for. Provide any additional documents not requested on application checklist to substantiate your points, including actual deeded easements.

	Category	Possible Points	Actual Points
1	**Condition of the Structure** (max of 10 points)		
	Has a certified bridge inspection report that supports the project & demonstrates need (see example, must provide copy of report by August 1 for 2024 only)	10	10
2	**Permits** (maximum points 4)		
	Consultation with DNR Water Mgmt Specialist has occurred & permit is likely, if needed	1	1
	Permit in hand / Bridge already permitted	3	
3	**Funding** (maximum points 2) Are other funds already committed?		
	50% or greater from other funding source(s)?	2	2
	11% - 49% from other funding source(s)?	1	
4	**Length of Written Easements or Land Use Agreement** (max points 5)(ch. 23.09(26)(am)1 WI Stats)		
	On public land (County, State, Federal)	5	5
	10 or more year **deeded easement** on private land or other public land, for all portions of that trail to the nearest road on each side of the bridge	5	
	3-9 year **deeded easement** on private land or other public land, for all portions of that trail to the nearest road on each side of the bridge	4	
	10 or more year **deeded easement** on private land or other public land, for just the bridge site	3	
	3-9 **deeded easement** on private land or other public land, for just the bridge site	2	
	10 or more year land use agreement (LUA, not deeded) on private land or other public land	1	
	3-9 year land use agreement (LUA, not deeded) on private land or other public land	0	
5	**Miles Impacted** – How many miles will need to rerouted if the structure is not replaced? Measured from nearest intersection on both sides of the bridge. (max 4 points)		
	Less than 20 miles	1	
	20 miles or more	3	3
	No other snowmobile trails connect. Explain:	4	
	DEDUCTIONS		
6	**County Active Project Deduction** (maximum deduction 1 point) A snowmobile active project is one that has exceeded it's initial grant period.		
	Two or more active projects - deduct 1 point	-1	
	GRAND TOTAL		**21**

Comments/Notes:

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Oconto County
Hay Creek Bridge



Legend: (some map layers may not be displayed)

24K USGS DRGs

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 8
- 9
- 10
- 11
- 12
- 20
- 21
- 24
- 25

Notes:

Topo Map

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 1,000 2,000 Feet
0 300 600 Meters

Service Layer Credits:
DNR Basic Feature VTL (WTM): Wisconsin Department of Natural Resources, GIS Section, Latest Leaf Off: ,
Topographic Maps:

Date Printed: 2/5/2026 12:35 PM

Clarence Kilmer General Store
Oconto Falls, WI
1913

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ADOLPH WAGNER, Vice-Pres.
WM. F. P. WAGNER, Treas.
OSCAR WAGNER, Sec'y.

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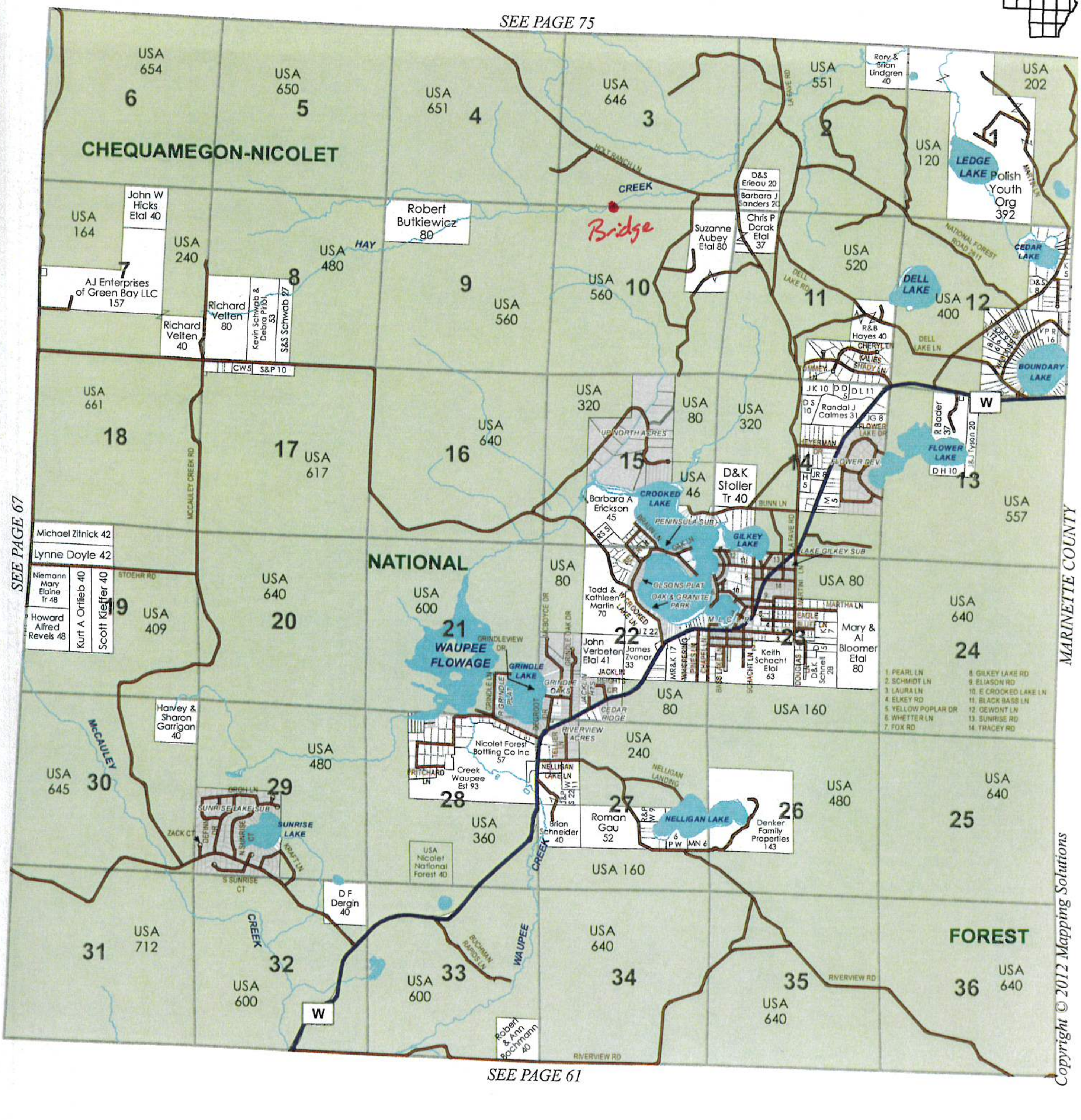
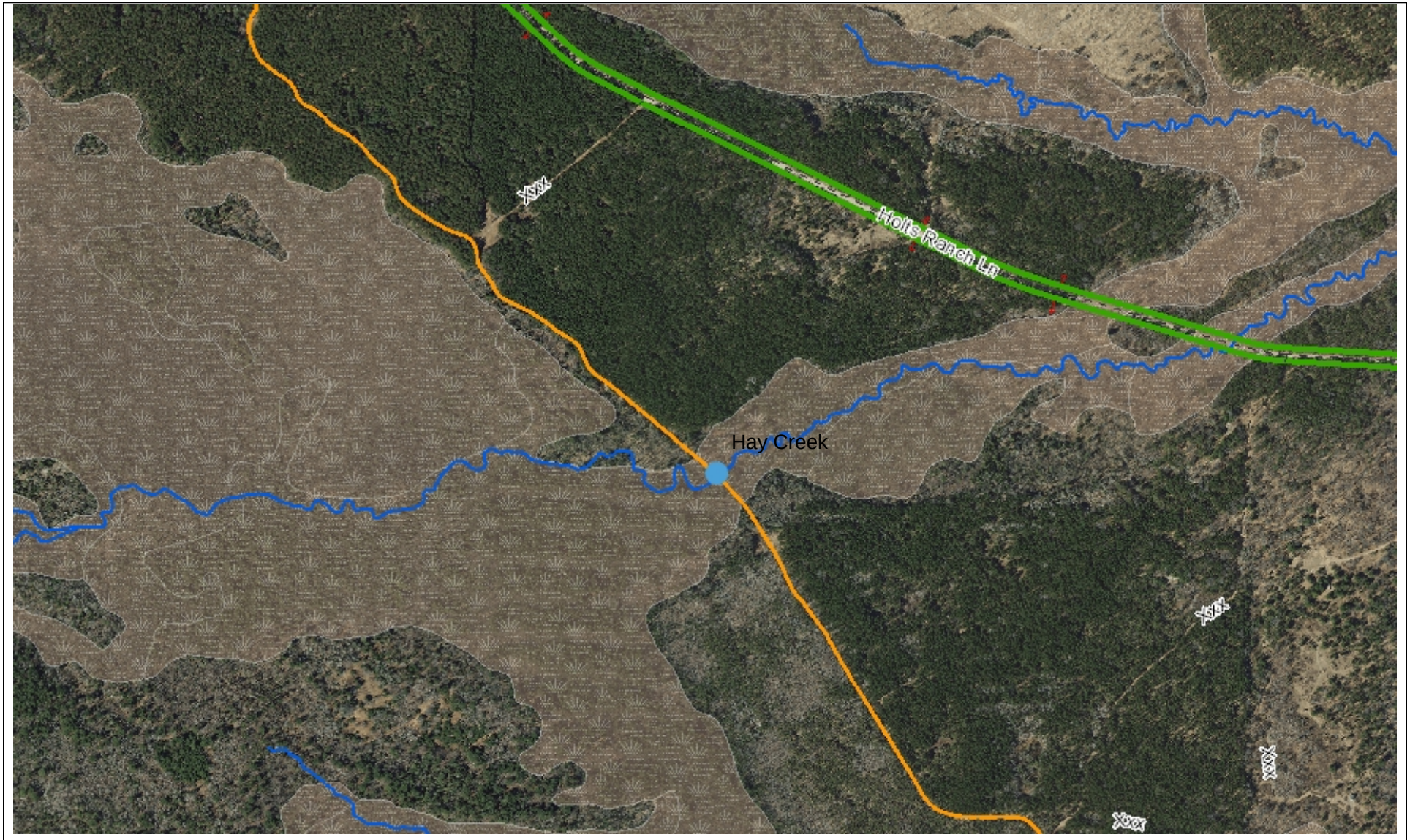




Oconto County

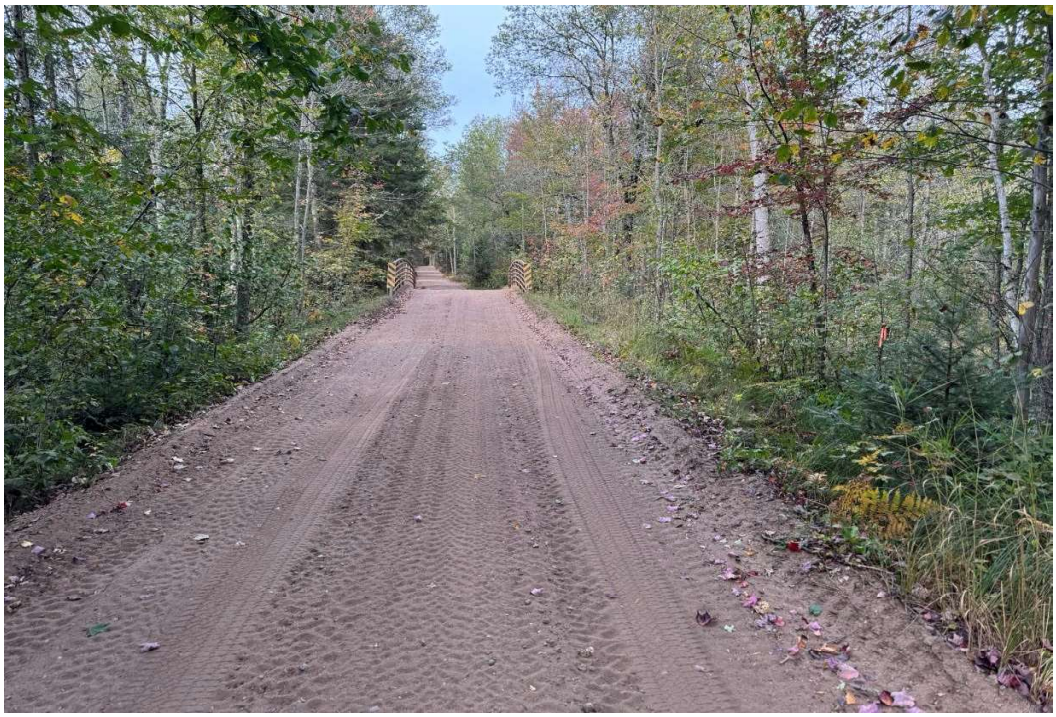
Aerial & Wetland

SCALE: 1" = 702 '

Print Date: 2/5/2026

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS



Hay Creek Bridge - looking north

Closer view looking north

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Downstream side. Sand windrow at edges

Upstream Truss

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

DS Channel

US channel

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Looking south

Toward crack at L1 panel point (Left truss looking north (upstream truss), 1st panel pt)

BRIDGE PHOTOS - cont.

