
Belford Ave over Happy Canyon Creek Super Structure IDC Calculations

DEVELOPED BY:



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FHU Reference No. 115360-01
March 2021

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I Superstructure Design

I.1 Precast Girder Design

I.1.1 Design Method

Standards Followed

The precast girders were designed in accordance with *AASHTO LRFD Bridge Design Specifications, 9th Edition* (hereafter referred to as LRFD BDS), and the *Colorado Department of Transportation Bridge Design Manual* (referred to as CDOT BDM).

PGSuper Analysis

The precast bulb-tee girders were designed using the PGSuper analysis program. Two different models were created to check all the design requirements. Both models use the same bridge geometry, girder arrangement, and girder strand design. The first model is the base design model. To start, an average haunch depth was assumed, and girder strengths and strand patterns were designed to meet strength and service requirements. The camber and deflections from this first iteration were then used to calculate a more precise average haunch which was updated in the model. This went through multiple iterations until the haunch calculated from the dead load deflections and camber in the model aligned. The second model assumes that the camber only reaches 50% of predicted and therefore a thicker haunch would result during construction. This model is used to check the strength and service requirements to ensure the girder would still meet all design requirements even with the camber tolerances provided in CDOT BDM 5.5.2.ID.

Design Loads and Load Distribution

The loads applied to the bridge for analysis include bridge rails on each side of the roadway, sidewalks on each side, a 3" asphalt overlay between the curbs, vehicular live load, a load to account for the potential use of stay-in-place metal deck forms, and a load for future utilities. The details of each of these loads can be seen in the following section.

The bridge rails, sidewalk, and overlay were distributed evenly across all the girders per common practice since these loads will only be applied after the superstructure is composite and will act as a single unit. The live loads were applied using distributed factors calculated using the equations in LRFD BDS Section 4.6.2.2.

Additional Design Calculations

There were a few design calculations which were performed outside of PGSuper. This includes the calculation for the number of strands extended at each girder end to provide a positive moment connection which was calculated using a Mathcad spreadsheet. Calculations to determine the haunch based on camber, vertical curve, and dead load deflection were performed using an Excel spreadsheet. In addition to calculating the haunch based on predicted camber, cases were evaluated for under camber and over camber per the CDOT BDM. The haunch depth determined from the under-camber condition was used in the second PGSuper model to check service and strength requirements. The over camber condition was used to check that a minimum haunch depth of 1" at the edge of the girder top flange would be maintained even if the camber was higher than expected. This minimum haunch is in accordance with CDOT BDM 5.5.2.IB for cases where partial depth precast panels are permitted.

I.1.1.2 PGSuper Inputs

Details Report

For

Span 1 Girder A

March 14, 2021 2:43:21 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC IDC.pgs

Configuration

Configuration Name: WSDOT

Configuration Source: ftp://ftp.wsdot.wa.gov/public/bridge/Software/PGSuper/Version_5.0.0/WSDOT.pgz

Configuration Date Stamp: September 25, 2020 2:10:27 pm

Library	Entry	Source
Girders	BT-42 CDOT	Project Library
Traffic Barriers	Parker Rail	Project Library
Project Criteria	CDOT based on AASHTO LRFD Bridge Design Specification, Eighth Edition 2017	Project Library
Vehicular Live Load	CDOT Permit	Project Library
Vehicular Live Load	OL1	Master Library
Vehicular Live Load	OL2	Master Library
Load Rating Criteria	WSDOT based on The Manual for Bridge Evaluation, Second Edition 2011, with 2011-2016 interim provisions	Master Library
Haul Trucks	HT40-72	Master Library

Analysis Controls

Structural Analysis Method: Simple Spans made Continuous

Section Properties: Gross

Losses: Approximate lump sum estimate per AASHTO LRFD 5.9.3.3

Notes

Symbol	Definition
L_r	Span Length of Girder at Release
L_l	Span Length of Girder during Lifting
L_{st}	Span Length of Girder during Storage
L_h	Span Length of Girder during Hauling
L_e	Span Length of Girder after Erection
L_s	Length of Span
Debond	Point where bond begins for a debonded strand
PSXFR	Point of prestress transfer
FoS	Face of Support
ST	Section Transitions
STLF	Section Transitions, Left Face
STRF	Section Transitions, Right Face
SDCR	Start of Deck Casting Region
EDCR	End of Deck Casting Region
Diaphragm	Location of a precast or cast in place diaphragm
Bar Cutoff	End of a reinforcing bar in the girder
Deck Bar Cutoff	End of a reinforcing bar in the deck
CS	Critical Section for Shear
SZB	Stirrup Zone Boundary
H	H from end of girder or face of support
1.5H	1.5H from end of girder or face of support
HP	Harp Point
Pick Point	Support point where girder is lifted from form
Bunk Point	Point where girder is supported during transportation

Status Items

Level	Description
Warning	Span 1, Girder A: The deck overhang exceeds S/2. The overhang is taken to be equal to S/2 for purposes of computing the effective flange width and the effect of structurally continuous barriers has been ignored. (LRFD 4.6.2.6.1)
Warning	Span 2, Girder A: The deck overhang exceeds S/2. The overhang is taken to be equal to S/2 for purposes of computing the effective flange width and the effect of structurally continuous barriers has been ignored. (LRFD 4.6.2.6.1)

Bridge Description

General Bridge Information

Number of Spans	2
Girder Type	BT-42 CDOT

Concrete Properties

Element	Type	f'_{ci} (KSI)	E_{ci} (KSI)	f'_c (KSI)	E_c (KSI)	w_w (kip/ft ³)	w_c (kip/ft ³)	D_{agg} (in)	f_{ct} (KSI)	E_c		Creep		Shrinkage		λ
										K_1	K_2	K_1	K_2	K_1	K_2	
Girder A	Normal Weight Concrete	6.000	4557.295	8.000	5011.145	0.163	0.145	0.750	N/A	1	1	1	1	1	1	1
Deck	Normal Weight Concrete	-	-	4.500	4144.550	0.150	0.145	0.750	N/A	1	1	1	1	1	1	1

$$E_c = 120,000 K_1 K_2 w_c^{2.0} f_c^{0.33}$$

* = Modulus of elasticity was input

Pier Layout

	Station	Bearing	Skew Angle	Boundary Condition
Abutment 1	93+85.19	N 73° 56' 01.00" E	23° 22' 01.32" R	Hinge
Pier 2	94+64.04	N 73° 56' 01.00" E	17° 29' 59.26" R	Continuous after deck placement
Abutment 3	95+42.78	N 73° 56' 01.00" E	11° 38' 26.68" R	Hinge

Pier Diaphragms

	Diaphragm - Back				Diaphragm - Ahead			
	Height (in)	Width (in)	Loading	Location(*) (in)	Height (in)	Width (in)	Loading	Location(*) (in)
Abutment 1					Compute	Compute	Apply load at centerline bearing	N/A
Pier 2	Compute	Compute	Apply load at centerline bearing	N/A	Compute	Compute	Apply load at centerline bearing	N/A
Abutment 3	Compute	Compute	Apply load at centerline bearing	N/A				

(*) Distance from Abutment/Pier Line to Centroid of Diaphragm

Pier Connections

	Back				Ahead			
	Bearing Offset (in)	Bearing Offset Measure	End Distance (in)	End Distance Measure	Bearing Offset (in)	Bearing Offset Measure	End Distance (in)	End Distance Measure
Abutment 1					18.000	FA-NA	5.000	FCLB-AG
Pier 2	10.000	FP-NP	5.000	FCLB-AG	10.000	FP-NP	5.000	FCLB-AG
Abutment 3	18.000	FA-NA	5.000	FCLB-AG				

Bearing Offset Measure

FA-AG = Measured From Abutment Line and Along Girder Centerline

FP-AG = Measured From Pier Line and Along Girder Centerline

FA-NA = Measured From and Normal to Abutment Line

FP-NP = Measured From and Normal to Pier Line

End Distance Measure

FCLB-AG = Measured From CL Bearing along Girder

FCLB-NCLB = Measured From and Normal to CL Bearing

FCLB-NCLB = Measured From and Normal to CL Bearing

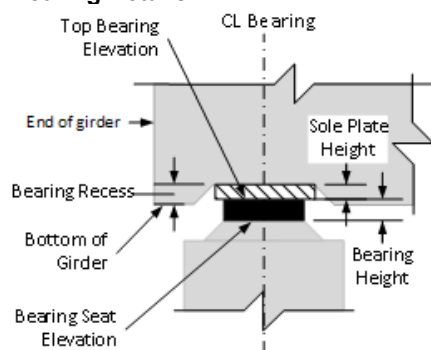
FA-AG = Measured From Abutment Line and Along Girder Centerline

FP-AG = Measured From Pier Line and Along Girder Centerline

FA-NA = Measured From and Normal to Abutment Line

FP-NP = Measured From and Normal to Pier Line

Bearing Details



Location	Shape	# of Bearings	Spacing (in)	Length or Diameter (in)	Width (in)	Height (in)	Recess Height (in)	Recess Length (in)	Sole Plate Height (in)
Abutment 1 - Ahead	Rectangular	1	N/A	8.000	12.000	0.000	0.000	0.000	0.000

Spans

Span	# Girders	Start of Span		End of Span	
		Girder Spacing	Datum	Girder Spacing	Datum
1	12	Between A & F : 8.322 ft Between F & G : 9.368 ft Between G & L : 8.393 ft	4	Between A & F : 8.322 ft Between F & G : 7.516 ft Between G & L : 8.393 ft	4
2	12	Between A & F : 8.114 ft Between F & G : 8.784 ft Between G & L : 8.076 ft	4	Between A & F : 8.114 ft Between F & G : 7.525 ft Between G & L : 8.080 ft	4

Girder Spacing Datum:

- (1) Measured normal to the alignment at the abutment/pier line
- (2) Measured normal to the alignment at the centerline of bearing
- (3) Measured at and along the abutment/pier line
- (4) Measured at and along the centerline of bearing

Girder spacing is measured at the work point elevation, which is at top centerline of girder.

Girder orientation is set plumb

Span 1, Girder A

Girder Type	BT-42 CDOT
Slab Offset ("A" Dimension) at Abutment 1	11.000 in
Slab Offset ("A" Dimension) at Pier 2	11.000 in
Strand Fill Type	Sequence of Straight/Harped Strands
Type of Adjustable Web Strands	Harped
Number of Straight Strands	18 8 extended at left end 8 extended at right end
Straight Strand P_{jack}	790.97 kip
Number of Harped Strands	10
Harped Strand P_{jack}	439.43 kip
Total Number of Permanent Strands	28
Distance from top of girder to top-most harped strand at ends of girder	4.000 in
Distance from bottom of girder to lowest harped strand at harp point	2.000 in
Specified Release Strength f'_{ci}	6.000 KSI
Specified 28 day Strength f'_c	8.000 KSI
Prestressing Strand (Permanent)	0.600 in Dia. Grade 270 Low Relaxation

Deck Geometry**Deck Type**

Composite cast-in-place deck

Cross Section

Gross Depth = 8.000 in

Left Overhang Edge Depth = 8.000 in

Left Overhang Taper = Taper overhang to bottom of girder top flange

Right Overhang Edge Depth = 8.000 in

Right Overhang Taper = Taper overhang to bottom of girder top flange

Fillet = 1.000 in

Slab Offset ("A" Dimension) = 11.000 in

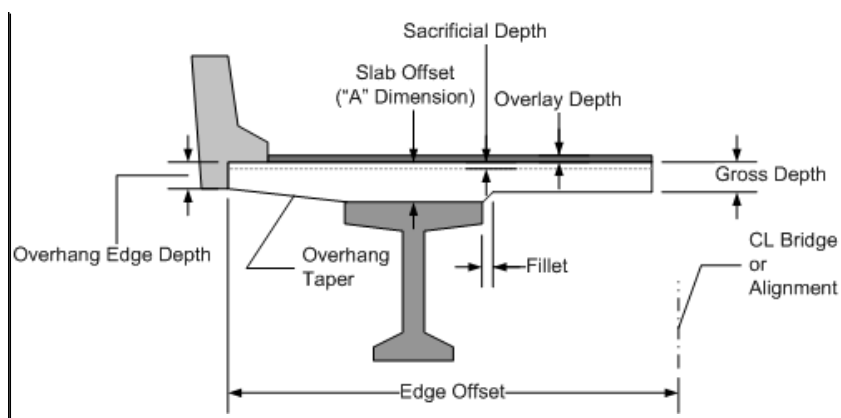
Plan (Edge of Deck)

Station	Measured From	Left Offset (ft)	Right Offset (ft)
0+00.00	Bridge Line	47.000	47.000

Wearing Surface

Wearing Surface: Overlay

Overlay Weight = 0.037 KSF



Deck Reinforcement

Reinforcement: AASHTO M31 (A615) - Grade 60

Top Mat Cover: 2.000 in

Bottom Mat Cover: 1.000 in

Primary Reinforcement - Longitudinal reinforcement running the full length of the bridge

Mat	Bars		Lump Sum (in ² /ft)
Top	#9 @ 6.000	AND	0.000
Bottom	None @ 18.000	AND	0.000

Supplemental Reinforcement - Negative moment reinforcement at continuous piers

No supplemental reinforcement

Section Properties

Left Traffic Barrier Area = 2145.000 in²

Left Traffic Barrier I_{yy} = 298512.8 in⁴

Left Traffic Barrier Y_b = 12.798 in

Left Exterior Traffic Barrier Weight = 0.700 kip/ft

Distance from CG of Left Exterior Traffic Barrier to Left Edge of Deck = 9.000 in

Left Sidewalk Nominal Width = 102.000 in

Distance from Nominal Centerline of Left Sidewalk to Left Edge of Deck = 69.000 in

Left Sidewalk Actual Width = 120.000 in

Left Sidewalk Face Depth = 11.000 in

Left Sidewalk Back Depth = 15.750 in

Left Sidewalk Weight = 1.672 kip/ft

Right Traffic Barrier Area = 2145.000 in²

Right Traffic Barrier I_{yy} = 298512.8 in⁴

Right Traffic Barrier Y_b = 12.798 in

Right Traffic Barrier Weight = 0.700 kip/ft

Distance from CG of Right Exterior Traffic Barrier to Right Edge of Deck = 9.000 in

Right Sidewalk Nominal Width = 102.000 in

Distance from Nominal Centerline of Right Sidewalk to Right Edge of Deck = 69.000 in

Right Sidewalk Actual Width = 120.000 in

Right Sidewalk Face Depth = 11.000 in

Right Sidewalk Back Depth = 15.750 in

Right Sidewalk Weight = 1.672 kip/ft

Deck E_c = 4144.550 KSI

Bending Stiffness of Entire Bridge Section at center of Span 1

EI_{xx} = 2.13e+10 kip-in² (used to compute Live Load Deflections per LRFD 3.6.1.3.2)

EI_{yy} = 8.13e+12 kip-in²

EI_{xy} = -1.97e+09 kip-in²

Section Properties

	Girder
Area (in ²)	654.000
I_x (in ⁴)	153070.0
I_y (in ⁴)	42346.5
d (girder depth) (in)	42.000

	Girder
Y_{tg} (in)	20.850
Y_{bg} (in)	21.150
Y_{td} (in)	-
Y_{bd} (in)	-
S_{tg} (in ³)	7341.4
S_{bg} (in ³)	7237.4
$S_{td} = n(I_x/Y_{td})$ (in ³)	-
$S_{bd} = n(I_x/Y_{bd})$ (in ³)	-
Q_{deck} (in ³)	-
Effective Flange Width (in)	-
k_t (in) (Top kern point)	11.066
k_b (in) (Bottom kern point)	11.225
Perimeter (in)	195.230
Span/Depth Ratio	22
Weight (kip/ft)	0.740
Total Weight (kip)	56.87

Interval 17 : Open to Traffic

Location from Left Support (ft)	Area (in ²)	Depth (in)	I_x (in ⁴)	X_{lg} (in)	X_{rg} (in)	Y_{tg} (in)	Y_{bg} (in)	Y_{td} (in)	Y_{bd} (in)	S_{tg} (in ³)	S_{bg} (in ³)	S_{td} (in ³)	S_{bd} (in ³)	Q_{deck} (in ³)	Effective Flange Width (in)	Assumed Haunch Depth (in)
(STRF) -0.417	1291.851	51.000	368576.6	45.514	45.514	8.211	33.789	17.211	8.211	44890.7	10908.0	25893.6	54277.0	8266.3	91.028	1.000
0.000	1293.133	51.000	368807.0	45.611	45.611	8.197	33.803	17.197	8.197	44990.6	10910.6	25929.6	54397.7	8274.9	91.221	1.000
(0.0L _e) 0.000	1293.133	51.000	368807.0	45.611	45.611	8.197	33.803	17.197	8.197	44990.6	10910.6	25929.6	54397.7	8274.9	91.221	1.000
(FoS) 0.333	1294.147	51.000	368988.8	45.687	45.687	8.187	33.813	17.187	8.187	45069.6	10912.7	25957.9	54493.3	8281.6	91.375	1.000
(SZB) 1.337	1297.133	51.000	369522.7	45.913	45.913	8.157	33.843	17.157	8.157	45302.7	10918.7	26041.5	54775.2	8301.5	91.826	1.000
(Bar Develop.) 1.705	1298.203	51.000	369713.6	45.994	45.994	8.146	33.854	17.146	8.146	45386.5	10920.8	26071.4	54876.5	8308.6	91.988	1.000
(PSXFR) 2.583	1300.706	51.000	370158.7	46.183	46.183	8.121	33.879	17.121	8.121	45582.7	10925.8	26141.4	55113.7	8325.1	92.366	1.000
(Bar Develop.) 2.765	1301.215	51.000	370249.0	46.221	46.221	8.115	33.885	17.115	8.115	45622.7	10926.8	26155.6	55162.0	8328.5	92.443	1.000
(H) 3.833	1304.137	51.000	370766.0	46.442	46.442	8.086	33.914	17.086	8.086	45852.4	10932.6	26237.2	55439.8	8347.7	92.884	1.000
(SZB) 5.003	1307.208	51.000	371307.1	46.674	46.674	8.055	33.945	17.055	8.055	46094.6	10938.6	26322.8	55732.6	8367.8	93.349	1.000
(1.5H) 5.583	1308.684	51.000	371566.2	46.786	46.786	8.041	33.959	17.041	8.041	46211.2	10941.5	26364.0	55873.6	8377.4	93.572	1.000
(0.1L _e) 7.599	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(SZB) 10.503	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(0.2L _e) 15.197	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(SZB) 18.753	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(0.3L _e) 22.796	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(SZB) 29.753	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(HP) 30.311	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(0.4L _e) 30.394	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(0.5L _e) 37.993	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(0.6L _e) 45.591	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(HP) 45.675	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(SZB) 46.233	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(0.7L _e) 53.190	1311.510	51.000	372060.9	46.999	46.999	8.013	33.987	17.013	8.013	46435.0	10947.0	26442.7	56144.2	8395.8	93.999	1.000
(SZB) 57.233	1308.228	51.000	371486.2	46.751	46.751	8.045	33.955	17.045	8.045	46175.1	10940.6	26351.2	55830.0	8374.5	93.503	1.000
(0.8L _e) 60.789	1298.614	51.000	369786.8	46.025	46.025	8.142	33.858	17.142	8.142	45418.7	10921.6	26082.9	54915.4	8311.3	92.050	1.000
(SZB) 65.483	1284.032	51.000	367162.1	44.923	44.923	8.291	33.709	17.291	8.291	44284.6	10892.1	25674.3	53544.1	8213.7	89.846	1.000
(0.9L _e) 68.387	1273.937	51.000	365310.8	44.160	44.160	8.396	33.604	17.396	8.396	43508.6	10871.1	25390.1	52605.9	8144.8	88.320	1.000
(1.5H) 70.402	1266.449	51.000	363919.0	43.594	43.594	8.476	33.524	17.476	8.476	42937.7	10855.3	25178.8	51915.7	8093.0	87.188	1.000
(SZB) 70.983	1264.217	51.000	363501.2	43.426	43.426	8.499	33.501	17.499	8.499	42768.4	10850.6	25115.7	51711.0	8077.5	86.851	1.000
(H) 72.152	1259.625	51.000	362636.8	43.079	43.079	8.549	33.451	17.549	8.549	42421.1	10840.7	24985.7	51291.0	8045.3	86.157	1.000
(Bar Develop.) 73.220	1255.314	51.000	361819.8	42.753	42.753	8.595	33.405	17.595	8.595	42096.4	10831.3	24863.5	50898.4	8014.8	85.506	1.000

Location from Left Support (ft)	Area (in ²)	Depth (in)	I _x (in ⁴)	X _{lg} (in)	X _{rg} (in)	Y _{tg} (in)	Y _{bg} (in)	Y _{td} (in)	Y _{bd} (in)	S _{tg} (in ³)	S _{bg} (in ³)	S _{td} (in ³)	S _{bd} (in ³)	Q _{deck} (in ³)	Effective Flange Width (in)	Assumed Haunch Depth (in)
(PSXFR) 73.402	1254.569	51.000	361677.9	42.696	42.696	8.603	33.397	17.603	8.603	42040.4	10829.7	24842.3	50830.7	8009.6	85.393	1.000
(Bar Develop.) 74.281	1250.923	51.000	360982.0	42.421	42.421	8.643	33.357	17.643	8.643	41767.0	10821.7	24738.8	50500.2	7983.6	84.842	1.000
(SZB) 74.649	1249.374	51.000	360685.0	42.304	42.304	8.660	33.340	17.660	8.660	41651.1	10818.3	24694.8	50360.1	7972.6	84.608	1.000
(FoS) 75.652	1245.084	51.000	359858.9	41.980	41.980	8.707	33.293	17.707	8.707	41331.1	10808.8	24572.7	49973.1	7941.8	83.959	1.000
(1.0L _e) 75.986	1243.637	51.000	359579.0	41.870	41.870	8.723	33.277	17.723	8.723	41223.4	10805.5	24531.5	49842.9	7931.4	83.741	1.000
75.986	1243.637	51.000	359579.0	41.870	41.870	8.723	33.277	17.723	8.723	41223.4	10805.5	24531.5	49842.9	7931.4	83.741	1.000
(STLF) 76.402	1241.813	51.000	359225.3	41.733	41.733	8.743	33.257	17.743	8.743	41087.9	10801.4	24479.5	49679.1	7918.2	83.465	1.000

Project Criteria

Name: CDOT

Description: AASHTO LRFD Bridge Design Spec, 8th Ed. 2017, US Units, CDOT stress requirements

Based on: AASHTO LRFD Bridge Design Specification, Eighth Edition 2017 - US Units

Section Properties: Gross

Effective Flange Width computed in accordance with LRFD 4.6.2.6

Load Modifiers	Environmental	Structural Analysis
Ductility - η_D	1	Exposure Condition Normal
Importance - η_I	1	Relative Humidity 55%
Redundancy - η_R	1	Simple Spans Made Continuous

Casting Yard Criteria

Max. Strand slope is not checked

Permissible hold down force per strand = 4.00 kip

The hold down force includes 0.00 % friction

Max. girder weight in casting yard is not checked

Girder was cured using Normal method

1 day of steam or radiant heat curing is equal to 7 days of normal curing

Concrete Stress Limits - Service I (5.9.2.3.1)

- Compressive Stress = -3.900 KSI

- Tensile Stress (w/o mild rebar) = 0.200 KSI

- Tensile Stress (w/ mild rebar) = 0.588 KSI

Splitting checks (5.9.4.4.1) are disabled.

Confinement checks (5.9.4.4.2) are disabled.

Temporary Strand Removal Criteria

Compression Stress Limits

- Service I = -5.200 KSI

Tension Stress Limits

- Service I (w/o mild rebar) = 0.537 KSI

- Service I (w/ mild rebar) = 0.679 KSI

Deck and Diaphragm Placement Stage Criteria

Compression Stress Limits

- Service I = -3.600 KSI

Tension Stress Limits

- Service I = 0.537 KSI

Final without Live Load Criteria

Railing system weight is distributed to 6 nearest girders

Compression Stress Limits (5.9.2.3.2a)

- Service I = -3.600 KSI

Tension Stress Limits

- Service I = 0.000 KSI

Effective Flange Width computed in accordance with LRFD 4.6.2.6

Overlay load is distributed uniformly among all girders per LRFD 4.6.2.2.1

Final with Live Load Stage Criteria

Compression Stress Limits (5.9.2.3.2a)

- Service I (permanent + live load) = -4.800 KSI

Tension Stress Limits (5.9.2.3.2b)

- Service III = 0.000 KSI

Allowable Compressive Concrete Stresses (5.5.3.1)

- Fatigue I = -3.200 KSI

LL Distribution factors are calculated in accordance with LRFD 4.6.2.2

Haunch Geometry check is disabled.

Moment Capacity Criteria

Modulus of rupture = 0.679 KSI

Shear Capacity Criteria

Shear capacity computed in accordance with LRFD 5.7.3.4.2 (General method)

Modulus of rupture = 0.566 KSI

Maximum Spacing of Transverse Reinforcement (LRFD 5.7.2.6)

Eqn 5.7.2.6-1: If $v_u < 0.125f'_c$ then $S_{max} = 0.8d_v \leq 18.000$ in

Eqn 5.7.2.6-2: If $v_u \geq 0.125f'_c$ then $S_{max} = 0.4d_v \leq 12.000$ in

Longitudinal reinforcement requirements computed in accordance with LRFD 5.7.3.5

Shear stress at girder/deck interface computed using the classical shear flow formula: $V_{ui} = (V_u Q)/(Ib)$

Maximum spacing of interface shear connectors (LRFD 5.7.4.5): 48.000 in, or the depth of the member.

Interface shear compressive force normal to shear plane, P_c , for use in LRFD Eq 5.7.4.3-3 is computed from the deck weight.

Haunch And Assumed Excess Camber Criteria

Haunch dead load is computed assuming that the top of the girder is flat (Zero assumed excess camber)

Composite section properties and capacities are computed assuming a Constant Haunch Depth equal to the Fillet value

Creep Criteria

Creep is calculated in accordance with LRFD (5.4.2.3.2)

of hours from stressing to prestress transfer : 24

of days from prestress transfer until removal of temporary strands / diaphragm casting : 1 Min, 1 Max

of days from prestress transfer until slab-girder continuity is achieved : 60 Min, 60 Max

Variability between upper and lower bound camber : 50

Losses Criteria

Losses calculated per Approximate Lump Sum Method in accordance with AASHTO LRFD 5.9.3.3

Assumed time at shipping = 10 day

Contribution to Elastic Gains

Slab = 100%

Haunch = 100%

Diaphragms = 100%

User DC (Before Deck Placement) = 100%

User DW (Before Deck Placement) = 100%

Railing System = 100%

Overlay = 100%

User DC (After Deck Placement) = 100%

User DW (After Deck Placement) = 100%

Stress Limits for Prestressing Tendons

Stress Limit at Jacking

- Stress Relieved Strand = $0.7f_{pu}$

- Low Relaxation Strand = $0.75f_{pu}$

Stress Limit at service limit state after all losses

- Stress Relieved Strand = $0.8f_{py}$

- Low Relaxation Strand = $0.8f_{py}$

Deflection Criteria

Live Load Deflection Limit: $L_{span}/800$

Loading Details

Uniform Loads Applied Along the Entire Girder

Load Type	w (kip/ft)
Girder	0.740
Sidewalk	0.279
Traffic Barrier	0.117
Pedestrian Live Load	0.106

Slab Load Applied Along Girder

Tributary width used to compute slab load is measured from top CL girder

Slab load is approximated with linear load segments applied along the length of the girder. Segments located outside of bearings are applied as point loads/moments at bearings.

Unit weight of Slab material is 0.150 kip/ft³

Haunch weight includes effects of roadway geometry, and is measured along the centerline of the girder, but does not include a reduction for camber.

Location From Left Bearing (ft)	Casting Region	Main Slab Weight (kip/ft)	Assumed Haunch Depth (in)	Haunch Weight (kip/ft)	Total Slab Weight (kip/ft)
-0.417	1	0.835	2.995	0.134	0.969
0.000	1	0.837	3.000	0.134	0.971
7.599	1	0.874	3.077	0.138	1.012
15.197	1	0.901	3.136	0.140	1.042
22.796	1	0.918	3.179	0.142	1.061
30.394	1	0.925	3.204	0.144	1.069
37.993	1	0.921	3.213	0.144	1.065

Location From Left Bearing (ft)	Casting Region	Main Slab Weight (kip/ft)	Assumed Haunch Depth (in)	Haunch Weight (kip/ft)	Total Slab Weight (kip/ft)
45.591	1	0.907	3.204	0.144	1.051
53.190	1	0.883	3.179	0.142	1.025
60.789	1	0.848	3.136	0.140	0.989
68.387	1	0.788	3.077	0.138	0.925
75.986	1	0.763	3.000	0.134	0.897
75.986	1	0.763	3.000	0.134	0.897
76.402	1	0.761	2.995	0.134	0.896

Slab Cantilever Loads

Location	Main Slab		Haunch	
	Point Load (kip)	Point Moment (kip-ft)	Point Load (kip)	Point Moment (kip-ft)
Back Bearing	0.35	0.00	0.06	0.00
Ahead Bearing	0.32	0.00	0.06	0.00

Slab Haunch Load Details

Location From Left Bearing (ft)	Station	Offset (ft)	Casting Region	Top Slab Elevation (ft)	Girder Chord Elevation (ft)	Top Girder Elevation (ft)	Slab Thickness (in)	Assumed Haunch Depth (in)	Haunch Load (kip/ft)
-0.417	94+03.96	43.331 L	1	-0.867	-1.783	-1.783	8.000	2.995	0.134
0.000	94+04.35	43.315 L	1	-0.866	-1.783	-1.783	8.000	3.000	0.134
7.599	94+11.54	43.058 L	1	-0.861	-1.784	-1.784	8.000	3.077	0.138
15.197	94+18.74	42.872 L	1	-0.857	-1.785	-1.785	8.000	3.136	0.140
22.796	94+25.94	42.756 L	1	-0.855	-1.787	-1.787	8.000	3.179	0.142
30.394	94+33.14	42.712 L	1	-0.854	-1.788	-1.788	8.000	3.204	0.144
37.993	94+40.34	42.739 L	1	-0.855	-1.789	-1.789	8.000	3.213	0.144
45.591	94+47.53	42.837 L	1	-0.857	-1.790	-1.790	8.000	3.204	0.144
53.190	94+54.73	43.006 L	1	-0.860	-1.792	-1.792	8.000	3.179	0.142
60.789	94+61.92	43.246 L	1	-0.865	-1.793	-1.793	8.000	3.136	0.140
68.387	94+69.11	43.557 L	1	-0.871	-1.794	-1.794	8.000	3.077	0.138
75.986	94+76.29	43.938 L	1	-0.879	-1.795	-1.795	8.000	3.000	0.134
75.986	94+76.29	43.938 L	1	-0.879	-1.795	-1.795	8.000	3.000	0.134
76.402	94+76.68	43.961 L	1	-0.879	-1.795	-1.795	8.000	2.995	0.134

Overlay

Overlay load is uniform along entire girder length.

Load Type	W _{cc} (ft)	w (kip/ft)
Overlay Weight	74.000	0.227

Overlay load is distributed uniformly among all girders per LRFD 4.6.2.2.1

W_{cc} is the curb to curb width

Distribution of Uniform Barrier, Sidewalk, and Pedestrian Loads to Girder

Load Type	Total Weight (kip/ft)	Fraction to Girder	Girder Load (kip/ft)
Left Ext. Barrier	0.700	0.167	0.117
Left Sidewalk	1.672	0.167	0.279
Left Pedestrian Live	0.637	0.167	0.106
Right Sidewalk	1.672	0.000	0.000
Right Ext. Barrier	0.700	0.000	0.000
Right Pedestrian Live	0.637	0.000	0.000

Span 1**Pier Diaphragm Loads**

Pier	Location	P (kip)	Moment Arm (ft)	M (kip-ft)
1	Ahead Bearing	2.93	0.000	0.00
2	Back Bearing	2.15	0.000	0.00
	Ahead Bearing	2.11	0.000	0.00

User Defined Loads

Point loads were not defined for this girder

Distributed Loads

Interval	Load Case	Start Location (ft)	End Location (ft)	Start Magnitude (kip/ft)	End Magnitude (kip/ft)	Description
Interval 11: Cast Deck, Apply User Defined Loads	DC	0.000	76.871	0.022	0.022	SIP Forms
Interval 15: Apply User Defined Loads, Install Railing System and Overlay	DW	0.000	76.871	0.040	0.040	Utility Load

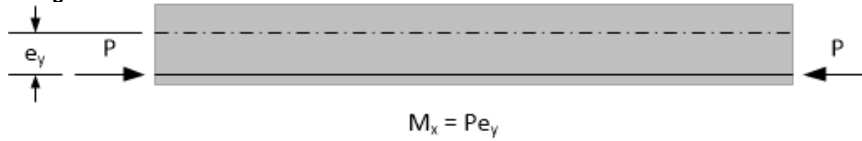
Moment loads were not defined for this girder

Equivalent Pretension Loading

These loads are used to determine girder deflections due to pretension forces

Loads and eccentricities shown in positive directions

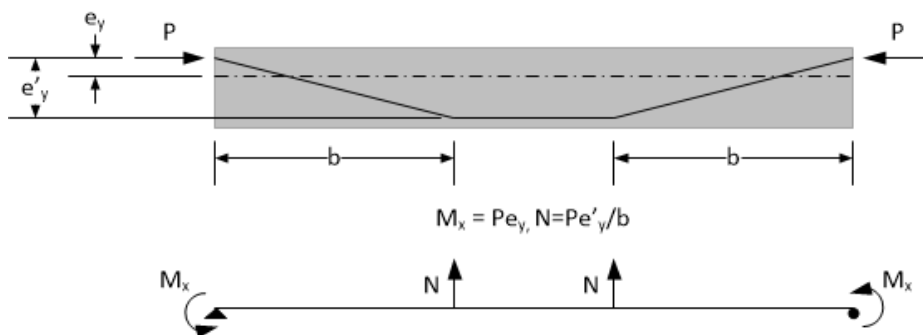
Straight Strands



$$M_x = (715.77 \text{ kip})(18.039 \text{ in}) = 1075.97 \text{ kip-ft at } 0.000 \text{ ft}$$

$$M_x = (-715.77 \text{ kip})(18.039 \text{ in}) = -1075.97 \text{ kip-ft at } 76.819 \text{ ft}$$

Harped Strands



$$M_x = (397.65 \text{ kip})(-12.850 \text{ in}) = -425.82 \text{ kip-ft at } 0.000 \text{ ft}$$

$$e'_y = (15.150 \text{ in} - -12.850 \text{ in}) = 28.000 \text{ in}$$

$$N = (397.65 \text{ kip})(28.000 \text{ in})(30.728 \text{ ft}) = 30.20 \text{ kip at } 30.728 \text{ ft}$$

$$e'_y = (15.150 \text{ in} - -12.850 \text{ in}) = 28.000 \text{ in}$$

$$N = (397.65 \text{ kip})(28.000 \text{ in})(30.728 \text{ ft}) = 30.20 \text{ kip at } 46.091 \text{ ft}$$

$$M_x = (-397.65 \text{ kip})(-12.850 \text{ in}) = 425.82 \text{ kip-ft at } 76.819 \text{ ft}$$

Live Loads

The following live loads were applied to the design (Service and Strength I) limit states:

HL-93

The following live loads were applied to the fatigue (Fatigue I) limit states:

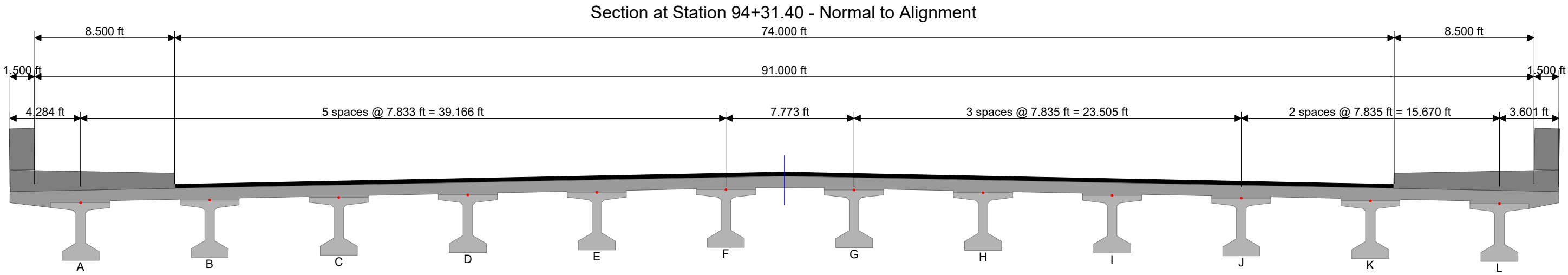
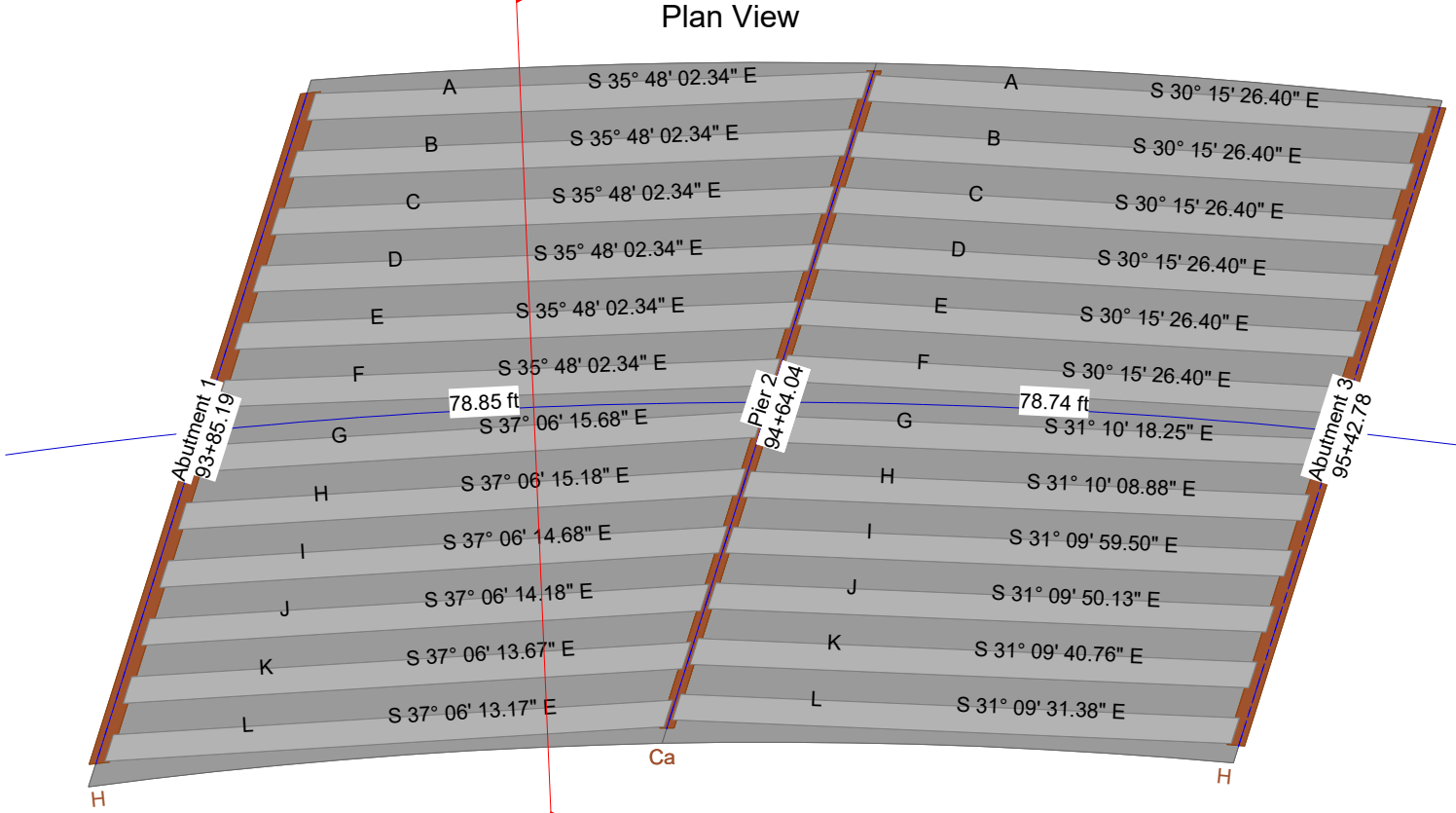
Fatigue

The following live loads were applied to the permit (Strength II) limit states:

CDOT Permit

Limit State Load Factors

Limit State	γ_{DC}	γ_{DW}	γ_{LL}
Service I	1.00	1.00	1.00
Service III	1.00	1.00	0.80
Fatigue I	0.50	0.50	1.50
Strength I	1.25/ 0.90	1.50/ 0.65	1.75
Strength II	1.25/ 0.90	1.50/ 0.65	1.35



Properties

Average Girder Spacing	$S_g := 7 \text{ ft} + 10 \text{ in}$	
Top Flange Width	$b_{tf} := 3 \text{ ft} + 7 \text{ in}$	
Deck Depth	$t_d := 8 \text{ in}$	
Haunch at Bearing	$h_{end} := 5.75 \text{ in}$	
Haunch at Midspan	$h_{mid} := 2.4 \text{ in}$	
Average Haunch Depth	$h_{avg} := \frac{2 h_{end} + 10 h_{mid}}{12} = 2.958 \text{ in}$	(CDOT BDM Eq. 5.1)
Thickness at Soffit Ext	$t_{s,ext} := 9 \text{ in}$	
Thickness of Soffit at Girder	$t_{s,int} := 12 \text{ in}$	
Average Overhang Width	$b_{oh} := 4 \text{ ft} + 0 \text{ in}$	
Unit Weight of Concrete	$w_c := 150 \text{ pcf}$	

Utility Load

Area Load	$a_u := 5 \text{ psf}$	
Line Load for Interior Girder	$w_{u,int} := a_u \cdot (S_g) = 0.039 \text{ klf}$	
Line Load for Exterior Girder	$w_{u,ext} := a_u \cdot (0.5 S_g + b_{oh}) = 0.04 \text{ klf}$	

SIP Form Load

Area Load	$a_f := 5 \text{ psf}$	
Line Load for Interior Girder	$w_{f,int} := a_f \cdot (S_g - b_{tf}) = 0.021 \text{ klf}$	
Line Load for Exterior Girder	$w_{f,ext} := a_f \cdot (0.5 S_g - 0.5 b_{tf}) = 0.011 \text{ klf}$	

Material Properties

Weight of Concrete

$$w_c := 150 \text{ pcf}$$

Geometry

Rail Width

$$b_b := 1 \text{ ft} + 6 \text{ in}$$

Inside Face Height

$$h_{if} := 2 \text{ ft} + 8 \text{ in}$$

Outside Face Height

$$h_{of} := h_{if} + \frac{b_b}{36} = 2.708 \text{ ft}$$

Post Weight - 2'-0" HSS 4x4x3/16

$$w_{post} := 9.42 \frac{\text{lb}}{\text{ft}} \cdot (2 \text{ ft} + 0 \text{ in}) = 18.84 \text{ lb} \quad (\text{AISC T1-11})$$

Post Spacing

$$s_{post} := 6 \text{ ft}$$

Rail Weight - HSS 6x2x3/16

$$w_{rail} := 10.7 \frac{\text{lb}}{\text{ft}} \quad (\text{AISC T1-13})$$

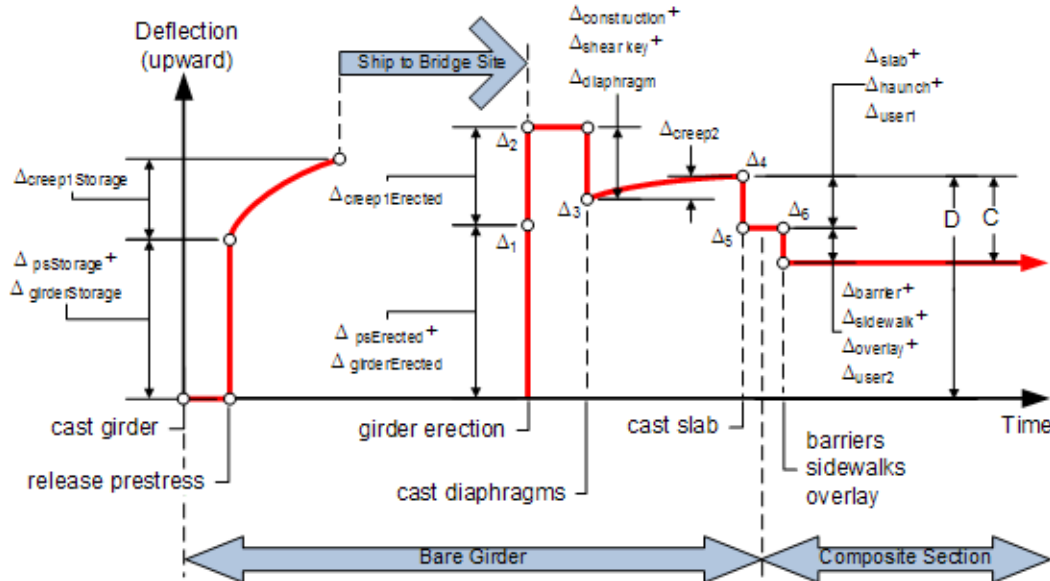
Weight of Rail

$$w_{rail} := 1.05 \left(b_b \cdot \left(\frac{h_{if} + h_{of}}{2} \right) \cdot w_c + 2 \cdot w_{rail} + \frac{w_{post}}{s_{post}} \right) = 0.661 \text{ klf}$$

I.1.3 Beam Deflections and Camber

Span 1 Girder A

Camber Details



Minimum Timing

Deflections at Release

Location from End of Girder (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_i (in)
(STRF, 0.0L _r) 0.000	0.000	0.000	0.000
0.417	-0.014	0.048	0.033
(0.1L _r) 7.682	-0.261	0.829	0.568
(0.2L _r) 15.364	-0.494	1.529	1.035
(0.3L _r) 23.046	-0.676	2.066	1.390
(HP, 0.4L _r) 30.728	-0.792	2.406	1.614
(0.5L _r) 38.410	-0.832	2.522	1.690
(HP, 0.6L _r) 46.091	-0.792	2.406	1.614
(0.7L _r) 53.773	-0.676	2.066	1.390
(0.8L _r) 61.455	-0.494	1.529	1.035
(0.9L _r) 69.137	-0.261	0.829	0.568
76.402	-0.014	0.048	0.033
(STLF, 1.0L _r) 76.819	0.000	0.000	0.000

$\Delta_i = \Delta_{girder} + \Delta_{ps}$ = Camber immediately after prestress release

Deflections during Storage

Location from Left Support (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_{creep1} (in)	Δ_{es} (in)
(STRF) -0.417	0.014	-0.048	0.000	-0.034
(0.0L_{st}) 0.000	0.000	0.000	0.000	0.000
(0.1L _{st}) 7.599	-0.250	0.815	0.000	0.565
(0.2L _{st}) 15.197	-0.473	1.501	0.000	1.029
(0.3L _{st}) 22.796	-0.647	2.028	0.000	1.381
(0.4L _{st}) 30.394	-0.758	2.361	0.000	1.603
(0.5L _{st}) 37.993	-0.796	2.474	0.000	1.678
(0.6L _{st}) 45.591	-0.758	2.361	0.000	1.603
(0.7L _{st}) 53.190	-0.647	2.028	0.000	1.381
(0.8L _{st}) 60.789	-0.473	1.501	0.000	1.029
(0.9L _{st}) 68.387	-0.250	0.815	0.000	0.565
(1.0L_{st}) 75.986	0.000	0.000	0.000	0.000
(STLF) 76.402	0.014	-0.048	0.000	-0.034

$\Delta_{creep1} = \psi(0, 1)(\Delta_{girder Storage} + \Delta_{ps Storage})$

$\Delta_{es} = \Delta_{girder} + \Delta_{ps} + \Delta_{creep1}$ = Camber at end of storage = Camber at shipping

Rows with **bold text** are at the support locations after erection
Storage Duration: Start 1 day, End 1 day, Duration 0 days

Deflections after Erection

Location from Left Support (ft)	Δ_{girder} Erected (in)	Δ_{ps} Erected (in)	δ_{girder} (in)	Δ_{creep1} Erected (in)	$\Delta_{diaphragm}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{User1} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)	$\Delta_{sidewalk}$ (in)	$\Delta_{barrier}$ (in)	$\Delta_{overlay}$ (in)	$\Delta_{User2} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)
(STRF) -0.417	0.014	-0.048	0.000	0.000	0.000	-0.033	0.015	0.002	0.000	0.001	0.000	0.000	0.000
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Location from Left Support (ft)	$\Delta_{\text{girder Erected}}$ (in)	$\Delta_{\text{ps Erected}}$ (in)	δ_{girder} (in)	$\Delta_{\text{creep1 Erected}}$ (in)	$\Delta_{\text{diaphragm}}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{\text{User1}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)	Δ_{sidewalk} (in)	Δ_{barrier} (in)	Δ_{overlay} (in)	$\Delta_{\text{User2}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)
(0.1L _e) 7.599	-0.250	0.815	0.000	0.000	0.000	0.548	-0.275	-0.044	-0.007	-0.018	-0.008	-0.015	-0.003
(0.2L _e) 15.197	-0.473	1.501	0.000	0.000	0.000	0.998	-0.521	-0.082	-0.013	-0.033	-0.014	-0.027	-0.005
(0.3L _e) 22.796	-0.647	2.028	0.000	0.000	0.000	1.339	-0.713	-0.113	-0.017	-0.044	-0.018	-0.036	-0.006
(0.4L _e) 30.394	-0.758	2.361	0.000	0.000	0.000	1.555	-0.835	-0.132	-0.020	-0.049	-0.020	-0.039	-0.007
(0.5L _e) 37.993	-0.796	2.474	0.000	0.000	0.000	1.628	-0.876	-0.139	-0.022	-0.047	-0.020	-0.038	-0.007
(0.6L _e) 45.591	-0.758	2.361	0.000	0.000	0.000	1.555	-0.833	-0.132	-0.020	-0.040	-0.017	-0.033	-0.006
(0.7L _e) 53.190	-0.647	2.028	0.000	0.000	0.000	1.339	-0.711	-0.113	-0.017	-0.029	-0.012	-0.024	-0.004
(0.8L _e) 60.789	-0.473	1.501	0.000	0.000	0.000	0.998	-0.518	-0.082	-0.013	-0.017	-0.007	-0.014	-0.002
(0.9L _e) 68.387	-0.250	0.815	0.000	0.000	0.000	0.548	-0.274	-0.044	-0.007	-0.006	-0.002	-0.005	0.000
(1.0L _e) 75.986	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 76.402	0.014	-0.048	0.000	0.000	0.000	-0.033	0.015	0.002	0.000	0.000	0.000	0.000	0.000

$\Delta_{\text{creep1}} = \psi(0, 1)[(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})]$

$\Delta_{\text{creep2}} = [\psi(59, 1) - \psi(0, 1)][(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})] + \psi(59, 1)(\delta_{\text{girder}} + \Delta_{\text{diaphragm}})$

δ_{girder} = girder deflection associated with change in dead load moment due to support location change between storage and erection

Deflection Summary

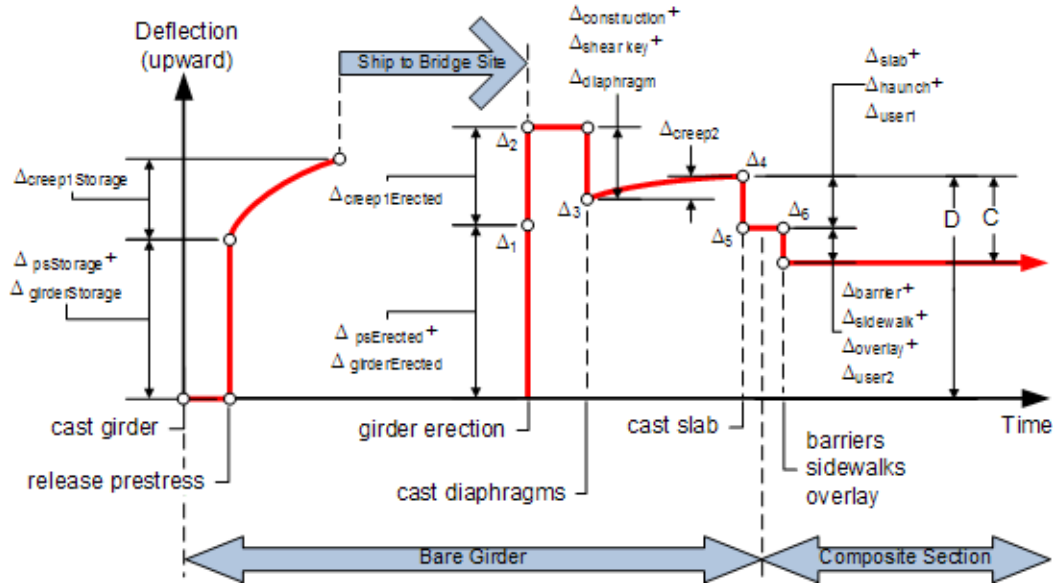
Location from Left Support (ft)	Δ_1 (in)	Δ_2 (in)	Δ_3 (in)	$D_{60} = \Delta_4$ (in)	Δ_5 (in)	$\Delta_{\text{excess}} = \Delta_6$ (in)	$C = \Delta_4 - \Delta_6$ (in)
(STRF) -0.417	-0.034	-0.034	-0.034	-0.066	-0.048	-0.046	-0.021
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(0.1L _e) 7.599	0.565	0.565	0.565	1.112	0.787	0.744	0.369
(0.2L _e) 15.197	1.029	1.029	1.029	2.027	1.410	1.331	0.695
(0.3L _e) 22.796	1.381	1.381	1.381	2.720	1.877	1.772	0.948
(0.4L _e) 30.394	1.603	1.603	1.603	3.158	2.171	2.056	1.103
(0.5L _e) 37.993	1.678	1.678	1.678	3.306	2.270	2.158	1.148
(0.6L _e) 45.591	1.603	1.603	1.603	3.158	2.172	2.077	1.082
(0.7L _e) 53.190	1.381	1.381	1.381	2.720	1.879	1.810	0.911
(0.8L _e) 60.789	1.029	1.029	1.029	2.027	1.413	1.374	0.653
(0.9L _e) 68.387	0.565	0.565	0.565	1.112	0.788	0.775	0.337
(1.0L _e) 75.986	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 76.402	-0.034	-0.034	-0.034	-0.066	-0.048	-0.048	-0.018

$\Delta_1 = 1 * (\Delta_{\text{girder Erected}} + \Delta_{\text{ps Erected}})$

$\Delta_2 = \Delta_1 + 1 * \Delta_{\text{creep1}}$

Span 1 Girder G

Camber Details



Minimum Timing

Deflections at Release

Location from End of Girder (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_i (in)
(STRF, 0.0L _r) 0.000	0.000	0.000	0.000
0.417	-0.015	0.048	0.033
(0.1L _r) 7.746	-0.270	0.843	0.573
(0.2L _r) 15.493	-0.511	1.555	1.045
(0.3L _r) 23.239	-0.699	2.102	1.403
(HP, 0.4L _r) 30.986	-0.819	2.448	1.629
(0.5L _r) 38.732	-0.860	2.565	1.705
(HP, 0.6L _r) 46.479	-0.819	2.448	1.629
(0.7L _r) 54.225	-0.699	2.102	1.403
(0.8L _r) 61.972	-0.511	1.555	1.045
(0.9L _r) 69.718	-0.270	0.843	0.573
77.048	-0.015	0.048	0.033
(STLF, 1.0L _r) 77.464	0.000	0.000	0.000

$\Delta_i = \Delta_{girder} + \Delta_{ps}$ = Camber immediately after prestress release

Deflections during Storage

Location from Left Support (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_{creep1} (in)	Δ_{es} (in)
(STRF) -0.417	0.014	-0.048	0.000	-0.034
(0.0L_{st}) 0.000	0.000	0.000	0.000	0.000
(0.1L _{st}) 7.663	-0.258	0.829	0.000	0.570
(0.2L _{st}) 15.326	-0.489	1.528	0.000	1.039
(0.3L _{st}) 22.989	-0.669	2.063	0.000	1.394
(0.4L _{st}) 30.652	-0.784	2.402	0.000	1.618
(0.5L _{st}) 38.316	-0.823	2.517	0.000	1.694
(0.6L _{st}) 45.979	-0.784	2.402	0.000	1.618
(0.7L _{st}) 53.642	-0.669	2.063	0.000	1.394
(0.8L _{st}) 61.305	-0.489	1.528	0.000	1.039
(0.9L _{st}) 68.968	-0.258	0.829	0.000	0.570
(1.0L_{st}) 76.631	0.000	0.000	0.000	0.000
(STLF) 77.048	0.014	-0.048	0.000	-0.034

$\Delta_{creep1} = \psi(0, 1)(\Delta_{girder Storage} + \Delta_{ps Storage})$

$\Delta_{es} = \Delta_{girder} + \Delta_{ps} + \Delta_{creep1}$ = Camber at end of storage = Camber at shipping

Rows with **bold text** are at the support locations after erection

Storage Duration: Start 1 day, End 1 day, Duration 0 days

Deflections after Erection

Location from Left Support (ft)	Δ_{girder} Erected (in)	Δ_{ps} Erected (in)	δ_{girder} (in)	Δ_{creep1} Erected (in)	$\Delta_{diaphragm}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{User1} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)	$\Delta_{sidewalk}$ (in)	$\Delta_{barrier}$ (in)	$\Delta_{overlay}$ (in)	$\Delta_{User2} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)
(STRF) -0.417	0.014	-0.048	0.000	0.000	0.000	-0.033	0.014	0.002	0.000	0.001	0.000	0.000	0.000
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Location from Left Support (ft)	$\Delta_{\text{girder Erected}}$ (in)	$\Delta_{\text{ps Erected}}$ (in)	δ_{girder} (in)	$\Delta_{\text{creep1 Erected}}$ (in)	$\Delta_{\text{diaphragm}}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{\text{User1}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)	Δ_{sidewalk} (in)	Δ_{barrier} (in)	Δ_{overlay} (in)	$\Delta_{\text{User2}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)
(0.1L _e) 7.663	-0.258	0.829	0.000	0.000	0.000	0.553	-0.252	-0.040	-0.007	-0.019	-0.008	-0.015	-0.003
(0.2L _e) 15.326	-0.489	1.528	0.000	0.000	0.000	1.007	-0.476	-0.076	-0.013	-0.035	-0.014	-0.028	-0.005
(0.3L _e) 22.989	-0.669	2.063	0.000	0.000	0.000	1.352	-0.651	-0.104	-0.018	-0.045	-0.019	-0.037	-0.007
(0.4L _e) 30.652	-0.784	2.402	0.000	0.000	0.000	1.570	-0.762	-0.121	-0.021	-0.050	-0.021	-0.041	-0.007
(0.5L _e) 38.316	-0.823	2.517	0.000	0.000	0.000	1.643	-0.800	-0.128	-0.022	-0.049	-0.020	-0.040	-0.007
(0.6L _e) 45.979	-0.784	2.402	0.000	0.000	0.000	1.570	-0.761	-0.121	-0.021	-0.042	-0.017	-0.034	-0.006
(0.7L _e) 53.642	-0.669	2.063	0.000	0.000	0.000	1.352	-0.649	-0.104	-0.018	-0.030	-0.013	-0.025	-0.004
(0.8L _e) 61.305	-0.489	1.528	0.000	0.000	0.000	1.007	-0.474	-0.076	-0.013	-0.017	-0.007	-0.014	-0.003
(0.9L _e) 68.968	-0.258	0.829	0.000	0.000	0.000	0.553	-0.250	-0.040	-0.007	-0.006	-0.002	-0.005	0.000
(1.0L _e) 76.631	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 77.048	0.014	-0.048	0.000	0.000	0.000	-0.033	0.014	0.002	0.000	0.000	0.000	0.000	0.000

$\Delta_{\text{creep1}} = \psi(0, 1)[(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})]$

$\Delta_{\text{creep2}} = [\psi(59, 1) - \psi(0, 1)][(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})] + \psi(59, 1)(\delta_{\text{girder}} + \Delta_{\text{diaphragm}})$

δ_{girder} = girder deflection associated with change in dead load moment due to support location change between storage and erection

Deflection Summary

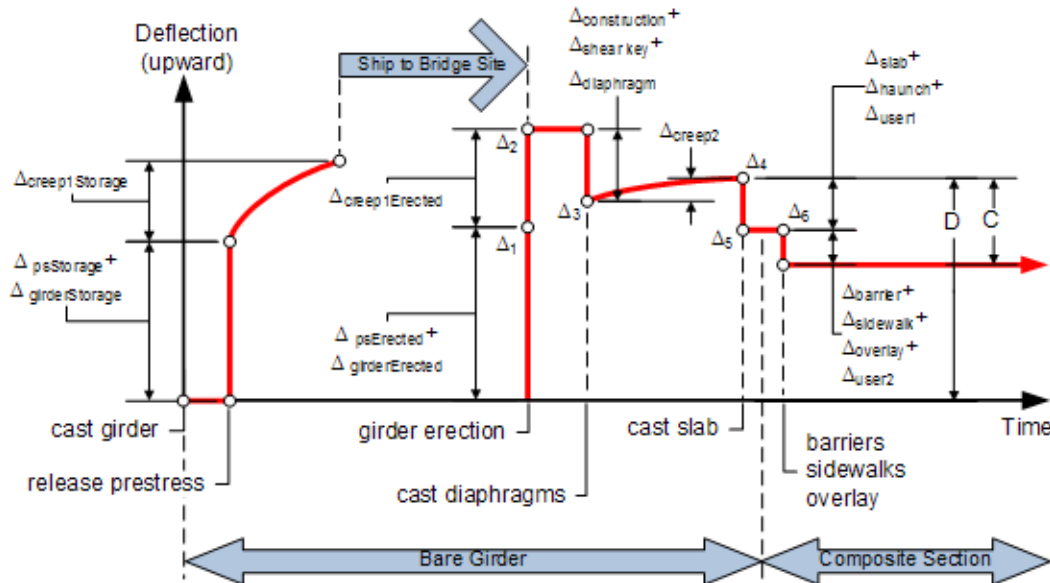
Location from Left Support (ft)	Δ_1 (in)	Δ_2 (in)	Δ_3 (in)	$D_{60} = \Delta_4$ (in)	Δ_5 (in)	$\Delta_{\text{excess}} = \Delta_6$ (in)	$C = \Delta_4 - \Delta_6$ (in)
(STRF) -0.417	-0.034	-0.034	-0.034	-0.067	-0.050	-0.048	-0.019
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(0.1L _e) 7.663	0.570	0.570	0.570	1.123	0.824	0.780	0.343
(0.2L _e) 15.326	1.039	1.039	1.039	2.046	1.481	1.399	0.647
(0.3L _e) 22.989	1.394	1.394	1.394	2.746	1.973	1.865	0.881
(0.4L _e) 30.652	1.618	1.618	1.618	3.188	2.283	2.164	1.024
(0.5L _e) 38.316	1.694	1.694	1.694	3.337	2.388	2.271	1.065
(0.6L _e) 45.979	1.618	1.618	1.618	3.188	2.285	2.185	1.003
(0.7L _e) 53.642	1.394	1.394	1.394	2.746	1.975	1.903	0.843
(0.8L _e) 61.305	1.039	1.039	1.039	2.046	1.484	1.442	0.604
(0.9L _e) 68.968	0.570	0.570	0.570	1.123	0.826	0.812	0.311
(1.0L _e) 76.631	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 77.048	-0.034	-0.034	-0.034	-0.067	-0.050	-0.050	-0.016

$\Delta_1 = 1 * (\Delta_{\text{girder Erected}} + \Delta_{\text{ps Erected}})$

$\Delta_2 = \Delta_1 + 1 * \Delta_{\text{creep1}}$

Span 2 Girder A

Camber Details



Minimum Timing

Deflections at Release

Location from End of Girder (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_i (in)
(STRF, 0.0L _r) 0.000	0.000	0.000	0.000
0.417	-0.015	0.048	0.033
(0.1L _r) 7.700	-0.263	0.833	0.569
(0.2L _r) 15.400	-0.498	1.536	1.038
(0.3L _r) 23.100	-0.682	2.076	1.393
(HP, 0.4L _r) 30.800	-0.799	2.418	1.619
(0.5L _r) 38.499	-0.839	2.534	1.694
(HP, 0.6L _r) 46.199	-0.799	2.418	1.619
(0.7L _r) 53.899	-0.682	2.076	1.393
(0.8L _r) 61.599	-0.498	1.536	1.038
(0.9L _r) 69.299	-0.263	0.833	0.569
76.582	-0.015	0.048	0.033
(STLF, 1.0L _r) 76.999	0.000	0.000	0.000

$\Delta_i = \Delta_{girder} + \Delta_{ps}$ = Camber immediately after prestress release

Deflections during Storage

Location from Left Support (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_{creep1} (in)	Δ_{es} (in)
(STRF) -0.417	0.014	-0.048	0.000	-0.034
(0.0L_{st}) 0.000	0.000	0.000	0.000	0.000
(0.1L _{st}) 7.617	-0.252	0.818	0.000	0.566
(0.2L _{st}) 15.233	-0.477	1.509	0.000	1.031
(0.3L _{st}) 22.850	-0.653	2.038	0.000	1.384
(0.4L _{st}) 30.466	-0.765	2.373	0.000	1.607
(0.5L _{st}) 38.083	-0.803	2.486	0.000	1.682
(0.6L _{st}) 45.699	-0.765	2.373	0.000	1.607
(0.7L _{st}) 53.316	-0.653	2.038	0.000	1.384
(0.8L _{st}) 60.932	-0.477	1.509	0.000	1.031
(0.9L _{st}) 68.549	-0.252	0.818	0.000	0.566
(1.0L_{st}) 76.165	0.000	0.000	0.000	0.000
(STLF) 76.582	0.014	-0.048	0.000	-0.034

$\Delta_{creep1} = \psi(0, 1)(\Delta_{girder Storage} + \Delta_{ps Storage})$

$\Delta_{es} = \Delta_{girder} + \Delta_{ps} + \Delta_{creep1}$ = Camber at end of storage = Camber at shipping

Rows with **bold text** are at the support locations after erection
Storage Duration: Start 1 day, End 1 day, Duration 0 days

Deflections after Erection

Location from Left Support (ft)	Δ_{girder} Erected (in)	Δ_{ps} Erected (in)	δ_{girder} (in)	Δ_{creep1} Erected (in)	$\Delta_{diaphragm}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{User1} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)	$\Delta_{sidewalk}$ (in)	$\Delta_{barrier}$ (in)	$\Delta_{overlay}$ (in)	$\Delta_{User2} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)
(STRF) -0.417	0.014	-0.048	0.000	0.000	0.000	-0.033	0.015	0.002	0.000	0.000	0.000	0.000	0.000
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Location from Left Support (ft)	$\Delta_{\text{girder Erected}}$ (in)	$\Delta_{\text{ps Erected}}$ (in)	δ_{girder} (in)	$\Delta_{\text{creep1 Erected}}$ (in)	$\Delta_{\text{diaphragm}}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{\text{User1}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)	Δ_{sidewalk} (in)	Δ_{barrier} (in)	Δ_{overlay} (in)	$\Delta_{\text{User2}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)
(0.1L _e) 7.617	-0.252	0.818	0.000	0.000	0.000	0.549	-0.271	-0.044	-0.007	-0.006	-0.002	-0.005	0.000
(0.2L _e) 15.233	-0.477	1.509	0.000	0.000	0.000	1.001	-0.513	-0.083	-0.013	-0.017	-0.007	-0.014	-0.002
(0.3L _e) 22.850	-0.653	2.038	0.000	0.000	0.000	1.343	-0.702	-0.114	-0.018	-0.030	-0.012	-0.024	-0.004
(0.4L _e) 30.466	-0.765	2.373	0.000	0.000	0.000	1.559	-0.822	-0.134	-0.021	-0.041	-0.017	-0.033	-0.006
(0.5L _e) 38.083	-0.803	2.486	0.000	0.000	0.000	1.632	-0.863	-0.140	-0.022	-0.048	-0.020	-0.039	-0.007
(0.6L _e) 45.699	-0.765	2.373	0.000	0.000	0.000	1.559	-0.821	-0.134	-0.021	-0.049	-0.021	-0.040	-0.007
(0.7L _e) 53.316	-0.653	2.038	0.000	0.000	0.000	1.343	-0.700	-0.114	-0.018	-0.044	-0.019	-0.036	-0.006
(0.8L _e) 60.932	-0.477	1.509	0.000	0.000	0.000	1.001	-0.511	-0.083	-0.013	-0.034	-0.014	-0.027	-0.005
(0.9L _e) 68.549	-0.252	0.818	0.000	0.000	0.000	0.549	-0.270	-0.044	-0.007	-0.018	-0.008	-0.015	-0.003
(1.0L _e) 76.165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 76.582	0.014	-0.048	0.000	0.000	0.000	-0.033	0.015	0.002	0.000	0.001	0.000	0.000	0.000