Closeup of L1 crack

SW corner, typical of all

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Typical at edge

South abut looking DS

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

South riprap slope looking DS

Channel under bridge

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward north abut

Bot chord butt weld

BRIDGE PHOTOS - cont.

Typical floorbeam connection

Typical FB condition

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward north abut

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward crack at L6

L6 panel point crack in vert

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Another view of crack width at L6

Toward R6 crack from NE quad

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

R6 vert crack

R6 width

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward upstream

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Signs looking south. Log trucks should not use this bridge

Insert photo here.

Load Rating

for

Hay Creek Trail Bridge, 091304-55555-0.0

Steel Truss/Steel Floorbeam/Timber Plank Deck, Trail Bridge

USDA Forest Service – Region 9

Chequamegon-Nicolet National Forest – Lakewood-Laona Ranger District

Oconto County, Wisconsin

Prepared by:

U.P. Engineers & Architects, Inc.

100 Portage Street

Houghton, MI 49931

June 16, 2025

UPEA Project Number: U28-04461

Table of Contents

I. Summary

BRIDGE RATING SUMMARY
USFS REGION 9 LOAD RATING REPORT

Forest:	CHEQUAMEGON-NICOLET NATIONAL FOREST	Ranger District:	LAKEWOOD-LAONA
Rated By:	CHASE SMITH, E.I.T.	Bridge Name:	HAY CREEK
Reviewed By:	GUST JUNTTILA, P.E.	Bridge Number:	091304-55555-0.0
Firm:	UPEA	Bridge SN:	091304-55555-0.0
Rating Date:	6/14/2025		

= =

SUMMARY OF CONTROLLING RATING
(Rating Factors)

	RF	Safe Load Capacity (tons)	Posting Load (tons)	Controlling Member	Location (span ratio)	Controlling Effect* (M, V, or A)
H5	0.89	4	---	Deck	0.5	STR I, M
H5	1.22	6	---	F.B.	0.5	SER II, Ac
H10	0.45	4	---	Deck	0.5	STR I, M
H10	0.61	6	---	F.B.	0.5	SER II, Ac
H15	0.30	4	---	Deck	0.5	STR I, M
H15	0.41	6	---	F.B.	0.5	SER II, Ac
Pedestrian	2.77	---	---	T.C.	0.5	STR I, Ac
U-Frame*	0.99*	9	---	T.C.	0.5	STR I, Ac/M

T.C. = Top Chord, B.C. = Bottom Chord, INT = Interior, EXT = Exterior, Ac = Axial Compression,

M = Bending Moment, D.M. = Diagonal Member, At = Axial Tension, F.B. = Floor Beam

NOTES or COMMENTS:

Existing trail bridge load rating, no previous load rating. A snow load of 51 psf was used with a load factor of 1.0(unmodified ground snow load, risk category I). The bridge was modeled with 0% reduction to the steel trusses, 0% reduction to the steel floor beams, and 0% reduction to the timber deck. However, the cracked members of the trusses were modeled as detailed in section IV. methodology.
*The U-Frame stiffness check is a combined stress index (CSI) check not a rating factor check (passing is <= 1.00).

Load Rating Engineer: Chase Smith, E.I.T. Chase Smith 6/19/2025

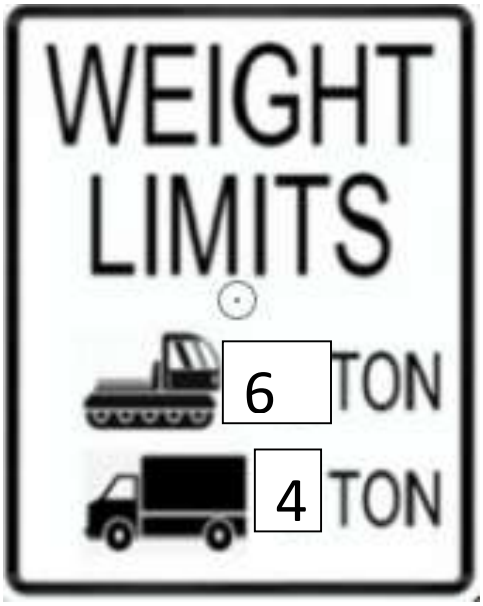
Checked By Engineer: Gust Junttila, P.E. 6/19/2025

Regional Bridge Program Manager: Jeff Dulka, P.E.

STATE OF MICHIGAN
Gust B. Junttila
License No. 6201063756
LICENSED PROFESSIONAL ENGINEER
6/19/2025

Recommended Posting

The bridge is recommended to be posted as shown below as controlled by the safe load capacity of the plank deck for H trucks, strength limit state and the Floorbeam Service II limit state for groomers. A posting of 9 tons for groomers is possible, as controlled by the U-Frame stiffness check, as the floorbeam spacing (2’-0” O.C.) is close enough that the groomer loading will be distributed over several floorbeams, but this would require a groomer specific analysis.



Note:

The groomer posting shall not be controlled by the deck, only the other superstructure components, due to the actual size of groomer tracks. For this bridge, the groomer weight is considered to be that of the H trucks (no other specified groomer).

II. Plan Information

This structure consists of two (2) steel thru trusses with six (6) four foot panels and two (2) three-foot sloped end panels for a span of 30 feet from centerline of bearing to centerline of bearing. The top chord is HSS 3x3x0.17 and bottom chord is HSS 3x4x0.17, vertical members are HSS 3x3x0.17, the diagonals are HSS 2x2x0.17, and the floor beams are HSS 6x2x1/4 members spaced at two feet on center. The longitudinal 2x8 decking is supported on the floorbeams and has a 2x8 timber wearing surface. The bridge dimensions and members were field measured (there are no existing plans on file). The thicknesses of steel tube elements were obtained with a D-meter. The deck has a 11.916-foot clear width.

III. Inspection Information

The most recent inspection was performed on October 3rd, 2024. The existing decking was rated as a 7 as viewed from below. The wearing surface was rated as 6 but only the edges were visible as the structure is covered in sand.

The superstructure was rated a 4 due to several vertical cracks in the vertical members. Three (3) vertical cracks were observed in the vertical members, The cracks are located at the verticals L1, L6, and R6, these are the verticals located at the corners. The largest of these cracks is 1/16th inch wide and 8 inches long.

This inspection was performed by UPEA. See **Appendix D: Inspection Report.**

IV. Methodology

The structure was load rated using LRFR in accordance with AASHTO MBE, 3rd Edition, 2018 and was performed using Visual Analysis 23 for the trusses and floor beams. Hand calculations were performed for the timber deck with a 1.00 condition factor.

Timber grades used for construction are unknown, therefore timber grades were assumed to be SYP no 1 for calculations. Steel grades were assumed to be 46 ksi steel based on the apparent age of the structure.

The steel vertical truss members that have cracks in them were modeled in Visual Analysis using shape builder to place a 1/16” wide crack in the tube steel as noted in the inspection report. The members that have these cracks, L1, R6, and L6 were then split into three sections. The first section is 2 inches long, undamaged HSS 3x3x0.188, the next 8 inches are the modeled cracked HSS3x3x0.188, and the remainder of the member is undamaged. But since the end vertical members are tension members and not compression members, the CSI checks on these members are significantly lower than all the other members and do not control the rating.

Per the Statement of Work, the bridge was checked for light vehicles (H5, H10, H15) plus snow, and pedestrian plus snow, and equestrian patch load on the deck (no snow).

For modeling purposes in the Visual Analysis software, vehicle load were applied to a weightless imaginary stringer added to the center of the model. The loads then distribute to each of the two trusses.

The frame was also checked for U-frame stiffness per the methodology in Chapter 7 of the AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges (Dec 2009), and the 6th Edition of "Guide to Stability Design Criteria for Metal Structures", chapter 15, titled "Members with Elastic Lateral Restraints", as edited by Theodore V. Galambos. The maximum axial compression force in the top chord at the middle of the bridge span, resulting from the controlling load combination, was retrieved from the Visual Analysis model and applied to the U-frame stiffness equations to determine an effective length factor, K for the top chord, as well as the resulting lateral load to be applied to the top of each thru truss. Once applied to the model, the combined stress index was checked for the top chord and the vertical members to verify adequate stiffness. Since the floorbeams are mounted to the side of the bottom chord and not into the side of the verticals, the frame doesn't adhere to the typical requirements of a U-frame structure. The calculations reduce the frame stiffness accordingly based on the difference in stiffness between a fixed end column and one that can rotate. (see **Appendix C: U-Frame Analysis**).

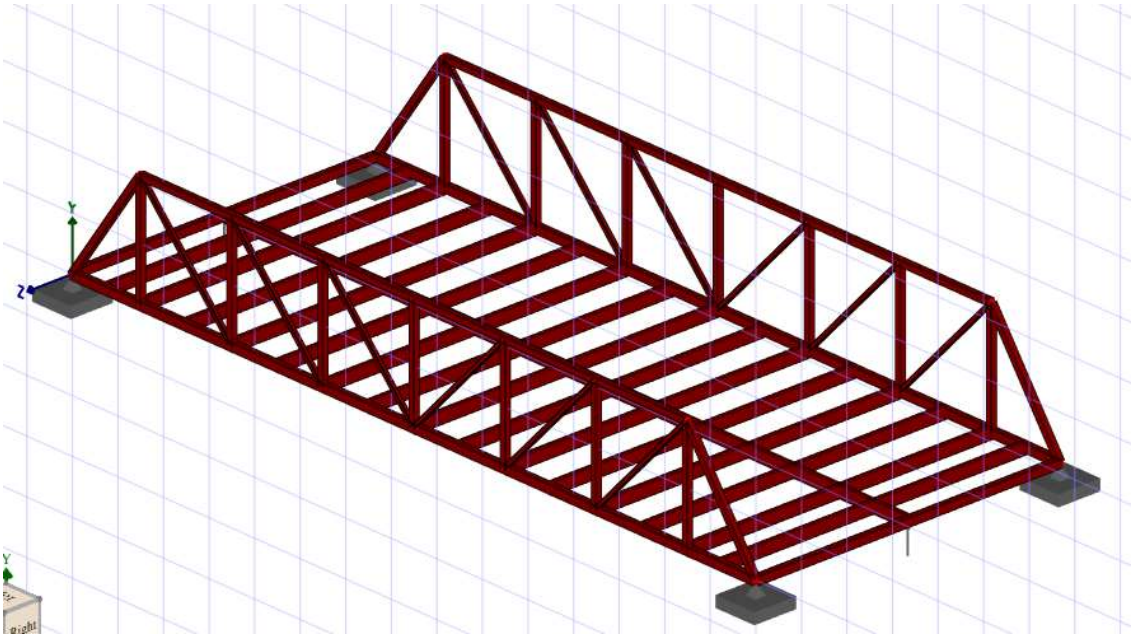


Figure 1: Visual Analysis 3D Truss View

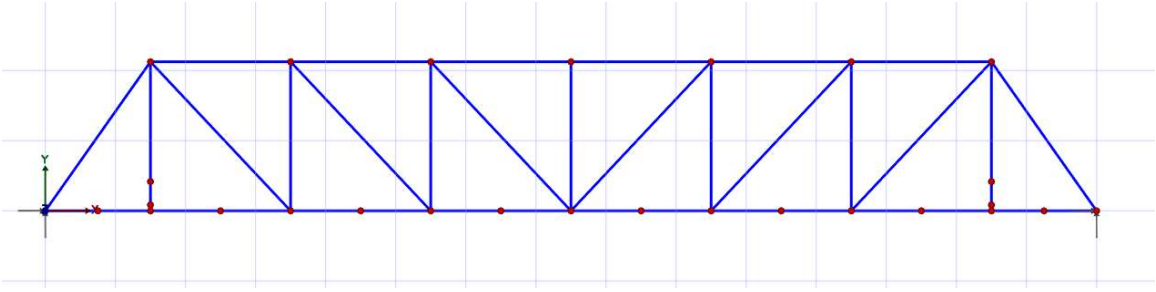


Figure 2: Visual Analysis Truss Profile

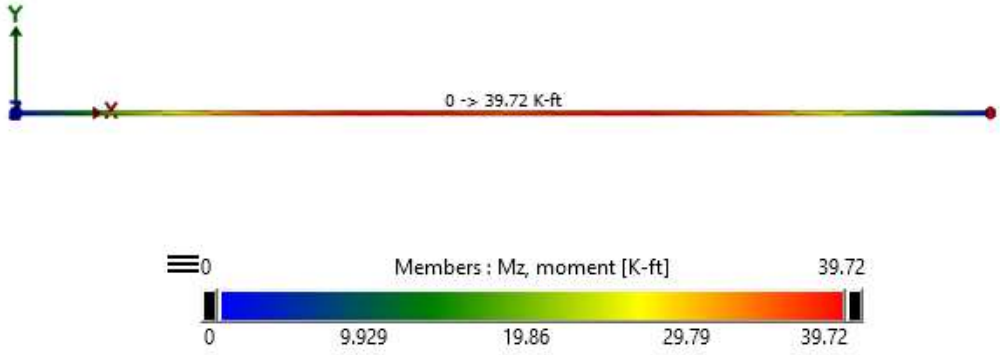


Figure 3: Floor Beam with H15 Loading

Appendix A: Visual Analysis Superstructure Modeling/Rating

H5 Loading

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Bill of Materials: Members

Material	Section	Count	Total Length ft	Total Volume in^3	Total Weight K
ASTM A500 Grade B (Fy = 46ksi)	3x3x.188 with crack	3	1.998	45.034	0.013
ASTM A500 Grade C (Fy = 46ksi)	HSS2X2X.188	12	70.036	1000.110	0.284
ASTM A500 Grade C (Fy = 46ksi)	HSS3X3X.188	33	126.311	2864.726	0.814
ASTM A500 Grade C (Fy = 46ksi)	HSS4X3X.188	34	84.833	2280.322	0.648
ASTM A500 Grade C (Fy = 46ksi)	HSS6X2X.250	16	216.251	8745.170	2.484