$\Delta_{\text{creep1}} = \psi(0, 1)[(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})]$

$\Delta_{\text{creep2}} = [\psi(59, 1) - \psi(0, 1)][(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})] + \psi(59, 1)(\delta_{\text{girder}} + \Delta_{\text{diaphragm}})$

δ_{girder} = girder deflection associated with change in dead load moment due to support location change between storage and erection

Deflection Summary

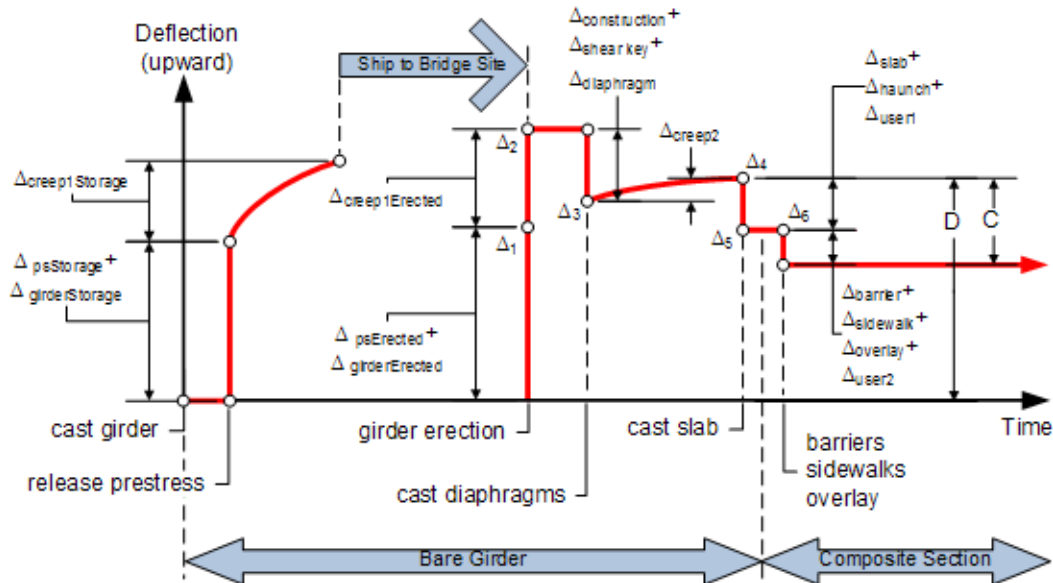
Location from Left Support (ft)	Δ_1 (in)	Δ_2 (in)	Δ_3 (in)	$D_{60} = \Delta_4$ (in)	Δ_5 (in)	$\Delta_{\text{excess}} = \Delta_6$ (in)	$C = \Delta_4 - \Delta_6$ (in)
(STRF) -0.417	-0.034	-0.034	-0.034	-0.067	-0.049	-0.049	-0.018
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(0.1L _e) 7.617	0.566	0.566	0.566	1.116	0.794	0.780	0.336
(0.2L _e) 15.233	1.031	1.031	1.031	2.032	1.423	1.383	0.649
(0.3L _e) 22.850	1.384	1.384	1.384	2.727	1.894	1.823	0.904
(0.4L _e) 30.466	1.607	1.607	1.607	3.167	2.190	2.094	1.073
(0.5L _e) 38.083	1.682	1.682	1.682	3.315	2.290	2.177	1.138
(0.6L _e) 45.699	1.607	1.607	1.607	3.167	2.192	2.075	1.092
(0.7L _e) 53.316	1.384	1.384	1.384	2.727	1.896	1.790	0.937
(0.8L _e) 60.932	1.031	1.031	1.031	2.032	1.425	1.345	0.687
(0.9L _e) 68.549	0.566	0.566	0.566	1.116	0.795	0.752	0.364
(1.0L _e) 76.165	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 76.582	-0.034	-0.034	-0.034	-0.067	-0.049	-0.046	-0.020

$\Delta_1 = 1 * (\Delta_{\text{girder Erected}} + \Delta_{\text{ps Erected}})$

$\Delta_2 = \Delta_1 + 1 * \Delta_{\text{creep1}}$

Span 2 Girder G

Camber Details



Minimum Timing

Deflections at Release

Location from End of Girder (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_i (in)
(STRF, 0.0L _r) 0.000	0.000	0.000	0.000
0.417	-0.015	0.048	0.033
(0.1L _r) 7.732	-0.268	0.840	0.572
(0.2L _r) 15.463	-0.507	1.549	1.042
(0.3L _r) 23.195	-0.694	2.093	1.400
(HP, 0.4L _r) 30.927	-0.813	2.438	1.626
(0.5L _r) 38.659	-0.853	2.555	1.702
(HP, 0.6L _r) 46.390	-0.813	2.438	1.626
(0.7L _r) 54.122	-0.694	2.093	1.400
(0.8L _r) 61.854	-0.507	1.549	1.042
(0.9L _r) 69.585	-0.268	0.840	0.572
76.900	-0.015	0.048	0.033
(STLF, 1.0L _r) 77.317	0.000	0.000	0.000

$\Delta_i = \Delta_{girder} + \Delta_{ps}$ = Camber immediately after prestress release

Deflections during Storage

Location from Left Support (ft)	Δ_{girder} (in)	Δ_{ps} (in)	Δ_{creep1} (in)	Δ_{es} (in)
(STRF) -0.417	0.014	-0.048	0.000	-0.034
(0.0L_{st}) 0.000	0.000	0.000	0.000	0.000
(0.1L _{st}) 7.648	-0.256	0.825	0.000	0.569
(0.2L _{st}) 15.297	-0.485	1.522	0.000	1.036
(0.3L _{st}) 22.945	-0.664	2.055	0.000	1.391
(0.4L _{st}) 30.594	-0.778	2.393	0.000	1.615
(0.5L _{st}) 38.242	-0.817	2.507	0.000	1.690
(0.6L _{st}) 45.890	-0.778	2.393	0.000	1.615
(0.7L _{st}) 53.539	-0.664	2.055	0.000	1.391
(0.8L _{st}) 61.187	-0.485	1.522	0.000	1.036
(0.9L _{st}) 68.835	-0.256	0.825	0.000	0.569
(1.0L_{st}) 76.484	0.000	0.000	0.000	0.000
(STLF) 76.900	0.014	-0.048	0.000	-0.034

$\Delta_{creep1} = \psi(0, 1)(\Delta_{girder Storage} + \Delta_{ps Storage})$

$\Delta_{es} = \Delta_{girder} + \Delta_{ps} + \Delta_{creep1}$ = Camber at end of storage = Camber at shipping

Rows with **bold text** are at the support locations after erection

Storage Duration: Start 1 day, End 1 day, Duration 0 days

Deflections after Erection

Location from Left Support (ft)	Δ_{girder} Erected (in)	Δ_{ps} Erected (in)	δ_{girder} (in)	Δ_{creep1} Erected (in)	$\Delta_{diaphragm}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{User1} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)	$\Delta_{sidewalk}$ (in)	$\Delta_{barrier}$ (in)	$\Delta_{overlay}$ (in)	$\Delta_{User2} = \Delta_{UserDC} + \Delta_{UserDW}$ (in)
(STRF) -0.417	0.014	-0.048	0.000	0.000	0.000	-0.033	0.014	0.002	0.000	0.000	0.000	0.000	0.000
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Location from Left Support (ft)	$\Delta_{\text{girder Erected}}$ (in)	$\Delta_{\text{ps Erected}}$ (in)	δ_{girder} (in)	$\Delta_{\text{creep1 Erected}}$ (in)	$\Delta_{\text{diaphragm}}$ (in)	Δ_{creep2} (in)	Δ_{slab} (in)	Δ_{haunch} (in)	$\Delta_{\text{User1}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)	Δ_{sidewalk} (in)	Δ_{barrier} (in)	Δ_{overlay} (in)	$\Delta_{\text{User2}} = \Delta_{\text{UserDC}} + \Delta_{\text{UserDW}}$ (in)
(0.1L _e) 7.648	-0.256	0.825	0.000	0.000	0.000	0.552	-0.248	-0.040	-0.007	-0.006	-0.002	-0.005	0.000
(0.2L _e) 15.297	-0.485	1.522	0.000	0.000	0.000	1.005	-0.469	-0.075	-0.013	-0.017	-0.007	-0.014	-0.002
(0.3L _e) 22.945	-0.664	2.055	0.000	0.000	0.000	1.349	-0.642	-0.103	-0.018	-0.030	-0.013	-0.024	-0.004
(0.4L _e) 30.594	-0.778	2.393	0.000	0.000	0.000	1.566	-0.752	-0.121	-0.021	-0.041	-0.017	-0.033	-0.006
(0.5L _e) 38.242	-0.817	2.507	0.000	0.000	0.000	1.640	-0.789	-0.127	-0.022	-0.048	-0.020	-0.039	-0.007
(0.6L _e) 45.890	-0.778	2.393	0.000	0.000	0.000	1.566	-0.750	-0.121	-0.021	-0.050	-0.021	-0.040	-0.007
(0.7L _e) 53.539	-0.664	2.055	0.000	0.000	0.000	1.349	-0.640	-0.103	-0.018	-0.045	-0.019	-0.036	-0.006
(0.8L _e) 61.187	-0.485	1.522	0.000	0.000	0.000	1.005	-0.467	-0.075	-0.013	-0.034	-0.014	-0.028	-0.005
(0.9L _e) 68.835	-0.256	0.825	0.000	0.000	0.000	0.552	-0.247	-0.040	-0.007	-0.018	-0.008	-0.015	-0.003
(1.0L _e) 76.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 76.900	0.014	-0.048	0.000	0.000	0.000	-0.033	0.014	0.002	0.000	0.001	0.000	0.000	0.000

$\Delta_{\text{creep1}} = \psi(0, 1)[(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})]$

$\Delta_{\text{creep2}} = [\psi(59, 1) - \psi(0, 1)][(\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}}) - (\Delta_{\text{girder Storage}} + \Delta_{\text{ps Storage}} \text{ at location of erected segment supports})] + \psi(59, 1)(\delta_{\text{girder}} + \Delta_{\text{diaphragm}})$

δ_{girder} = girder deflection associated with change in dead load moment due to support location change between storage and erection

Deflection Summary

Location from Left Support (ft)	Δ_1 (in)	Δ_2 (in)	Δ_3 (in)	$D_{60} = \Delta_4$ (in)	Δ_5 (in)	$\Delta_{\text{excess}} = \Delta_6$ (in)	$C = \Delta_4 - \Delta_6$ (in)
(STRF) -0.417	-0.034	-0.034	-0.034	-0.067	-0.050	-0.050	-0.016
(0.0L _e) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(0.1L _e) 7.648	0.569	0.569	0.569	1.121	0.826	0.813	0.308
(0.2L _e) 15.297	1.036	1.036	1.036	2.042	1.484	1.444	0.598
(0.3L _e) 22.945	1.391	1.391	1.391	2.740	1.977	1.906	0.834
(0.4L _e) 30.594	1.615	1.615	1.615	3.181	2.288	2.191	0.991
(0.5L _e) 38.242	1.690	1.690	1.690	3.330	2.393	2.278	1.052
(0.6L _e) 45.890	1.615	1.615	1.615	3.181	2.289	2.171	1.010
(0.7L _e) 53.539	1.391	1.391	1.391	2.740	1.979	1.872	0.868
(0.8L _e) 61.187	1.036	1.036	1.036	2.042	1.486	1.405	0.637
(0.9L _e) 68.835	0.569	0.569	0.569	1.121	0.827	0.783	0.338
(1.0L _e) 76.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(STLF) 76.900	-0.034	-0.034	-0.034	-0.067	-0.050	-0.048	-0.019

$\Delta_1 = 1 * (\Delta_{\text{girder Erected}} + \Delta_{\text{ps Erected}})$

$\Delta_2 = \Delta_1 + 1 * \Delta_{\text{creep1}}$

I.1.4 Haunch Calculations

As described in Section I.1.1, the calculations for the haunch variations were performed in an excel spreadsheet. There are multiple steps that are necessary to complete this calculation. First the stations and top of deck elevations were calculated for each girder line and every span. The top of deck profile elevations were then converted into a corrected curve that starts and ends at 0. This is done by first determining the difference in elevation from the starting point of girder, then taking the difference from one end of the girder to the next and using that to create a linear baseline equation, and then taking that linear baseline and adding it to each of the differences in elevation from the starting point.

Next, this corrected curve was adjusted upward to account for the dead load deflection. The maximum dead load deflection was used to create a parabolic curve with the maximum value at the mid-point. This parabolic curve is then added to the corrected curve. This new curve is the profile for the top of deck as they pour the deck or the screed curve. The camber curve is taken directly from the PGSuper camber results.

The last step is to determine the difference between the camber curve and the screed curve to determine the haunch thickness at each tenth point. This is used to determine where the minimum haunch will control and need to be set. The next column, which has no title, takes the screed curve and shifts it up to the point where it is a set haunch height above the camber curve at the mid-point, and then the camber curve is subtracted from this to get the haunch. Using the haunch at each tenth point, the average haunch is calculated per CDOT BDM Eq. 5.1 to determine what value to use for the haunch depth in the PGSuper analysis.

Bridge Information									
VPI Station=	93+36.	BF Abutment 1 Station=							
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=							
Length of Vertical Curve=	500	Span 1 Length=	75.9867	(Girder Length Brg to Brg)					
g1=	-3.12%	Span 2 Length=	76.1662	(Girder Length Brg to Brg)					
g2=	3.35%								
Cross Slope=	-0.02								
Skew Angle=									
VPC Station=	90+86.								
VPC Elevation=	5788.14								
VPC Elevation=	5788.72								

Girder 1 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+04.36	318.36	43.32	5783.90	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.60	94+11.55	325.55	43.06	5783.98	0.96	-1.25	-0.28	0.396	0.11	1.113	0.000	1.113	1.00	5.86	4.75	0.56	5.31	1.34	4.53
0.2	15.20	94+18.74	332.74	42.88	5784.06	1.99	-2.50	-0.51	0.704	0.20	2.027	0.000	2.027	1.83	5.95	3.92	1.01	4.93	2.43	3.51
0.3	22.80	94+25.94	339.94	42.76	5784.16	3.08	-3.75	-0.66	0.924	0.26	2.720	0.000	2.720	2.46	6.01	3.29	1.36	4.65	3.26	2.75
0.4	30.39	94+33.14	347.14	42.72	5784.25	4.24	-5.00	-0.76	1.056	0.30	3.159	0.000	3.159	2.86	6.05	2.89	1.58	4.47	3.79	2.26
0.5	37.99	94+40.31	354.31	42.75	5784.35	5.45	-6.25	-0.79	1.100	0.31	3.306	0.000	3.306	3.00	6.06	2.75	1.65	4.40	3.97	2.09
0.6	45.59	94+47.51	361.51	42.85	5784.46	6.73	-7.50	-0.76	1.056	0.29	3.159	0.000	3.159	2.87	6.04	2.89	1.58	4.46	3.79	2.25
0.7	53.19	94+54.73	368.73	43.02	5784.57	8.08	-8.75	-0.66	0.924	0.26	2.720	0.000	2.720	2.46	6.01	3.29	1.36	4.65	3.26	2.75
0.8	60.79	94+61.93	375.93	43.26	5784.69	9.49	-10.00	-0.50	0.704	0.20	2.027	0.000	2.027	1.82	5.95	3.93	1.01	4.94	2.43	3.52
0.9	68.39	94+69.11	383.11	43.26	5784.82	11.04	-11.24	-0.21	0.396	0.19	1.113	0.000	1.113	0.93	5.94	4.83	0.56	5.38	1.34	4.60
1	75.99	94+76.29	390.29	43.95	5784.94	12.49	-12.49	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.25	Avg Haunch	4.63	Avg Haunch	2.70
																2.95	4.33			

Girder 1 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+77.94	391.94	43.38	5784.98	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.62	94+84.99	398.99	43.11	5785.13	1.75	-2.07	-0.32	0.40	0.08	1.115	0.000	1.115	1.04	5.82	4.71	0.56	5.27	1.34	4.48
0.2	15.23	94+92.2	406.20	42.92	5785.28	3.61	-4.15	-0.54	0.70	0.16	2.032	0.000	2.032	1.87	5.91	3.88	1.02	4.89	2.44	3.47
0.3	22.85	94+99.41	413.41	42.79	5785.44	5.53	-6.22	-0.69	0.92	0.23	2.727	0.000	2.727	2.50	5.98	3.25	1.36	4.61	3.27	2.70
0.4	30.47	95+06.63	420.63	42.73	5785.61	7.51	-8.30	-0.78	1.06	0.27	3.167	0.000	3.167	2.89	6.02	2.85	1.58	4.44	3.80	2.22
0.5	38.08	95+13.84	427.84	42.75	5785.78	9.56	-10.37	-0.81	1.10	0.29	3.315	0.000	3.315	3.03	6.04	2.72	1.66	4.38	3.98	2.06
0.6	45.70	95+21.06	435.06	42.84	5785.96	11.67	-12.45	-0.77	1.06	0.28	3.167	0.000	3.167	2.88	6.03	2.86	1.58	4.45	3.80	2.23
0.7	53.32	95+28.27	442.27	43	5786.14	13.85	-14.52	-0.67	0.92	0.25	2.727	0.000	2.727	2.48	6.00	3.27	1.36	4.63	3.27	2.72
0.8	60.93	95+35.48	449.48	43.23	5786.32	16.08	-16.59	-0.51	0.70	0.19	2.032	0.000	2.032	1.84	5.94	3.91	1.02	4.92	2.44	3.50
0.9	68.55	95+42.69	456.69	43.53	5786.51	18.38	-18.67	-0.28	0.40	0.11	1.115	0.000	1.115	1.00	5.86	4.74	0.56	5.30	1.34	4.52
1	76.17	95+49.88	463.88	43.9	5786.71	20.74	-20.74	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.22	Avg Haunch	4.61	Avg Haunch	2.67
																2.94	4.33			

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	75.9867	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.1662	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 2 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+01.39	315.39	35.6	5784.02	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.60	94+08.64	322.64	35.32	5784.10	0.94	-1.24	-0.29	0.396	0.10	1.113	0.000	1.113	1.01	5.86	4.74	0.56	5.30	1.34	4.52
0.2	15.20	94+15.91	329.91	35.1	5784.19	1.96	-2.48	-0.52	0.704	0.19	2.027	0.000	2.027	1.84	5.94	3.91	1.01	4.93	2.43	3.51
0.3	22.80	94+23.17	337.17	34.96	5784.28	3.03	-3.71	-0.68	0.924	0.24	2.720	0.000	2.720	2.48	6.00	3.28	1.36	4.64	3.26	2.73
0.4	30.39	94+30.44	344.44	34.89	5784.37	4.18	-4.95	-0.78	1.056	0.28	3.159	0.000	3.159	2.88	6.03	2.87	1.58	4.45	3.79	2.24
0.5	37.99	94+37.71	351.71	34.89	5784.47	5.38	-6.19	-0.81	1.100	0.29	3.306	0.000	3.306	3.01	6.05	2.74	1.65	4.39	3.97	2.08
0.6	45.59	94+44.98	358.98	34.97	5784.58	6.65	-7.43	-0.77	1.056	0.28	3.159	0.000	3.159	2.88	6.03	2.88	1.58	4.45	3.79	2.24
0.7	53.19	94+52.25	366.25	35.11	5784.69	7.99	-8.67	-0.67	0.924	0.25	2.720	0.000	2.720	2.47	6.00	3.28	1.36	4.64	3.26	2.74
0.8	60.79	94+59.51	373.51	35.33	5784.81	9.39	-9.91	-0.51	0.704	0.19	2.027	0.000	2.027	1.84	5.94	3.92	1.01	4.93	2.43	3.51
0.9	68.39	94+66.77	380.77	35.62	5784.93	10.85	-11.14	-0.29	0.396	0.11	1.113	0.000	1.113	1.01	5.86	4.75	0.56	5.30	1.34	4.52
1	75.99	94+74.02	388.02	35.98	5785.06	12.38	-12.38	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.24	Avg Haunch	4.62	Avg Haunch	2.69

Girder 2 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+75.59	389.59	35.64	5785.09	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.62	94+82.86	396.86	35.35	5785.24	1.79	-2.08	-0.30	0.40	0.10	1.115	0.000	1.115	1.01	5.85	4.73	0.56	5.29	1.34	4.51
0.2	15.23	94+90.14	404.14	35.13	5785.40	3.64	-4.16	-0.52	0.70	0.18	2.032	0.000	2.032	1.85	5.93	3.90	1.02	4.91	2.44	3.49
0.3	22.85	94+97.43	411.43	34.98	5785.56	5.56	-6.25	-0.68	0.92	0.24	2.727	0.000	2.727	2.49	5.99	3.26	1.36	4.63	3.27	2.72
0.4	30.47	95+04.71	418.71	34.91	5785.72	7.55	-8.33	-0.78	1.06	0.27	3.167	0.000	3.167	2.89	6.02	2.85	1.58	4.44	3.80	2.22
0.5	38.08	95+12.	426.00	34.91	5785.89	9.60	-10.41	-0.81	1.10	0.29	3.315	0.000	3.315	3.03	6.04	2.72	1.66	4.38	3.98	2.06
0.6	45.70	95+19.29	433.29	34.98	5786.07	11.72	-12.49	-0.78	1.06	0.28	3.167	0.000	3.167	2.89	6.03	2.86	1.58	4.44	3.80	2.23
0.7	53.32	95+26.57	440.57	35.12	5786.25	13.90	-14.58	-0.68	0.92	0.24	2.727	0.000	2.727	2.48	5.99	3.26	1.36	4.63	3.27	2.72
0.8	60.93	95+35.48	449.48	35.33	5786.48	16.67	-16.66	0.01	0.70	0.71	2.032	0.000	2.032	1.32	6.46	4.43	1.02	5.44	2.44	4.02
0.9	68.55	95+41.13	455.13	35.62	5786.63	18.45	-18.74	-0.29	0.40	0.11	1.115	0.000	1.115	1.01	5.85	4.74	0.56	5.30	1.34	4.52
1	76.17	95+48.4	462.40	35.97	5786.83	20.82	-20.82	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.22	Avg Haunch	4.61	Avg Haunch	2.67

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	75.9867	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.1662	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 3 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+98.36	312.36	27.9	5784.15	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.60	94+05.68	319.68	27.59	5784.23	0.93	-1.23	-0.30	0.396	0.10	1.113	0.000	1.113	1.02	5.85	4.74	0.56	5.29	1.34	4.51
0.2	15.20	94+13.02	327.02	27.34	5784.31	1.92	-2.45	-0.53	0.704	0.17	2.027	0.000	2.027	1.85	5.93	3.90	1.01	4.91	2.43	3.50
0.3	22.80	94+20.35	334.35	27.17	5784.40	2.98	-3.68	-0.70	0.924	0.23	2.720	0.000	2.720	2.49	5.98	3.26	1.36	4.62	3.26	2.72
0.4	30.39	94+27.69	341.69	27.08	5784.49	4.11	-4.91	-0.80	1.056	0.26	3.159	0.000	3.159	2.90	6.01	2.85	1.58	4.43	3.79	2.22
0.5	37.99	94+35.03	349.03	27.05	5784.59	5.30	-6.13	-0.83	1.100	0.27	3.306	0.000	3.306	3.03	6.03	2.72	1.65	4.37	3.97	2.06
0.6	45.59	94+42.37	356.37	27.1	5784.70	6.56	-7.36	-0.79	1.056	0.26	3.159	0.000	3.159	2.90	6.02	2.86	1.58	4.44	3.79	2.22
0.7	53.19	94+49.71	363.71	27.22	5784.81	7.89	-8.59	-0.69	0.924	0.23	2.720	0.000	2.720	2.49	5.98	3.26	1.36	4.62	3.26	2.72
0.8	60.79	94+57.05	371.05	27.41	5784.92	9.28	-9.81	-0.53	0.704	0.18	2.027	0.000	2.027	1.85	5.93	3.90	1.01	4.92	2.43	3.50
0.9	68.39	94+64.38	378.38	27.68	5785.04	10.74	-11.04	-0.30	0.396	0.10	1.113	0.000	1.113	1.02	5.85	4.74	0.56	5.30	1.34	4.52
1	75.99	94+71.71	385.71	28.01	5785.17	12.27	-12.27	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.23	Avg Haunch	4.60	Avg Haunch	2.67

Girder 3 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+73.36	387.36	27.9	5785.20	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.62	94+80.7	394.70	27.59	5785.35	1.78	-2.09	-0.30	0.40	0.09	1.115	0.000	1.115	1.02	5.84	4.73	0.56	5.28	1.34	4.50
0.2	15.23	94+88.05	402.05	27.35	5785.51	3.64	-4.17	-0.54	0.70	0.17	2.032	0.000	2.032	1.86	5.92	3.88	1.02	4.90	2.44	3.48
0.3	22.85	94+95.41	409.41	27.18	5785.67	5.56	-6.26	-0.70	0.92	0.22	2.727	0.000	2.727	2.50	5.97	3.24	1.36	4.61	3.27	2.70
0.4	30.47	95+02.76	416.76	27.09	5785.83	7.54	-8.34	-0.80	1.06	0.26	3.167	0.000	3.167	2.91	6.00	2.84	1.58	4.42	3.80	2.20
0.5	38.08	95+10.12	424.12	27.07	5786.00	9.60	-10.43	-0.83	1.10	0.27	3.315	0.000	3.315	3.05	6.02	2.70	1.66	4.36	3.98	2.04
0.6	45.70	95+17.48	431.48	27.12	5786.18	11.72	-12.51	-0.80	1.06	0.26	3.167	0.000	3.167	2.91	6.01	2.84	1.58	4.42	3.80	2.21
0.7	53.32	95+24.83	438.83	27.24	5786.36	13.90	-14.60	-0.70	0.92	0.23	2.727	0.000	2.727	2.50	5.98	3.25	1.36	4.61	3.27	2.70
0.8	60.93	95+32.19	446.19	27.44	5786.55	16.16	-16.69	-0.53	0.70	0.18	2.032	0.000	2.032	1.86	5.92	3.89	1.02	4.91	2.44	3.48
0.9	68.55	95+39.54	453.54	27.71	5786.74	18.48	-18.77	-0.30	0.40	0.10	1.115	0.000	1.115	1.01	5.85	4.73	0.56	5.29	1.34	4.51
1	76.17	95+46.88	460.88	28.05	5786.94	20.86	-20.86	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.21	Avg Haunch	4.59	Avg Haunch	2.66

Bridge Information					
VPI Station=	93+36.	BF Abutment 1 Station=			
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=			
Length of Vertical Curve=	500	Span 1 Length=	75.9867	(Girder Length Brg to Brg)	
g1=	-3.12%	Span 2 Length=	76.1662	(Girder Length Brg to Brg)	
g2=	3.35%				
Cross Slope=	-0.02				
Skew Angle=					
VPC Station=	90+86.				
VPC Elevation=	5788.14				
VPC Elevation=	5788.72				

Girder 4 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+95.27	309.27	20.21	5784.27	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.60	94+02.67	316.67	19.87	5784.35	0.91	-1.21	-0.31	0.396	0.09	1.113	0.000	1.113	1.02	5.84	4.73	0.56	5.29	1.34	4.51
0.2	15.20	94+10.07	324.07	19.6	5784.43	1.88	-2.43	-0.55	0.704	0.16	2.027	0.000	2.027	1.87	5.91	3.89	1.01	4.90	2.43	3.48
0.3	22.80	94+17.48	331.48	19.4	5784.52	2.93	-3.64	-0.71	0.924	0.21	2.720	0.000	2.720	2.51	5.96	3.24	1.36	4.60	3.26	2.70
0.4	30.39	94+24.89	338.89	19.27	5784.61	4.04	-4.86	-0.81	1.056	0.24	3.159	0.000	3.159	2.92	6.00	2.84	1.58	4.42	3.79	2.21
0.5	37.99	94+32.3	346.30	19.22	5784.71	5.22	-6.07	-0.85	1.100	0.25	3.306	0.000	3.306	3.05	6.01	2.70	1.65	4.35	3.97	2.04
0.6	45.59	94+39.72	353.72	19.24	5784.81	6.47	-7.28	-0.81	1.056	0.24	3.159	0.000	3.159	2.92	6.00	2.84	1.58	4.42	3.79	2.21
0.7	53.19	94+47.15	361.15	19.33	5784.92	7.79	-8.50	-0.71	0.924	0.22	2.720	0.000	2.720	2.50	5.97	3.25	1.36	4.61	3.26	2.71
0.8	60.79	94+54.54	368.54	19.5	5785.04	9.17	-9.71	-0.54	0.704	0.16	2.027	0.000	2.027	1.86	5.92	3.89	1.01	4.90	2.43	3.49
0.9	68.39	94+61.95	375.95	19.74	5785.16	10.62	-10.93	-0.30	0.396	0.09	1.113	0.000	1.113	1.02	5.85	4.73	0.56	5.29	1.34	4.51
1	75.99	94+69.35	383.35	20.05	5785.29	12.14	-12.14	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.21	Avg Haunch	4.59	Avg Haunch	2.66

Girder 4 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+71.08	385.08	20.17	5785.32	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.62	94+78.5	392.50	19.84	5785.46	1.78	-2.09	-0.31	0.40	0.09	1.115	0.000	1.115	1.03	5.83	4.72	0.56	5.28	1.34	4.50
0.2	15.23	94+85.92	399.92	19.57	5785.62	3.63	-4.18	-0.55	0.70	0.16	2.032	0.000	2.032	1.87	5.90	3.87	1.02	4.89	2.44	3.47
0.3	22.85	94+93.34	407.34	19.39	5785.78	5.55	-6.27	-0.72	0.92	0.21	2.727	0.000	2.727	2.52	5.95	3.22	1.36	4.59	3.27	2.68
0.4	30.47	95+00.77	414.77	19.27	5785.94	7.54	-8.36	-0.82	1.06	0.24	3.167	0.000	3.167	2.93	5.98	2.82	1.58	4.40	3.80	2.18
0.5	38.08	95+08.2	422.20	19.23	5786.12	9.59	-10.44	-0.85	1.10	0.25	3.315	0.000	3.315	3.07	6.00	2.68	1.66	4.34	3.98	2.02
0.6	45.70	95+15.64	429.64	19.26	5786.29	11.72	-12.53	-0.81	1.06	0.24	3.167	0.000	3.167	2.92	5.99	2.82	1.58	4.41	3.80	2.19
0.7	53.32	95+23.06	437.06	19.37	5786.48	13.91	-14.62	-0.71	0.92	0.21	2.727	0.000	2.727	2.52	5.96	3.23	1.36	4.59	3.27	2.69
0.8	60.93	95+30.49	444.49	19.55	5786.66	16.17	-16.71	-0.54	0.70	0.16	2.032	0.000	2.032	1.87	5.91	3.88	1.02	4.89	2.44	3.47
0.9	68.55	95+37.91	451.91	19.8	5786.86	18.50	-18.80	-0.30	0.40	0.09	1.115	0.000	1.115	1.02	5.84	4.72	0.56	5.28	1.34	4.50
1	76.17	95+45.33	459.33	20.13	5787.06	20.89	-20.89	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.19	Avg Haunch	4.57	Avg Haunch	2.64

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	75.9867	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.1662	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 5 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+92.12	306.12	12.54	5784.40	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.60	93+99.59	313.59	12.16	5784.48	0.89	-1.20	-0.31	0.396	0.08	1.113	0.000	1.113	1.03	5.84	4.72	0.56	5.28	1.34	4.50
0.2	15.20	94+07.06	321.06	11.86	5784.55	1.84	-2.40	-0.56	0.704	0.15	2.027	0.000	2.027	1.88	5.90	3.87	1.01	4.89	2.43	3.47
0.3	22.80	94+14.54	328.54	11.63	5784.64	2.87	-3.60	-0.73	0.924	0.19	2.720	0.000	2.720	2.53	5.95	3.23	1.36	4.59	3.26	2.68
0.4	30.39	94+22.03	336.03	11.48	5784.73	3.97	-4.80	-0.83	1.056	0.22	3.159	0.000	3.159	2.94	5.98	2.82	1.58	4.40	3.79	2.18
0.5	37.99	94+29.52	343.52	11.4	5784.83	5.13	-6.00	-0.87	1.100	0.23	3.306	0.000	3.306	3.07	5.99	2.68	1.65	4.33	3.97	2.02
0.6	45.59	94+37.	351.00	11.39	5784.93	6.37	-7.20	-0.83	1.056	0.22	3.159	0.000	3.159	2.94	5.98	2.82	1.58	4.40	3.79	2.19
0.7	53.19	94+44.49	358.49	11.46	5785.04	7.67	-8.40	-0.73	0.924	0.20	2.720	0.000	2.720	2.52	5.95	3.23	1.36	4.59	3.26	2.69
0.8	60.79	94+51.98	365.98	11.6	5785.16	9.05	-9.60	-0.55	0.704	0.15	2.027	0.000	2.027	1.88	5.90	3.88	1.01	4.89	2.43	3.47
0.9	68.39	94+59.46	373.46	11.82	5785.28	10.49	-10.80	-0.31	0.396	0.08	1.113	0.000	1.113	1.03	5.84	4.72	0.56	5.28	1.34	4.50
1	75.99	94+66.94	380.94	12.1	5785.40	12.00	-12.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.19	Avg Haunch	4.57	Avg Haunch	2.64

Girder 5 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+68.76	382.76	12.45	5785.43	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.62	94+76.25	390.25	12.09	5785.58	1.78	-2.09	-0.31	0.40	0.08	1.115	0.000	1.115	1.03	5.84	4.72	0.56	5.28	1.34	4.50
0.2	15.23	94+83.74	397.74	11.81	5785.73	3.62	-4.18	-0.56	0.70	0.14	2.032	0.000	2.032	1.89	5.90	3.87	1.02	4.88	2.44	3.46
0.3	22.85	94+91.24	405.24	11.6	5785.89	5.54	-6.28	-0.73	0.92	0.19	2.727	0.000	2.727	2.54	5.94	3.22	1.36	4.58	3.27	2.67
0.4	30.47	94+98.74	412.74	11.46	5786.06	7.53	-8.37	-0.84	1.06	0.22	3.167	0.000	3.167	2.95	5.97	2.81	1.58	4.39	3.80	2.17
0.5	38.08	95+06.25	420.25	11.4	5786.23	9.59	-10.46	-0.87	1.10	0.23	3.315	0.000	3.315	3.08	5.99	2.67	1.66	4.33	3.98	2.01
0.6	45.70	95+13.75	427.75	11.42	5786.40	11.71	-12.55	-0.84	1.06	0.22	3.167	0.000	3.167	2.95	5.97	2.81	1.58	4.39	3.80	2.17
0.7	53.32	95+21.26	435.26	11.5	5786.59	13.92	-14.64	-0.73	0.92	0.20	2.727	0.000	2.727	2.53	5.95	3.22	1.36	4.59	3.27	2.68
0.8	60.93	95+28.76	442.76	11.67	5786.78	16.18	-16.73	-0.55	0.70	0.15	2.032	0.000	2.032	1.88	5.90	3.87	1.02	4.89	2.44	3.47
0.9	68.55	95+36.26	450.26	11.9	5786.97	18.52	-18.83	-0.31	0.40	0.09	1.115	0.000	1.115	1.03	5.84	4.73	0.56	5.28	1.34	4.50
1	76.17	95+43.75	457.75	12.21	5787.17	20.92	-20.92	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.18	Avg Haunch	4.57	Avg Haunch	2.63

Bridge Information									
VPI Station=	93+36.	BF Abutment 1 Station=							
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=							
Length of Vertical Curve=	500	Span 1 Length=	75.9867	(Girder Length Brg to Brg)					
g1=	-3.12%	Span 2 Length=	76.1662	(Girder Length Brg to Brg)					
g2=	3.35%								
Cross Slope=	-0.02								
Skew Angle=									
VPC Station=	90+86.								
VPC Elevation=	5788.14								
VPC Elevation=	5788.72								

Girder 6 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+88.91	302.91	4.87	5784.53	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.60	93+96.27	310.27	4.48	5784.60	0.84	-1.19	-0.34	0.396	0.05	1.113	0.000	1.113	1.06	5.80	4.69	0.56	5.24	1.34	4.46
0.2	15.20	94+04.	318.00	4.14	5784.68	1.80	-2.37	-0.57	0.704	0.13	2.027	0.000	2.027	1.89	5.88	3.85	1.01	4.87	2.43	3.45
0.3	22.80	94+11.55	325.55	3.88	5784.76	2.81	-3.56	-0.75	0.924	0.18	2.720	0.000	2.720	2.54	5.92	3.20	1.36	4.56	3.26	2.66
0.4	30.39	94+19.11	333.11	3.69	5784.85	3.89	-4.74	-0.85	1.056	0.20	3.159	0.000	3.159	2.96	5.95	2.79	1.58	4.37	3.79	2.16
0.5	37.99	94+26.67	340.67	3.59	5784.95	5.04	-5.93	-0.89	1.100	0.21	3.306	0.000	3.306	3.10	5.96	2.65	1.65	4.30	3.97	1.99
0.6	45.59	94+34.24	348.24	3.55	5785.05	6.26	-7.11	-0.85	1.056	0.20	3.159	0.000	3.159	2.95	5.95	2.79	1.58	4.37	3.79	2.16
0.7	53.19	94+41.8	355.80	3.59	5785.16	7.55	-8.30	-0.74	0.924	0.18	2.720	0.000	2.720	2.54	5.93	3.21	1.36	4.57	3.26	2.66
0.8	60.79	94+49.36	363.36	3.71	5785.27	8.92	-9.48	-0.57	0.704	0.14	2.027	0.000	2.027	1.89	5.88	3.85	1.01	4.87	2.43	3.45
0.9	68.39	94+56.92	370.92	3.9	5785.39	10.35	-10.67	-0.32	0.396	0.08	1.113	0.000	1.113	1.04	5.82	4.71	0.56	5.27	1.34	4.49
1	75.99	94+64.48	378.48	4.16	5785.52	11.86	-11.86	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.17	Avg Haunch	4.54	Avg Haunch	2.62

Girder 6 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+66.39	380.39	4.73	5785.54	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.62	94+73.95	387.95	4.35	5785.69	1.77	-2.10	-0.32	0.40	0.07	1.115	0.000	1.115	1.04	5.82	4.71	0.56	5.26	1.34	4.48
0.2	15.23	94+81.52	395.52	4.04	5785.84	3.62	-4.19	-0.57	0.70	0.13	2.032	0.000	2.032	1.90	5.88	3.85	1.02	4.86	2.44	3.44
0.3	22.85	94+89.1	403.10	3.81	5786.00	5.53	-6.29	-0.75	0.92	0.17	2.727	0.000	2.727	2.56	5.92	3.20	1.36	4.56	3.27	2.65
0.4	30.47	94+96.67	410.67	3.66	5786.17	7.52	-8.38	-0.86	1.06	0.19	3.167	0.000	3.167	2.97	5.94	2.78	1.58	4.36	3.80	2.14
0.5	38.08	95+04.26	418.26	3.58	5786.34	9.58	-10.48	-0.90	1.10	0.20	3.315	0.000	3.315	3.11	5.96	2.64	1.66	4.30	3.98	1.98
0.6	45.70	95+11.84	425.84	3.57	5786.52	11.71	-12.57	-0.86	1.06	0.20	3.167	0.000	3.167	2.97	5.95	2.78	1.58	4.36	3.80	2.15
0.7	53.32	95+19.42	433.42	3.67	5786.70	13.91	-14.67	-0.76	0.92	0.17	2.727	0.000	2.727	2.56	5.92	3.19	1.36	4.55	3.27	2.64
0.8	60.93	95+27.	441.00	3.79	5786.89	16.19	-16.76	-0.57	0.70	0.13	2.032	0.000	2.032	1.90	5.88	3.85	1.02	4.86	2.44	3.44
0.9	68.55	95+34.57	448.57	4	5787.08	18.53	-18.86	-0.33	0.40	0.07	1.115	0.000	1.115	1.05	5.82	4.71	0.56	5.26	1.34	4.48
1	76.17	95+42.17	456.17	4.3	5787.28	20.95	-20.95	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																3.16	Avg Haunch	4.54	Avg Haunch	2.61

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	76.6324	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.485	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 7 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+85.21	299.21	3.73	5784.52	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.66	93+92.91	306.91	4.01	5784.58	0.67	-1.17	-0.50	0.396	-0.10	1.123	0.000	1.123	1.23	5.64	4.52	0.56	5.08	1.35	4.30
0.2	15.33	94+00.61	314.61	4.2	5784.64	1.46	-2.34	-0.88	0.704	-0.18	2.046	0.000	2.046	2.23	5.57	3.52	1.02	4.54	2.46	3.11
0.3	22.99	94+08.32	322.32	4.32	5784.72	2.36	-3.52	-1.16	0.924	-0.24	2.746	0.000	2.746	2.98	5.51	2.76	1.37	4.14	3.30	2.22
0.4	30.65	94+16.02	330.02	4.36	5784.80	3.37	-4.69	-1.32	1.056	-0.27	3.188	0.000	3.188	3.46	5.48	2.29	1.59	3.88	3.83	1.65
0.5	38.32	94+23.73	337.73	4.33	5784.90	4.48	-5.86	-1.38	1.100	-0.28	3.337	0.000	3.337	3.62	5.47	2.13	1.67	3.80	4.00	1.46
0.6	45.98	94+31.44	345.44	4.22	5785.00	5.71	-7.03	-1.32	1.056	-0.27	3.188	0.000	3.188	3.45	5.48	2.29	1.59	3.89	3.83	1.65
0.7	53.64	94+39.14	353.14	4.03	5785.11	7.05	-8.21	-1.16	0.924	-0.23	2.746	0.000	2.746	2.98	5.51	2.77	1.37	4.14	3.30	2.22
0.8	61.31	94+46.84	360.84	3.75	5785.23	8.50	-9.38	-0.88	0.704	-0.17	2.046	0.000	2.046	2.22	5.57	3.53	1.02	4.55	2.46	3.12
0.9	68.97	94+54.53	368.53	3.42	5785.36	10.06	-10.55	-0.49	0.396	-0.10	1.123	0.000	1.123	1.22	5.65	4.53	0.56	5.09	1.35	4.30
1	76.63	94+62.21	376.21	3	5785.50	11.72	-11.72	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.73	Avg Haunch	4.12	Avg Haunch	2.18

Girder 7 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+63.76	377.76	3.65	5785.51	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.65	94+71.44	385.44	3.94	5785.65	1.61	-2.10	-0.50	0.40	-0.10	1.121	0.000	1.121	1.22	5.65	4.53	0.56	5.09	1.35	4.31
0.2	15.30	94+79.13	393.13	4.15	5785.79	3.32	-4.21	-0.88	0.70	-0.18	2.042	0.000	2.042	2.22	5.58	3.53	1.02	4.55	2.45	3.12
0.3	22.95	94+86.82	400.82	4.28	5785.94	5.15	-6.31	-1.15	0.92	-0.23	2.740	0.000	2.740	2.97	5.52	2.78	1.37	4.15	3.29	2.23
0.4	30.59	94+94.51	408.51	4.34	5786.10	7.09	-8.41	-1.32	1.06	-0.26	3.181	0.000	3.181	3.44	5.49	2.31	1.59	3.90	3.82	1.67
0.5	38.24	95+02.2	416.20	4.32	5786.28	9.14	-10.52	-1.37	1.10	-0.27	3.330	0.000	3.330	3.60	5.48	2.15	1.67	3.82	4.00	1.48
0.6	45.89	95+09.89	423.89	4.22	5786.46	11.30	-12.62	-1.32	1.06	-0.26	3.181	0.000	3.181	3.44	5.49	2.31	1.59	3.90	3.82	1.68
0.7	53.54	95+17.58	431.58	4.05	5786.64	13.57	-14.72	-1.15	0.92	-0.22	2.740	0.000	2.740	2.96	5.53	2.79	1.37	4.16	3.29	2.24
0.8	61.19	95+25.26	439.26	3.8	5786.84	15.95	-16.82	-0.87	0.70	-0.17	2.042	0.000	2.042	2.21	5.58	3.54	1.02	4.56	2.45	3.13
0.9	68.84	95+32.94	446.94	3.47	5787.05	18.44	-18.93	-0.49	0.40	-0.09	1.121	0.000	1.121	1.21	5.66	4.54	0.56	5.10	1.35	4.31
1	76.49	95+40.61	454.61	3.07	5787.27	21.03	-21.03	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.75	Avg Haunch	4.14	Avg Haunch	2.20

Bridge Information					
VPI Station=	93+36.	BF Abutment 1 Station=			
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=			
Length of Vertical Curve=	500	Span 1 Length=	76.6324	(Girder Length Brg to Brg)	
g1=	-3.12%	Span 2 Length=	76.485	(Girder Length Brg to Brg)	
g2=	3.35%				
Cross Slope=	-0.02				
Skew Angle=					
VPC Station=	90+86.				
VPC Elevation=	5788.14				
VPC Elevation=	5788.72				

Girder 8 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+81.84	295.84	11.43	5784.34	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.66	93+89.61	303.61	11.74	5784.40	0.63	-1.14	-0.51	0.396	-0.11	1.123	0.000	1.123	1.24	5.64	4.52	0.56	5.08	1.35	4.29
0.2	15.33	93+97.39	311.39	11.97	5784.46	1.38	-2.28	-0.90	0.704	-0.20	2.046	0.000	2.046	2.24	5.55	3.51	1.02	4.53	2.46	3.10
0.3	22.99	94+05.17	319.17	12.12	5784.53	2.24	-3.42	-1.18	0.924	-0.26	2.746	0.000	2.746	3.01	5.49	2.75	1.37	4.12	3.30	2.20
0.4	30.65	94+12.96	326.96	12.19	5784.61	3.21	-4.56	-1.35	1.056	-0.29	3.188	0.000	3.188	3.48	5.46	2.27	1.59	3.86	3.83	1.63
0.5	38.32	94+20.74	334.74	12.18	5784.70	4.30	-5.71	-1.41	1.100	-0.31	3.337	0.000	3.337	3.64	5.45	2.11	1.67	3.78	4.00	1.44
0.6	45.98	94+28.53	342.53	12.1	5784.80	5.50	-6.85	-1.35	1.056	-0.29	3.188	0.000	3.188	3.48	5.46	2.27	1.59	3.87	3.83	1.64
0.7	53.64	94+36.31	350.31	11.94	5784.91	6.81	-7.99	-1.18	0.924	-0.25	2.746	0.000	2.746	3.00	5.50	2.75	1.37	4.13	3.30	2.20
0.8	61.31	94+45.29	359.29	12.53	5785.03	8.25	-9.13	-0.88	0.704	-0.17	2.046	0.000	2.046	2.22	5.58	3.53	1.02	4.56	2.46	3.13
0.9	68.97	94+51.87	365.87	11.39	5785.16	9.77	-10.27	-0.50	0.396	-0.11	1.123	0.000	1.123	1.23	5.65	4.52	0.56	5.08	1.35	4.30
1	76.63	94+59.63	373.63	11	5785.29	11.41	-11.41	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.72	Avg Haunch	4.11	Avg Haunch	2.16

Girder 8 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+61.28	375.28	11.39	5785.32	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.65	94+69.04	383.04	11.7	5785.45	1.59	-2.09	-0.51	0.40	-0.11	1.121	0.000	1.121	1.23	5.64	4.52	0.56	5.08	1.35	4.29
0.2	15.30	94+76.8	390.80	11.93	5785.59	3.29	-4.19	-0.90	0.70	-0.20	2.042	0.000	2.042	2.24	5.55	3.51	1.02	4.53	2.45	3.10
0.3	22.95	94+84.57	398.57	12.08	5785.74	5.11	-6.28	-1.18	0.92	-0.25	2.740	0.000	2.740	2.99	5.50	2.76	1.37	4.13	3.29	2.21
0.4	30.59	94+92.34	406.34	12.16	5785.90	7.04	-8.38	-1.34	1.06	-0.29	3.181	0.000	3.181	3.47	5.46	2.28	1.59	3.87	3.82	1.64
0.5	38.24	95+00.11	414.11	12.16	5786.07	9.08	-10.47	-1.40	1.10	-0.30	3.330	0.000	3.330	3.63	5.45	2.12	1.67	3.79	4.00	1.45
0.6	45.89	95+07.88	421.88	12.09	5786.25	11.23	-12.57	-1.34	1.06	-0.29	3.181	0.000	3.181	3.47	5.46	2.28	1.59	3.87	3.82	1.64
0.7	53.54	95+15.65	429.65	11.93	5786.44	13.49	-14.66	-1.17	0.92	-0.25	2.740	0.000	2.740	2.99	5.50	2.76	1.37	4.13	3.29	2.21
0.8	61.19	95+23.42	437.42	11.7	5786.64	15.87	-16.76	-0.89	0.70	-0.19	2.042	0.000	2.042	2.23	5.56	3.52	1.02	4.54	2.45	3.11
0.9	68.84	95+31.18	445.18	11.39	5786.85	18.36	-18.85	-0.50	0.40	-0.10	1.121	0.000	1.121	1.22	5.65	4.53	0.56	5.09	1.35	4.30
1	76.49	95+38.93	452.93	11.01	5787.06	20.95	-20.95	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.72	Avg Haunch	4.11	Avg Haunch	2.17

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	76.6324	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.485	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 9 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+78.39	292.39	19.11	5784.17	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.66	93+86.24	300.24	19.45	5784.22	0.59	-1.11	-0.52	0.396	-0.12	1.123	0.000	1.123	1.24	5.63	4.50	0.56	5.07	1.35	4.28
0.2	15.33	93+94.1	308.10	19.71	5784.27	1.30	-2.22	-0.92	0.704	-0.21	2.046	0.000	2.046	2.26	5.53	3.49	1.02	4.51	2.46	3.08
0.3	22.99	94+01.96	315.96	19.9	5784.34	2.12	-3.32	-1.21	0.924	-0.28	2.746	0.000	2.746	3.03	5.47	2.72	1.37	4.09	3.30	2.17
0.4	30.65	94+09.83	323.83	20	5784.42	3.06	-4.43	-1.38	1.056	-0.32	3.188	0.000	3.188	3.51	5.43	2.24	1.59	3.84	3.83	1.60
0.5	38.32	94+17.7	331.70	20.03	5784.51	4.11	-5.54	-1.43	1.100	-0.33	3.337	0.000	3.337	3.67	5.42	2.08	1.67	3.75	4.00	1.41
0.6	45.98	94+25.56	339.56	19.98	5784.61	5.27	-6.65	-1.37	1.056	-0.32	3.188	0.000	3.188	3.51	5.43	2.24	1.59	3.84	3.83	1.60
0.7	53.64	94+33.43	347.43	19.85	5784.71	6.56	-7.76	-1.20	0.924	-0.28	2.746	0.000	2.746	3.02	5.47	2.73	1.37	4.10	3.30	2.18
0.8	61.31	94+41.29	355.29	19.64	5784.83	7.95	-8.87	-0.91	0.704	-0.21	2.046	0.000	2.046	2.25	5.54	3.49	1.02	4.52	2.46	3.09
0.9	68.97	94+49.15	363.15	19.35	5784.96	9.46	-9.97	-0.51	0.396	-0.11	1.123	0.000	1.123	1.24	5.64	4.51	0.56	5.07	1.35	4.29
1	76.63	94+56.99	370.99	19	5785.09	11.08	-11.08	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.69	Avg Haunch	4.08	Avg Haunch	2.14

Girder 9 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+58.75	372.75	19.11	5785.12	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.65	94+66.59	380.59	19.45	5785.25	1.57	-2.09	-0.52	0.40	-0.12	1.121	0.000	1.121	1.24	5.63	4.51	0.56	5.07	1.35	4.28
0.2	15.30	94+74.43	388.43	19.7	5785.39	3.25	-4.17	-0.92	0.70	-0.21	2.042	0.000	2.042	2.25	5.53	3.49	1.02	4.51	2.45	3.08
0.3	22.95	94+82.28	396.28	19.88	5785.54	5.05	-6.26	-1.20	0.92	-0.28	2.740	0.000	2.740	3.02	5.47	2.73	1.37	4.10	3.29	2.18
0.4	30.59	94+90.13	404.13	19.98	5785.70	6.97	-8.34	-1.37	1.06	-0.32	3.181	0.000	3.181	3.50	5.43	2.25	1.59	3.84	3.82	1.61
0.5	38.24	94+97.98	411.98	20	5785.87	9.00	-10.43	-1.43	1.10	-0.33	3.330	0.000	3.330	3.66	5.42	2.09	1.67	3.76	4.00	1.42
0.6	45.89	95+05.84	419.84	19.95	5786.05	11.15	-12.51	-1.37	1.06	-0.31	3.181	0.000	3.181	3.49	5.44	2.25	1.59	3.85	3.82	1.62
0.7	53.54	95+13.69	427.69	19.81	5786.23	13.41	-14.60	-1.19	0.92	-0.27	2.740	0.000	2.740	3.01	5.48	2.74	1.37	4.11	3.29	2.19
0.8	61.19	95+21.53	435.53	19.6	5786.43	15.78	-16.68	-0.91	0.70	-0.21	2.042	0.000	2.042	2.25	5.54	3.50	1.02	4.52	2.45	3.09
0.9	68.84	95+29.37	443.37	19.31	5786.64	18.26	-18.77	-0.51	0.40	-0.11	1.121	0.000	1.121	1.24	5.63	4.51	0.56	5.07	1.35	4.29
1	76.49	95+37.21	451.21	18.95	5786.86	20.86	-20.86	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.70	Avg Haunch	4.09	Avg Haunch	2.14

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	76.6324	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.485	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 10 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+74.87	288.87	26.78	5783.99	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.66	93+82.8	296.80	27.16	5784.04	0.55	-1.07	-0.53	0.396	-0.13	1.123	0.000	1.123	1.26	5.62	4.49	0.56	5.06	1.35	4.27
0.2	15.33	93+90.74	304.74	27.45	5784.09	1.21	-2.15	-0.94	0.704	-0.23	2.046	0.000	2.046	2.28	5.52	3.47	1.02	4.49	2.46	3.06
0.3	22.99	93+98.68	312.68	27.67	5784.16	1.99	-3.22	-1.23	0.924	-0.31	2.746	0.000	2.746	3.05	5.44	2.70	1.37	4.07	3.30	2.15
0.4	30.65	94+06.63	320.63	27.8	5784.23	2.89	-4.30	-1.41	1.056	-0.35	3.188	0.000	3.188	3.54	5.40	2.21	1.59	3.81	3.83	1.58
0.5	38.32	94+14.58	328.58	27.86	5784.32	3.91	-5.37	-1.46	1.100	-0.36	3.337	0.000	3.337	3.70	5.39	2.05	1.67	3.72	4.00	1.38
0.6	45.98	94+22.53	336.53	27.84	5784.41	5.04	-6.45	-1.40	1.056	-0.35	3.188	0.000	3.188	3.54	5.40	2.21	1.59	3.81	3.83	1.58
0.7	53.64	94+30.48	344.48	27.74	5784.52	6.29	-7.52	-1.23	0.924	-0.30	2.746	0.000	2.746	3.05	5.45	2.70	1.37	4.07	3.30	2.15
0.8	61.31	94+38.43	352.43	27.56	5784.63	7.66	-8.60	-0.94	0.704	-0.23	2.046	0.000	2.046	2.28	5.52	3.47	1.02	4.50	2.46	3.06
0.9	68.97	94+46.37	360.37	27.3	5784.75	9.15	-9.67	-0.53	0.396	-0.13	1.123	0.000	1.123	1.25	5.62	4.50	0.56	5.06	1.35	4.27
1	76.63	94+54.31	368.31	26.96	5784.89	10.75	-10.75	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.67	Avg Haunch	4.06	Avg Haunch	2.11

Girder 10 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+56.17	370.17	26.83	5784.92	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.65	94+64.09	378.09	27.19	5785.05	1.55	-2.08	-0.53	0.40	-0.13	1.121	0.000	1.121	1.25	5.62	4.50	0.56	5.06	1.35	4.27
0.2	15.30	94+72.01	386.01	27.47	5785.19	3.22	-4.15	-0.94	0.70	-0.23	2.042	0.000	2.042	2.27	5.51	3.47	1.02	4.49	2.45	3.06
0.3	22.95	94+79.94	393.94	27.67	5785.34	5.00	-6.23	-1.23	0.92	-0.30	2.740	0.000	2.740	3.04	5.44	2.70	1.37	4.07	3.29	2.16
0.4	30.59	94+87.87	401.87	27.79	5785.49	6.90	-8.30	-1.40	1.06	-0.34	3.181	0.000	3.181	3.52	5.40	2.22	1.59	3.81	3.82	1.59
0.5	38.24	94+95.81	409.81	27.84	5785.66	8.92	-10.38	-1.46	1.10	-0.36	3.330	0.000	3.330	3.69	5.39	2.06	1.67	3.73	4.00	1.39
0.6	45.89	95+03.74	417.74	27.8	5785.84	11.06	-12.45	-1.40	1.06	-0.34	3.181	0.000	3.181	3.52	5.41	2.23	1.59	3.82	3.82	1.59
0.7	53.54	95+11.68	425.68	27.69	5786.03	13.31	-14.53	-1.22	0.92	-0.29	2.740	0.000	2.740	3.03	5.45	2.71	1.37	4.08	3.29	2.16
0.8	61.19	95+19.61	433.61	27.5	5786.23	15.68	-16.60	-0.93	0.70	-0.22	2.042	0.000	2.042	2.27	5.52	3.48	1.02	4.50	2.45	3.07
0.9	68.84	95+27.53	441.53	27.23	5786.43	18.16	-18.68	-0.52	0.40	-0.13	1.121	0.000	1.121	1.25	5.62	4.50	0.56	5.06	1.35	4.28
1	76.49	95+35.45	449.45	26.88	5786.65	20.76	-20.76	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.67	Avg Haunch	4.06	Avg Haunch	2.12

Bridge Information					
VPI Station=	93+36.	BF Abutment 1 Station=			
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=			
Length of Vertical Curve=	500	Span 1 Length=	76.6324	(Girder Length Brg to Brg)	
g1=	-3.12%	Span 2 Length=	76.485	(Girder Length Brg to Brg)	
g2=	3.35%				
Cross Slope=	-0.02				
Skew Angle=					
VPC Station=	90+86.				
VPC Elevation=	5788.14				
VPC Elevation=	5788.72				

Girder 11 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+71.28	285.28	34.43	5783.82	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.66	93+79.29	293.29	34.84	5783.86	0.50	-1.04	-0.54	0.396	-0.14	1.123	0.000	1.123	1.27	5.61	4.49	0.56	5.05	1.35	4.26
0.2	15.33	93+87.31	301.31	35.17	5783.91	1.12	-2.08	-0.96	0.704	-0.25	2.046	0.000	2.046	2.30	5.50	3.45	1.02	4.48	2.46	3.05
0.3	22.99	93+95.34	309.34	35.42	5783.97	1.86	-3.12	-1.25	0.924	-0.33	2.746	0.000	2.746	3.08	5.42	2.68	1.37	4.05	3.30	2.13
0.4	30.65	94+03.35	317.35	35.59	5784.04	2.72	-4.16	-1.44	1.056	-0.38	3.188	0.000	3.188	3.57	5.37	2.18	1.59	3.78	3.83	1.55
0.5	38.32	94+11.4	325.40	35.69	5784.12	3.70	-5.19	-1.50	1.100	-0.40	3.337	0.000	3.337	3.73	5.36	2.02	1.67	3.69	4.00	1.35
0.6	45.98	94+19.44	333.44	35.69	5784.22	4.80	-6.23	-1.43	1.056	-0.38	3.188	0.000	3.188	3.56	5.38	2.19	1.59	3.78	3.83	1.55
0.7	53.64	94+27.47	341.47	35.62	5784.32	6.02	-7.27	-1.25	0.924	-0.33	2.746	0.000	2.746	3.08	5.42	2.68	1.37	4.05	3.30	2.13
0.8	61.31	94+35.51	349.51	35.47	5784.43	7.36	-8.31	-0.95	0.704	-0.25	2.046	0.000	2.046	2.30	5.50	3.46	1.02	4.48	2.46	3.05
0.9	68.97	94+43.53	357.53	35.24	5784.55	8.81	-9.35	-0.54	0.396	-0.14	1.123	0.000	1.123	1.26	5.61	4.49	0.56	5.05	1.35	4.26
1	76.63	94+51.56	365.56	34.93	5784.68	10.39	-10.39	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.64	Avg Haunch	4.03	Avg Haunch	2.09

Girder 11 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+53.53	367.53	34.54	5784.72	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.65	94+61.56	375.56	34.92	5784.85	1.54	-2.06	-0.53	0.40	-0.13	1.121	0.000	1.121	1.25	5.61	4.49	0.56	5.05	1.35	4.27
0.2	15.30	94+69.54	383.54	35.23	5784.99	3.18	-4.13	-0.95	0.70	-0.25	2.042	0.000	2.042	2.29	5.50	3.45	1.02	4.48	2.45	3.05
0.3	22.95	94+77.55	391.55	35.45	5785.13	4.94	-6.19	-1.25	0.92	-0.33	2.740	0.000	2.740	3.07	5.42	2.68	1.37	4.05	3.29	2.13
0.4	30.59	94+85.57	399.57	35.6	5785.29	6.83	-8.26	-1.43	1.06	-0.37	3.181	0.000	3.181	3.55	5.37	2.19	1.59	3.78	3.82	1.56
0.5	38.24	94+93.59	407.59	35.67	5785.46	8.84	-10.32	-1.49	1.10	-0.39	3.330	0.000	3.330	3.72	5.36	2.03	1.67	3.70	4.00	1.36
0.6	45.89	95+01.61	415.61	35.65	5785.64	10.97	-12.39	-1.42	1.06	-0.37	3.181	0.000	3.181	3.55	5.38	2.20	1.59	3.79	3.82	1.56
0.7	53.54	95+09.63	423.63	35.56	5785.82	13.21	-14.45	-1.24	0.92	-0.32	2.740	0.000	2.740	3.06	5.43	2.69	1.37	4.06	3.29	2.14
0.8	61.19	95+17.64	431.64	35.39	5786.02	15.57	-16.52	-0.95	0.70	-0.24	2.042	0.000	2.042	2.29	5.50	3.46	1.02	4.48	2.45	3.05
0.9	68.84	95+25.65	439.65	35.14	5786.23	18.05	-18.58	-0.53	0.40	-0.14	1.121	0.000	1.121	1.26	5.61	4.49	0.56	5.05	1.35	4.26
1	76.49	95+33.66	447.66	34.81	5786.44	20.65	-20.65	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.65	Avg Haunch	4.04	Avg Haunch	2.09

Bridge Information				
VPI Station=	93+36.	BF Abutment 1 Station=		
VPI Elevation=	5780.34	Dist. To CL Bear. at Abut=		
Length of Vertical Curve=	500	Span 1 Length=	76.6324	(Girder Length Brg to Brg)
g1=	-3.12%	Span 2 Length=	76.485	(Girder Length Brg to Brg)
g2=	3.35%			
Cross Slope=	-0.02			
Skew Angle=				
VPC Station=	90+86.			
VPC Elevation=	5788.14			
VPC Elevation=	5788.72			

Girder 12 Span 1																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	93+67.61	281.61	42.07	5783.64	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.66	93+75.7	289.70	42.51	5783.68	0.45	-1.00	-0.55	0.396	-0.15	1.123	0.000	1.123	1.27	5.60	4.48	0.56	5.04	1.35	4.25
0.2	15.33	93+83.81	297.81	42.88	5783.73	1.03	-2.00	-0.98	0.704	-0.27	2.046	0.000	2.046	2.32	5.48	3.43	1.02	4.46	2.46	3.02
0.3	22.99	93+91.92	305.92	43.16	5783.79	1.73	-3.01	-1.28	0.924	-0.36	2.746	0.000	2.746	3.10	5.40	2.65	1.37	4.02	3.30	2.10
0.4	30.65	94+00.03	314.03	43.37	5783.86	2.54	-4.01	-1.46	1.056	-0.41	3.188	0.000	3.188	3.60	5.34	2.15	1.59	3.75	3.83	1.52
0.5	38.32	94+08.15	322.15	43.49	5783.93	3.48	-5.01	-1.52	1.100	-0.42	3.337	0.000	3.337	3.76	5.33	1.99	1.67	3.66	4.00	1.32
0.6	45.98	94+16.28	330.28	43.53	5784.02	4.55	-6.01	-1.46	1.056	-0.41	3.188	0.000	3.188	3.59	5.35	2.16	1.59	3.75	3.83	1.52
0.7	53.64	94+24.4	338.40	43.49	5784.12	5.73	-7.01	-1.28	0.924	-0.35	2.746	0.000	2.746	3.10	5.40	2.65	1.37	4.02	3.30	2.10
0.8	61.31	94+32.52	346.52	43.37	5784.23	7.04	-8.01	-0.97	0.704	-0.27	2.046	0.000	2.046	2.31	5.48	3.44	1.02	4.46	2.46	3.03
0.9	68.97	94+40.63	354.63	43.17	5784.35	8.47	-9.02	-0.55	0.396	-0.15	1.123	0.000	1.123	1.27	5.60	4.48	0.56	5.04	1.35	4.25
1	76.63	94+48.75	362.75	42.89	5784.48	10.02	-10.02	0.00	0.000	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.62	Avg Haunch	4.01	Avg Haunch	2.06