Total Member Weight = 3.897 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft
BmZ020	D	Force Y	-0.036 K/ft	No	6.208	12.417
BmZ020	D	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ020	Di	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ020	Di	Force Y	-0.009 K/ft	No	6.208	12.417
BmZ020	S	Force Y	-0.077 K/ft	No	0.000	6.208
BmZ020	S	Force Y	-0.077 K/ft	No	6.208	12.417
BmZ016	D	Force Y	-0.036 K/ft	No	6.208	12.417
BmZ016	D	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ016	Di	Force Y	-0.011 K/ft	No	0.000	6.208
BmZ016	Di	Force Y	-0.009 K/ft	No	6.208	12.417
BmZ016	S	Force Y	-0.077 K/ft	No	0.000	6.208
BmZ016	S	Force Y	-0.077 K/ft	No	6.208	12.417
BmZ015	D	Force Y	-0.042 K/ft	Yes	0.000	12.417
BmZ015	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417
BmZ015	S	Force Y	-0.089 K/ft	Yes	0.000	12.417
BmZ014	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ014	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ014	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ013	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ013	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ013	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ012	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ012	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417

Member Loads, Uniform (continued)

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft
BmZ012	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ011	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ011	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ011	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ010	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ010	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ010	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ009	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ009	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ009	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ008	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ008	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ008	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ007	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ007	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ007	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ006	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ006	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ006	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ005	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ005	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ005	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ004	D	Force Y	-0.048 K/ft	Yes	0.000	12.417
BmZ004	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417
BmZ004	S	Force Y	-0.102 K/ft	Yes	0.000	12.417
BmZ003	D	Force Y	-0.042 K/ft	Yes	0.000	12.417
BmZ003	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417
BmZ003	S	Force Y	-0.089 K/ft	Yes	0.000	12.417

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H5	H5	Yes	BmX048,	Axle Loads: 0 ft : -2 K 14 ft : -8 K

Custom Combination Cases

Name	Combination Type	Cases and Factors
Unfactored Component Dead Load	Strength	1 D.
Unfactored Snow Load	Strength	1 S.
Unfactored Wearing Surface Dead Load	Strength	1 Di.

Section Properties

Section	Source	Area in^2	Iz in^4	Iy in^4	J in^4	α deg
3x3x.188 with crack	Database Shape	1.878	2.446	2.438	3.066	0.000
HSS2X2X.188	Database Shape	1.190	0.641	0.641	1.090	0.000
HSS3X3X.188	Database Shape	1.890	2.460	2.460	4.030	0.000
HSS4X3X.188	Database Shape	2.240	4.930	3.160	6.260	0.000
HSS6X2X.250	Database Shape	3.370	13.100	2.210	6.550	0.000

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.198	24.840	H3-1	**0.008**	Tr = -0.0456 K-ft, Venant Shear = 0.1985 Ksi

Top Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX012	HSS3X3X.188	0.000	Unfactored Snow Load	0.071	1.000	H1-1b	**0.071**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.1207, Mz Unity = 0.0088, My Unity = 0.0014, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1.31

Top Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Unfactored Snow Load	8.383	69.462	E3-2	**0.121**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1
BmX026	HSS3X3X.188	0.000	Unfactored Snow Load	8.383	69.462	E3-2	**0.121**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Snow Load	-0.086	6.797	F7-1	**0.013**	Lb = 4 ft, Cb = 2.211

Top Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX027	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.019	6.797	F7-1	**0.003**	

Top Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Component Dead Load	-0.037	21.421	G4-1	**0.002**	Shear Area = 0.8623 in^2, Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	0.519	24.840	H3-1	**0.021**	Tr = 0.0493 K-ft, Venant Shear = 0.5186 Ksi

Diagonals: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V001	HSS3X3X.188	5.202	Unfactored Snow Load	0.061	1.000	H1-1b	**0.061**	KLz = 5.202 ft, KLy = 4.648 ft, KL(torsion) = 5.202 ft, Lb = 5.202 ft, Axial Unity = 0.0807, Mz Unity = 0.0148, My Unity = 0.0056, Kz = 1, Ky = 0.8936, K(torsion) = 1, Cb = 2.242

Diagonals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Unfactored Snow Load	4.324	49.266	D2-1	**0.088**	

Diagonals: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.139	6.797	F7-1	**0.020**	Lb = 5.202 ft, Cb = 1

Diagonals: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.056	6.797	F7-1	**0.008**	

Diagonals: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.037	21.421	G4-1	**0.002**	Shear Area = 0.8623 in^2, Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False

Verticals: Results (continued)

Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL010	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.052	24.840	H3-1	**0.002**	Tr = -0.0118 K-ft, Venant Shear = 0.0515 Ksi

Verticals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	2.051	68.404	E3-2	**0.030**	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	1.857	24.840	H3-1	**0.075**	Tr = 0.5791 K-ft, Venant Shear = 1.857 Ksi

Low Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.086	1.000	H1-1b	**0.086**	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0308, Mz Unity = 0.0699, My Unity = 0.0008, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 1

Low Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	2.861	92.736	D2-1	**0.031**	

Low Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.723	10.350	F7-1	**0.070**	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Result Superposition Case 1 Low Extreme	-0.017	8.487	F7-1	**0.002**	

Low Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	-0.648	30.065	G4-1	**0.022**	Shear Area = 1.21 in^2, Cv = 1

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False

Steel_Beam Z_G 1: Results (continued)

Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL017	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.033	24.840	H3-1	**0.001**	Tr = 0.0075 K-ft, Venant Shear = 0.0326 Ksi
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	0.033	24.840	H3-1	**0.001**	Tr = 0.0075 K-ft, Venant Shear = 0.0326 Ksi
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.033	24.840	H3-1	**0.001**	Tr = 0.0075 K-ft, Venant Shear = 0.0326 Ksi

Cracked vertical members: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	1.746	77.761	D2-1	**0.022**	

Service Load Cases

Name	Source	SelfWeight	Loads	Pattern
D	Dead Loads	Vertical Direction	17	0
Di	Ice Weight Loads	Exclude	17	0
S	Snow Loads	Exclude	17	0

H5 Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H5 Rear Axle	H5 back axle	Yes	BmX001,	Axle Loads: 0 ft : -4 K 6 ft : -4 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	4.369	H5 High Extreme	13.239	19.580	F7-10	**0.676**	Lp = 4.449 ft, Lr = 130.8 ft, Lb = 11.92 ft, Cb = 1

Steel_Beam X_G 1: Strong Shear Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	0.000	H5 High Extreme	5.746	61.361	G4-1	**0.094**	Shear Area = 2.47 in^2, Cv = 1

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H10	H10	Yes	BmX048,	Axle Loads: 0 ft : -4 K 14 ft : -16 K

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.397	24.840	H3-1	**0.016**	Tr = -0.0913 K-ft, Venant Shear = 0.397 Ksi

Top Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX026	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	0.099	1.000	H1-1b	**0.099**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.1848, Mz Unity = 0.0007, My Unity = 0.0056, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1

Top Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	12.835	69.462	E3-2	**0.185**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.132	6.797	F7-1	**0.019**	Lb = 4 ft, Cb = 1

Top Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX027	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.039	6.797	F7-1	**0.006**	

Top Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.065	21.421	G4-1	**0.003**	Shear Area = 0.8623 in^2, Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	1.037	24.840	H3-1	**0.042**	Tr = 0.0985 K-ft, Venant Shear = 1.037 Ksi

Diagonals: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V001	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.103	1.000	H1-1b	**0.103**	KLz = 5.202 ft, KLy = 4.648 ft, KL(torsion) = 5.202 ft, Lb = 5.202 ft, Axial Unity = 0.1343, Mz Unity = 0.0195, My Unity = 0.0164, Kz = 1, Ky = 0.8936, K(torsion) = 1, Cb = 1

Diagonals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	7.477	49.266	D2-1	**0.152**	

Diagonals: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.277	6.797	F7-1	**0.041**	Lb = 5.202 ft, Cb = 1

Diagonals: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.111	6.797	F7-1	**0.016**	

Diagonals: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.074	21.421	G4-1	**0.003**	Shear Area = 0.8623 in^2, Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Verticals: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL010	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.103	24.840	H3-1	**0.004**	Tr = -0.0237 K-ft, Venant Shear = 0.1031 Ksi

Verticals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	4.101	68.404	E3-2	**0.060**	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	3.714	24.840	H3-1	**0.150**	Tr = 1.158 K-ft, Venant Shear = 3.714 Ksi

Low Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.172	1.000	H1-1b	**0.172**	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0617, Mz Unity = 0.1397, My Unity = 0.0015, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 1

Low Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	5.721	92.736	D2-1	**0.062**	

Low Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	1.446	10.350	F7-1	**0.140**	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Result Superposition Case 1 Low Extreme	-0.033	8.487	F7-1	**0.004**	

Low Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	-1.295	30.065	G4-1	**0.043**	Shear Area = 1.21 in^2, Cv = 1

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Steel_Beam Z_G 1: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.065	24.840	H3-1	**0.003**	Tr = 0.015 K-ft, Venant Shear = 0.0651 Ksi

Cracked vertical members: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	3.493	77.761	D2-1	**0.045**	

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H10 Rear Axle	H10 rear axle	Yes	BmX001,	Axle Loads: 0 ft : -8 K 6 ft : -8 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	4.369	unfactored live load High Extreme	26.477	19.580	F7-10	**1.352**	Lp = 4.449 ft, Lr = 130.8 ft, Lb = 11.92 ft, Cb = 1

Steel_Beam X_G 1: Strong Shear Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	0.000	unfactored live load High Extreme	11.492	61.361	G4-1	**0.187**	Shear Area = 2.47 in^2, Cv = 1

H15 Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H15	H15	Yes	BmX048,	Axle Loads: 0 ft : -6 K 14 ft : -24 K

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.595	24.840	H3-1	**0.024**	Tr = -0.1369 K-ft, Venant Shear = 0.5954 Ksi

Top Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX026	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	0.286	1.000	H1-1a	**0.286**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.2772, Mz Unity = 0.0011, My Unity = 0.0083, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1

Top Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	19.253	69.462	E3-2	**0.277**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.416	6.797	F7-1	**0.061**	Lb = 5.202 ft, Cb = 1

Top Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.167	6.797	F7-1	**0.025**	

Top Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.111	21.421	G4-1	**0.005**	Shear Area = 0.8623 in^2, Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	1.556	24.840	H3-1	**0.063**	Tr = 0.1478 K-ft, Venant Shear = 1.556 Ksi

Diagonals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	11.216	49.266	D2-1	**0.228**	

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL010	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.155	24.840	H3-1	**0.006**	Tr = -0.0355 K-ft, Venant Shear = 0.1546 Ksi

Verticals: Axial Check

(extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	6.152	68.404	E3-2	**0.090**	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Low Chord: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX046	HSS4X3X.188	0.000	Result Superposition Case 1 Low Extreme	4.951	24.840	H3-1	**0.199**	Tr = -1.544 K-ft, Venant Shear = 4.951 Ksi

Low Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	0.258	1.000	H1-1b	**0.258**	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0925, Mz Unity = 0.2096, My Unity = 0.0023, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 1

Low Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	8.582	92.736	D2-1	**0.093**	

Low Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Result Superposition Case 1 High Extreme	2.169	10.350	F7-1	**0.210**	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Result Superposition Case 1 Low Extreme	-0.050	8.487	F7-1	**0.006**	

Low Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	-1.943	30.065	G4-1	**0.065**	Shear Area = 1.21 in^2, Cv = 1

Low Chord: Combined Torsion Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX030	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	0.326	1.000	H3-6	**0.326**	Tr = -1.737 K-ft, Torsion Shear Stress Unity = 0.2243, Axial Unity = 0.0604, Bending Unity = 0.1817, Flexural Shear Unity = 0.0646

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False

Imaginary Stringer: Results (continued)

Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.098	24.840	H3-1	**0.004**	Tr = 0.0225 K-ft, Venant Shear = 0.0977 Ksi

Cracked vertical members: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Result Superposition Case 1 High Extreme	5.239	77.761	D2-1	**0.067**	

H15 Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H15 Rear Axle	H15 rear Axle	Yes	BmX001,	Axle Loads: 0 ft : -12 K 6 ft : -12 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	7.547	unfactored live load High Extreme	39.716	19.580	F7-10	**2.028**	Lp = 4.449 ft, Lr = 130.8 ft, Lb = 11.92 ft, Cb = 1

Steel_Beam X_G 1: Strong Shear Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	11.916	unfactored live load Low Extreme	-17.238	61.361	G4-1	**0.281**	Shear Area = 2.47 in^2, Cv = 1

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmZ001	L	Force Y	-0.068 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	D	Force Y	-0.042 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	L	Force Y	-0.158 K/ft	Yes	0.000	12.417	No	N.A.
BmZ003	S	Force Y	-0.089 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ004	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ005	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ006	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ007	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ008	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ009	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ010	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ011	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ012	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ012	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ012	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.