Girder 12 Span 2																				
Tenth Point	Distance from Bearing	Station	Distance from VPC	Offset	Profile Elevation	Diff from End	Linear Baseline	Corrected Curve	Extra Screed Elev. (in)	Corr. Curve + Extra Screed	Camber (in)	Pier Seat Adjustment	Camber + Pier Seat Adjustment	Diff between vert curve and camber curve	Set @ Brg	Haunch	Under Camber (in)	Haunch	Over Camber (in)	Haunch
									1.10			0.00								
0	0.00	94+50.84	364.84	42.24	5784.52	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
0.1	7.65	94+58.92	372.92	42.65	5784.65	1.50	-2.05	-0.55	0.40	-0.15	1.121	0.000	1.121	1.27	5.60	4.47	0.56	5.03	1.35	4.25
0.2	15.30	94+67.01	381.01	42.98	5784.79	3.13	-4.11	-0.97	0.70	-0.27	2.042	0.000	2.042	2.31	5.48	3.44	1.02	4.46	2.45	3.03
0.3	22.95	94+75.11	389.11	43.23	5784.93	4.88	-6.16	-1.28	0.92	-0.35	2.740	0.000	2.740	3.09	5.39	2.65	1.37	4.02	3.29	2.11
0.4	30.59	94+83.21	397.21	43.4	5785.09	6.75	-8.21	-1.46	1.06	-0.40	3.181	0.000	3.181	3.58	5.34	2.16	1.59	3.75	3.82	1.53
0.5	38.24	94+91.32	405.32	43.49	5785.25	8.75	-10.27	-1.52	1.10	-0.42	3.330	0.000	3.330	3.75	5.33	2.00	1.67	3.67	4.00	1.33
0.6	45.89	94+99.42	413.42	43.5	5785.43	10.86	-12.32	-1.46	1.06	-0.40	3.181	0.000	3.181	3.58	5.35	2.17	1.59	3.76	3.82	1.53
0.7	53.54	95+07.53	421.53	43.43	5785.62	13.10	-14.37	-1.27	0.92	-0.35	2.740	0.000	2.740	3.09	5.40	2.66	1.37	4.03	3.29	2.11
0.8	61.19	95+15.63	429.63	43.28	5785.81	15.46	-16.43	-0.97	0.70	-0.27	2.042	0.000	2.042	2.31	5.48	3.44	1.02	4.46	2.45	3.03
0.9	68.84	95+23.73	437.73	43.04	5786.02	17.94	-18.48	-0.54	0.40	-0.15	1.121	0.000	1.121	1.27	5.60	4.48	0.56	5.04	1.35	4.25
1	76.49	95+31.83	445.83	42.73	5786.24	20.54	-20.54	0.00	0.00	0.00	0.000	0.000	0.000	0.00	5.75	5.75	0.00	5.75	0.00	5.75
Avg Haunch																2.62	Avg Haunch	4.01	Avg Haunch	2.07

I.1.5 PGSuper Results

Spec Check Report

For

Span 1 Girder A

March 14, 2021 2:23:06 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	163.123	Pass (1.19)	163.123	Pass (1.19)

Required Concrete Strengths

Required f'_{ci} = 5.301 KSI $\Rightarrow$ 5.400 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.616 KSI $\Rightarrow$ 6.700 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.207	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.301 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
7.266	(0.1L _r) 7.682	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	No	Yes	Pass (1.33)
14.948	(0.2L _r) 15.365	0.121	-3.622	-0.571	0.580	-0.450	-3.043	No	Yes	Pass (1.28)
22.630	(0.3L _r) 23.047	0.503	-3.979	-0.750	0.761	-0.247	-3.218	No	Yes	Pass (1.21)
(HP) 30.313	(HP, 0.4L _r) 30.729	0.876	-4.315	-0.857	0.869	0.019	-3.446	No	Yes	Pass (1.13)
37.995		0.877	-4.319	-0.893	0.906	-0.016	-3.413	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.411									(1.14)
(HP) 45.677	(HP, 0.6L _r) 46.094	0.876	-4.315	-0.857	0.869	0.019	-3.446	No	Yes	Pass (1.13)
53.359	(0.7L _r) 53.776	0.503	-3.979	-0.750	0.761	-0.247	-3.218	No	Yes	Pass (1.21)
61.042	(0.8L _r) 61.458	0.121	-3.622	-0.571	0.580	-0.450	-3.043	No	Yes	Pass (1.28)
68.724	(0.9L _r) 69.141	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	No	Yes	Pass (1.33)
(PSXFR) 73.406	(PSXFR) 73.823	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
(STLF) 76.406	(STLF, 1.0L _r) 76.823	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.301 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
7.266	(0.1L _r) 7.682	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	0.200	-	No	Yes	Pass (-)
14.948	(0.2L _r) 15.365	0.121	-3.622	-0.571	0.580	-0.450	-3.043	0.200	-	No	Yes	Pass (-)
22.630	(0.3L _r) 23.047	0.503	-3.979	-0.750	0.761	-0.247	-3.218	0.200	-	No	Yes	Pass (-)
(HP) 30.313	(HP, 0.4L _r) 30.729	0.876	-4.315	-0.857	0.869	0.019	-3.446	0.200	-	No	Yes	Pass (10+)
37.995	(0.5L _r) 38.411	0.877	-4.319	-0.893	0.906	-0.016	-3.413	0.200	-	No	Yes	Pass (-)
(HP) 45.677	(HP, 0.6L _r) 46.094	0.876	-4.315	-0.857	0.869	0.019	-3.446	0.200	-	No	Yes	Pass (10+)
53.359	(0.7L _r) 53.776	0.503	-3.979	-0.750	0.761	-0.247	-3.218	0.200	-	No	Yes	Pass (-)
61.042	(0.8L _r) 61.458	0.121	-3.622	-0.571	0.580	-0.450	-3.043	0.200	-	No	Yes	Pass (-)
68.724	(0.9L _r) 69.141	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	0.200	-	No	Yes	Pass (-)
(PSXFR) 73.406	(PSXFR) 73.823	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
(STLF) 76.406	(STLF, 1.0L _r) 76.823	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.097 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.433	-2.583	-0.290	0.294	-0.724	-2.289	No	Yes	Pass (1.57)
(0.1L _s) 7.687	-0.212	-2.813	-0.805	0.817	-1.017	-1.996	No	Yes	Pass (1.80)
(0.2L _s) 15.375	0.123	-3.159	-1.432	1.453	-1.309	-1.706	No	Yes	Pass (2.11)
(0.3L _s) 23.062	0.459	-3.498	-1.877	1.904	-1.418	-1.594	No	Yes	Pass (2.26)
(HP) 30.313	0.772	-3.803	-2.129	2.160	-1.357	-1.643	No	Yes	Pass (2.19)
(0.4L _s) 30.750	0.772	-3.804	-2.139	2.170	-1.367	-1.634	No	Yes	Pass (2.20)
(0.5L _s) 38.437	0.774	-3.813	-2.217	2.248	-1.443	-1.564	No	Yes	Pass (2.30)
(HP) 45.677	0.772	-3.802	-2.122	2.152	-1.350	-1.650	No	Yes	Pass (2.18)
(0.6L _s) 46.125	0.753	-3.784	-2.110	2.141	-1.358	-1.643	No	Yes	Pass (2.19)
(0.7L _s) 53.812	0.420	-3.459	-1.822	1.848	-1.402	-1.610	No	Yes	Pass (2.24)
(0.8L _s) 61.500	0.085	-3.118	-1.354	1.373	-1.269	-1.745	No	Yes	Pass (2.06)
(0.9L _s) 69.187	-0.250	-2.772	-0.711	0.721	-0.961	-2.051	No	Yes	Pass (1.75)
(PSXFR) 73.406	-0.433	-2.583	-0.285	0.290	-0.719	-2.294	No	Yes	Pass (1.57)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.097 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 2.583	-0.433	-2.583	-0.290	0.294	-0.724	-2.289	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.813	-0.805	0.817	-1.017	-1.996	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.375	0.123	-3.159	-1.432	1.453	-1.309	-1.706	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.062	0.459	-3.498	-1.877	1.904	-1.418	-1.594	-	0.537	No	Yes	Pass (-)
(HP) 30.313	0.772	-3.803	-2.129	2.160	-1.357	-1.643	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.750	0.772	-3.804	-2.139	2.170	-1.367	-1.634	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.437	0.774	-3.813	-2.217	2.248	-1.443	-1.564	-	0.537	No	Yes	Pass (-)
(HP) 45.677	0.772	-3.802	-2.122	2.152	-1.350	-1.650	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.125	0.753	-3.784	-2.110	2.141	-1.358	-1.643	-	0.537	No	Yes	Pass (-)
(0.7L _s) 53.812	0.420	-3.459	-1.822	1.848	-1.402	-1.610	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.500	0.085	-3.118	-1.354	1.373	-1.269	-1.745	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.250	-2.772	-0.711	0.721	-0.961	-2.051	-	0.537	No	Yes	Pass (-)
(PSXFR) 73.406	-0.433	-2.583	-0.285	0.290	-0.719	-2.294	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.616 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.305	0.345	-0.739	-2.241	No	Yes	Pass (1.61)
(0.1L _s) 7.687	-0.212	-2.822	-0.844	0.952	-1.057	-1.870	No	Yes	Pass (1.93)
(0.2L _s) 15.375	0.124	-3.178	-1.499	1.680	-1.374	-1.498	No	Yes	Pass (2.40)
(0.3L _s) 23.062	0.463	-3.527	-1.960	2.181	-1.497	-1.346	No	Yes	Pass (2.41)
(HP) 30.313	0.779	-3.839	-2.215	2.443	-1.436	-1.396	No	Yes	Pass (2.51)
(0.4L _s) 30.750	0.780	-3.840	-2.225	2.452	-1.446	-1.387	No	Yes	Pass (2.49)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.5L _s) 38.437	0.780	-3.844	-2.295	2.494	-1.514	-1.350	No	Yes	Pass (2.38)
(HP) 45.677	0.777	-3.826	-2.182	2.324	-1.405	-1.501	No	Yes	Pass (2.40)
(0.6L _s) 46.125	0.757	-3.807	-2.169	2.307	-1.412	-1.499	No	Yes	Pass (2.40)
(0.7L _s) 53.812	0.421	-3.466	-1.849	1.892	-1.428	-1.574	No	Yes	Pass (2.29)
(0.8L _s) 61.500	0.085	-3.111	-1.338	1.252	-1.253	-1.859	No	Yes	Pass (1.94)
(0.9L _s) 69.187	-0.248	-2.754	-0.638	0.377	-0.887	-2.377	No	Yes	Pass (1.51)
(PSXFR) 73.406	-0.429	-2.560	-0.176	-0.204	-0.605	-2.764	No	Yes	Pass (1.30)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.6f'_c = -4.800 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 6.616 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.362	0.316	-0.796	-2.270	No	Yes	Pass (2.11)
(0.1L _s) 7.687	-0.212	-2.822	-0.996	0.867	-1.208	-1.955	No	Yes	Pass (2.46)
(0.2L _s) 15.375	0.124	-3.178	-1.754	1.511	-1.630	-1.667	No	Yes	Pass (2.88)
(0.3L _s) 23.062	0.463	-3.527	-2.275	1.927	-1.812	-1.600	No	Yes	Pass (2.65)
(HP) 30.313	0.779	-3.839	-2.557	2.109	-1.777	-1.729	No	Yes	Pass (2.70)
(0.4L _s) 30.750	0.780	-3.840	-2.567	2.114	-1.787	-1.726	No	Yes	Pass (2.69)
(0.5L _s) 38.437	0.780	-3.844	-2.630	2.071	-1.850	-1.773	No	Yes	Pass (2.60)
(HP) 45.677	0.777	-3.826	-2.485	1.822	-1.708	-2.004	No	Yes	Pass (2.40)
(0.6L _s) 46.125	0.757	-3.807	-2.469	1.800	-1.712	-2.007	No	Yes	Pass (2.39)
(0.7L _s) 53.812	0.421	-3.466	-2.081	1.300	-1.660	-2.166	No	Yes	Pass (2.22)
(0.8L _s) 61.500	0.085	-3.111	-1.478	0.592	-1.394	-2.519	No	Yes	Pass (1.91)
(0.9L _s) 69.187	-0.248	-2.754	-0.694	-0.531	-0.943	-3.285	No	Yes	Pass (1.46)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 73.406	-0.429	-2.560	-0.195	-1.410	-0.625	-3.970	No	Yes	Pass (1.21)

Interval 17: Open to Traffic : Service I Tension without live load**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000$ KSI

Concrete strength required to satisfy this requirement = 6.616 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.586	-0.302	0.356	-0.736	-2.230	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.822	-0.837	0.983	-1.050	-1.839	No	Yes	Pass (-)
(0.2L _s) 15.375	0.124	-3.178	-1.486	1.735	-1.361	-1.443	No	Yes	Pass (-)
(0.3L _s) 23.062	0.463	-3.527	-1.942	2.253	-1.480	-1.274	No	Yes	Pass (-)
(HP) 30.313	0.779	-3.839	-2.196	2.525	-1.417	-1.313	No	Yes	Pass (-)
(0.4L _s) 30.750	0.780	-3.840	-2.206	2.535	-1.426	-1.305	No	Yes	Pass (-)
(0.5L _s) 38.437	0.780	-3.844	-2.275	2.581	-1.494	-1.264	No	Yes	Pass (-)
(HP) 45.677	0.777	-3.826	-2.162	2.407	-1.385	-1.418	No	Yes	Pass (-)
(0.6L _s) 46.125	0.757	-3.807	-2.150	2.390	-1.392	-1.417	No	Yes	Pass (-)
(0.7L _s) 53.812	0.421	-3.466	-1.832	1.965	-1.411	-1.501	No	Yes	Pass (-)
(0.8L _s) 61.500	0.085	-3.111	-1.325	1.307	-1.240	-1.804	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.248	-2.754	-0.624	0.433	-0.873	-2.321	No	Yes	Pass (-)
(PSXFR) 73.406	-0.429	-2.560	-0.158	-0.135	-0.588	-2.695	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.586	-0.297	0.545	-0.731	-2.042	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.822	-0.821	1.490	-1.034	-1.332	No	Yes	Pass (-)
(0.2L _s) 15.375	0.124	-3.178	-1.454	2.592	-1.330	-0.586	No	Yes	Pass (-)
(0.3L _s) 23.062	0.463	-3.527	-1.895	3.310	-1.432	-0.217	No	Yes	Pass (-)
(HP) 30.313	0.779	-3.839	-2.134	3.671	-1.354	-0.168	No	Yes	Pass (-)
(0.4L _s) 30.750	0.780	-3.840	-2.143	3.682	-1.363	-0.158	No	Yes	Pass (-)
(0.5L _s) 38.437	0.780	-3.844	-2.196	3.705	-1.415	-0.139	No	Yes	Pass (-)
(HP) 45.677	0.777	-3.826	-2.069	3.424	-1.292	-0.401	No	Yes	Pass (-)
(0.6L _s) 46.125	0.757	-3.807	-2.055	3.397	-1.298	-0.410	No	Yes	Pass (-)
(0.7L _s) 53.812	0.421	-3.466	-1.722	2.742	-1.301	-0.724	No	Yes	Pass (-)
(0.8L _s) 61.500	0.085	-3.111	-1.199	1.769	-1.114	-1.343	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.248	-2.754	-0.444	0.609	-0.693	-2.145	No	Yes	Pass (-)
(PSXFR) 73.406	-0.429	-2.560	0.087	-0.075	-0.342	-2.634	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression

Fatigue I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.4f'_c = -3.200$ KSI

Concrete strength required to satisfy this requirement = 4.747 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.192	0.154	-0.409	-1.139	No	Yes	Pass (2.81)
(0.1L _s) 7.687	-0.212	-2.822	-0.525	0.421	-0.631	-0.990	No	Yes	Pass (3.23)
(0.2L _s) 15.375	0.124	-3.178	-0.916	0.730	-0.854	-0.859	No	Yes	Pass (3.73)
(0.3L _s) 23.062	0.463	-3.527	-1.187	0.925	-0.956	-0.838	No	Yes	Pass (3.35)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 30.313	0.779	-3.839	-1.325	1.005	-0.936	-0.914	No	Yes	Pass (3.42)
(0.4L _s) 30.750	0.780	-3.840	-1.330	1.006	-0.940	-0.913	No	Yes	Pass (3.40)
(0.5L _s) 38.437	0.780	-3.844	-1.353	0.972	-0.963	-0.950	No	Yes	Pass (3.32)
(HP) 45.677	0.777	-3.826	-1.287	0.836	-0.899	-1.077	No	Yes	Pass (2.97)
(0.6L _s) 46.125	0.757	-3.807	-1.279	0.824	-0.901	-1.079	No	Yes	Pass (2.96)
(0.7L _s) 53.812	0.421	-3.466	-1.079	0.561	-0.868	-1.171	No	Yes	Pass (2.73)
(0.8L _s) 61.500	0.085	-3.111	-0.761	0.185	-0.719	-1.370	No	Yes	Pass (2.34)
(0.9L _s) 69.187	-0.248	-2.754	-0.327	-0.304	-0.451	-1.681	No	Yes	Pass (1.90)
(PSXFR) 73.406	-0.429	-2.560	-0.088	-0.619	-0.303	-1.899	No	Yes	Pass (1.69)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2143.04	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.687	1852.91	4498.80	2464.37	Pass (1.83)	Pass (2.43)
(0.2L _s) 15.375	3187.96	5417.46	3730.56	Pass (1.45)	Pass (1.70)
(0.3L _s) 23.062	4020.12	5774.38	3941.22	Pass (1.47)	Pass (1.44)
(0.4L _s) 30.750	4424.39	6105.87	4172.92	Pass (1.46)	Pass (1.38)
(0.5L _s) 38.437	4397.03	6105.88	4153.21	Pass (1.47)	Pass (1.39)
(0.6L _s) 46.125	3973.74	6085.65	4148.79	Pass (1.47)	Pass (1.53)
(0.7L _s) 53.812	3120.23	5733.15	3897.31	Pass (1.47)	Pass (1.84)
(0.8L _s) 61.500	1914.88	5365.10	2546.80	Pass (2.11)	Pass (2.80)
(0.9L _s) 69.187	634.64	4338.44	844.07	Pass (5.14)	Pass (6.84)
(1.0L _s) 76.875	-391.56	1887.96	-520.78	Pass (-)	Pass (-)

Positive Moment Capacity for Strength II Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2143.04	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.687	1750.55	4498.80	2464.37	Pass (1.83)	Pass (2.57)
(0.2L _s) 15.375	2991.64	5417.46	3730.56	Pass (1.45)	Pass (1.81)
(0.3L _s) 23.062	3777.30	5774.38	3941.22	Pass (1.47)	Pass (1.53)
(0.4L _s) 30.750	4152.60	6105.87	4172.92	Pass (1.46)	Pass (1.47)
(0.5L _s) 38.437	4163.07	6105.88	4153.21	Pass (1.47)	Pass (1.47)
(0.6L _s) 46.125	3724.36	6085.65	4148.79	Pass (1.47)	Pass (1.63)
(0.7L _s) 53.812	2906.03	5733.15	3897.31	Pass (1.47)	Pass (1.97)
(0.8L _s) 61.500	1746.23	5365.10	2546.80	Pass (2.11)	Pass (3.07)
(0.9L _s) 69.187	276.43	4338.44	844.07	Pass (5.14)	Pass (10+)
(1.0L _s) 76.875	-391.56	1887.96	-520.78	Pass (-)	Pass (-)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	-1.10	-5412.73	-1.47	Pass (10+)	Pass (10+)
(0.1L _s) 7.687	-40.39	-5343.28	-53.72	Pass (10+)	Pass (10+)
(0.2L _s) 15.375	-112.05	-5285.99	-149.03	Pass (10+)	Pass (10+)
(0.3L _s) 23.062	-214.98	-5243.01	-285.92	Pass (10+)	Pass (10+)
(0.4L _s) 30.750	-349.17	-5215.64	-464.40	Pass (10+)	Pass (10+)
(0.5L _s) 38.437	-514.64	-5206.34	-684.47	Pass (7.61)	Pass (10+)
(0.6L _s) 46.125	-711.37	-5215.32	-946.12	Pass (5.51)	Pass (7.33)
(0.7L _s) 53.812	-939.37	-5242.91	-1196.62	Pass (4.38)	Pass (5.58)
(0.8L _s) 61.500	-1196.41	-5287.11	-1176.90	Pass (4.49)	Pass (4.42)
(0.9L _s) 69.187	-1821.90	-5038.82	-1144.32	Pass (4.40)	Pass (2.77)
(FoS) 75.656	-2902.66	-4789.05	-1110.94	Pass (4.31)	Pass (1.65)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(1.0L _s) 76.875	-3110.89	-4222.67	-1104.03	Pass (3.82)	Pass (1.36)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	-0.49	-5412.73	-1.47	Pass (10+)	Pass (10+)
(0.1L _s) 7.687	-26.23	-5343.28	-53.72	Pass (10+)	Pass (10+)
(0.2L _s) 15.375	-83.72	-5285.99	-149.03	Pass (10+)	Pass (10+)
(0.3L _s) 23.062	-172.48	-5243.01	-285.92	Pass (10+)	Pass (10+)
(0.4L _s) 30.750	-292.51	-5215.64	-464.40	Pass (10+)	Pass (10+)
(0.5L _s) 38.437	-443.81	-5206.34	-684.47	Pass (7.61)	Pass (10+)
(0.6L _s) 46.125	-626.37	-5215.32	-946.12	Pass (5.51)	Pass (8.33)
(0.7L _s) 53.812	-840.20	-5242.91	-1196.62	Pass (4.38)	Pass (6.24)
(0.8L _s) 61.500	-1084.66	-5287.11	-1176.90	Pass (4.49)	Pass (4.87)
(0.9L _s) 69.187	-1519.93	-5038.82	-1144.32	Pass (4.40)	Pass (3.32)
(FoS) 75.656	-2400.71	-4789.05	-1110.94	Pass (4.31)	Pass (1.99)
(1.0L _s) 76.875	-2563.59	-4222.67	-1104.03	Pass (3.82)	Pass (1.65)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n / V_u$)
(CS) 3.924	Yes	Yes	257.59	569.36	Pass (2.21)
(SZB) 5.003	Yes	Yes	250.12	412.83	Pass (1.65)
(1.5H) 5.583	Yes	Yes	246.11	415.69	Pass (1.69)
(0.1L _s) 7.687	Yes	Yes	231.67	399.37	Pass (1.72)
(SZB) 10.503	Yes	Yes	212.55	300.99	Pass (1.42)
(0.2L _s) 15.375	Yes	Yes	180.14	306.65	Pass (1.70)
(SZB) 18.753	Yes	Yes	158.19	247.57	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.57)
(0.3L _s) 23.062	Yes	Yes	130.79	234.46	Pass (1.79)
(SZB) 29.753	Yes	Yes	89.99	198.29	Pass (2.20)
(HP) 30.313	Yes	Yes	86.76	200.27	Pass (2.31)
(0.4L _s) 30.750	Yes	Yes	84.25	168.13	Pass (2.00)
(0.5L _s) 38.437	Yes	Yes	94.30	167.37	Pass (1.77)
(HP) 45.677	Yes	Yes	138.13	221.38	Pass (1.60)
(0.6L _s) 46.125	Yes	Yes	140.83	222.33	Pass (1.58)
(SZB) 46.237	Yes	Yes	141.51	222.60	Pass (1.57)
(0.7L _s) 53.812	Yes	Yes	186.99	279.44	Pass (1.49)
(SZB) 57.237	Yes	Yes	207.32	278.45	Pass (1.34)
(0.8L _s) 61.500	Yes	Yes	232.36	323.31	Pass (1.39)
(SZB) 65.487	Yes	Yes	255.43	319.44	Pass (1.25)
(0.9L _s) 69.187	Yes	Yes	276.41	416.48	Pass (1.51)
(1.5H) 70.406	Yes	Yes	283.25	407.92	Pass (1.44)
(SZB) 70.987	Yes	Yes	286.51	413.29	Pass (1.44)
(CS) 71.651	Yes	Yes	290.22	554.13	Pass (1.91)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.003	Yes	Yes	239.54	414.81	Pass (1.73)
(1.5H) 5.583	Yes	Yes	235.74	417.86	Pass (1.77)
(0.1L _s) 7.687	Yes	Yes	221.97	401.97	Pass (1.81)
(SZB) 10.503	Yes	Yes	203.63	303.88	Pass (1.49)
(0.2L _s) 15.375	Yes	Yes	172.41	310.31	Pass (1.80)
(SZB) 18.753	Yes	Yes	151.07	269.32	Pass (1.78)
(0.3L _s) 23.062	Yes	Yes	124.37	265.32	Pass (2.13)

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 29.753	Yes	Yes	84.32	230.39	Pass (2.73)
(HP) 30.313	Yes	Yes	81.14	232.12	Pass (2.86)
(0.4L _s) 30.750	Yes	Yes	78.67	195.06	Pass (2.48)
(0.5L _s) 38.437	Yes	Yes	81.85	192.59	Pass (2.35)
(HP) 45.677	Yes	Yes	130.37	243.23	Pass (1.87)
(0.6L _s) 46.125	Yes	Yes	133.29	242.70	Pass (1.82)
(SZB) 46.237	Yes	Yes	134.02	242.57	Pass (1.81)
(0.7L _s) 53.812	Yes	Yes	182.01	283.18	Pass (1.56)
(SZB) 57.237	Yes	Yes	202.78	282.10	Pass (1.39)
(0.8L _s) 61.500	Yes	Yes	227.74	327.06	Pass (1.44)
(SZB) 65.487	Yes	Yes	250.18	324.78	Pass (1.30)
(0.9L _s) 69.187	Yes	Yes	270.10	427.36	Pass (1.58)
(1.5H) 70.406	Yes	Yes	276.50	419.32	Pass (1.52)
(SZB) 70.987	Yes	Yes	279.54	425.47	Pass (1.52)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.40	212.85	5.7.3.5-2	Pass (1.99)
(SZB) 1.337	585.80	212.85	5.7.3.5-2	Pass (2.75)
(Bar Develop.) 1.705	645.14	212.85	5.7.3.5-2	Pass (3.03)
(Bar Develop.) 2.765	780.20	212.85	5.7.3.5-2	Pass (3.67)
(H) 3.833	811.95	212.85	5.7.3.5-2	Pass (3.81)
(CS) 3.924	814.64	493.10	5.7.3.5-1	Pass (1.65)
(SZB) 5.003	846.74	569.26	5.7.3.5-1	Pass (1.49)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(1.5H) 5.583	957.34	604.06	5.7.3.5-1	Pass (1.58)
(0.1L _s) 7.687	1127.17	739.42	5.7.3.5-1	Pass (1.52)
(SZB) 10.503	1339.15	946.38	5.7.3.5-1	Pass (1.42)
(0.2L _s) 15.375	1653.23	1098.25	5.7.3.5-1	Pass (1.51)
(SZB) 18.753	1656.79	1194.01	5.7.3.5-1	Pass (1.39)
(0.3L _s) 23.062	1660.98	1219.31	5.7.3.5-1	Pass (1.36)
(SZB) 29.753	1664.33	1226.44	5.7.3.5-1	Pass (1.36)
(HP) 30.313	1664.44	1221.92	5.7.3.5-1	Pass (1.36)
(0.4L _s) 30.750	1664.44	1265.48	5.7.3.5-1	Pass (1.32)
(0.5L _s) 38.437	1664.45	1273.06	5.7.3.5-1	Pass (1.31)
(HP) 45.677	1664.44	1208.11	5.7.3.5-1	Pass (1.38)
(0.6L _s) 46.125	1664.34	1207.44	5.7.3.5-1	Pass (1.38)
(SZB) 46.237	1664.32	1207.21	5.7.3.5-1	Pass (1.38)
(0.7L _s) 53.812	1660.19	1080.69	5.7.3.5-1	Pass (1.54)
(SZB) 57.237	1656.46	1003.22	5.7.3.5-1	Pass (1.65)
(0.8L _s) 61.500	1651.29	828.82	5.7.3.5-1	Pass (1.99)
(SZB) 65.487	1337.79	677.80	5.7.3.5-1	Pass (1.97)
(0.9L _s) 69.187	1504.80	615.24	5.7.3.5-1	Pass (2.45)
(1.5H) 70.406	1504.80	686.71	5.7.3.5-1	Pass (2.19)
(SZB) 70.987	1504.80	722.78	5.7.3.5-1	Pass (2.08)
(CS) 71.651	1504.80	760.92	5.7.3.5-1	Pass (1.98)
(H) 72.156	1504.80	788.89	5.7.3.5-1	Pass (1.91)
(Bar Develop.) 73.224	1504.80	853.97	5.7.3.5-1	Pass (1.76)
(Bar Develop.) 74.285	1487.20	924.55	5.7.3.5-1	Pass (1.61)
(SZB) 74.653	1472.77	949.35	5.7.3.5-1	Pass (1.55)
(FoS) 75.656	1339.82	1012.99	5.7.3.5-1	Pass (1.32)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.40	202.11	5.7.3.5-2	Pass (2.09)
(SZB) 1.337	585.80	202.11	5.7.3.5-2	Pass (2.90)
(Bar Develop.) 1.705	645.14	202.11	5.7.3.5-2	Pass (3.19)
(Bar Develop.) 2.765	780.20	202.11	5.7.3.5-2	Pass (3.86)
(H) 3.833	811.95	202.11	5.7.3.5-2	Pass (4.02)
(SZB) 5.003	846.74	540.34	5.7.3.5-1	Pass (1.57)
(1.5H) 5.583	957.34	573.02	5.7.3.5-1	Pass (1.67)
(0.1L _s) 7.687	1127.17	699.54	5.7.3.5-1	Pass (1.61)
(SZB) 10.503	1339.15	884.31	5.7.3.5-1	Pass (1.51)
(0.2L _s) 15.375	1653.23	1025.08	5.7.3.5-1	Pass (1.61)
(SZB) 18.753	1656.79	1116.96	5.7.3.5-1	Pass (1.48)
(0.3L _s) 23.062	1660.98	1145.88	5.7.3.5-1	Pass (1.45)
(SZB) 29.753	1664.33	1145.93	5.7.3.5-1	Pass (1.45)
(HP) 30.313	1664.44	1144.20	5.7.3.5-1	Pass (1.45)
(0.4L _s) 30.750	1664.44	1191.76	5.7.3.5-1	Pass (1.40)
(0.5L _s) 38.437	1664.45	1197.29	5.7.3.5-1	Pass (1.39)
(HP) 45.677	1664.44	1126.41	5.7.3.5-1	Pass (1.48)
(0.6L _s) 46.125	1664.34	1126.41	5.7.3.5-1	Pass (1.48)
(SZB) 46.237	1664.32	1126.35	5.7.3.5-1	Pass (1.48)
(0.7L _s) 53.812	1660.19	1009.71	5.7.3.5-1	Pass (1.64)
(SZB) 57.237	1656.46	937.24	5.7.3.5-1	Pass (1.77)
(0.8L _s) 61.500	1651.29	768.39	5.7.3.5-1	Pass (2.15)
(SZB) 65.487	1337.79	594.38	5.7.3.5-1	Pass (2.25)
(0.9L _s) 69.187	1504.80	528.30	5.7.3.5-1	Pass (2.85)
(1.5H) 70.406	1504.80	589.41	5.7.3.5-1	Pass (2.55)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 70.987	1504.80	621.77	5.7.3.5-1	Pass (2.42)
(H) 72.156	1504.80	679.89	5.7.3.5-1	Pass (2.21)
(Bar Develop.) 73.224	1504.80	735.70	5.7.3.5-1	Pass (2.05)
(Bar Develop.) 74.285	1487.20	796.66	5.7.3.5-1	Pass (1.87)
(SZB) 74.653	1472.77	818.01	5.7.3.5-1	Pass (1.80)
(FoS) 75.656	1339.82	872.84	5.7.3.5-1	Pass (1.54)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	69.355	142.528	Pass (2.06)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	69.355	142.528	Pass (2.06)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	69.377	142.529	Pass (2.05)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	69.443	142.532	Pass (2.05)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	69.466	142.533	Pass (2.05)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	69.532	142.536	Pass (2.05)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	69.595	142.539	Pass (2.05)
(CS) 3.924	12.000	48.000	Pass	0.220	0.000	Pass	69.600	142.539	Pass (2.05)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	67.640	142.542	Pass (2.11)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	66.586	142.544	Pass (2.14)
(0.1L _s) 7.687	12.000	48.000	Pass	0.220	0.000	Pass	62.732	142.549	Pass (2.27)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	57.555	146.515	Pass (2.55)
(0.2L _s) 15.375	9.000	48.000	Pass	0.293	0.000	Pass	48.779	146.524	Pass (3.00)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	42.836	142.569	Pass (3.33)
(0.3L _s) 23.062	12.000	48.000	Pass	0.220	0.000	Pass	35.416	142.573	Pass (4.03)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	24.369	138.616	Pass (5.69)
(HP) 30.313	18.000	48.000	Pass	0.147	0.000	Pass	23.494	138.616	Pass (5.90)
(0.4L _s) 30.750	18.000	48.000	Pass	0.147	0.000	Pass	22.813	138.616	Pass (6.08)
(0.5L _s) 38.437	18.000	48.000	Pass	0.147	0.000	Pass	25.534	138.614	Pass (5.43)
(HP) 45.677	18.000	48.000	Pass	0.147	0.000	Pass	37.405	138.606	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(3.71)
(0.6L _s) 46.125	18.000	48.000	Pass	0.147	0.000	Pass	38.135	138.605	Pass (3.63)
(SZB) 46.237	18.000	48.000	Pass	0.147	0.000	Pass	38.318	138.605	Pass (3.62)
(0.7L _s) 53.812	12.000	48.000	Pass	0.220	0.000	Pass	50.633	142.551	Pass (2.82)
(SZB) 57.237	12.000	48.000	Pass	0.220	0.000	Pass	56.073	142.542	Pass (2.54)
(0.8L _s) 61.500	9.000	48.000	Pass	0.293	0.000	Pass	62.616	146.491	Pass (2.34)
(SZB) 65.487	9.000	48.000	Pass	0.293	0.000	Pass	68.554	146.478	Pass (2.14)
(0.9L _s) 69.187	12.000	48.000	Pass	0.220	0.000	Pass	73.860	142.504	Pass (1.93)
(1.5H) 70.406	12.000	48.000	Pass	0.220	0.000	Pass	75.569	142.500	Pass (1.89)
(SZB) 70.987	12.000	48.000	Pass	0.220	0.000	Pass	76.378	142.497	Pass (1.87)
(CS) 71.651	12.000	48.000	Pass	0.220	0.000	Pass	77.297	142.495	Pass (1.84)
(H) 72.156	12.000	48.000	Pass	0.220	0.000	Pass	77.242	142.493	Pass (1.84)
(Bar Develop.) 73.224	12.000	48.000	Pass	0.220	0.000	Pass	77.123	142.488	Pass (1.85)
(Bar Develop.) 74.285	12.000	48.000	Pass	0.220	0.000	Pass	77.001	142.484	Pass (1.85)
(SZB) 74.653	12.000	48.000	Pass	0.220	0.000	Pass	76.957	142.482	Pass (1.85)
(FoS) 75.656	12.000	48.000	Pass	0.220	0.000	Pass	76.835	142.478	Pass (1.85)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	66.406	142.528	Pass (2.15)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	66.406	142.528	Pass (2.15)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	66.428	142.529	Pass (2.15)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	66.491	142.532	Pass (2.14)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	66.513	142.533	Pass (2.14)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	66.576	142.536	Pass (2.14)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	66.636	142.539	Pass (2.14)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	64.780	142.542	Pass (2.20)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	63.779	142.544	Pass (2.23)
	12.000	48.000	Pass	0.220	0.000	Pass	60.105	142.549	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.1L _s) 7.687									(2.37)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	55.141	146.515	Pass (2.66)
(0.2L _s) 15.375	9.000	48.000	Pass	0.293	0.000	Pass	46.685	146.524	Pass (3.14)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	40.909	142.569	Pass (3.49)
(0.3L _s) 23.062	12.000	48.000	Pass	0.220	0.000	Pass	33.677	142.573	Pass (4.23)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	22.832	138.616	Pass (6.07)
(HP) 30.313	18.000	48.000	Pass	0.147	0.000	Pass	21.971	138.616	Pass (6.31)
(0.4L _s) 30.750	18.000	48.000	Pass	0.147	0.000	Pass	21.302	138.616	Pass (6.51)
(0.5L _s) 38.437	18.000	48.000	Pass	0.147	0.000	Pass	22.163	138.614	Pass (6.25)
(HP) 45.677	18.000	48.000	Pass	0.147	0.000	Pass	35.302	138.606	Pass (3.93)
(0.6L _s) 46.125	18.000	48.000	Pass	0.147	0.000	Pass	36.094	138.605	Pass (3.84)
(SZB) 46.237	18.000	48.000	Pass	0.147	0.000	Pass	36.291	138.605	Pass (3.82)
(0.7L _s) 53.812	12.000	48.000	Pass	0.220	0.000	Pass	49.285	142.551	Pass (2.89)
(SZB) 57.237	12.000	48.000	Pass	0.220	0.000	Pass	54.845	142.542	Pass (2.60)
(0.8L _s) 61.500	9.000	48.000	Pass	0.293	0.000	Pass	61.371	146.491	Pass (2.39)
(SZB) 65.487	9.000	48.000	Pass	0.293	0.000	Pass	67.145	146.478	Pass (2.18)
(0.9L _s) 69.187	12.000	48.000	Pass	0.220	0.000	Pass	72.173	142.504	Pass (1.97)
(1.5H) 70.406	12.000	48.000	Pass	0.220	0.000	Pass	73.768	142.500	Pass (1.93)
(SZB) 70.987	12.000	48.000	Pass	0.220	0.000	Pass	74.519	142.497	Pass (1.91)
(H) 72.156	12.000	48.000	Pass	0.220	0.000	Pass	75.318	142.493	Pass (1.89)
(Bar Develop.) 73.224	12.000	48.000	Pass	0.220	0.000	Pass	75.202	142.488	Pass (1.89)
(Bar Develop.) 74.285	12.000	48.000	Pass	0.220	0.000	Pass	75.082	142.484	Pass (1.90)
(SZB) 74.653	12.000	48.000	Pass	0.220	0.000	Pass	75.040	142.482	Pass (1.90)
(FoS) 75.656	12.000	48.000	Pass	0.220	0.000	Pass	74.921	142.478	Pass (1.90)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.153 in