Member Loads, Uniform (continued)

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmZ012	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ013	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	D	Force Y	-0.048 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	Di	Force Y	-0.013 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	L	Force Y	-0.180 K/ft	Yes	0.000	12.417	No	N.A.
BmZ014	S	Force Y	-0.102 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	D	Force Y	-0.042 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	Di	Force Y	-0.011 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	L	Force Y	-0.158 K/ft	Yes	0.000	12.417	No	N.A.
BmZ015	S	Force Y	-0.089 K/ft	Yes	0.000	12.417	No	N.A.
BmZ016	D	Force Y	-0.036 K/ft	No	6.208	12.417	No	N.A.
BmZ016	D	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ016	Di	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ016	Di	Force Y	-0.009 K/ft	No	6.208	12.417	No	N.A.
BmZ016	L	Force Y	-0.135 K/ft	Yes	0.000	12.417	No	N.A.
BmZ016	S	Force Y	-0.077 K/ft	No	0.000	6.208	No	N.A.
BmZ016	S	Force Y	-0.077 K/ft	No	6.208	12.417	No	N.A.
BmZ019	L	Force Y	-0.068 K/ft	Yes	0.000	12.417	No	N.A.
BmZ020	D	Force Y	-0.036 K/ft	No	6.208	12.417	No	N.A.
BmZ020	D	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ020	Di	Force Y	-0.011 K/ft	No	0.000	6.208	No	N.A.
BmZ020	Di	Force Y	-0.009 K/ft	No	6.208	12.417	No	N.A.
BmZ020	L	Force Y	-0.135 K/ft	Yes	0.000	12.417	No	N.A.
BmZ020	S	Force Y	-0.077 K/ft	No	0.000	6.208	No	N.A.
BmZ020	S	Force Y	-0.077 K/ft	No	6.208	12.417	No	N.A.

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Top Chord: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.183	24.840	H3-1	**0.007**	Tr = -0.042 K-ft, Venant Shear = 0.1826 Ksi

Top Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX012	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.229	1.000	H1-1a	**0.229**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.213, Mz Unity = 0.0155, My Unity = 0.0023, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1.309

Top Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	14.796	69.462	E3-2	**0.213**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Pedestrian Loading	-0.151	6.797	F7-1	**0.022**	Lb = 4 ft, Cb = 2.211

Top Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX026	HSS3X3X.188	4.000	Unfactored Pedestrian Loading	-0.016	6.797	F7-1	**0.002**	

Top Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX028	HSS3X3X.188	4.000	Unfactored Pedestrian Loading	-0.064	21.421	G4-1	**0.003**	Shear Area = 0.8623 in^2, Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V012	HSS2X2X.188	0.000	Unfactored Pedestrian Loading	0.336	24.840	H3-1	**0.014**	Tr = 0.032 K-ft, Venant Shear = 0.3365 Ksi

Diagonals: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V001	HSS3X3X.188	5.202	Unfactored Pedestrian Loading	0.107	1.000	H1-1b	**0.107**	KLz = 5.202 ft, KLy = 4.648 ft, KL(torsion) = 5.202 ft, Lb = 5.202 ft, Axial Unity = 0.1424, Mz Unity = 0.026, My Unity = 0.0094, Kz = 1, Ky = 0.8936, K(torsion) = 1, Cb = 2.243

Diagonals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	0.000	Unfactored Pedestrian Loading	7.635	49.266	D2-1	**0.155**	

Diagonals: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Unfactored Pedestrian Loading	0.177	6.797	F7-1	**0.026**	Lb = 5.202 ft, Cb = 2.243

Diagonals: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.064	6.797	F7-1	**0.009**	

Diagonals: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Unfactored Pedestrian Loading	0.063	21.421	G4-1	**0.003**	Shear Area = 0.8623 in^2, Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL006	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.057	24.840	H3-1	**0.002**	Tr = -0.0131 K-ft, Venant Shear = 0.0569 Ksi

Verticals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL009	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	3.348	68.404	E3-2	**0.049**	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX045	HSS4X3X.188	0.000	Unfactored Pedestrian Loading	1.271	24.840	H3-1	**0.051**	Tr = -0.3965 K-ft, Venant Shear = 1.271 Ksi

Low Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	2.000	Unfactored Pedestrian Loading	0.097	1.000	H1-1b	**0.097**	KLz = 2 ft, KLy = 1.955 ft, KL(torsion) = 2 ft, Lb = 2 ft, Axial Unity = 0.0517, Mz Unity = 0.0703, My Unity = 0.0009, Kz = 1, Ky = 0.9775, K(torsion) = 1, Cb = 2.193

Low Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX004	HSS4X3X.188	0.000	Unfactored Pedestrian Loading	4.792	92.736	D2-1	**0.052**	

Low Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	2.000	Unfactored Pedestrian Loading	0.727	10.350	F7-1	**0.070**	Lb = 2 ft, Cb = 2.171

Low Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX019	HSS4X3X.188	2.000	Unfactored Pedestrian Loading	-0.017	8.487	F7-1	**0.002**	

Low Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX017	HSS4X3X.188	1.500	Unfactored Pedestrian Loading	-0.600	30.065	G4-1	**0.020**	Shear Area = 1.21 in^2, Cv = 1

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

End floor beams: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Unfactored Pedestrian Loading	0.037	24.840	H3-1	**0.001**	Tr = 0.0085 K-ft, Venant Shear = 0.0372 Ksi

Cracked vertical members: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL016	3x3x.188 with crack	0.000	Unfactored Pedestrian Loading	1.780	77.761	D2-1	**0.023**	

Pedestrian Floorbeam Loading

Moving Loads

Name	Truck	Reversible	Members	Truck Details
H15 Rear Axle	H15 rear Axle	Yes	BmX001,	Axle Loads: 0 ft : -12 K 6 ft : -12 K

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset ft	End Offset ft	Projected?	Predefined Load
BmX001	D	Force Y	-0.048 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	L	Force Y	-0.180 K/ft	Yes	0.000	11.916	No	N.A.
BmX001	S	Force Y	-0.102 K/ft	Yes	0.000	11.916	No	N.A.

Steel_Beam X_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Steel_Beam X_G 1: Strong Flexure Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	5.958	Unfactored Ped Load	3.195	20.148	F7-1	**0.159**	Lb = 11.92 ft, Cb = 1.137

Steel_Beam X_G 1: Strong Shear Check (extreme rows: max)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX001	HSS6X2X.250	0.000	Unfactored Ped Load	1.072	61.361	G4-1	**0.017**	Shear Area = 2.47 in^2, Cv = 1

Appendix B: Ratings and Hand Calculations

Rating Factor Equation

$$RF = \frac{C - (\gamma_{DC})(DC) - (\gamma_{DW})(DW) \pm (\gamma_P)(P)}{(\gamma_{LL})(LL + IM)} \qquad (6A.4.2.1\text{-}1)$$

For the strength limit states:

$$C = \varphi_c \varphi_s \varphi R_n \qquad (6A.4.2.1\text{-}2)$$

Where the following lower limit shall apply:

$$\varphi_c \varphi_s \geq 0.85 \qquad (6A.4.2.1\text{-}3)$$

For the service limit states:

$$C = f_R \qquad (6A.4.2.1\text{-}4)$$

where:

RF = Rating factor

C = Capacity

f_R = Allowable stress specified in the LRFD code

R_n = Nominal member resistance (as inspected)

DC = Dead load effect due to structural components and attachments

DW = Dead load effect due to wearing surface and utilities

P = Permanent loads other than dead loads

LL = Live load effect

IM = Dynamic load allowance

γ_{DC} = LRFD load factor for structural components and attachments

γ_{DW} = LRFD load factor for wearing surfaces and utilities

γ_p = LRFD load factor for permanent loads other than dead loads = 1.0

γ_{LL} = Evaluation live load factor

φ_c = Condition factor

φ_s = System factor

φ = LRFD resistance factor

LL LF= Live load load factor

DL LF = dead load load factor

SL LF = Snow load load factor

Impact does not apply to trail bridges

LRFD resistance factor of 0.9 is applied to capacities of steel members in axial compression.

LRFD resistance factor of 1.0 is applied to steel bending and shear capacities.

A stringer distribution factor of (Spacing/8) is applied to the stringer live load Per AASHTO LRFD table 4.6.2.2.2a-1

Floor beam Distribution factor is not applicable for bridges with longitudinal stringers

Timber Capacities and Demand

8.4.4.1 General

Adjusted design values shall be obtained by adjusting reference design values by applicable adjustment factors in accordance with the following equations:

$$F_b = F_{bo}\, C_{KF}\, C_M\, (C_F \text{ or } C_v)\, C_{fu}\, C_i\, C_d\, C_\lambda \qquad (8.4.4.1\text{-}1)$$

$$F_v = F_{vo}\, C_{KF}\, C_M\, C_i\, C_\lambda \qquad (8.4.4.1\text{-}2)$$

$$F_t = F_{to}\, C_{KF}\, C_M\, C_F\, C_i\, C_\lambda \qquad (8.4.4.1\text{-}3)$$

$$F_c = F_{co}\, C_{KF}\, C_M\, C_F\, C_i\, C_\lambda \qquad (8.4.4.1\text{-}4)$$

$$F_{cp} = F_{cpo}\, C_{KF}\, C_M\, C_i\, C_\lambda \qquad (8.4.4.1\text{-}5)$$

$$E = E_o\, C_M\, C_i \qquad (8.4.4.1\text{-}6)$$

where:

F = applicable adjusted design values F_b, F_v, F_t, F_c, or F_{cp} (ksi)

F_o = reference design values F_{bo}, F_{vo}, F_{to}, F_{co}, or F_{cpo} specified in Article 8.4 (ksi)

E = adjusted modulus of elasticity (ksi)

E_o = reference modulus of elasticity specified in Article 8.4. (ksi)

C_{KF} = format conversion factor specified in Article 8.4.4.2

C_M = wet service factor specified in Article 8.4.4.3

C_F = size factor for visually-graded dimension lumber and sawn timbers specified in Article 8.4.4.4

C_V = volume factor for structural glued laminated timber specified in Article 8.4.4.5

C_{fu} = flat-use factor specified in Article 8.4.4.6

C_i = incising factor specified in Article 8.4.4.7

C_d = deck factor specified in Article 8.4.4.8

C_λ = time effect factor specified in Article 8.4.4.9

LRFD resistance factor of 0.85 is applied to timber members in flexure.

LRFD resistance factor of 0.75 is applied to timber members in shear.

continuous Beam factor

Timber Flexure Demand = $0.8 * \frac{Live\ load * 12 * \frac{plank\ width}{10}}{Syy}$

Timber Shear Demand = $\frac{\frac{Live\ load * \frac{plank\ width}{10}}{A}}{.83}$

Continuous beam factor

Plank width/10 only applies for bridges with a plank width <10 inches, in cases where plank width is greater than or equal to 10 inches, the equations will be as follows.