Minimum live load deflection along girder = -0.221 in

Maximum live load deflection along girder = 0.093 in

Status = **Pass**

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 3.924	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.687	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.375	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.062	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.313	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.750	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.437	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 45.677	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.125	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.237	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.812	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.237	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.500	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 65.487	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.187	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 70.406	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 70.987	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 71.651	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 72.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.224	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.285	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 74.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 75.656	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.687	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.375	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.062	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.313	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.750	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.437	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 45.677	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.125	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.237	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.812	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.237	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.500	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 65.487	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.187	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 70.406	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 70.987	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 72.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.224	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.285	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 74.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 75.656	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.33	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be

equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
1	A	12.300	11.250	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
1	A	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.222
Lower Bound Camber at 60 days, 50% of D_{60}	1.653
Average Camber at 60 days, 75% of D_{60}	2.479
Upper Bound Camber at 60 days, D_{60}	3.306

Spec Check Report

For

Span 1 Girder B

March 14, 2021 2:25:32 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.395	Pass (1.20)	162.395	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.301 KSI $\Rightarrow$ 5.400 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.209 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.058	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.301 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
7.266	(0.1L _r) 7.682	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	No	Yes	Pass (1.33)
14.948	(0.2L _r) 15.365	0.121	-3.622	-0.571	0.580	-0.450	-3.043	No	Yes	Pass (1.28)
22.630	(0.3L _r) 23.047	0.503	-3.979	-0.750	0.761	-0.247	-3.218	No	Yes	Pass (1.21)
(HP) 30.313	(HP, 0.4L _r) 30.729	0.876	-4.315	-0.857	0.869	0.019	-3.446	No	Yes	Pass (1.13)
37.995		0.877	-4.319	-0.893	0.906	-0.016	-3.413	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.411									(1.14)
(HP) 45.677	(HP, 0.6L _r) 46.094	0.876	-4.315	-0.857	0.869	0.019	-3.446	No	Yes	Pass (1.13)
53.359	(0.7L _r) 53.776	0.503	-3.979	-0.750	0.761	-0.247	-3.218	No	Yes	Pass (1.21)
61.042	(0.8L _r) 61.458	0.121	-3.622	-0.571	0.580	-0.450	-3.043	No	Yes	Pass (1.28)
68.724	(0.9L _r) 69.141	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	No	Yes	Pass (1.33)
(PSXFR) 73.406	(PSXFR) 73.823	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
(STLF) 76.406	(STLF, 1.0L _r) 76.823	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.301 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
7.266	(0.1L _r) 7.682	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	0.200	-	No	Yes	Pass (-)
14.948	(0.2L _r) 15.365	0.121	-3.622	-0.571	0.580	-0.450	-3.043	0.200	-	No	Yes	Pass (-)
22.630	(0.3L _r) 23.047	0.503	-3.979	-0.750	0.761	-0.247	-3.218	0.200	-	No	Yes	Pass (-)
(HP) 30.313	(HP, 0.4L _r) 30.729	0.876	-4.315	-0.857	0.869	0.019	-3.446	0.200	-	No	Yes	Pass (10+)
37.995	(0.5L _r) 38.411	0.877	-4.319	-0.893	0.906	-0.016	-3.413	0.200	-	No	Yes	Pass (-)
(HP) 45.677	(HP, 0.6L _r) 46.094	0.876	-4.315	-0.857	0.869	0.019	-3.446	0.200	-	No	Yes	Pass (10+)
53.359	(0.7L _r) 53.776	0.503	-3.979	-0.750	0.761	-0.247	-3.218	0.200	-	No	Yes	Pass (-)
61.042	(0.8L _r) 61.458	0.121	-3.622	-0.571	0.580	-0.450	-3.043	0.200	-	No	Yes	Pass (-)
68.724	(0.9L _r) 69.141	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	0.200	-	No	Yes	Pass (-)
(PSXFR) 73.406	(PSXFR) 73.823	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
(STLF) 76.406	(STLF, 1.0L _r) 76.823	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.130 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.433	-2.583	-0.270	0.274	-0.704	-2.308	No	Yes	Pass (1.56)
(0.1L _s) 7.687	-0.211	-2.810	-0.749	0.760	-0.960	-2.050	No	Yes	Pass (1.76)
(0.2L _s) 15.375	0.123	-3.152	-1.330	1.349	-1.206	-1.803	No	Yes	Pass (2.00)
(0.3L _s) 23.062	0.457	-3.486	-1.742	1.767	-1.284	-1.720	No	Yes	Pass (2.09)
(HP) 30.313	0.769	-3.786	-1.976	2.004	-1.207	-1.782	No	Yes	Pass (2.02)
(0.4L _s) 30.750	0.769	-3.787	-1.985	2.014	-1.216	-1.774	No	Yes	Pass (2.03)
(0.5L _s) 38.437	0.771	-3.796	-2.060	2.089	-1.289	-1.706	No	Yes	Pass (2.11)
(HP) 45.677	0.769	-3.786	-1.976	2.004	-1.207	-1.782	No	Yes	Pass (2.02)
(0.6L _s) 46.125	0.750	-3.769	-1.966	1.994	-1.216	-1.775	No	Yes	Pass (2.03)
(0.7L _s) 53.812	0.419	-3.449	-1.703	1.727	-1.284	-1.721	No	Yes	Pass (2.09)
(0.8L _s) 61.500	0.085	-3.113	-1.271	1.290	-1.187	-1.823	No	Yes	Pass (1.97)
(0.9L _s) 69.187	-0.250	-2.771	-0.671	0.681	-0.921	-2.090	No	Yes	Pass (1.72)
(PSXFR) 73.406	-0.433	-2.583	-0.270	0.274	-0.704	-2.308	No	Yes	Pass (1.56)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.130 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 2.583	-0.433	-2.583	-0.270	0.274	-0.704	-2.308	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.211	-2.810	-0.749	0.760	-0.960	-2.050	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.375	0.123	-3.152	-1.330	1.349	-1.206	-1.803	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.062	0.457	-3.486	-1.742	1.767	-1.284	-1.720	-	0.537	No	Yes	Pass (-)
(HP) 30.313	0.769	-3.786	-1.976	2.004	-1.207	-1.782	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.750	0.769	-3.787	-1.985	2.014	-1.216	-1.774	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.437	0.771	-3.796	-2.060	2.089	-1.289	-1.706	-	0.537	No	Yes	Pass (-)
(HP) 45.677	0.769	-3.786	-1.976	2.004	-1.207	-1.782	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.125	0.750	-3.769	-1.966	1.994	-1.216	-1.775	-	0.537	No	Yes	Pass (-)
(0.7L _s) 53.812	0.419	-3.449	-1.703	1.727	-1.284	-1.721	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.500	0.085	-3.113	-1.271	1.290	-1.187	-1.823	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.250	-2.771	-0.671	0.681	-0.921	-2.090	-	0.537	No	Yes	Pass (-)
(PSXFR) 73.406	-0.433	-2.583	-0.270	0.274	-0.704	-2.308	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.209 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.285	0.324	-0.719	-2.261	No	Yes	Pass (1.59)
(0.1L _s) 7.687	-0.212	-2.819	-0.788	0.895	-1.000	-1.925	No	Yes	Pass (1.87)
(0.2L _s) 15.375	0.124	-3.171	-1.396	1.576	-1.272	-1.596	No	Yes	Pass (2.26)
(0.3L _s) 23.062	0.461	-3.515	-1.824	2.043	-1.363	-1.472	No	Yes	Pass (2.45)
(HP) 30.313	0.776	-3.822	-2.062	2.288	-1.286	-1.534	No	Yes	Pass (2.35)
(0.4L _s) 30.750	0.776	-3.823	-2.071	2.296	-1.295	-1.526	No	Yes	Pass (2.36)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.5L _s) 38.437	0.777	-3.827	-2.138	2.335	-1.361	-1.492	No	Yes	Pass (2.41)
(HP) 45.677	0.773	-3.810	-2.036	2.177	-1.263	-1.633	No	Yes	Pass (2.20)
(0.6L _s) 46.125	0.754	-3.791	-2.024	2.160	-1.270	-1.630	No	Yes	Pass (2.21)
(0.7L _s) 53.812	0.420	-3.456	-1.730	1.771	-1.310	-1.684	No	Yes	Pass (2.14)
(0.8L _s) 61.500	0.084	-3.106	-1.256	1.168	-1.171	-1.938	No	Yes	Pass (1.86)
(0.9L _s) 69.187	-0.248	-2.752	-0.604	0.340	-0.852	-2.412	No	Yes	Pass (1.49)
(PSXFR) 73.406	-0.429	-2.559	-0.171	-0.214	-0.601	-2.773	No	Yes	Pass (1.30)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.6f'_c = -4.800 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 6.209 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.328	0.302	-0.762	-2.283	No	Yes	Pass (2.10)
(0.1L _s) 7.687	-0.212	-2.819	-0.905	0.829	-1.117	-1.990	No	Yes	Pass (2.41)
(0.2L _s) 15.375	0.124	-3.171	-1.594	1.445	-1.470	-1.727	No	Yes	Pass (2.78)
(0.3L _s) 23.062	0.461	-3.515	-2.068	1.846	-1.607	-1.669	No	Yes	Pass (2.88)
(HP) 30.313	0.776	-3.822	-2.327	2.029	-1.551	-1.793	No	Yes	Pass (2.68)
(0.4L _s) 30.750	0.776	-3.823	-2.336	2.034	-1.560	-1.789	No	Yes	Pass (2.68)
(0.5L _s) 38.437	0.777	-3.827	-2.398	2.008	-1.621	-1.819	No	Yes	Pass (2.64)
(HP) 45.677	0.773	-3.810	-2.271	1.787	-1.497	-2.023	No	Yes	Pass (2.37)
(0.6L _s) 46.125	0.754	-3.791	-2.257	1.767	-1.503	-2.024	No	Yes	Pass (2.37)
(0.7L _s) 53.812	0.420	-3.456	-1.910	1.313	-1.490	-2.143	No	Yes	Pass (2.24)
(0.8L _s) 61.500	0.084	-3.106	-1.362	0.643	-1.277	-2.463	No	Yes	Pass (1.95)
(0.9L _s) 69.187	-0.248	-2.752	-0.644	-0.380	-0.892	-3.132	No	Yes	Pass (1.53)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 73.406	-0.429	-2.559	-0.185	-1.166	-0.614	-3.726	No	Yes	Pass (1.29)

Interval 17: Open to Traffic : Service I Tension without live load**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000$ KSI

Concrete strength required to satisfy this requirement = 6.209 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.586	-0.282	0.336	-0.716	-2.250	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.819	-0.781	0.926	-0.993	-1.894	No	Yes	Pass (-)
(0.2L _s) 15.375	0.124	-3.171	-1.383	1.631	-1.259	-1.540	No	Yes	Pass (-)
(0.3L _s) 23.062	0.461	-3.515	-1.807	2.115	-1.346	-1.400	No	Yes	Pass (-)
(HP) 30.313	0.776	-3.822	-2.043	2.370	-1.267	-1.452	No	Yes	Pass (-)
(0.4L _s) 30.750	0.776	-3.823	-2.052	2.379	-1.276	-1.444	No	Yes	Pass (-)
(0.5L _s) 38.437	0.777	-3.827	-2.118	2.422	-1.341	-1.405	No	Yes	Pass (-)
(HP) 45.677	0.773	-3.810	-2.016	2.260	-1.243	-1.550	No	Yes	Pass (-)
(0.6L _s) 46.125	0.754	-3.791	-2.005	2.243	-1.251	-1.548	No	Yes	Pass (-)
(0.7L _s) 53.812	0.420	-3.456	-1.713	1.844	-1.293	-1.612	No	Yes	Pass (-)
(0.8L _s) 61.500	0.084	-3.106	-1.243	1.224	-1.158	-1.882	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.248	-2.752	-0.591	0.395	-0.839	-2.357	No	Yes	Pass (-)
(PSXFR) 73.406	-0.429	-2.559	-0.155	-0.145	-0.585	-2.705	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.586	-0.278	0.481	-0.712	-2.104	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.819	-0.769	1.317	-0.981	-1.502	No	Yes	Pass (-)
(0.2L _s) 15.375	0.124	-3.171	-1.359	2.292	-1.235	-0.879	No	Yes	Pass (-)
(0.3L _s) 23.062	0.461	-3.515	-1.770	2.931	-1.309	-0.584	No	Yes	Pass (-)
(HP) 30.313	0.776	-3.822	-1.995	3.254	-1.219	-0.568	No	Yes	Pass (-)
(0.4L _s) 30.750	0.776	-3.823	-2.003	3.264	-1.227	-0.558	No	Yes	Pass (-)
(0.5L _s) 38.437	0.777	-3.827	-2.057	3.289	-1.280	-0.538	No	Yes	Pass (-)
(HP) 45.677	0.773	-3.810	-1.944	3.045	-1.171	-0.765	No	Yes	Pass (-)
(0.6L _s) 46.125	0.754	-3.791	-1.932	3.021	-1.178	-0.770	No	Yes	Pass (-)
(0.7L _s) 53.812	0.420	-3.456	-1.628	2.444	-1.208	-1.012	No	Yes	Pass (-)
(0.8L _s) 61.500	0.084	-3.106	-1.145	1.579	-1.061	-1.527	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.248	-2.752	-0.457	0.530	-0.706	-2.222	No	Yes	Pass (-)
(PSXFR) 73.406	-0.429	-2.559	0.021	-0.099	-0.408	-2.659	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression

Fatigue I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.4f'_c = -3.200$ KSI

Concrete strength required to satisfy this requirement = 4.141 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.164	0.152	-0.380	-1.140	No	Yes	Pass (2.81)
(0.1L _s) 7.687	-0.212	-2.819	-0.450	0.418	-0.556	-0.992	No	Yes	Pass (3.23)
(0.2L _s) 15.375	0.124	-3.171	-0.789	0.729	-0.727	-0.857	No	Yes	Pass (3.73)
(0.3L _s) 23.062	0.461	-3.515	-1.024	0.933	-0.794	-0.825	No	Yes	Pass (3.88)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 30.313	0.776	-3.822	-1.149	1.027	-0.761	-0.884	No	Yes	Pass (3.62)
(0.4L _s) 30.750	0.776	-3.823	-1.153	1.030	-0.765	-0.882	No	Yes	Pass (3.63)
(0.5L _s) 38.437	0.777	-3.827	-1.180	1.020	-0.792	-0.894	No	Yes	Pass (3.58)
(HP) 45.677	0.773	-3.810	-1.124	0.912	-0.738	-0.993	No	Yes	Pass (3.22)
(0.6L _s) 46.125	0.754	-3.791	-1.118	0.902	-0.741	-0.993	No	Yes	Pass (3.22)
(0.7L _s) 53.812	0.420	-3.456	-0.949	0.678	-0.739	-1.050	No	Yes	Pass (3.05)
(0.8L _s) 61.500	0.084	-3.106	-0.677	0.347	-0.635	-1.206	No	Yes	Pass (2.65)
(0.9L _s) 69.187	-0.248	-2.752	-0.306	-0.091	-0.430	-1.467	No	Yes	Pass (2.18)
(PSXFR) 73.406	-0.429	-2.559	-0.086	-0.377	-0.300	-1.656	No	Yes	Pass (1.93)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2142.96	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.687	1579.15	4492.46	2100.27	Pass (2.14)	Pass (2.84)
(0.2L _s) 15.375	2719.91	5417.41	3617.49	Pass (1.50)	Pass (1.99)
(0.3L _s) 23.062	3435.47	5774.30	3972.01	Pass (1.45)	Pass (1.68)
(0.4L _s) 30.750	3784.89	6105.85	4204.29	Pass (1.45)	Pass (1.61)
(0.5L _s) 38.437	3765.63	6105.85	4185.16	Pass (1.46)	Pass (1.62)
(0.6L _s) 46.125	3405.06	6085.62	4178.48	Pass (1.46)	Pass (1.79)
(0.7L _s) 53.812	2675.72	5733.08	3558.70	Pass (1.61)	Pass (2.14)
(0.8L _s) 61.500	1642.90	5376.59	2185.06	Pass (2.46)	Pass (3.27)
(0.9L _s) 69.187	525.15	4354.32	698.45	Pass (6.23)	Pass (8.29)
(1.0L _s) 76.875	-391.56	1891.00	-520.78	Pass (-)	Pass (-)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2142.96	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.687	1490.27	4492.46	2100.27	Pass (2.14)	Pass (3.01)
(0.2L _s) 15.375	2551.13	5417.41	3617.49	Pass (1.50)	Pass (2.12)
(0.3L _s) 23.062	3226.02	5774.30	3972.01	Pass (1.45)	Pass (1.79)
(0.4L _s) 30.750	3550.82	6105.85	4204.29	Pass (1.45)	Pass (1.72)
(0.5L _s) 38.437	3561.17	6105.85	4185.16	Pass (1.46)	Pass (1.71)
(0.6L _s) 46.125	3191.44	6085.62	4178.48	Pass (1.46)	Pass (1.91)
(0.7L _s) 53.812	2494.60	5733.08	3558.70	Pass (1.61)	Pass (2.30)
(0.8L _s) 61.500	1504.81	5376.59	2185.06	Pass (2.46)	Pass (3.57)
(0.9L _s) 69.187	246.18	4354.32	698.45	Pass (6.23)	Pass (10+)
(1.0L _s) 76.875	-391.56	1891.00	-520.78	Pass (-)	Pass (-)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.22	-5412.53	1.01	Pass (-)	Pass (-)
(0.1L _s) 7.687	-9.95	-5338.77	-13.23	Pass (10+)	Pass (10+)
(0.2L _s) 15.375	-51.16	-5277.46	-68.04	Pass (10+)	Pass (10+)
(0.3L _s) 23.062	-123.64	-5231.38	-164.44	Pass (10+)	Pass (10+)
(0.4L _s) 30.750	-227.39	-5202.11	-302.43	Pass (10+)	Pass (10+)
(0.5L _s) 38.437	-362.41	-5192.29	-482.01	Pass (10+)	Pass (10+)
(0.6L _s) 46.125	-528.70	-5202.15	-703.17	Pass (7.40)	Pass (9.84)
(0.7L _s) 53.812	-726.25	-5231.91	-965.91	Pass (5.42)	Pass (7.20)
(0.8L _s) 61.500	-984.64	-5279.35	-1196.62	Pass (4.41)	Pass (5.36)
(0.9L _s) 69.187	-1532.07	-5343.75	-1196.62	Pass (4.47)	Pass (3.49)
(FoS) 75.656	-2466.30	-5412.35	-1196.62	Pass (4.52)	Pass (2.19)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(1.0L _s) 76.875	-2645.12	-4041.46	-1196.62	Pass (3.38)	Pass (1.53)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.76	-5412.53	1.01	Pass (-)	Pass (-)
(0.1L _s) 7.687	2.58	-5338.77	-13.23	Pass (10+)	Pass (-)
(0.2L _s) 15.375	-26.11	-5277.46	-68.04	Pass (10+)	Pass (10+)
(0.3L _s) 23.062	-86.07	-5231.38	-164.44	Pass (10+)	Pass (10+)
(0.4L _s) 30.750	-177.30	-5202.11	-302.43	Pass (10+)	Pass (10+)
(0.5L _s) 38.437	-299.79	-5192.29	-482.01	Pass (10+)	Pass (10+)
(0.6L _s) 46.125	-453.55	-5202.15	-703.17	Pass (7.40)	Pass (10+)
(0.7L _s) 53.812	-638.58	-5231.91	-965.91	Pass (5.42)	Pass (8.19)
(0.8L _s) 61.500	-884.31	-5279.35	-1196.62	Pass (4.41)	Pass (5.97)
(0.9L _s) 69.187	-1274.65	-5343.75	-1196.62	Pass (4.47)	Pass (4.19)
(FoS) 75.656	-2039.95	-5412.35	-1196.62	Pass (4.52)	Pass (2.65)
(1.0L _s) 76.875	-2180.42	-4041.46	-1196.62	Pass (3.38)	Pass (1.85)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n / V_u$)
(CS) 3.924	Yes	Yes	242.67	569.37	Pass (2.35)
(SZB) 5.003	Yes	Yes	235.56	417.57	Pass (1.77)
(1.5H) 5.583	Yes	Yes	231.75	420.92	Pass (1.82)
(0.1L _s) 7.687	Yes	Yes	218.04	405.70	Pass (1.86)
(SZB) 10.503	Yes	Yes	199.92	307.76	Pass (1.54)
(0.2L _s) 15.375	Yes	Yes	169.28	315.13	Pass (1.86)
(SZB) 18.753	Yes	Yes	148.58	274.28	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.85)
(0.3L _s) 23.062	Yes	Yes	122.78	280.16	Pass (2.28)
(SZB) 29.753	Yes	Yes	84.44	244.52	Pass (2.90)
(HP) 30.313	Yes	Yes	81.41	245.61	Pass (3.02)
(0.4L _s) 30.750	Yes	Yes	79.06	220.18	Pass (2.79)
(0.5L _s) 38.437	Yes	Yes	88.78	219.94	Pass (2.48)
(HP) 45.677	Yes	Yes	130.07	247.89	Pass (1.91)
(0.6L _s) 46.125	Yes	Yes	132.61	247.33	Pass (1.87)
(SZB) 46.237	Yes	Yes	133.25	247.19	Pass (1.86)
(0.7L _s) 53.812	Yes	Yes	176.29	287.36	Pass (1.63)
(SZB) 57.237	Yes	Yes	195.63	285.83	Pass (1.46)
(0.8L _s) 61.500	Yes	Yes	219.54	330.32	Pass (1.50)
(SZB) 65.487	Yes	Yes	241.72	324.05	Pass (1.34)
(0.9L _s) 69.187	Yes	Yes	262.04	426.49	Pass (1.63)
(1.5H) 70.406	Yes	Yes	268.69	418.68	Pass (1.56)
(SZB) 70.987	Yes	Yes	271.86	424.54	Pass (1.56)
(CS) 71.673	Yes	Yes	275.59	567.65	Pass (2.06)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.003	Yes	Yes	225.31	419.45	Pass (1.86)
(1.5H) 5.583	Yes	Yes	221.69	422.98	Pass (1.91)
(0.1L _s) 7.687	Yes	Yes	208.63	408.16	Pass (1.96)
(SZB) 10.503	Yes	Yes	191.28	310.50	Pass (1.62)
(0.2L _s) 15.375	Yes	Yes	161.79	318.64	Pass (1.97)
(SZB) 18.753	Yes	Yes	141.70	277.72	Pass (1.96)
(0.3L _s) 23.062	Yes	Yes	116.58	283.85	Pass (2.43)

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 29.753	Yes	Yes	78.99	248.48	Pass (3.15)
(HP) 30.313	Yes	Yes	76.02	249.49	Pass (3.28)
(0.4L _s) 30.750	Yes	Yes	73.70	223.94	Pass (3.04)
(0.5L _s) 38.437	Yes	Yes	76.91	223.60	Pass (2.91)
(HP) 45.677	Yes	Yes	122.54	251.66	Pass (2.05)
(0.6L _s) 46.125	Yes	Yes	125.29	251.07	Pass (2.00)
(SZB) 46.237	Yes	Yes	125.98	250.92	Pass (1.99)
(0.7L _s) 53.812	Yes	Yes	171.31	290.87	Pass (1.70)
(SZB) 57.237	Yes	Yes	191.02	289.20	Pass (1.51)
(0.8L _s) 61.500	Yes	Yes	214.82	333.68	Pass (1.55)
(SZB) 65.487	Yes	Yes	236.36	328.55	Pass (1.39)
(0.9L _s) 69.187	Yes	Yes	255.65	436.08	Pass (1.71)
(1.5H) 70.406	Yes	Yes	261.88	428.89	Pass (1.64)
(SZB) 70.987	Yes	Yes	264.83	435.51	Pass (1.64)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	422.95	198.57	5.7.3.5-2	Pass (2.13)
(SZB) 1.337	584.77	198.57	5.7.3.5-2	Pass (2.94)
(Bar Develop.) 1.705	643.94	198.57	5.7.3.5-2	Pass (3.24)
(Bar Develop.) 2.765	778.59	198.57	5.7.3.5-2	Pass (3.92)
(H) 3.833	810.33	198.57	5.7.3.5-2	Pass (4.08)
(CS) 3.924	813.02	437.33	5.7.3.5-1	Pass (1.86)
(SZB) 5.003	845.13	501.52	5.7.3.5-1	Pass (1.69)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(1.5H) 5.583	955.56	530.89	5.7.3.5-1	Pass (1.80)
(0.1L _s) 7.687	1125.29	645.02	5.7.3.5-1	Pass (1.74)
(SZB) 10.503	1337.42	812.27	5.7.3.5-1	Pass (1.65)
(0.2L _s) 15.375	1653.21	941.05	5.7.3.5-1	Pass (1.76)
(SZB) 18.753	1656.76	1020.03	5.7.3.5-1	Pass (1.62)
(0.3L _s) 23.062	1660.95	1049.13	5.7.3.5-1	Pass (1.58)
(SZB) 29.753	1664.32	1051.83	5.7.3.5-1	Pass (1.58)
(HP) 30.313	1664.43	1048.23	5.7.3.5-1	Pass (1.59)
(0.4L _s) 30.750	1664.44	1096.41	5.7.3.5-1	Pass (1.52)
(0.5L _s) 38.437	1664.44	1100.98	5.7.3.5-1	Pass (1.51)
(HP) 45.677	1664.43	1039.25	5.7.3.5-1	Pass (1.60)
(0.6L _s) 46.125	1664.33	1039.32	5.7.3.5-1	Pass (1.60)
(SZB) 46.237	1664.31	1039.29	5.7.3.5-1	Pass (1.60)
(0.7L _s) 53.812	1660.17	932.67	5.7.3.5-1	Pass (1.78)
(SZB) 57.237	1656.68	870.37	5.7.3.5-1	Pass (1.90)
(0.8L _s) 61.500	1652.18	719.21	5.7.3.5-1	Pass (2.30)
(SZB) 65.487	1337.34	594.65	5.7.3.5-1	Pass (2.25)
(0.9L _s) 69.187	1598.40	532.32	5.7.3.5-1	Pass (3.00)
(1.5H) 70.406	1598.40	595.91	5.7.3.5-1	Pass (2.68)
(SZB) 70.987	1598.40	628.17	5.7.3.5-1	Pass (2.54)
(CS) 71.673	1598.40	663.45	5.7.3.5-1	Pass (2.41)
(H) 72.156	1598.40	687.07	5.7.3.5-1	Pass (2.33)
(Bar Develop.) 73.224	1598.40	745.88	5.7.3.5-1	Pass (2.14)
(Bar Develop.) 74.285	1580.80	808.86	5.7.3.5-1	Pass (1.95)
(SZB) 74.653	1566.37	831.00	5.7.3.5-1	Pass (1.88)
(FoS) 75.656	1527.02	892.09	5.7.3.5-1	Pass (1.71)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	422.95	188.07	5.7.3.5-2	Pass (2.25)
(SZB) 1.337	584.77	188.07	5.7.3.5-2	Pass (3.11)
(Bar Develop.) 1.705	643.94	188.07	5.7.3.5-2	Pass (3.42)
(Bar Develop.) 2.765	778.59	188.07	5.7.3.5-2	Pass (4.14)
(H) 3.833	810.33	188.07	5.7.3.5-2	Pass (4.31)
(SZB) 5.003	845.13	475.14	5.7.3.5-1	Pass (1.78)
(1.5H) 5.583	955.56	502.70	5.7.3.5-1	Pass (1.90)
(0.1L _s) 7.687	1125.29	609.32	5.7.3.5-1	Pass (1.85)
(SZB) 10.503	1337.42	756.63	5.7.3.5-1	Pass (1.77)
(0.2L _s) 15.375	1653.21	883.17	5.7.3.5-1	Pass (1.87)
(SZB) 18.753	1656.76	951.62	5.7.3.5-1	Pass (1.74)
(0.3L _s) 23.062	1660.95	983.84	5.7.3.5-1	Pass (1.69)
(SZB) 29.753	1664.32	980.87	5.7.3.5-1	Pass (1.70)
(HP) 30.313	1664.43	978.98	5.7.3.5-1	Pass (1.70)
(0.4L _s) 30.750	1664.44	1028.50	5.7.3.5-1	Pass (1.62)
(0.5L _s) 38.437	1664.44	1034.49	5.7.3.5-1	Pass (1.61)
(HP) 45.677	1664.43	966.31	5.7.3.5-1	Pass (1.72)
(0.6L _s) 46.125	1664.33	966.98	5.7.3.5-1	Pass (1.72)
(SZB) 46.237	1664.31	967.09	5.7.3.5-1	Pass (1.72)
(0.7L _s) 53.812	1660.17	870.89	5.7.3.5-1	Pass (1.91)
(SZB) 57.237	1656.68	813.38	5.7.3.5-1	Pass (2.04)
(0.8L _s) 61.500	1652.18	667.71	5.7.3.5-1	Pass (2.47)
(SZB) 65.487	1337.34	526.08	5.7.3.5-1	Pass (2.54)
(0.9L _s) 69.187	1598.40	456.48	5.7.3.5-1	Pass (3.50)
(1.5H) 70.406	1598.40	511.33	5.7.3.5-1	Pass (3.13)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 70.987	1598.40	540.38	5.7.3.5-1	Pass (2.96)
(H) 72.156	1598.40	592.39	5.7.3.5-1	Pass (2.70)
(Bar Develop.) 73.224	1598.40	643.35	5.7.3.5-1	Pass (2.48)
(Bar Develop.) 74.285	1580.80	698.17	5.7.3.5-1	Pass (2.26)
(SZB) 74.653	1566.37	717.39	5.7.3.5-1	Pass (2.18)
(FoS) 75.656	1527.02	770.30	5.7.3.5-1	Pass (1.98)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(CS) 3.924	12.000	48.000	Pass	0.220	0.000	Pass	65.712	142.546	Pass (2.17)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	63.787	142.546	Pass (2.23)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	62.756	142.546	Pass (2.27)
(0.1L _s) 7.687	12.000	48.000	Pass	0.220	0.000	Pass	59.041	142.546	Pass (2.41)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	54.134	146.506	Pass (2.71)
(0.2L _s) 15.375	9.000	48.000	Pass	0.293	0.000	Pass	45.838	146.506	Pass (3.20)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	40.232	142.546	Pass (3.54)
(0.3L _s) 23.062	12.000	48.000	Pass	0.220	0.000	Pass	33.247	142.546	Pass (4.29)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	22.865	138.586	Pass (6.06)
(HP) 30.313	18.000	48.000	Pass	0.147	0.000	Pass	22.046	138.586	Pass (6.29)
(0.4L _s) 30.750	18.000	48.000	Pass	0.147	0.000	Pass	21.408	138.586	Pass (6.47)
(0.5L _s) 38.437	18.000	48.000	Pass	0.147	0.000	Pass	24.041	138.586	Pass (5.76)
(HP) 45.677	18.000	48.000	Pass	0.147	0.000	Pass	35.221	138.586	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(3.93)
(0.6L _s) 46.125	18.000	48.000	Pass	0.147	0.000	Pass	35.910	138.586	Pass (3.86)
(SZB) 46.237	18.000	48.000	Pass	0.147	0.000	Pass	36.082	138.586	Pass (3.84)
(0.7L _s) 53.812	12.000	48.000	Pass	0.220	0.000	Pass	47.737	142.546	Pass (2.99)
(SZB) 57.237	12.000	48.000	Pass	0.220	0.000	Pass	52.973	142.546	Pass (2.69)
(0.8L _s) 61.500	9.000	48.000	Pass	0.293	0.000	Pass	59.447	146.506	Pass (2.46)
(SZB) 65.487	9.000	48.000	Pass	0.293	0.000	Pass	65.453	146.506	Pass (2.24)
(0.9L _s) 69.187	12.000	48.000	Pass	0.220	0.000	Pass	70.956	142.546	Pass (2.01)
(1.5H) 70.406	12.000	48.000	Pass	0.220	0.000	Pass	72.757	142.546	Pass (1.96)
(SZB) 70.987	12.000	48.000	Pass	0.220	0.000	Pass	73.615	142.546	Pass (1.94)
(CS) 71.673	12.000	48.000	Pass	0.220	0.000	Pass	74.625	142.546	Pass (1.91)
(H) 72.156	12.000	48.000	Pass	0.220	0.000	Pass	74.625	142.546	Pass (1.91)
(Bar Develop.) 73.224	12.000	48.000	Pass	0.220	0.000	Pass	74.625	142.546	Pass (1.91)
(Bar Develop.) 74.285	12.000	48.000	Pass	0.220	0.000	Pass	74.625	142.546	Pass (1.91)
(SZB) 74.653	12.000	48.000	Pass	0.220	0.000	Pass	74.625	142.546	Pass (1.91)
(FoS) 75.656	12.000	48.000	Pass	0.220	0.000	Pass	74.625	142.546	Pass (1.91)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	62.837	142.546	Pass (2.27)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	61.011	142.546	Pass (2.34)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	60.032	142.546	Pass (2.37)
	12.000	48.000	Pass	0.220	0.000	Pass	56.494	142.546	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.1L _s) 7.687									(2.52)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	51.795	146.506	Pass (2.83)
(0.2L _s) 15.375	9.000	48.000	Pass	0.293	0.000	Pass	43.811	146.506	Pass (3.34)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	38.369	142.546	Pass (3.72)
(0.3L _s) 23.062	12.000	48.000	Pass	0.220	0.000	Pass	31.569	142.546	Pass (4.52)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	21.389	138.586	Pass (6.48)
(HP) 30.313	18.000	48.000	Pass	0.147	0.000	Pass	20.584	138.586	Pass (6.73)
(0.4L _s) 30.750	18.000	48.000	Pass	0.147	0.000	Pass	19.957	138.586	Pass (6.94)
(0.5L _s) 38.437	18.000	48.000	Pass	0.147	0.000	Pass	20.827	138.586	Pass (6.65)
(HP) 45.677	18.000	48.000	Pass	0.147	0.000	Pass	33.183	138.586	Pass (4.18)
(0.6L _s) 46.125	18.000	48.000	Pass	0.147	0.000	Pass	33.928	138.586	Pass (4.08)
(SZB) 46.237	18.000	48.000	Pass	0.147	0.000	Pass	34.114	138.586	Pass (4.06)
(0.7L _s) 53.812	12.000	48.000	Pass	0.220	0.000	Pass	46.388	142.546	Pass (3.07)
(SZB) 57.237	12.000	48.000	Pass	0.220	0.000	Pass	51.726	142.546	Pass (2.76)
(0.8L _s) 61.500	9.000	48.000	Pass	0.293	0.000	Pass	58.169	146.506	Pass (2.52)
(SZB) 65.487	9.000	48.000	Pass	0.293	0.000	Pass	64.004	146.506	Pass (2.29)
(0.9L _s) 69.187	12.000	48.000	Pass	0.220	0.000	Pass	69.226	142.546	Pass (2.06)
(1.5H) 70.406	12.000	48.000	Pass	0.220	0.000	Pass	70.912	142.546	Pass (2.01)
(SZB) 70.987	12.000	48.000	Pass	0.220	0.000	Pass	71.711	142.546	Pass (1.99)
(H) 72.156	12.000	48.000	Pass	0.220	0.000	Pass	72.652	142.546	Pass (1.96)
(Bar Develop.) 73.224	12.000	48.000	Pass	0.220	0.000	Pass	72.652	142.546	Pass (1.96)
(Bar Develop.) 74.285	12.000	48.000	Pass	0.220	0.000	Pass	72.652	142.546	Pass (1.96)
(SZB) 74.653	12.000	48.000	Pass	0.220	0.000	Pass	72.652	142.546	Pass (1.96)
(FoS) 75.656	12.000	48.000	Pass	0.220	0.000	Pass	72.652	142.546	Pass (1.96)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.153 in