Timber Flexure Demand = $0.8 * \frac{Live\ load * 12}{S}$

Timber Shear Demand = $\frac{\frac{Live\ load}{A}}{.83}$

Enter by user loads and capacities are from Visual Analysis Software without load or resistance factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3 DL LF= 1.25 SL LF= 1.00 LL LF= 1.3 SL LF= DL LF= 1.00

ϕc= 1.00 ϕc= 1.00 DL LF= 1

H5

Trusses	Axial loads		Floor Beams	Bending loads	
Dead Load=	5596	lb	Dead Load =	1056	ft-lb
Snow Load=	8383	lb	SL=	1810	ft-lb
Live Load =	6418	lb	Live Load =	13240	ft-lb
Member Capacity =	69462	lb	Member Capacity =	20148	ft-lb
			Floor Beam Spacing =	2	ft
			*distribution factor=	0.5	
RF=	**5.65**		RF=	**1.98**	

Trusses			Floor Beams		
H5 Service II check			**H5 Service II check**		
fLL=	3396	psi	fLL (+)=	36380	psi
fDL =	2961	psi	fDL (+)=	2901	psi
fSL=	4435	psi	fSL=	4975	psi
Fyf=	46000	psi	Fyf=	46000	psi
			Df=	0.5	
RF=	**6.66**		RF=	**1.22**	

H10

Trusses	Axial loads		Floor Beams	Bending loads	
Dead Load=	5596	lb	Dead Load =	1056	ft-lb
Snow Load=	8383	lb	SL=	1810	ft-lb
Live Load =	12840	lb	Live Load =	28060	ft-lb
Member Capacity =	69462	lb	Member Capacity =	20148	ft-lb
			Floor Beam Spacing =	2	ft
			*distribution factor=	0.5	
RF=	**2.82**		RF=	**0.93**	

Trusses			Floor Beams		
H10 Service II check			**H10 Service II check**		
fLL =	6791	psi	fLL (+)=	72760	psi
fDL =	2961	psi	fDL (+)=	2901	psi
fSL=	4435	psi	fSL=	4975	psi
Fyf=	46000	psi	Fyf=	46000	psi
			Df=	0.5	
RF=	**3.33**		RF=	**0.61**	

H15

Trusses	Axial loads		Floor Beams	Bending loads	
Dead Load=	5596	lb	Dead Load =	1056	ft-lb
Snow Load=	8383	lb	SL=	1810	ft-lb
Live Load =	19251	lb	Live Load =	39720	ft-lb
Member Capacity =	69462	lb	Member Capacity =	20148	ft-lb
			Floor Beam Spacing =	2	ft
			*distribution factor=	0.5	
RF=	**1.88**		RF=	**0.66**	

Trusses			Floor Beams		
H15 Service II check			**H15 Service II check**		
fLL =	10190	psi	fLL (+)=	109100	psi
fDL =	2961	psi	fDL (+)=	2901	psi
fSL=	4435	psi	fSL=	4975	psi
Fyf=	46000	psi	Fyf=	46000	psi
			Df=	0.5	
RF=	**2.22**		RF=	**0.41**	

* Distribution factors per AASHTO LRFD Table 4.6.2.2.2F-1

Enter by user loads and capacities are from Visual Analysis Software without load or resistance factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3 SL LF= 1.00

DL LF= 1

Pedestrian

Trusses	Axial loads		Floor Beams	Bending loads	
Dead Load=	5596	lb	Dead Load =	1056	ft-lb
Snow Load=	8383	lb	SL=	1810	ft-lb
Live Load =	14800	lb	Live Load =	3195	ft-lb
Member Capacity =	69462	lb	Member Capacity =	20148	ft-lb
			Floor Beam Spacing =	2	ft
			*distribution factor=	0.5	
RF=	**2.45**		RF=	**8.19**	

* Distribution factors per AASHTO LRFD Table 4.6.2.2.2F-1

Deck width=	11.916
Bridge length=	30

bridge area= 357.48

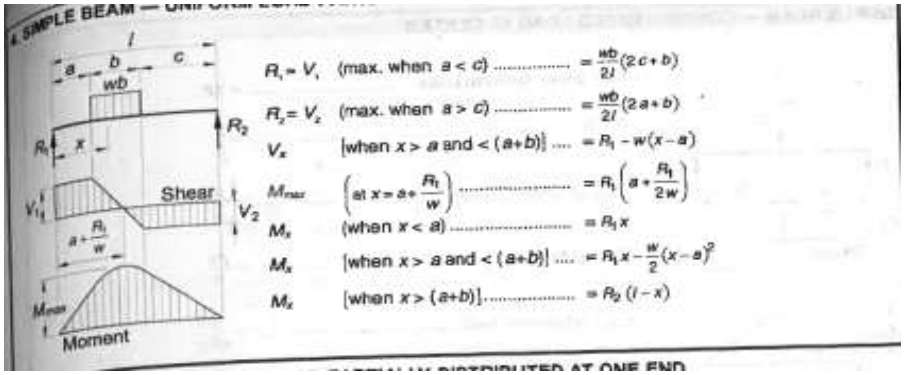
Trusses			Floor Beams		
Pedestrian Service II ch			**Pedestrian Service II check**		
fLL =	5623	psi	fLL =	8780	psi
fDL =	1986	psi	fDL =	2901	psi
fSL=	4078	psi	fSL=	4975	psi
Fyf=	46000	psi	Fyf=	46000	psi
			Df=	0.5	
RF=	**4.20**		RF=	**5.07**	

Planks

Plank length= 2 ft *span between Floorbeam Flanges snow load = 51 psf

C-C Plank Spacing = 7.25 inches

Truck wheel weight			max moment		Max Shear	
H5	4000	lb	573.9583	lb-ft	1147.917	lb
H10	8000	lb	1147.917	lb-ft	2295.833	lb
H15	12000	lb	1721.875	lb-ft	3443.75	lb
Ped	54.375	plf	27	lb-ft	54	lb
DL	14	plf	7	lb-ft	14	lb
SL	30.8125	plf	15	lb-ft	31	lb
Equestrian	1000	lb	500	lb-ft	500	lb



b= 10 inches 0.833333 ft

Tire location for max Shear

c= 1.166667 ft a= 0 ft max shear load location

max reactions used to calculate the max moment

a=c= 0.583333 max moment load location

2000 lb

4000 lb

6000 lb

Enter by user loads are from Visual Analysis Software without load factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3 DL LF= 1.25 SL LF=1.0 ϕc= 1

Plank Deck Moment Check

H5

Dead Load MY =	7.00	lb-ft
Snow load MY=	15.41	lb-ft
Live Load MY =	574	lb-ft
Plank depth =	1.5	Dressed 2x8 Lumber SYP #1 Assumed
Plank width =	7.25	
% deterioration =	0%	
Syy=	2.72	in^3
LL Demand =	2026.67	psi
DL Demand =	24.7172	psi
SL Demand =	54.4	psi
Member Capacity, Fb' =	2442.77	psi
RF=	**0.89**	

H10

Dead Load MY =	7	lb-ft
Snow load MY=	15.41	lb-ft
Live Load MY =	1148	lb-ft
Syy=	2.72	in^3
LL Demand =	4053.3	psi
DL Demand =	24.717	psi
SL Demand =	54.4	psi
Member Capacity, Fb' =	2442.8	psi
RF=	**0.45**	

H15

Dead Load MY =	7	lb-ft
Snow load MY=	15.41	lb-ft
Live Load MY =	1722	lb-ft
Syy=	2.72	in^3
LL Demand =	6080	psi
DL Demand =	24.717	psi
SL Demand =	54.4	psi
Member Capacity, Fb' =	2442.8	psi
RF=	**0.30**	

Fb=	1250	psi
Ckf=	2.94	
CM=	0.85	
CF=	1	
Cfu=	1.15	
Ci=	1	
Cd=	1	
Cλ=	0.8	STR I

Pedestrian

Dead Load MY =	7	lb-ft
Snow load MY=	15.406	lb-ft
Live Load MY =	27	lb-ft
Syy=	2.72	in^3
LL Demand =	96	psi
DL Demand =	24.717	psi
SL Demand =	54.4	psi
Member Capacity, Fb' =	2442.8	psi
RF=	**18.89**	

Equestrian

Dead Load MY =	7	lb-ft
Snow load MY=		lb-ft
Live Load MY =	500	lb-ft
Syy=	2.72	in^3
LL Demand =	1765.5	psi
DL Demand =	24.717	psi
SL Demand =	0	psi
Member Capacity, Fb' =	2442.8	psi
RF=	**1.05**	

Enter by user loads are from Visual Analysis Software without load factors applied. The "RF" output applies the applicable factors.

LL LF= 1.3 DL LF= 1.25 SL LF=1.0 ϕc= 1

Plank Deck Shear Check

H5

Dead Load V =	14	lb
Snow Load V=	31	lb
Live Load V =	1147.92	lb
Plank depth =	1.5	Dressed 2x8 Lumber SYP #1 Assumed
Plank width =	7.25	
% deterioration =	0%	
A=	10.875	in^2
LL Demand =	127.175	psi
DL Demand =	1.55103	psi
SL Demand =	3.41365	psi
Member Capacity, Fv' =	339.161	psi
RF=	**2.02**	
Fv=	175	psi
Ckf=	3.33	
CM=	0.97	
Ci=	1	
Cλ=	0.8	STR I

H10

Dead Load V =	14	lb
Snow Load V=	30.813	lb
Live Load V =	2295.8	lb
A=	10.875	in^3
LL Demand =	254.35	psi
DL Demand =	1.551	psi
SL Demand =	3.4137	psi
Member Capacity, Fv' =	339.16	psi
RF=	**1.01**	

H15

Dead Load V =	14	lb
Snow Load V=	30.813	lb
Live Load V =	3443.8	lb
A=	10.875	in^3
LL Demand =	381.53	psi
DL Demand =	1.551	psi
SL Demand =	3.4137	psi
Member Capacity, Fv' =	339.16	psi
RF=	**0.67**	

Pedestrian

Dead Load V =	14	lb
Snow Load V=	30.813	lb
Live Load V =	54	lb
A=	10.875	in^3
LL Demand =	6.0241	psi
DL Demand =	1.551	psi
SL Demand =	3.4137	psi
Member Capacity, Fv' =	339.16	psi
RF=	**42.62**	

Equestrian

Dead Load V =	14	lb
Snow Load V=		lb
Live Load V =	500	lb
A=	10.875	in^3
LL Demand =	55.394	psi
DL Demand =	1.551	psi
SL Demand =	0	psi
Member Capacity, Fv' =	339.16	psi
RF=	**4.68**	

Appendix C: U-Frame Analysis

U-FRAME STIFFNESS, THRU TRUSS CHECK

[AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, Chaper 7][6th Edition of "Guide to Stability Design Criteria for Metal Structures"]

Definitions

C=	Applied lateral load for U-frame stiffness check
h=	Dimension from centerline of of top chord to centerline of floorbeam, in
b=	dimension from centerline to centerline of verticals, in
Iv=	Moment of Inertia of verticals, in^4
Ifb=	Moment of inertia of floor beams, in^4
L=	Length of top chord between transverse frames, in
Pc=	factored compression of top chord
F.S.=	Factor of Safety
n=	Number of panels of transverse frames
K=	Effective Length Factor

Input Data

h=	51	in	
b=	146	in	
Iv=	2.46	in^4	HSS 3x3x3/16
Ifb=	13.1	in^4	HSS 6x2x1/4
E=	29000	ksi	
L=	48	in	
Pc=	31.24	kips	Str I (1.25*DL+1.0SL+1.3*9 Ton truck)
n=	6		
1/k=	0.496	See 1/k	
F.S.=	1.33		
Ϙ=	1.73	reduction factor	

Output

C=	**1.17**	Kips	Factored
CL/Pc=	1.35		
K=	**2.02**	*inverse of 1/k	

CSI check for top chord =	0.985	CSI VALUE OKAY
CSI check for Verticals =	0.304	CSI VALUE OKAY

The Effective length factor K is applied manually to the top chord of the visual analysis model The C is applied as a nodal load at the middle of the truss in the configuration as shown in the schematic below, to check the resulting combined stress index for the top chord and the verticals.

Since the truss does not fully adhere to the requirements laid out by the LRFD guide for pedestrian bridges, the stiffness factor of the columns has been reduced by Ϙ=1.73, based on the differences between a fixed end column and a column attached to a low cord that can rotate.