Minimum live load deflection along girder = -0.221 in

Maximum live load deflection along girder = 0.093 in

Status = **Pass**

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 3.924	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.687	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.375	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.062	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.313	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.750	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.437	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 45.677	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.125	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.237	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.812	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.237	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.500	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 65.487	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.187	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 70.406	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 70.987	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 71.673	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 72.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.224	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.285	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 74.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 75.656	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.687	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.375	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.062	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.313	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.750	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.437	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 45.677	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.125	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.237	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.812	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.237	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.500	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 65.487	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.187	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 70.406	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 70.987	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 72.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.224	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.285	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 74.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 75.656	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.33	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be

equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
1	B	12.300	11.500	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
1	B	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.095
Lower Bound Camber at 60 days, 50% of D_{60}	1.653
Average Camber at 60 days, 75% of D_{60}	2.479
Upper Bound Camber at 60 days, D_{60}	3.306

Spec Check Report

For

Span 1 Girder F

March 14, 2021 2:27:32 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.417	Pass (1.20)	162.417	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.301 KSI $\Rightarrow$ 5.400 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.225 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.055	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.301 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
7.266	(0.1L _r) 7.682	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	No	Yes	Pass (1.33)
14.948	(0.2L _r) 15.365	0.121	-3.622	-0.571	0.580	-0.450	-3.043	No	Yes	Pass (1.28)
22.630	(0.3L _r) 23.047	0.503	-3.979	-0.750	0.761	-0.247	-3.218	No	Yes	Pass (1.21)
(HP) 30.313	(HP, 0.4L _r) 30.729	0.876	-4.315	-0.857	0.869	0.019	-3.446	No	Yes	Pass (1.13)
37.995		0.877	-4.319	-0.893	0.906	-0.016	-3.413	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.411									(1.14)
(HP) 45.677	(HP, 0.6L _r) 46.094	0.876	-4.315	-0.857	0.869	0.019	-3.446	No	Yes	Pass (1.13)
53.359	(0.7L _r) 53.776	0.503	-3.979	-0.750	0.761	-0.247	-3.218	No	Yes	Pass (1.21)
61.042	(0.8L _r) 61.458	0.121	-3.622	-0.571	0.580	-0.450	-3.043	No	Yes	Pass (1.28)
68.724	(0.9L _r) 69.141	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	No	Yes	Pass (1.33)
(PSXFR) 73.406	(PSXFR) 73.823	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
(STLF) 76.406	(STLF, 1.0L _r) 76.823	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.301 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
7.266	(0.1L _r) 7.682	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	0.200	-	No	Yes	Pass (-)
14.948	(0.2L _r) 15.365	0.121	-3.622	-0.571	0.580	-0.450	-3.043	0.200	-	No	Yes	Pass (-)
22.630	(0.3L _r) 23.047	0.503	-3.979	-0.750	0.761	-0.247	-3.218	0.200	-	No	Yes	Pass (-)
(HP) 30.313	(HP, 0.4L _r) 30.729	0.876	-4.315	-0.857	0.869	0.019	-3.446	0.200	-	No	Yes	Pass (10+)
37.995	(0.5L _r) 38.411	0.877	-4.319	-0.893	0.906	-0.016	-3.413	0.200	-	No	Yes	Pass (-)
(HP) 45.677	(HP, 0.6L _r) 46.094	0.876	-4.315	-0.857	0.869	0.019	-3.446	0.200	-	No	Yes	Pass (10+)
53.359	(0.7L _r) 53.776	0.503	-3.979	-0.750	0.761	-0.247	-3.218	0.200	-	No	Yes	Pass (-)
61.042	(0.8L _r) 61.458	0.121	-3.622	-0.571	0.580	-0.450	-3.043	0.200	-	No	Yes	Pass (-)
68.724	(0.9L _r) 69.141	-0.268	-3.252	-0.321	0.326	-0.589	-2.926	0.200	-	No	Yes	Pass (-)
(PSXFR) 73.406	(PSXFR) 73.823	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
(STLF) 76.406	(STLF, 1.0L _r) 76.823	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.133 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.433	-2.583	-0.273	0.277	-0.706	-2.306	No	Yes	Pass (1.56)
(0.1L _s) 7.687	-0.212	-2.810	-0.756	0.766	-0.967	-2.044	No	Yes	Pass (1.76)
(0.2L _s) 15.375	0.123	-3.153	-1.339	1.358	-1.216	-1.794	No	Yes	Pass (2.01)
(0.3L _s) 23.062	0.458	-3.487	-1.751	1.777	-1.294	-1.711	No	Yes	Pass (2.10)
(HP) 30.313	0.769	-3.787	-1.984	2.012	-1.215	-1.775	No	Yes	Pass (2.03)
(0.4L _s) 30.750	0.769	-3.788	-1.993	2.022	-1.224	-1.767	No	Yes	Pass (2.04)
(0.5L _s) 38.437	0.771	-3.796	-2.064	2.094	-1.294	-1.702	No	Yes	Pass (2.12)
(HP) 45.677	0.769	-3.787	-1.977	2.006	-1.208	-1.781	No	Yes	Pass (2.02)
(0.6L _s) 46.125	0.750	-3.769	-1.967	1.995	-1.217	-1.774	No	Yes	Pass (2.03)
(0.7L _s) 53.812	0.419	-3.448	-1.701	1.725	-1.282	-1.723	No	Yes	Pass (2.09)
(0.8L _s) 61.500	0.085	-3.113	-1.268	1.286	-1.183	-1.827	No	Yes	Pass (1.97)
(0.9L _s) 69.187	-0.250	-2.770	-0.668	0.678	-0.918	-2.093	No	Yes	Pass (1.72)
(PSXFR) 73.406	-0.433	-2.583	-0.269	0.273	-0.702	-2.310	No	Yes	Pass (1.56)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.133 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 2.583	-0.433	-2.583	-0.273	0.277	-0.706	-2.306	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.810	-0.756	0.766	-0.967	-2.044	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.375	0.123	-3.153	-1.339	1.358	-1.216	-1.794	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.062	0.458	-3.487	-1.751	1.777	-1.294	-1.711	-	0.537	No	Yes	Pass (-)
(HP) 30.313	0.769	-3.787	-1.984	2.012	-1.215	-1.775	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.750	0.769	-3.788	-1.993	2.022	-1.224	-1.767	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.437	0.771	-3.796	-2.064	2.094	-1.294	-1.702	-	0.537	No	Yes	Pass (-)
(HP) 45.677	0.769	-3.787	-1.977	2.006	-1.208	-1.781	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.125	0.750	-3.769	-1.967	1.995	-1.217	-1.774	-	0.537	No	Yes	Pass (-)
(0.7L _s) 53.812	0.419	-3.448	-1.701	1.725	-1.282	-1.723	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.500	0.085	-3.113	-1.268	1.286	-1.183	-1.827	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.250	-2.770	-0.668	0.678	-0.918	-2.093	-	0.537	No	Yes	Pass (-)
(PSXFR) 73.406	-0.433	-2.583	-0.269	0.273	-0.702	-2.310	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.225 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.287	0.327	-0.721	-2.259	No	Yes	Pass (1.59)
(0.1L _s) 7.687	-0.212	-2.819	-0.793	0.901	-1.005	-1.919	No	Yes	Pass (1.88)
(0.2L _s) 15.375	0.124	-3.172	-1.403	1.585	-1.279	-1.587	No	Yes	Pass (2.27)
(0.3L _s) 23.062	0.461	-3.516	-1.831	2.052	-1.370	-1.464	No	Yes	Pass (2.46)
(HP) 30.313	0.776	-3.823	-2.068	2.295	-1.292	-1.528	No	Yes	Pass (2.36)
(0.4L _s) 30.750	0.776	-3.824	-2.078	2.304	-1.301	-1.520	No	Yes	Pass (2.37)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.5L _s) 38.437	0.777	-3.827	-2.142	2.340	-1.365	-1.488	No	Yes	Pass (2.42)
(HP) 45.677	0.774	-3.810	-2.038	2.178	-1.264	-1.632	No	Yes	Pass (2.21)
(0.6L _s) 46.125	0.754	-3.791	-2.026	2.162	-1.272	-1.629	No	Yes	Pass (2.21)
(0.7L _s) 53.812	0.420	-3.456	-1.729	1.770	-1.309	-1.686	No	Yes	Pass (2.14)
(0.8L _s) 61.500	0.084	-3.106	-1.252	1.164	-1.167	-1.941	No	Yes	Pass (1.85)
(0.9L _s) 69.187	-0.248	-2.752	-0.598	0.335	-0.846	-2.417	No	Yes	Pass (1.49)
(PSXFR) 73.406	-0.429	-2.559	-0.165	-0.218	-0.594	-2.777	No	Yes	Pass (1.30)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.6f'_c = -4.800 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 6.225 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.328	0.305	-0.762	-2.281	No	Yes	Pass (2.10)
(0.1L _s) 7.687	-0.212	-2.819	-0.904	0.835	-1.116	-1.984	No	Yes	Pass (2.42)
(0.2L _s) 15.375	0.124	-3.172	-1.593	1.454	-1.469	-1.718	No	Yes	Pass (2.79)
(0.3L _s) 23.062	0.461	-3.516	-2.069	1.856	-1.608	-1.660	No	Yes	Pass (2.89)
(HP) 30.313	0.776	-3.823	-2.329	2.037	-1.553	-1.786	No	Yes	Pass (2.69)
(0.4L _s) 30.750	0.776	-3.824	-2.339	2.041	-1.562	-1.782	No	Yes	Pass (2.69)
(0.5L _s) 38.437	0.777	-3.827	-2.401	2.012	-1.624	-1.816	No	Yes	Pass (2.64)
(HP) 45.677	0.774	-3.810	-2.275	1.787	-1.501	-2.022	No	Yes	Pass (2.37)
(0.6L _s) 46.125	0.754	-3.791	-2.261	1.767	-1.507	-2.024	No	Yes	Pass (2.37)
(0.7L _s) 53.812	0.420	-3.456	-1.912	1.309	-1.492	-2.147	No	Yes	Pass (2.24)
(0.8L _s) 61.500	0.084	-3.106	-1.361	0.636	-1.277	-2.469	No	Yes	Pass (1.94)
(0.9L _s) 69.187	-0.248	-2.752	-0.640	-0.388	-0.888	-3.140	No	Yes	Pass (1.53)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 73.406	-0.429	-2.559	-0.179	-1.176	-0.609	-3.735	No	Yes	Pass (1.29)

Interval 17: Open to Traffic : Service I Tension without live load**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000$ KSI

Concrete strength required to satisfy this requirement = 6.225 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.586	-0.284	0.338	-0.718	-2.248	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.819	-0.786	0.931	-0.998	-1.888	No	Yes	Pass (-)
(0.2L _s) 15.375	0.124	-3.172	-1.391	1.639	-1.267	-1.532	No	Yes	Pass (-)
(0.3L _s) 23.062	0.461	-3.516	-1.815	2.124	-1.353	-1.392	No	Yes	Pass (-)
(HP) 30.313	0.776	-3.823	-2.049	2.377	-1.273	-1.445	No	Yes	Pass (-)
(0.4L _s) 30.750	0.776	-3.824	-2.058	2.386	-1.282	-1.437	No	Yes	Pass (-)
(0.5L _s) 38.437	0.777	-3.827	-2.122	2.426	-1.345	-1.401	No	Yes	Pass (-)
(HP) 45.677	0.774	-3.810	-2.018	2.261	-1.245	-1.549	No	Yes	Pass (-)
(0.6L _s) 46.125	0.754	-3.791	-2.006	2.245	-1.252	-1.547	No	Yes	Pass (-)
(0.7L _s) 53.812	0.420	-3.456	-1.712	1.842	-1.292	-1.613	No	Yes	Pass (-)
(0.8L _s) 61.500	0.084	-3.106	-1.238	1.220	-1.154	-1.886	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.248	-2.752	-0.584	0.390	-0.833	-2.362	No	Yes	Pass (-)
(PSXFR) 73.406	-0.429	-2.559	-0.148	-0.149	-0.577	-2.708	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.586	-0.280	0.483	-0.714	-2.103	No	Yes	Pass (-)
(0.1L _s) 7.687	-0.212	-2.819	-0.774	1.322	-0.986	-1.498	No	Yes	Pass (-)
(0.2L _s) 15.375	0.124	-3.172	-1.367	2.299	-1.243	-0.872	No	Yes	Pass (-)
(0.3L _s) 23.062	0.461	-3.516	-1.779	2.940	-1.318	-0.576	No	Yes	Pass (-)
(HP) 30.313	0.776	-3.823	-2.002	3.262	-1.226	-0.561	No	Yes	Pass (-)
(0.4L _s) 30.750	0.776	-3.824	-2.011	3.272	-1.234	-0.552	No	Yes	Pass (-)
(0.5L _s) 38.437	0.777	-3.827	-2.062	3.295	-1.284	-0.532	No	Yes	Pass (-)
(HP) 45.677	0.774	-3.810	-1.945	3.048	-1.172	-0.762	No	Yes	Pass (-)
(0.6L _s) 46.125	0.754	-3.791	-1.933	3.024	-1.179	-0.767	No	Yes	Pass (-)
(0.7L _s) 53.812	0.420	-3.456	-1.625	2.445	-1.205	-1.011	No	Yes	Pass (-)
(0.8L _s) 61.500	0.084	-3.106	-1.137	1.577	-1.053	-1.529	No	Yes	Pass (-)
(0.9L _s) 69.187	-0.248	-2.752	-0.445	0.527	-0.693	-2.225	No	Yes	Pass (-)
(PSXFR) 73.406	-0.429	-2.559	0.038	-0.103	-0.392	-2.662	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression

Fatigue I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.4f'_c = -3.200$ KSI

Concrete strength required to satisfy this requirement = 4.151 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.586	-0.163	0.154	-0.380	-1.139	No	Yes	Pass (2.81)
(0.1L _s) 7.687	-0.212	-2.819	-0.449	0.421	-0.555	-0.989	No	Yes	Pass (3.24)
(0.2L _s) 15.375	0.124	-3.172	-0.789	0.733	-0.727	-0.853	No	Yes	Pass (3.75)
(0.3L _s) 23.062	0.461	-3.516	-1.025	0.937	-0.794	-0.821	No	Yes	Pass (3.90)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 30.313	0.776	-3.823	-1.150	1.031	-0.762	-0.881	No	Yes	Pass (3.63)
(0.4L _s) 30.750	0.776	-3.824	-1.155	1.033	-0.767	-0.879	No	Yes	Pass (3.64)
(0.5L _s) 38.437	0.777	-3.827	-1.182	1.022	-0.794	-0.892	No	Yes	Pass (3.59)
(HP) 45.677	0.774	-3.810	-1.126	0.912	-0.739	-0.993	No	Yes	Pass (3.22)
(0.6L _s) 46.125	0.754	-3.791	-1.119	0.903	-0.742	-0.993	No	Yes	Pass (3.22)
(0.7L _s) 53.812	0.420	-3.456	-0.950	0.676	-0.740	-1.051	No	Yes	Pass (3.04)
(0.8L _s) 61.500	0.084	-3.106	-0.676	0.344	-0.634	-1.209	No	Yes	Pass (2.65)
(0.9L _s) 69.187	-0.248	-2.752	-0.303	-0.095	-0.427	-1.471	No	Yes	Pass (2.18)
(PSXFR) 73.406	-0.429	-2.559	-0.082	-0.381	-0.297	-1.660	No	Yes	Pass (1.93)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2144.93	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.687	1585.70	4508.64	2108.98	Pass (2.14)	Pass (2.84)
(0.2L _s) 15.375	2729.75	5434.20	3630.57	Pass (1.50)	Pass (1.99)
(0.3L _s) 23.062	3445.99	5786.42	3978.09	Pass (1.45)	Pass (1.68)
(0.4L _s) 30.750	3794.25	6111.81	4207.66	Pass (1.45)	Pass (1.61)
(0.5L _s) 38.437	3772.57	6107.53	4185.54	Pass (1.46)	Pass (1.62)
(0.6L _s) 46.125	3409.07	6082.76	4175.95	Pass (1.46)	Pass (1.78)
(0.7L _s) 53.812	2676.85	5724.21	3560.21	Pass (1.61)	Pass (2.14)
(0.8L _s) 61.500	1641.92	5363.07	2183.76	Pass (2.46)	Pass (3.27)
(0.9L _s) 69.187	523.52	4341.03	696.28	Pass (6.23)	Pass (8.29)
(1.0L _s) 76.875	-391.56	1889.75	-520.78	Pass (-)	Pass (-)

Positive Moment Capacity for Strength II Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2144.93	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.687	1496.73	4508.64	2108.98	Pass (2.14)	Pass (3.01)
(0.2L _s) 15.375	2560.79	5434.20	3630.57	Pass (1.50)	Pass (2.12)
(0.3L _s) 23.062	3236.33	5786.42	3978.09	Pass (1.45)	Pass (1.79)
(0.4L _s) 30.750	3559.90	6111.81	4207.66	Pass (1.45)	Pass (1.72)
(0.5L _s) 38.437	3567.90	6107.53	4185.54	Pass (1.46)	Pass (1.71)
(0.6L _s) 46.125	3195.19	6082.76	4175.95	Pass (1.46)	Pass (1.90)
(0.7L _s) 53.812	2495.48	5724.21	3560.21	Pass (1.61)	Pass (2.29)
(0.8L _s) 61.500	1503.56	5363.07	2183.76	Pass (2.46)	Pass (3.57)
(0.9L _s) 69.187	243.88	4341.03	696.28	Pass (6.23)	Pass (10+)
(1.0L _s) 76.875	-391.56	1889.75	-520.78	Pass (-)	Pass (-)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5725.14	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.21	-5721.19	1.00	Pass (-)	Pass (-)
(0.1L _s) 7.687	-10.20	-5643.33	-13.56	Pass (10+)	Pass (10+)
(0.2L _s) 15.375	-51.66	-5578.58	-68.71	Pass (10+)	Pass (10+)
(0.3L _s) 23.062	-124.39	-5529.86	-165.44	Pass (10+)	Pass (10+)
(0.4L _s) 30.750	-228.39	-5203.53	-303.76	Pass (10+)	Pass (10+)
(0.5L _s) 38.437	-363.66	-5193.69	-483.66	Pass (10+)	Pass (10+)
(0.6L _s) 46.125	-530.19	-5203.40	-705.15	Pass (7.38)	Pass (9.81)
(0.7L _s) 53.812	-727.99	-5232.92	-968.23	Pass (5.40)	Pass (7.19)
(0.8L _s) 61.500	-985.64	-5280.06	-1173.55	Pass (4.50)	Pass (5.36)
(0.9L _s) 69.187	-1532.81	-5344.11	-1164.74	Pass (4.59)	Pass (3.49)
(FoS) 75.656	-2467.37	-5100.21	-1157.31	Pass (4.41)	Pass (2.07)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(1.0L _s) 76.875	-2646.23	-4106.51	-1155.90	Pass (3.55)	Pass (1.55)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5725.14	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.75	-5721.19	1.00	Pass (-)	Pass (-)
(0.1L _s) 7.687	2.35	-5643.33	-13.56	Pass (10+)	Pass (-)
(0.2L _s) 15.375	-26.58	-5578.58	-68.71	Pass (10+)	Pass (10+)
(0.3L _s) 23.062	-86.77	-5529.86	-165.44	Pass (10+)	Pass (10+)
(0.4L _s) 30.750	-178.23	-5203.53	-303.76	Pass (10+)	Pass (10+)
(0.5L _s) 38.437	-300.95	-5193.69	-483.66	Pass (10+)	Pass (10+)
(0.6L _s) 46.125	-454.95	-5203.40	-705.15	Pass (7.38)	Pass (10+)
(0.7L _s) 53.812	-640.21	-5232.92	-968.23	Pass (5.40)	Pass (8.17)
(0.8L _s) 61.500	-885.23	-5280.06	-1173.55	Pass (4.50)	Pass (5.96)
(0.9L _s) 69.187	-1275.43	-5344.11	-1164.74	Pass (4.59)	Pass (4.19)
(FoS) 75.656	-2041.06	-5100.21	-1157.31	Pass (4.41)	Pass (2.50)
(1.0L _s) 76.875	-2181.58	-4106.51	-1155.90	Pass (3.55)	Pass (1.88)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n / V_u$)
(CS) 3.924	Yes	Yes	235.81	569.37	Pass (2.41)
(SZB) 5.003	Yes	Yes	229.06	417.84	Pass (1.82)
(1.5H) 5.583	Yes	Yes	225.44	421.17	Pass (1.87)
(0.1L _s) 7.687	Yes	Yes	212.39	405.82	Pass (1.91)
(SZB) 10.503	Yes	Yes	195.09	307.79	Pass (1.58)
(0.2L _s) 15.375	Yes	Yes	165.71	315.93	Pass (1.91)
(SZB) 18.753	Yes	Yes	145.75	274.85	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.89)
(0.3L _s) 23.062	Yes	Yes	120.76	280.60	Pass (2.32)
(SZB) 29.753	Yes	Yes	83.40	244.72	Pass (2.93)
(HP) 30.313	Yes	Yes	80.44	245.79	Pass (3.06)
(0.4L _s) 30.750	Yes	Yes	78.14	220.35	Pass (2.82)
(0.5L _s) 38.437	Yes	Yes	89.25	219.88	Pass (2.46)
(HP) 45.677	Yes	Yes	130.57	247.70	Pass (1.90)
(0.6L _s) 46.125	Yes	Yes	133.11	247.13	Pass (1.86)
(SZB) 46.237	Yes	Yes	133.75	246.99	Pass (1.85)
(0.7L _s) 53.812	Yes	Yes	176.73	286.96	Pass (1.62)
(SZB) 57.237	Yes	Yes	196.01	285.37	Pass (1.46)
(0.8L _s) 61.500	Yes	Yes	219.83	329.68	Pass (1.50)
(SZB) 65.487	Yes	Yes	241.90	324.15	Pass (1.34)
(0.9L _s) 69.187	Yes	Yes	262.10	426.46	Pass (1.63)
(1.5H) 70.406	Yes	Yes	268.71	418.66	Pass (1.56)
(SZB) 70.987	Yes	Yes	271.85	424.91	Pass (1.56)
(CS) 71.653	Yes	Yes	275.45	568.34	Pass (2.06)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.003	Yes	Yes	219.06	419.70	Pass (1.92)
(1.5H) 5.583	Yes	Yes	215.63	423.21	Pass (1.96)
(0.1L _s) 7.687	Yes	Yes	203.20	408.27	Pass (2.01)
(SZB) 10.503	Yes	Yes	186.64	310.53	Pass (1.66)
(0.2L _s) 15.375	Yes	Yes	158.35	319.44	Pass (2.02)
(SZB) 18.753	Yes	Yes	138.98	278.29	Pass (2.00)
(0.3L _s) 23.062	Yes	Yes	114.65	284.29	Pass (2.48)