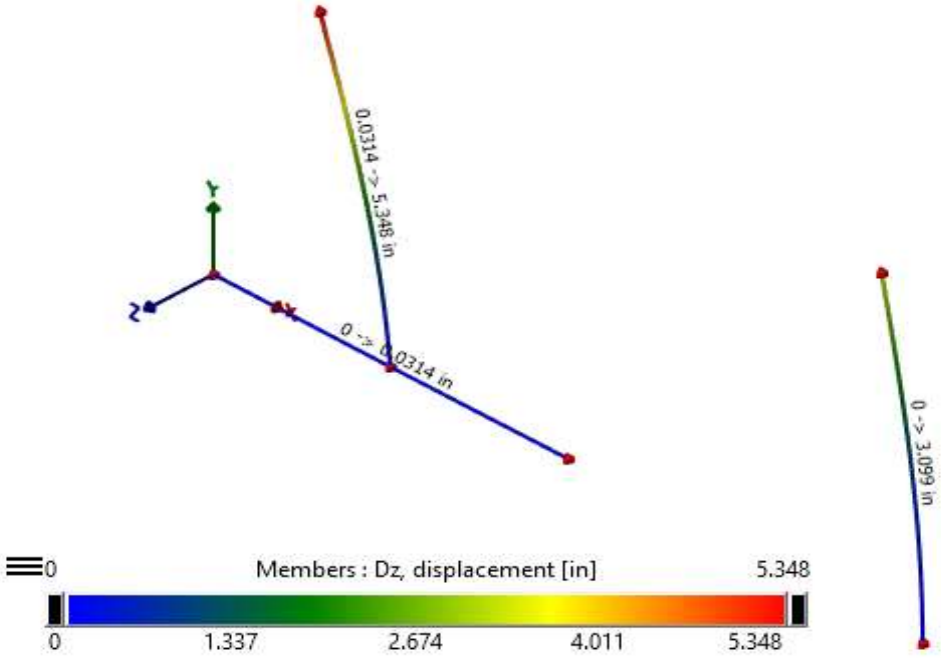
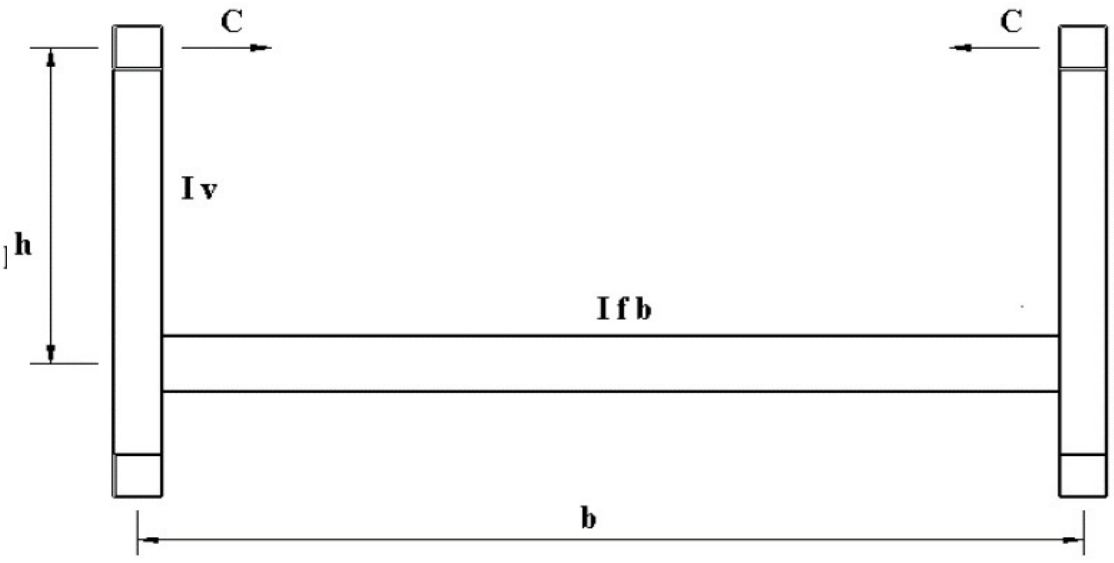

0.0314 -> 5.348 in
0 -> 0.0314 in
0 -> 3.099 in
Y
Z
X
0
Members : Dz, displacement [in]
5.348
0
1.337
2.674
4.011
5.348

Table 7.1.2-1—Values of $1/K$ for Various Values of CL/P_c and n

$1/K$	$n = 4$	$n = 6$	$n = 8$	$n = 10$	$n = 12$	$n = 14$	$n = 16$
1.000	3.686	3.616	3.660	3.714	3.754	3.785	3.809
0.980		3.284	2.944	2.806	2.787	2.771	2.774
0.960		3.000	2.665	2.542	2.456	2.454	2.479
0.950			2.595				
0.940		2.754		2.303	2.252	2.254	2.282
0.920		2.643		2.146	2.094	2.101	2.121
0.900	3.352	2.593	2.263	2.045	1.951	1.968	1.981
0.850		2.460	2.013	1.794	1.709	1.681	1.694
0.800	2.961	2.313	1.889	1.629	1.480	1.456	1.465
0.750		2.147	1.750	1.501	1.344	1.273	1.262
0.700	2.448	1.955	1.595	1.359	1.200	1.111	1.088
0.650		1.739	1.442	1.236	1.087	0.988	0.940
0.600	2.035	1.639	1.338	1.133	0.985	0.878	0.808
0.550		1.517	1.211	1.007	0.860	0.768	0.708
0.500	1.750	1.362	1.047	0.847	0.750	0.668	0.600
0.450		1.158	0.829	0.714	0.624	0.537	0.500
0.400	1.232	0.886	0.627	0.555	0.454	0.428	0.383
0.350		0.530	0.434	0.352	0.323	0.292	0.280
0.300	0.121	0.187	0.249	0.170	0.203	0.183	0.187
0.293	0						
0.259		0					
0.250			0.135	0.107	0.103	0.121	0.112
0.200			0.045	0.068	0.055	0.053	0.070
0.180			0				
0.150				0.017	0.031	0.029	0.025
0.139				0			
0.114					0		
0.100						0.003	0.010
0.097						0	
0.085							0



$$C = \frac{E}{h^2 (h/3I_v + b/2\, I_{fb})}$$

Nodal Loads

Node	Service Case	Type & Direction	Magnitude	Predefined Load
N014	L	Force Z	-1.170 K	N.A.
N029	L	Force Z	1.170 K	N.A.

Top Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: True Cb: 2.02 Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Top Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V005	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	2.609	24.840	H3-1	**0.105**	Tr = 0.5998 K-ft, Venant Shear = 2.609 Ksi

Top Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	0.985	1.000	H1-1a	**0.985**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Lb = 4 ft, Axial Unity = 0.4689, Mz Unity = 0.0166, My Unity = 0.5642, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 2.02

Top Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX025	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	32.572	69.462	E3-2	**0.469**	KLz = 4 ft, KLy = 4 ft, KL(torsion) = 4 ft, Fn = 40.84 Ksi, Fe (E3-4) = 161.7 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Top Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V002	HSS3X3X.188	5.202	Result Superposition Case 1 High Extreme	0.509	6.797	F7-1	**0.075**	Lb = 5.202 ft, Cb = 2.02

Top Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
V001	HSS3X3X.188	5.202	Result Superposition Case 1 Low Extreme	-3.863	6.797	F7-1	**0.568**	

Top Chord: Weak Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vz K	Capacity Vz K	Code Reference	Unity Check	Details
BmX023	HSS3X3X.188	4.000	Result Superposition Case 1 Low Extreme	-0.771	21.421	G4-1	**0.036**	Shear Area = 0.8623 in^2, Cv = 1

Diagonals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Diagonals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
V006	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	3.068	24.840	H3-1	**0.124**	Tr = 0.2915 K-ft, Venant Shear = 3.068 Ksi

Diagonals: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
V017	HSS2X2X.188	2.918	Result Superposition Case 1 High Extreme	0.369	1.000	H1-1a	**0.369**	KLz = 5.836 ft, KLy = 5.836 ft, KL(torsion) = 5.836 ft, Lb = 5.836 ft, Axial Unity = 0.3643, Mz Unity = 0.0054, My Unity = 0, Kz = 1, Ky = 1, K(torsion) = 1, Cb = 1

Diagonals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
V017	HSS2X2X.188	5.836	Result Superposition Case 1 High Extreme	17.956	49.266	D2-1	**0.364**	

Diagonals: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
V006	HSS2X2X.188	2.918	Result Superposition Case 1 High Extreme	0.015	2.750	F7-1	**0.005**	Lb = 5.836 ft, Cb = 1

Diagonals: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
V006	HSS2X2X.188	0.000	Result Superposition Case 1 High Extreme	0.010	12.776	G4-1	**0.001**	Shear Area = 0.5143 in^2, Cv = 1

Verticals: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Verticals: Combined Torsion Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
COL006	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.304	1.000	H3-6	**0.304**	Tr = -1.736 K-ft, Torsion Shear Stress Unity = 0.304, Axial Unity = 0.1309, Bending Unity = 0, Flexural Shear Unity = 0

Verticals: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL013	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	8.958	68.404	E3-2	**0.131**	KLz = 4.25 ft, KLy = 4.25 ft, KL(torsion) = 4.25 ft, Fn = 40.21 Ksi, Fe (E3-4) = 143.2 Ksi, Kz = 1, Ky = 1, K(torsion) = 1

Verticals: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
COL011	HSS3X3X.188	0.000	Result Superposition Case 1 Low Extreme	0.132	24.840	H3-1	**0.005**	Tr = -0.0304 K-ft, Venant Shear = 0.1323 Ksi

Low Chord: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): at Interior Crossings Lateral Bottom (-y): at Interior Crossings Strong (z): at Interior Crossings	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Low Chord: Torsion Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Tau Ksi	Capacity Tau Ksi	Code Reference	Unity Check	Details
BmX044	HSS4X3X.188	0.000	Result Superposition Case 1 Low Extreme	4.474	24.840	H3-1	**0.180**	Tr = -1.395 K-ft, Venant Shear = 4.474 Ksi

Low Chord: Combined Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX029	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	0.366	1.000	H1-1b	**0.366**	KLz = 1.5 ft, KLy = 1.455 ft, KL(torsion) = 1.5 ft, Lb = 1.5 ft, Axial Unity = 0.0378, Mz Unity = 0.1049, My Unity = 0.2424, Kz = 1, Ky = 0.9697, K(torsion) = 1, Cb = 1

Low Chord: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
BmX039	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	12.572	92.736	D2-1	**0.136**	

Low Chord: Strong Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Mz K-ft	Capacity Mz K-ft	Code Reference	Unity Check	Details
BmX040	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	2.561	10.350	F7-1	**0.247**	Lb = 2 ft, Cb = 1

Low Chord: Weak Flexure Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand My K-ft	Capacity My K-ft	Code Reference	Unity Check	Details
BmX037	HSS4X3X.188	1.500	Result Superposition Case 1 High Extreme	2.058	8.487	F7-1	**0.242**	

Low Chord: Weak Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vz K	Capacity Vz K	Code Reference	Unity Check	Details
BmX037	HSS4X3X.188	1.500	Result Superposition Case 1 High Extreme	1.597	21.421	G4-1	**0.075**	Shear Area = 0.8623 in^2, Cv = 1

Low Chord: Combined Torsion Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
BmX030	HSS4X3X.188	1.500	Result Superposition Case 1 Low Extreme	0.464	1.000	H3-6	**0.464**	Tr = -1.692 K-ft, Torsion Shear Stress Unity = 0.2184, Axial Unity = 0.0947, Bending Unity = 0.286, Flexural Shear Unity = 0.0709

Low Chord: Strong Shear Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Vy K	Capacity Vy K	Code Reference	Unity Check	Details
BmX045	HSS4X3X.188	0.000	Result Superposition Case 1 High Extreme	2.142	30.065	G4-1	**0.071**	Shear Area = 1.21 in^2, Cv = 1

Steel_Beam Z_G 1: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Continuous Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

End floor beams: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Continuous Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Imaginary Stringer: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	

Imaginary Stringer: Results (continued)

Steel Material: ASTM A500 Grade C (Fy = 46ksi) Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: True Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Results

Deflections - Strong (dy) Limit Type: None	Deflections - Weak (dz) Limit Type: None	Axial Manual Kz: False Kz Sidesway?: False Manual Ky: False Ky Sidesway?: False
Size Constraints Limit Depth?: False Limit Width?: False	Overrides Override Fy?: False Override Cb?: False Override HSS t_des?: False Advanced Torsion: False	
Steel Material: Varies Specification: AISC 360-22 LRFD Composite Beam?: False Seismic Compactness: Not Ductile Check Constrained Axis FTB?: False Overstrength?: False Live Load Reduction: None Disable Checks?: False Check Level: Each Limit State	Bracing Lateral Top (+y): Unbraced Lateral Bottom (-y): Unbraced Strong (z): Unbraced	Torsional Bracing Lateral Top (+y): True Lateral Bottom (-y): True Strong (z): True

Cracked vertical members: Combined Torsion Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand	Capacity	Code Reference	Unity Check	Details
COL015	HSS3X3X.188	0.000	Result Superposition Case 1 High Extreme	0.247	1.000	H3-6	**0.247**	Tr = 1.412 K-ft, Torsion Shear Stress Unity = 0.2472, Axial Unity = 0.0766, Bending Unity = 0, Flexural Shear Unity = 0

Cracked vertical members: Axial Check (extreme rows: extreme)

Member	Section	Offset ft	Result Case	Demand Fx K	Capacity Fx K	Code Reference	Unity Check	Details
COL020	3x3x.188 with crack	0.666	Result Superposition Case 1 High Extreme	6.021	77.761	D2-1	**0.077**	

Appendix D: Inspection Report

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	091304-55555-0.0

TRACS
TRAIL BRIDGE
INSPECTION

BRIDGE IDENTIFICATION AND LOCATION				Category	COMPLEX
Trail Bridge Name:	Hay Creek Bridge	Trail Number-Bridge MP:	091304-55555-0.0		
Location:	Hay Creek Bridge	Feature Crossed:	Hay Creek		
Latitude:	45.274	Longitude:	-88.365		
Trail Class:	3	Designed Use:	ATV		
Forest/Special Use Unit:	CNNF	District:	Lakewood-Laona		

STRUCTURE TYPE AND MATERIAL

Superstructure	Number of Main Spans:		1	Number of Approach Spans:		0					
Main Span Type:	SIDE TRUSS		Material:	STEEL							
Quantity and Dimensions (Q x D" x W" x L'):			x		x		x		x	30'	
Approach Span Type:	Choose an item.		Material:	Choose an item.							
Quantity and Dimensions (Q x D" x W" x L'):			x		x		x				
Substructure Type:	SPREAD FOOTING		Material:	CONCRETE							
Deck Type:	PLANK		Material:	TIMBER, SAWN TREATED							
Dimensions (D"xW"xL"):	2''	x	8''	x		Wearing Surface:	TIMBER RUNNING PLANKS - TREATED				
User Barrier Rail Type:				RAILING INTEGRAL WITH TRUSS/SIDER GIRDER							
Rail Material:	Choose an item.		Rail Ht: (in)			Max Rail Opening: (in)					
Curb Material:	Choose an item.		Curb (Ht" x W"):			x					

Geometry / Design / Rating				Plan Number:			
Overall Length (ft):	30'	Overall Deck Width (in):	149"	Service Under Bridge:	WATERWAY		
Maximum Span (ft):	30'	Horizontal Clear Width (in):	143"	Vertical Under Bridge Opening (ft):			
Clear Span (ft):		Tread Width (in):		Top of Deck Height (ft):			
Bridge Skew (°):	0	Bridge Flare (Y/N):		Vertical Clear Height (ft):			

Structure Remarks

Nonredundant Steel Tension Members (NSTM's): Two welded steel trusses. NSTM's are bottom chords, truss diagonals, and floorbeams as shown in red on the sketch (last page of report).

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	091304-55555-0.0
Inspection Date:	10/3/2024	Inspection Frequency (Months):			
Inspected by:	Gust Junttila, P.E.				
Description:	Routine and NSTM inspection.				

CONDITION CODES and REMARKS

ITEM			CODE	REMARKS
Wearing Surface:			6	Only the edge visible as sand covers the deck.
58. DECK:			7	Condition of the longit plank deck is solid as viewed from side and below.
Cleanliness			Poor	Sand covers the deck.
Deck Slab/Panels			-	
Drains and Drainage			Poor	Sand covers the deck with built up sand windrows at the sides.
Utilities			-	
Deck Joints			Good	Only end joints as the trail abuts the bridge. No problems.
36. User Barriers:			Pick	
Railing			-	Trusses serve as bridge railing.
Post			-	
Curb			-	
59. SUPERSTRUCTURE (Main Span):			4	See defects noted in truss members. The defects warrant structural review and load rating.
All	Bearings		Good	Good condition, but must be cleaned as they are covered in sand.
	Paint		-	Weathering Steel
Flooring	Bracing		-	
	Floor Beams		Good	No apparent section loss, but corrosion is initiating/worsening.
	Stringers/Girders		-	No stringers, only floorbeams.
Truss	Bracing		-	No bracing.
	Truss Members		Poor	3 vertical cracks observed and noted on members (see photos). Cracks in L1 panel point (upstream truss looking north, 1st panel pt), L6, and R6 panel points. At L6, there is a noticeable bulge in the vertical. The crack is 1/16" wide. At R6, there is a noticable bulge in the vertical. The crack is 1/32" wide.

Tr. Bridge Name: Hay Creek Bridge		Feature Crossed: Hay Creek	Trail #-MP: 091304-55555-0.0
60. SUBSTRUCTURE:		8	
All	Alignment/Settlment/Skew	Good	
	Scour/Erosion	Good	No scour.
Abutments	Backing Plank/Backwall	-	
	Gabion/Reinforced Earth	-	
	Sill/Grade Beam	Good	Concrete abutment in good condition. No defects noted.
61. Channel		7	Channel appears stable due to heavy vegetation and riprap. The bridge opening appears adequate, however, the banks/riprap are silted indicating the water may get high at this crossing.
Channel Protection		Good	Thick vegetation with stable banks. Fair to good riprap protecting slopes in front of abutments.
Channel Scour/Erosion		Good	No scour or erosion.
Vegetation		Good	Thick vegetation/tree lined channel.
Waterway Obstruction/Drift		Fair	2 large logs in the channel beneath the bridge.
TRAIL APPROACHES:		6	With no wingwalls, the trail sand sloughs at the ends of the bridge.
Approach Settlement		Good	No observed settlement.
Shoulder Embankment		Fair	Poor drainage due to sandy windrows at the edges of the road.
Surfacing		Poor	Soft sand.
71.WATERWAY ADEQUACY:		7	Apparently slight chance of overtopping, but it may be more than slight based on the observed sand/silt at the bearings and riprap slopes.
Opening/Stream Constraint		Good	
Vertical Underbridge Opening		Good	

Appraisal – Bridge Elements Meet TMO? (Print TMO direct from INFRA Tr. Bridge Module)

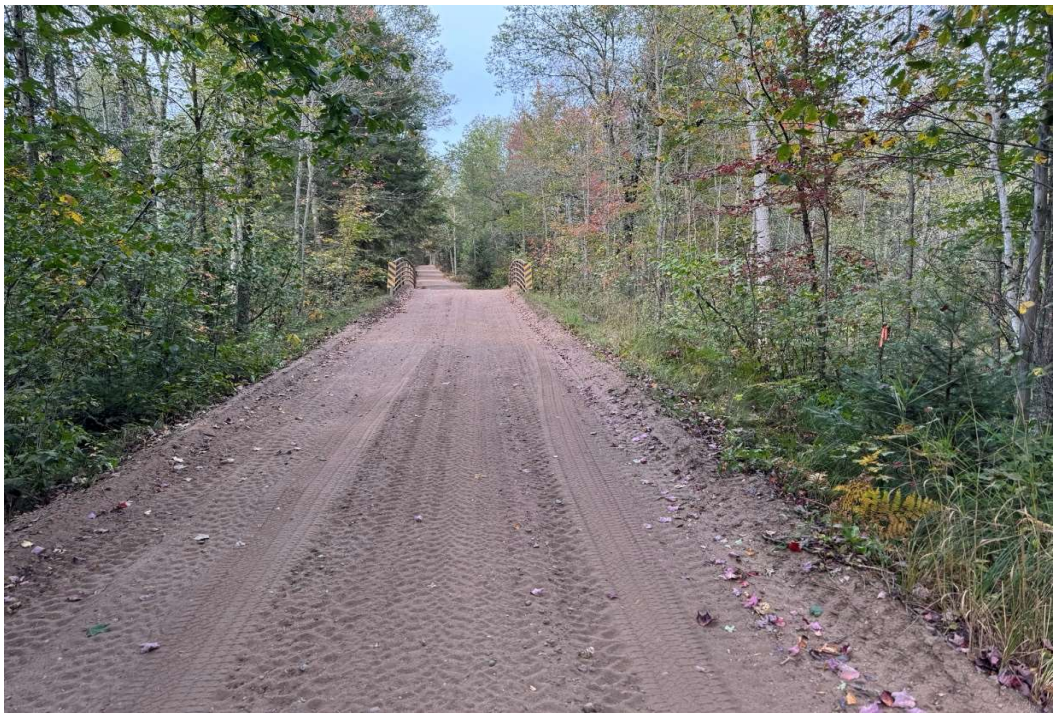
COMPONENT	VALUE	MEET	REMARKS
Deck Width	149	Y	
User Barrier	-	-	
Bridge Grade		Y	
Trail Alignment		Y	
Trail Grade		Y	
Tread Width	0	-	
Other		-	

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	091304-55555-0.0

Tasks					
Item Category	**Task**		**Material**	**Cost/Unit Severity**	**Quantity**
Superstructure	Repair/replace superstructure component		-	-	
	Task ID	TB-CPX-SUP-			
	Comments	Arrest the vertical cracks noted and reinforce the members per MFR recommendations or per analysis.			
Superstructure	-		-	-	
	Task ID	-			
	Comments	Perform detailed load rating of the bridge superstructure.			
Whole_Bridge	Basic Maintenance		-	-	
	Task ID	TB-CPX-WHL-01A			
	Comments	Clean sand off the bridge deck and bearings to limit the dead load, allow drainage, and limit moisture trapping around bearings/members.			
Whole_Bridge	Basic Maintenance		-	-	
	Task ID	TB-CPX-WHL-01A			
	Comments	Install warning signs or load posting signs to not allow log trucks or any large vehicles.			
Approaches	-		-	-	
	Task ID	-			
	Comments	Install better/higher reflective object marker signs.			

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS



Hay Creek Bridge - looking north

Closer view looking north

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Downstream side. Sand windrow at edges

Upstream Truss

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

DS Channel

US channel

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Looking south

Toward crack at L1 panel point (Left truss looking north (upstream truss), 1st panel pt)

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Closeup of L1 crack

SW corner, typical of all

BRIDGE PHOTOS - cont.

Typical at edge

South abut looking DS

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

South riprap slope looking DS

Channel under bridge

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward north abut

Bot chord butt weld

BRIDGE PHOTOS - cont.

Typical floorbeam connection

Typical FB condition

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward north abut

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward crack at L6

L6 panel point crack in vert

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Another view of crack width at L6

Toward R6 crack from NE quad

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

R6 vert crack

R6 width

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Toward upstream

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

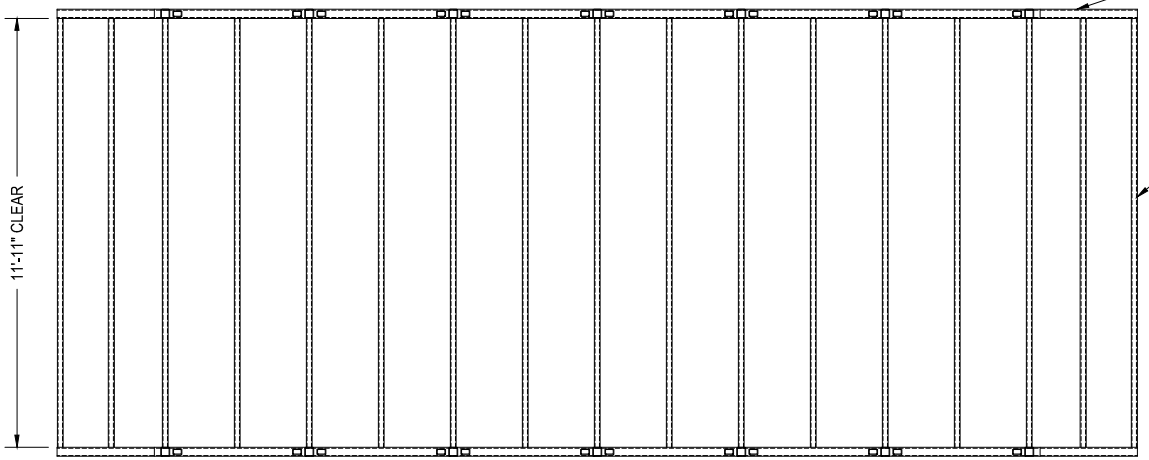
Signs looking south. Log trucks should not use this bridge

Insert photo here.

Structure Name:	**Hay Creek Bridge**	Date:	**10/3/2024**
Trail #-MP:	**091304-55555-0.0**	Feature Crossed:	**Hay Creek**

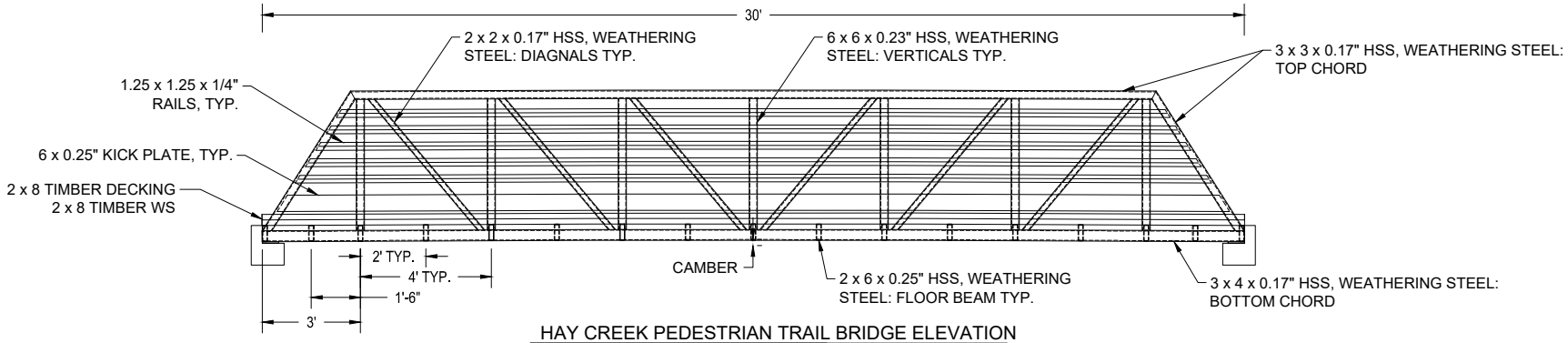
BRIDGE SKETCHES

BRIDGE SKETCHES



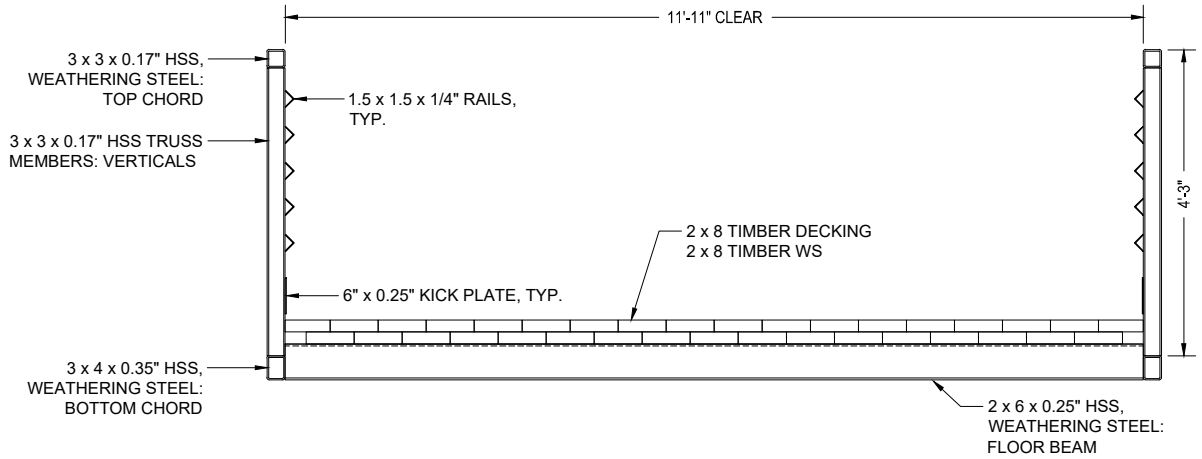
HAY CREEK PEDESTRIAN TRAIL BRIDGE PLAN

SCALE: 3/16" = 1'-0"



HAY CREEK PEDESTRIAN TRAIL BRIDGE ELEVATION

SCALE: 3/16" = 1'-0"



HAY CREEK PEDESTRIAN TRAIL BRIDGE SECTION

SCALE: 3/8" = 1'-0"

Structure Name:	HAY CREEK
Trail #-MP:	-
Feature Crossed:	Ephemeral
Date:	9/24/2024

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	55555-0.0000

TRACS TRAIL BRIDGE INSPECTION

TYLER LEMAHIEU

Digitally signed by TYLER LEMAHIEU
Date: 2024.10.31 05:57:25 -05'00'

BRIDGE IDENTIFICATION AND LOCATION				Category	COMPLEX
Trail Bridge Name:	Hay Creek Bridge	Trail Number-Bridge MP:	55555-0.0000		
Location:	LKLN ATV Trail	Feature Crossed:	Hay Creek		
Latitude:	45.274	Longitude:	-88.365		
Trail Class:	3	Designed Use:	SNOWMOBILE		
Forest/Special Use Unit:	Chequamegon-Nicolet NF	District:	Lakewood Laona RD		

STRUCTURE TYPE AND MATERIAL

Superstructure	Number of Main Spans:		1	Number of Approach Spans:						
Main Span Type:	SIDE TRUSS		Material:	STEEL						
Quantity and Dimensions (Q x D" x W" x L'):			x		x		x			
Approach Span Type:	Choose an item.		Material:	Choose an item.						
Quantity and Dimensions (Q x D" x W" x L'):			x		x		x			
Substructure Type:	SPREAD FOOTING		Material:	CONCRETE						
Deck Type:	PLANK		Material:	TIMBER, SAWN TREATED						
Dimensions (D"xW"xL"):		2x8	x	nomina	x		Wearing Surface:	TIMBER RUNNING PLANKS - TREATED		
User Barrier Rail Type:				POST WITH HORIZONTAL RAILING						
Rail Material:	STEEL			Rail Ht: (in)	45"		Max Rail Opening: (in)	5.5"		
Curb Material:	STEEL			Curb (Ht" x W"):	7.5"		x	0.25"		

Geometry / Design / Rating				Plan Number:			
Overall Length (ft):	30.5'	Overall Deck Width (in):	142"	Service Under Bridge:	WATERWAY		
Maximum Span (ft):	29'	Horizontal Clear Width (in):	140"	Vertical Under Bridge Opening (ft):	8.5'		
Clear Span (ft):	28.2'	Tread Width (in):	140"	Top of Deck Height (ft):	10'		
Bridge Skew (°):	0	Bridge Flare (Y/N):	N	Vertical Clear Height (ft):	99.9'		

Structure Remarks

- Excessive sand on deck

- Inspected per SNBI

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	55555-0.0000
Inspection Date:	10/29/2024	Inspection Frequency (Months):	60		
Inspected by:	Tyler LeMahieu				
Description:	Routine				

CONDITION CODES and REMARKS

ITEM		CODE	REMARKS
Wearing Surface:		6	Difficult to inspect
58. DECK:		6	Widespread minor defects due to drainage; but deck materials appear sound
Cleanliness		Poor	3" to 6" of sand and gravel throughout deck
Deck Slab/Panels		Good	No observed defects
Drains and Drainage		Poor	No drainage at present; sides clogged with sand
Utilities		-	
Deck Joints		-	
36. User Barriers:		5	Some moderate defects
Railing		Good	Minor local CS-2 corrsion spots throughout; pitting of weathering steel
Post		Fair	Cracking of 3 vertical members; likely from freezing water draining into bottom of posts.
Curb		Good	Minor local CS-2 corrsion spots throughout; pitting of weathering steel
59. SUPERSTRUCTURE (Main Span):		5	Some moderate defects
All	Bearings	Good	Not observable
	Paint	-	
Flooring	Bracing	Good	
	Floor Beams	Fair	CS-2 rust spots throughout (beyond weathering steel patina)
	Stringers/Girders	Fair	CS-2 rust spots throughout (beyond weathering steel patina)
Truss	Bracing	Good	
	Truss Members	Fair	Cracking of 3 vertical members; likely from freezing water draining into bottom of posts. See images. No progression of cracking noted since last inspection
		-	
		-	
59. SUPERSTRUCT (Approach Span):		Pick	
NA		-	
		-	
NA		-	
		-	
		-	
NA		-	
		-	
		-	
		-	

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	55555-0.0000
60. SUBSTRUCTURE:		8	Isolated minor defects		
All	Alignment/Settlment/Skew	Good			
	Scour/Erosion	Good			
Abutments	Backing Plank/Backwall	Fair	Minor CS-2 abrasion of exposed portion of concrete backwall		
	Gabion/Reinforced Earth	-			
	Sill/Grade Beam	Good			
		-			
		-			
		-			
		-			
		-			
Piers	Sill/Grade Beam	-			
		-			
		-			
		-			
		-			
		-			
		-			
		-			
61. Channel		7	Some minor defects		
Channel Protection		Good			
Channel Scour/Erosion		Fair	Minor slumping of banks US and DS		
Vegetation		Good			
Waterway Obstruction/Drift		Fair	Minor amounts of drift present in channel		
TRAIL APPROACHES:		7	Some minor defects		
Approach Settlement		Good			
Shoulder Embankment		Good			
Surfacing		Fair	not crowned		
71.WATERWAY ADEQUACY:		6	Bridge above approaches, with occasional overtopping		
Opening/Stream Constraint		Good			
Vertical Underbridge Opening		Good			

Appraisal – Bridge Elements Meet TMO? (Print TMO direct from INFRA Tr. Bridge Module)

COMPONENT	VALUE	MEET	REMARKS
Deck Width	142	N	Shy of 12' for snowmobile
User Barrier	-	Y	
Bridge Grade		Y	
Trail Alignment		Y	
Trail Grade		Y	Shy of 12' for snowmobile
Tread Width	140	N	
Other		-	

Tr. Bridge Name:	Hay Creek Bridge	Feature Crossed:	Hay Creek	Trail #-MP:	55555-0.0000

Tasks

Item Category	Task		Material	Cost/Unit Severity	Quantity
Deck	Repair/replace Deck Component		-	-	
	Task ID	TB-CPX-DCK-			
	Comments	Shovel off and clean all sand from the deck; Do not dump into river			
Approaches	Repair/replace/install safety signage		-	-	
	Task ID	TB-CPX-APR-SGN-02A			
	Comments	Install 4 refelective object markers and posts			
Approaches	Repair/replace/install safety signage		-	-	
	Task ID	TB-CPX-APR-SGN-02A			
	Comments	Load rate and post bridge			
Superstructure	Repair/replace superstructure members		-	-	
	Task ID	TB-CPX-SUP-			
	Comments	Drill drain holes in verticals to stop cracks from forming			
-	-		-	-	
	Task ID	-			
	Comments				
-	-		-	-	
	Task ID	-			
	Comments				
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	Task ID	-			
	Comments				

Tr. Bridge Name: Hay Creek Bridge **Feature Crossed:** Hay Creek **Trail #-MP:** 55555-0.0000

Tasks

Item Category	Task		Material	Cost/Unit Severity	Quantity
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	Task ID	-			
	Comments				

Structure Name:	**Hay Creek Bridge**	Date:	**10/29/2024**
Trail #-MP:	**55555-0.0000**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS

River Right Approach

River Left Approach

Structure Name:	**Hay Creek Bridge**	Date:	**10/29/2024**
Trail #-MP:	**55555-0.0000**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Looking Upstream from the Bridge Deck

Looking Downstream from the Bridge Deck

Structure Name:	**Hay Creek Bridge**	Date:	**10/29/2024**
Trail #-MP:	**55555-0.0000**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

Looking Upstream - Elevation Profile

Looking Downstream - Elevation Profile

Structure Name:	**Hay Creek Bridge**	Date:	**10/29/2024**
Trail #-MP:	**55555-0.0000**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

River Right Abutment

River Left Abutment

Structure Name:	**Hay Creek Bridge**	Date:	**10/29/2024**
Trail #-MP:	**55555-0.0000**	Feature Crossed:	**Hay Creek**

BRIDGE PHOTOS - cont.

View of Superstructure

View of Deck and Rails

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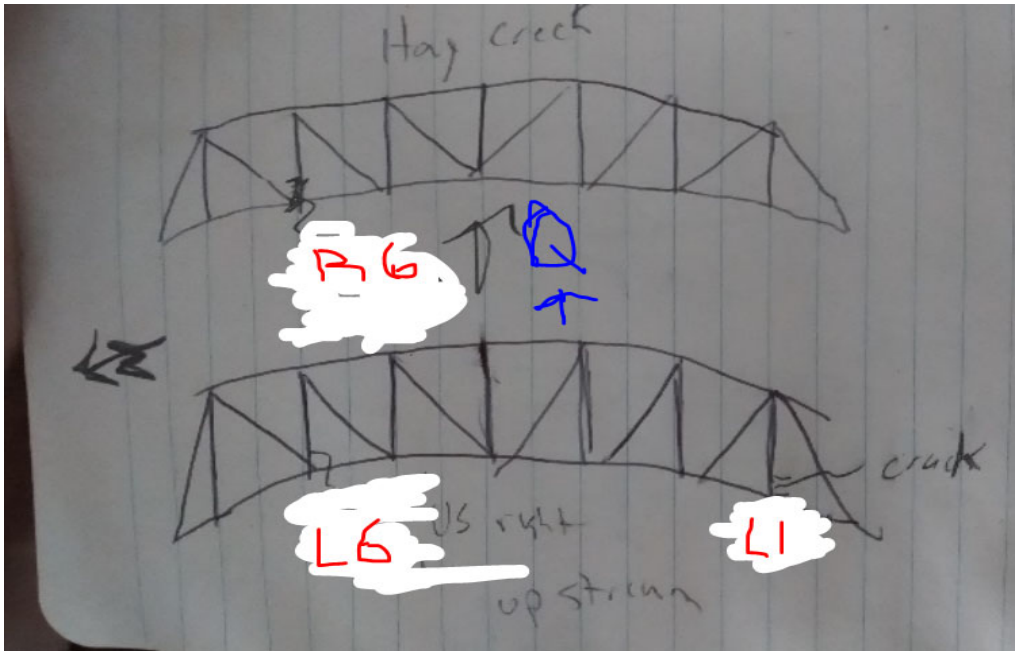
BRIDGE PHOTOS - cont.

Excessive sand on deck



Map of three locations with cracked verticals

Structure Name:	**Hay Creek Bridge**	Date:	**10/29/2024**
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BRIDGE PHOTOS - cont.

R6 vertical crack

L6 vertical crack

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BRIDGE PHOTOS - cont.

L1 Vertical Crack

Backwall abasion where visible (SE quad)

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BRIDGE PHOTOS - cont.

Typical rust on floor beams

Insert photo here.

Backwall abasion where visible (SE quad)