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 29.753	Yes	Yes	77.99	248.68	Pass (3.19)
(HP) 30.313	No	Yes	75.08	249.68	Pass (3.33)
(0.4L _s) 30.750	Yes	Yes	72.82	224.10	Pass (3.08)
(0.5L _s) 38.437	Yes	Yes	77.37	223.54	Pass (2.89)
(HP) 45.677	Yes	Yes	123.03	251.46	Pass (2.04)
(0.6L _s) 46.125	Yes	Yes	125.79	250.86	Pass (1.99)
(SZB) 46.237	Yes	Yes	126.47	250.71	Pass (1.98)
(0.7L _s) 53.812	Yes	Yes	171.75	290.48	Pass (1.69)
(SZB) 57.237	Yes	Yes	191.41	288.74	Pass (1.51)
(0.8L _s) 61.500	Yes	Yes	215.11	333.04	Pass (1.55)
(SZB) 65.487	Yes	Yes	236.55	328.66	Pass (1.39)
(0.9L _s) 69.187	Yes	Yes	255.72	436.12	Pass (1.71)
(1.5H) 70.406	Yes	Yes	261.90	428.87	Pass (1.64)
(SZB) 70.987	Yes	Yes	264.83	436.38	Pass (1.65)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.01	191.65	5.7.3.5-2	Pass (2.21)
(SZB) 1.337	585.14	191.65	5.7.3.5-2	Pass (3.05)
(Bar Develop.) 1.705	644.40	191.65	5.7.3.5-2	Pass (3.36)
(Bar Develop.) 2.765	779.86	191.65	5.7.3.5-2	Pass (4.07)
(H) 3.833	811.50	191.65	5.7.3.5-2	Pass (4.23)
(CS) 3.924	814.18	431.46	5.7.3.5-1	Pass (1.89)
(SZB) 5.003	846.23	496.39	5.7.3.5-1	Pass (1.70)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(1.5H) 5.583	956.79	526.05	5.7.3.5-1	Pass (1.82)
(0.1L _s) 7.687	1126.61	641.39	5.7.3.5-1	Pass (1.76)
(SZB) 10.503	1338.75	805.17	5.7.3.5-1	Pass (1.66)
(0.2L _s) 15.375	1654.62	938.57	5.7.3.5-1	Pass (1.76)
(SZB) 18.753	1658.09	1015.36	5.7.3.5-1	Pass (1.63)
(0.3L _s) 23.062	1661.83	1048.55	5.7.3.5-1	Pass (1.58)
(SZB) 29.753	1664.48	1052.33	5.7.3.5-1	Pass (1.58)
(HP) 30.313	1664.52	1048.80	5.7.3.5-1	Pass (1.59)
(0.4L _s) 30.750	1664.52	1097.05	5.7.3.5-1	Pass (1.52)
(0.5L _s) 38.437	1664.48	1103.06	5.7.3.5-1	Pass (1.51)
(HP) 45.677	1664.37	1041.78	5.7.3.5-1	Pass (1.60)
(0.6L _s) 46.125	1664.27	1041.84	5.7.3.5-1	Pass (1.60)
(SZB) 46.237	1664.24	1041.80	5.7.3.5-1	Pass (1.60)
(0.7L _s) 53.812	1659.45	934.89	5.7.3.5-1	Pass (1.78)
(SZB) 57.237	1655.76	872.31	5.7.3.5-1	Pass (1.90)
(0.8L _s) 61.500	1651.12	720.79	5.7.3.5-1	Pass (2.29)
(SZB) 65.487	1336.36	594.44	5.7.3.5-1	Pass (2.25)
(0.9L _s) 69.187	1598.40	533.01	5.7.3.5-1	Pass (3.00)
(1.5H) 70.406	1598.40	596.53	5.7.3.5-1	Pass (2.68)
(SZB) 70.987	1504.80	626.19	5.7.3.5-1	Pass (2.40)
(CS) 71.653	1504.80	660.12	5.7.3.5-1	Pass (2.28)
(H) 72.156	1504.80	684.57	5.7.3.5-1	Pass (2.20)
(Bar Develop.) 73.224	1504.80	743.11	5.7.3.5-1	Pass (2.02)
(Bar Develop.) 74.285	1487.20	805.67	5.7.3.5-1	Pass (1.85)
(SZB) 74.653	1472.77	827.65	5.7.3.5-1	Pass (1.78)
(FoS) 75.656	1433.42	888.32	5.7.3.5-1	Pass (1.61)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.01	181.41	5.7.3.5-2	Pass (2.33)
(SZB) 1.337	585.14	181.41	5.7.3.5-2	Pass (3.23)
(Bar Develop.) 1.705	644.40	181.41	5.7.3.5-2	Pass (3.55)
(Bar Develop.) 2.765	779.86	181.41	5.7.3.5-2	Pass (4.30)
(H) 3.833	811.50	181.41	5.7.3.5-2	Pass (4.47)
(SZB) 5.003	846.23	470.22	5.7.3.5-1	Pass (1.80)
(1.5H) 5.583	956.79	498.07	5.7.3.5-1	Pass (1.92)
(0.1L _s) 7.687	1126.61	605.85	5.7.3.5-1	Pass (1.86)
(SZB) 10.503	1338.75	749.81	5.7.3.5-1	Pass (1.79)
(0.2L _s) 15.375	1654.62	880.86	5.7.3.5-1	Pass (1.88)
(SZB) 18.753	1658.09	947.18	5.7.3.5-1	Pass (1.75)
(0.3L _s) 23.062	1661.83	983.36	5.7.3.5-1	Pass (1.69)
(SZB) 29.753	1664.48	981.40	5.7.3.5-1	Pass (1.70)
(HP) 30.313	1664.52	979.56	5.7.3.5-1	Pass (1.70)
(0.4L _s) 30.750	1664.52	1029.15	5.7.3.5-1	Pass (1.62)
(0.5L _s) 38.437	1664.48	1036.51	5.7.3.5-1	Pass (1.61)
(HP) 45.677	1664.37	968.74	5.7.3.5-1	Pass (1.72)
(0.6L _s) 46.125	1664.27	969.40	5.7.3.5-1	Pass (1.72)
(SZB) 46.237	1664.24	969.51	5.7.3.5-1	Pass (1.72)
(0.7L _s) 53.812	1659.45	872.99	5.7.3.5-1	Pass (1.90)
(SZB) 57.237	1655.76	815.20	5.7.3.5-1	Pass (2.03)
(0.8L _s) 61.500	1651.12	669.15	5.7.3.5-1	Pass (2.47)
(SZB) 65.487	1336.36	525.83	5.7.3.5-1	Pass (2.54)
(0.9L _s) 69.187	1598.40	457.22	5.7.3.5-1	Pass (3.50)
(1.5H) 70.406	1598.40	511.98	5.7.3.5-1	Pass (3.12)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 70.987	1504.80	539.00	5.7.3.5-1	Pass (2.79)
(H) 72.156	1504.80	590.55	5.7.3.5-1	Pass (2.55)
(Bar Develop.) 73.224	1504.80	641.28	5.7.3.5-1	Pass (2.35)
(Bar Develop.) 74.285	1487.20	695.71	5.7.3.5-1	Pass (2.14)
(SZB) 74.653	1472.77	714.79	5.7.3.5-1	Pass (2.06)
(FoS) 75.656	1433.42	767.32	5.7.3.5-1	Pass (1.87)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	64.543	142.585	Pass (2.21)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	64.543	142.585	Pass (2.21)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	64.538	142.584	Pass (2.21)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	64.522	142.583	Pass (2.21)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	64.516	142.583	Pass (2.21)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	64.499	142.582	Pass (2.21)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	64.482	142.581	Pass (2.21)
(CS) 3.924	12.000	48.000	Pass	0.220	0.000	Pass	64.480	142.581	Pass (2.21)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	62.619	142.580	Pass (2.28)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	61.621	142.579	Pass (2.31)
(0.1L _s) 7.687	12.000	48.000	Pass	0.220	0.000	Pass	58.022	142.577	Pass (2.46)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	53.259	146.535	Pass (2.75)
(0.2L _s) 15.375	9.000	48.000	Pass	0.293	0.000	Pass	45.181	146.530	Pass (3.24)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	39.705	142.567	Pass (3.59)
(0.3L _s) 23.062	12.000	48.000	Pass	0.220	0.000	Pass	32.861	142.563	Pass (4.34)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	22.654	138.597	Pass (6.12)
(HP) 30.313	18.000	48.000	Pass	0.147	0.000	Pass	21.847	138.597	Pass (6.34)
(0.4L _s) 30.750	18.000	48.000	Pass	0.147	0.000	Pass	21.218	138.596	Pass (6.53)
(0.5L _s) 38.437	18.000	48.000	Pass	0.147	0.000	Pass	24.187	138.589	Pass (5.73)
(HP) 45.677	18.000	48.000	Pass	0.147	0.000	Pass	35.313	138.582	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(3.92)
(0.6L _s) 46.125	18.000	48.000	Pass	0.147	0.000	Pass	35.996	138.582	Pass (3.85)
(SZB) 46.237	18.000	48.000	Pass	0.147	0.000	Pass	36.167	138.582	Pass (3.83)
(0.7L _s) 53.812	12.000	48.000	Pass	0.220	0.000	Pass	47.689	142.535	Pass (2.99)
(SZB) 57.237	12.000	48.000	Pass	0.220	0.000	Pass	52.841	142.532	Pass (2.70)
(0.8L _s) 61.500	9.000	48.000	Pass	0.293	0.000	Pass	59.189	146.488	Pass (2.47)
(SZB) 65.487	9.000	48.000	Pass	0.293	0.000	Pass	65.056	146.484	Pass (2.25)
(0.9L _s) 69.187	12.000	48.000	Pass	0.220	0.000	Pass	70.412	142.521	Pass (2.02)
(1.5H) 70.406	12.000	48.000	Pass	0.220	0.000	Pass	72.162	142.520	Pass (1.98)
(SZB) 70.987	12.000	48.000	Pass	0.220	0.000	Pass	72.993	142.519	Pass (1.95)
(CS) 71.653	12.000	48.000	Pass	0.220	0.000	Pass	73.944	142.518	Pass (1.93)
(H) 72.156	12.000	48.000	Pass	0.220	0.000	Pass	73.933	142.518	Pass (1.93)
(Bar Develop.) 73.224	12.000	48.000	Pass	0.220	0.000	Pass	73.909	142.517	Pass (1.93)
(Bar Develop.) 74.285	12.000	48.000	Pass	0.220	0.000	Pass	73.886	142.516	Pass (1.93)
(SZB) 74.653	12.000	48.000	Pass	0.220	0.000	Pass	73.878	142.516	Pass (1.93)
(FoS) 75.656	12.000	48.000	Pass	0.220	0.000	Pass	73.856	142.515	Pass (1.93)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	61.711	142.585	Pass (2.31)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	61.711	142.585	Pass (2.31)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	61.706	142.584	Pass (2.31)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	61.691	142.583	Pass (2.31)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	61.685	142.583	Pass (2.31)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	61.669	142.582	Pass (2.31)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	61.653	142.581	Pass (2.31)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	59.885	142.580	Pass (2.38)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	58.938	142.579	Pass (2.42)
	12.000	48.000	Pass	0.220	0.000	Pass	55.512	142.577	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.1L _s) 7.687									(2.57)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	50.950	146.535	Pass (2.88)
(0.2L _s) 15.375	9.000	48.000	Pass	0.293	0.000	Pass	43.176	146.530	Pass (3.39)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	37.860	142.567	Pass (3.77)
(0.3L _s) 23.062	12.000	48.000	Pass	0.220	0.000	Pass	31.197	142.563	Pass (4.57)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	21.185	138.597	Pass (6.54)
(HP) 30.313	18.000	48.000	Pass	0.147	0.000	Pass	20.392	138.597	Pass (6.80)
(0.4L _s) 30.750	18.000	48.000	Pass	0.147	0.000	Pass	19.774	138.596	Pass (7.01)
(0.5L _s) 38.437	18.000	48.000	Pass	0.147	0.000	Pass	20.967	138.589	Pass (6.61)
(HP) 45.677	18.000	48.000	Pass	0.147	0.000	Pass	33.275	138.582	Pass (4.16)
(0.6L _s) 46.125	18.000	48.000	Pass	0.147	0.000	Pass	34.016	138.582	Pass (4.07)
(SZB) 46.237	18.000	48.000	Pass	0.147	0.000	Pass	34.200	138.582	Pass (4.05)
(0.7L _s) 53.812	12.000	48.000	Pass	0.220	0.000	Pass	46.345	142.535	Pass (3.08)
(SZB) 57.237	12.000	48.000	Pass	0.220	0.000	Pass	51.601	142.532	Pass (2.76)
(0.8L _s) 61.500	9.000	48.000	Pass	0.293	0.000	Pass	57.920	146.488	Pass (2.53)
(SZB) 65.487	9.000	48.000	Pass	0.293	0.000	Pass	63.618	146.484	Pass (2.30)
(0.9L _s) 69.187	12.000	48.000	Pass	0.220	0.000	Pass	68.697	142.521	Pass (2.07)
(1.5H) 70.406	12.000	48.000	Pass	0.220	0.000	Pass	70.333	142.520	Pass (2.03)
(SZB) 70.987	12.000	48.000	Pass	0.220	0.000	Pass	71.107	142.519	Pass (2.00)
(H) 72.156	12.000	48.000	Pass	0.220	0.000	Pass	71.980	142.518	Pass (1.98)
(Bar Develop.) 73.224	12.000	48.000	Pass	0.220	0.000	Pass	71.957	142.517	Pass (1.98)
(Bar Develop.) 74.285	12.000	48.000	Pass	0.220	0.000	Pass	71.935	142.516	Pass (1.98)
(SZB) 74.653	12.000	48.000	Pass	0.220	0.000	Pass	71.927	142.516	Pass (1.98)
(FoS) 75.656	12.000	48.000	Pass	0.220	0.000	Pass	71.905	142.515	Pass (1.98)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.153 in

Minimum live load deflection along girder = -0.221 in

Maximum live load deflection along girder = 0.093 in

Status = **Pass**

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 3.924	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.687	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.375	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.062	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.313	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.750	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.437	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 45.677	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.125	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.237	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.812	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.237	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.500	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 65.487	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.187	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 70.406	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 70.987	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 71.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 72.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.224	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.285	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 74.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 75.656	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.687	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.375	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.062	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.313	#4	18.000	18.000	1.500	0.267	0.000	Pass
(0.4L _s) 30.750	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.437	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 45.677	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.125	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.237	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.812	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.237	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.500	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 65.487	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.187	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 70.406	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 70.987	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 72.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.224	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.285	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 74.653	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 75.656	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.33	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be

equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
1	F	12.300	11.500	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
1	F	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.098
Lower Bound Camber at 60 days, 50% of D_{60}	1.653
Average Camber at 60 days, 75% of D_{60}	2.479
Upper Bound Camber at 60 days, D_{60}	3.306

Spec Check Report

For

Span 1 Girder G

March 14, 2021 2:29:10 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.532	Pass (1.20)	162.532	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.281 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.243 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.066	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.281 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	No	Yes	Pass (1.35)
7.330	(0.1L _r) 7.747	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	No	Yes	Pass (1.34)
15.077	(0.2L _r) 15.494	0.121	-3.623	-0.581	0.589	-0.460	-3.034	No	Yes	Pass (1.29)
22.824	(0.3L _r) 23.241	0.503	-3.980	-0.763	0.773	-0.259	-3.206	No	Yes	Pass (1.22)
(HP) 30.571	(HP, 0.4L _r) 30.987	0.876	-4.317	-0.871	0.884	0.005	-3.433	No	Yes	Pass (1.14)
38.318		0.877	-4.320	-0.908	0.921	-0.031	-3.400	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.734									(1.15)
(HP) 46.064	(HP, 0.6L _r) 46.481	0.876	-4.317	-0.871	0.884	0.005	-3.433	No	Yes	Pass (1.14)
53.811	(0.7L _r) 54.228	0.503	-3.980	-0.763	0.773	-0.259	-3.206	No	Yes	Pass (1.22)
61.558	(0.8L _r) 61.975	0.121	-3.623	-0.581	0.589	-0.460	-3.034	No	Yes	Pass (1.29)
69.305	(0.9L _r) 69.722	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	No	Yes	Pass (1.34)
(PSXFR) 74.052	(PSXFR) 74.468	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	No	Yes	Pass (1.35)
(STLF) 77.052	(STLF, 1.0L _r) 77.468	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.281 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	0.200	-	No	Yes	Pass (-)
7.330	(0.1L _r) 7.747	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	0.200	-	No	Yes	Pass (-)
15.077	(0.2L _r) 15.494	0.121	-3.623	-0.581	0.589	-0.460	-3.034	0.200	-	No	Yes	Pass (-)
22.824	(0.3L _r) 23.241	0.503	-3.980	-0.763	0.773	-0.259	-3.206	0.200	-	No	Yes	Pass (-)
(HP) 30.571	(HP, 0.4L _r) 30.987	0.876	-4.317	-0.871	0.884	0.005	-3.433	0.200	-	No	Yes	Pass (10+)
38.318	(0.5L _r) 38.734	0.877	-4.320	-0.908	0.921	-0.031	-3.400	0.200	-	No	Yes	Pass (-)
(HP) 46.064	(HP, 0.6L _r) 46.481	0.876	-4.317	-0.871	0.884	0.005	-3.433	0.200	-	No	Yes	Pass (10+)
53.811	(0.7L _r) 54.228	0.503	-3.980	-0.763	0.773	-0.259	-3.206	0.200	-	No	Yes	Pass (-)
61.558	(0.8L _r) 61.975	0.121	-3.623	-0.581	0.589	-0.460	-3.034	0.200	-	No	Yes	Pass (-)
69.305	(0.9L _r) 69.722	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.052	(PSXFR) 74.468	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	0.200	-	No	Yes	Pass (-)
(STLF) 77.052	(STLF, 1.0L _r) 77.468	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.129 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.582	-0.274	0.278	-0.708	-2.304	No	Yes	Pass (1.56)
(0.1L _s) 7.753	-0.212	-2.811	-0.764	0.775	-0.975	-2.036	No	Yes	Pass (1.77)
(0.2L _s) 15.506	0.123	-3.153	-1.353	1.372	-1.229	-1.781	No	Yes	Pass (2.02)
(0.3L _s) 23.258	0.458	-3.489	-1.768	1.794	-1.311	-1.695	No	Yes	Pass (2.12)
(HP) 30.571	0.769	-3.789	-2.002	2.031	-1.233	-1.758	No	Yes	Pass (2.05)
(0.4L _s) 31.011	0.770	-3.790	-2.012	2.040	-1.242	-1.750	No	Yes	Pass (2.06)
(0.5L _s) 38.764	0.771	-3.798	-2.084	2.114	-1.312	-1.685	No	Yes	Pass (2.14)
(HP) 46.064	0.769	-3.789	-1.996	2.024	-1.226	-1.764	No	Yes	Pass (2.04)
(0.6L _s) 46.517	0.750	-3.771	-1.985	2.014	-1.235	-1.757	No	Yes	Pass (2.05)
(0.7L _s) 54.270	0.419	-3.450	-1.717	1.742	-1.298	-1.708	No	Yes	Pass (2.11)
(0.8L _s) 62.022	0.085	-3.113	-1.280	1.299	-1.196	-1.815	No	Yes	Pass (1.98)
(0.9L _s) 69.775	-0.250	-2.771	-0.675	0.685	-0.925	-2.086	No	Yes	Pass (1.73)
(PSXFR) 74.052	-0.434	-2.582	-0.270	0.274	-0.704	-2.308	No	Yes	Pass (1.56)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.129 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 2.583	-0.434	-2.582	-0.274	0.278	-0.708	-2.304	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.811	-0.764	0.775	-0.975	-2.036	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.506	0.123	-3.153	-1.353	1.372	-1.229	-1.781	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.258	0.458	-3.489	-1.768	1.794	-1.311	-1.695	-	0.537	No	Yes	Pass (-)
(HP) 30.571	0.769	-3.789	-2.002	2.031	-1.233	-1.758	-	0.537	No	Yes	Pass (-)
(0.4L _s) 31.011	0.770	-3.790	-2.012	2.040	-1.242	-1.750	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.764	0.771	-3.798	-2.084	2.114	-1.312	-1.685	-	0.537	No	Yes	Pass (-)
(HP) 46.064	0.769	-3.789	-1.996	2.024	-1.226	-1.764	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.517	0.750	-3.771	-1.985	2.014	-1.235	-1.757	-	0.537	No	Yes	Pass (-)
(0.7L _s) 54.270	0.419	-3.450	-1.717	1.742	-1.298	-1.708	-	0.537	No	Yes	Pass (-)
(0.8L _s) 62.022	0.085	-3.113	-1.280	1.299	-1.196	-1.815	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.250	-2.771	-0.675	0.685	-0.925	-2.086	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.052	-0.434	-2.582	-0.270	0.274	-0.704	-2.308	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.243 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.288	0.328	-0.723	-2.256	No	Yes	Pass (1.60)
(0.1L _s) 7.753	-0.212	-2.820	-0.801	0.911	-1.014	-1.909	No	Yes	Pass (1.89)
(0.2L _s) 15.506	0.124	-3.173	-1.417	1.602	-1.293	-1.571	No	Yes	Pass (2.29)
(0.3L _s) 23.258	0.462	-3.518	-1.849	2.074	-1.388	-1.443	No	Yes	Pass (2.49)
(HP) 30.571	0.777	-3.825	-2.088	2.320	-1.312	-1.506	No	Yes	Pass (2.39)
(0.4L _s) 31.011	0.777	-3.826	-2.098	2.328	-1.321	-1.498	No	Yes	Pass (2.40)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.5L _s) 38.764	0.778	-3.830	-2.163	2.365	-1.385	-1.465	No	Yes	Pass (2.46)
(HP) 46.064	0.774	-3.812	-2.057	2.201	-1.283	-1.611	No	Yes	Pass (2.23)
(0.6L _s) 46.517	0.755	-3.794	-2.045	2.185	-1.291	-1.609	No	Yes	Pass (2.24)
(0.7L _s) 54.270	0.420	-3.457	-1.746	1.789	-1.326	-1.669	No	Yes	Pass (2.16)
(0.8L _s) 62.022	0.084	-3.106	-1.265	1.177	-1.180	-1.929	No	Yes	Pass (1.87)
(0.9L _s) 69.775	-0.248	-2.752	-0.604	0.339	-0.853	-2.413	No	Yes	Pass (1.49)
(PSXFR) 74.052	-0.430	-2.558	-0.165	-0.224	-0.595	-2.782	No	Yes	Pass (1.29)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.6f'_c = -4.800 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 6.243 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.329	0.306	-0.764	-2.278	No	Yes	Pass (2.11)
(0.1L _s) 7.753	-0.212	-2.820	-0.913	0.846	-1.126	-1.974	No	Yes	Pass (2.43)
(0.2L _s) 15.506	0.124	-3.173	-1.609	1.471	-1.485	-1.702	No	Yes	Pass (2.82)
(0.3L _s) 23.258	0.462	-3.518	-2.089	1.877	-1.627	-1.641	No	Yes	Pass (2.93)
(HP) 30.571	0.777	-3.825	-2.351	2.060	-1.574	-1.765	No	Yes	Pass (2.72)
(0.4L _s) 31.011	0.777	-3.826	-2.361	2.065	-1.584	-1.761	No	Yes	Pass (2.73)
(0.5L _s) 38.764	0.778	-3.830	-2.424	2.035	-1.646	-1.795	No	Yes	Pass (2.67)
(HP) 46.064	0.774	-3.812	-2.296	1.809	-1.522	-2.004	No	Yes	Pass (2.40)
(0.6L _s) 46.517	0.755	-3.794	-2.282	1.788	-1.527	-2.005	No	Yes	Pass (2.39)
(0.7L _s) 54.270	0.420	-3.457	-1.931	1.326	-1.511	-2.131	No	Yes	Pass (2.25)
(0.8L _s) 62.022	0.084	-3.106	-1.375	0.649	-1.290	-2.458	No	Yes	Pass (1.95)
(0.9L _s) 69.775	-0.248	-2.752	-0.647	-0.387	-0.895	-3.139	No	Yes	Pass (1.53)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 74.052	-0.430	-2.558	-0.179	-1.188	-0.609	-3.746	No	Yes	Pass (1.28)

Interval 17: Open to Traffic : Service I Tension without live load**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.243 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.435	-2.585	-0.285	0.339	-0.720	-2.245	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.820	-0.794	0.943	-1.007	-1.877	No	Yes	Pass (-)
(0.2L _s) 15.506	0.124	-3.173	-1.405	1.658	-1.281	-1.515	No	Yes	Pass (-)
(0.3L _s) 23.258	0.462	-3.518	-1.833	2.148	-1.371	-1.370	No	Yes	Pass (-)
(HP) 30.571	0.777	-3.825	-2.069	2.403	-1.292	-1.422	No	Yes	Pass (-)
(0.4L _s) 31.011	0.777	-3.826	-2.078	2.412	-1.301	-1.414	No	Yes	Pass (-)
(0.5L _s) 38.764	0.778	-3.830	-2.142	2.452	-1.365	-1.378	No	Yes	Pass (-)
(HP) 46.064	0.774	-3.812	-2.037	2.285	-1.263	-1.527	No	Yes	Pass (-)
(0.6L _s) 46.517	0.755	-3.794	-2.026	2.269	-1.271	-1.525	No	Yes	Pass (-)
(0.7L _s) 54.270	0.420	-3.457	-1.728	1.862	-1.308	-1.595	No	Yes	Pass (-)
(0.8L _s) 62.022	0.084	-3.106	-1.251	1.233	-1.167	-1.873	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.248	-2.752	-0.591	0.395	-0.839	-2.357	No	Yes	Pass (-)
(PSXFR) 74.052	-0.430	-2.558	-0.147	-0.154	-0.578	-2.712	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.435	-2.585	-0.281	0.485	-0.716	-2.100	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.820	-0.783	1.338	-0.995	-1.482	No	Yes	Pass (-)
(0.2L _s) 15.506	0.124	-3.173	-1.381	2.326	-1.257	-0.847	No	Yes	Pass (-)
(0.3L _s) 23.258	0.462	-3.518	-1.797	2.973	-1.335	-0.545	No	Yes	Pass (-)
(HP) 30.571	0.777	-3.825	-2.022	3.298	-1.245	-0.527	No	Yes	Pass (-)
(0.4L _s) 31.011	0.777	-3.826	-2.030	3.308	-1.253	-0.518	No	Yes	Pass (-)
(0.5L _s) 38.764	0.778	-3.830	-2.082	3.332	-1.304	-0.498	No	Yes	Pass (-)
(HP) 46.064	0.774	-3.812	-1.964	3.082	-1.190	-0.730	No	Yes	Pass (-)
(0.6L _s) 46.517	0.755	-3.794	-1.952	3.057	-1.197	-0.736	No	Yes	Pass (-)
(0.7L _s) 54.270	0.420	-3.457	-1.641	2.472	-1.221	-0.985	No	Yes	Pass (-)
(0.8L _s) 62.022	0.084	-3.106	-1.151	1.595	-1.066	-1.512	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.248	-2.752	-0.451	0.533	-0.700	-2.219	No	Yes	Pass (-)
(PSXFR) 74.052	-0.430	-2.558	0.039	-0.107	-0.392	-2.665	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression

Fatigue I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.4f'_c = -3.200$ KSI

Concrete strength required to satisfy this requirement = 4.159 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.164	0.154	-0.381	-1.138	No	Yes	Pass (2.81)
(0.1L _s) 7.753	-0.212	-2.820	-0.454	0.426	-0.560	-0.984	No	Yes	Pass (3.25)
(0.2L _s) 15.506	0.124	-3.173	-0.796	0.742	-0.734	-0.845	No	Yes	Pass (3.79)
(0.3L _s) 23.258	0.462	-3.518	-1.035	0.948	-0.804	-0.811	No	Yes	Pass (3.95)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 30.571	0.777	-3.825	-1.161	1.042	-0.773	-0.870	No	Yes	Pass (3.68)
(0.4L _s) 31.011	0.777	-3.826	-1.166	1.045	-0.777	-0.868	No	Yes	Pass (3.69)
(0.5L _s) 38.764	0.778	-3.830	-1.193	1.033	-0.804	-0.882	No	Yes	Pass (3.63)
(HP) 46.064	0.774	-3.812	-1.137	0.923	-0.750	-0.983	No	Yes	Pass (3.26)
(0.6L _s) 46.517	0.755	-3.794	-1.130	0.913	-0.753	-0.983	No	Yes	Pass (3.25)
(0.7L _s) 54.270	0.420	-3.457	-0.959	0.685	-0.749	-1.043	No	Yes	Pass (3.07)
(0.8L _s) 62.022	0.084	-3.106	-0.683	0.349	-0.641	-1.204	No	Yes	Pass (2.66)
(0.9L _s) 69.775	-0.248	-2.752	-0.306	-0.094	-0.430	-1.470	No	Yes	Pass (2.18)
(PSXFR) 74.052	-0.430	-2.558	-0.082	-0.385	-0.297	-1.663	No	Yes	Pass (1.92)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2145.24	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.753	1605.48	4518.91	2135.28	Pass (2.12)	Pass (2.81)
(0.2L _s) 15.506	2763.42	5436.11	3675.34	Pass (1.48)	Pass (1.97)
(0.3L _s) 23.258	3488.43	5788.29	3976.11	Pass (1.46)	Pass (1.66)
(0.4L _s) 31.011	3840.47	6113.43	4205.92	Pass (1.45)	Pass (1.59)
(0.5L _s) 38.764	3818.19	6109.27	4183.65	Pass (1.46)	Pass (1.60)
(0.6L _s) 46.517	3449.93	6084.45	4174.07	Pass (1.46)	Pass (1.76)
(0.7L _s) 54.270	2708.74	5726.23	3602.63	Pass (1.59)	Pass (2.11)
(0.8L _s) 62.022	1660.74	5364.86	2208.78	Pass (2.43)	Pass (3.23)
(0.9L _s) 69.775	529.17	4350.13	703.80	Pass (6.18)	Pass (8.22)
(1.0L _s) 77.528	-396.55	1889.84	-527.41	Pass (-)	Pass (-)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2145.24	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.753	1515.01	4518.91	2135.28	Pass (2.12)	Pass (2.98)
(0.2L _s) 15.506	2591.86	5436.11	3675.34	Pass (1.48)	Pass (2.10)
(0.3L _s) 23.258	3275.12	5788.29	3976.11	Pass (1.46)	Pass (1.77)
(0.4L _s) 31.011	3602.46	6113.43	4205.92	Pass (1.45)	Pass (1.70)
(0.5L _s) 38.764	3609.85	6109.27	4183.65	Pass (1.46)	Pass (1.69)
(0.6L _s) 46.517	3232.66	6084.45	4174.07	Pass (1.46)	Pass (1.88)
(0.7L _s) 54.270	2525.01	5726.23	3602.63	Pass (1.59)	Pass (2.27)
(0.8L _s) 62.022	1522.12	5364.86	2208.78	Pass (2.43)	Pass (3.52)
(0.9L _s) 69.775	246.60	4350.13	703.80	Pass (6.18)	Pass (10+)
(1.0L _s) 77.528	-396.55	1889.84	-527.41	Pass (-)	Pass (-)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5725.14	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.27	-5720.27	1.09	Pass (-)	Pass (-)
(0.1L _s) 7.753	-8.89	-5623.31	-11.82	Pass (10+)	Pass (10+)
(0.2L _s) 15.506	-49.58	-5543.15	-65.94	Pass (10+)	Pass (10+)
(0.3L _s) 23.258	-122.07	-5483.51	-162.35	Pass (10+)	Pass (10+)
(0.4L _s) 31.011	-226.36	-5153.87	-301.06	Pass (10+)	Pass (10+)
(0.5L _s) 38.764	-362.46	-5142.14	-482.07	Pass (10+)	Pass (10+)
(0.6L _s) 46.517	-530.35	-5154.16	-705.37	Pass (7.31)	Pass (9.72)
(0.7L _s) 54.270	-730.05	-5190.20	-970.96	Pass (5.35)	Pass (7.11)
(0.8L _s) 62.022	-986.74	-5248.07	-1176.73	Pass (4.46)	Pass (5.32)
(0.9L _s) 69.775	-1542.10	-5327.14	-1167.85	Pass (4.56)	Pass (3.45)
(FoS) 76.302	-2488.54	-5099.39	-1160.36	Pass (4.39)	Pass (2.05)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(1.0L _s) 77.528	-2669.72	-4109.12	-1158.95	Pass (3.55)	Pass (1.54)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5725.14	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.82	-5720.27	1.09	Pass (-)	Pass (-)
(0.1L _s) 7.753	3.76	-5623.31	-11.82	Pass (10+)	Pass (-)
(0.2L _s) 15.506	-24.28	-5543.15	-65.94	Pass (10+)	Pass (10+)
(0.3L _s) 23.258	-84.12	-5483.51	-162.35	Pass (10+)	Pass (10+)
(0.4L _s) 31.011	-175.76	-5153.87	-301.06	Pass (10+)	Pass (10+)
(0.5L _s) 38.764	-299.20	-5142.14	-482.07	Pass (10+)	Pass (10+)
(0.6L _s) 46.517	-454.45	-5154.16	-705.37	Pass (7.31)	Pass (10+)
(0.7L _s) 54.270	-641.50	-5190.20	-970.96	Pass (5.35)	Pass (8.09)
(0.8L _s) 62.022	-885.64	-5248.07	-1176.73	Pass (4.46)	Pass (5.93)
(0.9L _s) 69.775	-1276.50	-5327.14	-1167.85	Pass (4.56)	Pass (4.17)
(FoS) 76.302	-2050.44	-5099.39	-1160.36	Pass (4.39)	Pass (2.49)
(1.0L _s) 77.528	-2193.92	-4109.12	-1158.95	Pass (3.55)	Pass (1.87)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n / V_u$)
(CS) 3.924	Yes	Yes	237.20	569.17	Pass (2.40)
(SZB) 5.003	Yes	Yes	230.46	417.37	Pass (1.81)
(1.5H) 5.583	Yes	Yes	226.85	420.68	Pass (1.85)
(0.1L _s) 7.753	Yes	Yes	213.42	405.11	Pass (1.90)
(SZB) 10.503	Yes	Yes	196.56	307.14	Pass (1.56)
(0.2L _s) 15.506	Yes	Yes	166.47	315.17	Pass (1.89)
(SZB) 18.753	Yes	Yes	147.33	273.92	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.86)
(0.3L _s) 23.258	Yes	Yes	121.32	279.79	Pass (2.31)
(SZB) 29.753	Yes	Yes	85.13	243.44	Pass (2.86)
(HP) 30.571	Yes	Yes	80.83	244.98	Pass (3.03)
(0.4L _s) 31.011	Yes	Yes	78.52	219.74	Pass (2.80)
(0.5L _s) 38.764	Yes	Yes	89.80	219.27	Pass (2.44)
(HP) 46.064	Yes	Yes	131.23	246.91	Pass (1.88)
(0.6L _s) 46.517	Yes	Yes	133.79	246.35	Pass (1.84)
(SZB) 46.883	Yes	Yes	135.86	245.90	Pass (1.81)
(0.7L _s) 54.270	Yes	Yes	177.57	286.24	Pass (1.61)
(SZB) 57.883	Yes	Yes	197.83	284.67	Pass (1.44)
(0.8L _s) 62.022	Yes	Yes	220.86	329.08	Pass (1.49)
(SZB) 66.133	Yes	Yes	243.53	323.69	Pass (1.33)
(0.9L _s) 69.775	Yes	Yes	263.36	424.53	Pass (1.61)
(1.5H) 71.052	Yes	Yes	270.27	416.64	Pass (1.54)
(SZB) 71.633	Yes	Yes	273.41	422.56	Pass (1.55)
(CS) 72.326	Yes	Yes	277.15	565.31	Pass (2.04)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.003	Yes	Yes	220.35	419.25	Pass (1.90)
(1.5H) 5.583	Yes	Yes	216.92	422.74	Pass (1.95)
(0.1L _s) 7.753	Yes	Yes	204.15	407.59	Pass (2.00)
(SZB) 10.503	Yes	Yes	188.02	309.89	Pass (1.65)
(0.2L _s) 15.506	Yes	Yes	159.08	318.70	Pass (2.00)
(SZB) 18.753	Yes	Yes	140.52	277.37	Pass (1.97)
(0.3L _s) 23.258	Yes	Yes	115.20	283.51	Pass (2.46)

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 29.753	Yes	Yes	79.72	247.45	Pass (3.10)
(HP) 30.571	No	Yes	75.49	248.88	Pass (3.30)
(0.4L _s) 31.011	Yes	Yes	73.22	223.51	Pass (3.05)
(0.5L _s) 38.764	Yes	Yes	77.79	222.96	Pass (2.87)
(HP) 46.064	Yes	Yes	123.60	250.70	Pass (2.03)
(0.6L _s) 46.517	Yes	Yes	126.36	250.11	Pass (1.98)
(SZB) 46.883	Yes	Yes	128.59	249.65	Pass (1.94)
(0.7L _s) 54.270	Yes	Yes	172.47	289.78	Pass (1.68)
(SZB) 57.883	Yes	Yes	193.10	288.02	Pass (1.49)
(0.8L _s) 62.022	Yes	Yes	216.00	332.44	Pass (1.54)
(SZB) 66.133	Yes	Yes	237.99	328.32	Pass (1.38)
(0.9L _s) 69.775	Yes	Yes	256.78	434.30	Pass (1.69)
(1.5H) 71.052	Yes	Yes	263.24	427.12	Pass (1.62)
(SZB) 71.633	Yes	Yes	266.16	433.80	Pass (1.63)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.10	193.43	5.7.3.5-2	Pass (2.19)
(SZB) 1.337	585.35	193.43	5.7.3.5-2	Pass (3.03)
(Bar Develop.) 1.705	644.65	193.43	5.7.3.5-2	Pass (3.33)
(Bar Develop.) 2.765	780.26	193.43	5.7.3.5-2	Pass (4.03)
(H) 3.833	811.86	193.43	5.7.3.5-2	Pass (4.20)
(CS) 3.924	814.54	434.34	5.7.3.5-1	Pass (1.88)
(SZB) 5.003	846.57	499.68	5.7.3.5-1	Pass (1.69)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(1.5H) 5.583	957.15	529.54	5.7.3.5-1	Pass (1.81)
(0.1L _s) 7.753	1129.34	648.74	5.7.3.5-1	Pass (1.74)
(SZB) 10.503	1339.06	812.45	5.7.3.5-1	Pass (1.65)
(0.2L _s) 15.506	1654.80	949.53	5.7.3.5-1	Pass (1.74)
(SZB) 18.753	1658.11	1026.54	5.7.3.5-1	Pass (1.62)
(0.3L _s) 23.258	1661.94	1061.18	5.7.3.5-1	Pass (1.57)
(SZB) 29.753	1664.47	1066.61	5.7.3.5-1	Pass (1.56)
(HP) 30.571	1664.52	1061.65	5.7.3.5-1	Pass (1.57)
(0.4L _s) 31.011	1664.52	1109.49	5.7.3.5-1	Pass (1.50)
(0.5L _s) 38.764	1664.52	1115.51	5.7.3.5-1	Pass (1.49)
(HP) 46.064	1664.41	1054.31	5.7.3.5-1	Pass (1.58)
(0.6L _s) 46.517	1664.31	1054.32	5.7.3.5-1	Pass (1.58)
(SZB) 46.883	1664.23	1054.05	5.7.3.5-1	Pass (1.58)
(0.7L _s) 54.270	1659.64	945.84	5.7.3.5-1	Pass (1.75)
(SZB) 57.883	1655.75	878.52	5.7.3.5-1	Pass (1.88)
(0.8L _s) 62.022	1651.26	728.84	5.7.3.5-1	Pass (2.27)
(SZB) 66.133	1336.65	598.11	5.7.3.5-1	Pass (2.23)
(0.9L _s) 69.775	1598.40	537.04	5.7.3.5-1	Pass (2.98)
(1.5H) 71.052	1598.40	603.50	5.7.3.5-1	Pass (2.65)
(SZB) 71.633	1598.40	635.78	5.7.3.5-1	Pass (2.51)
(CS) 72.326	1598.40	671.41	5.7.3.5-1	Pass (2.38)
(H) 72.802	1598.40	694.62	5.7.3.5-1	Pass (2.30)
(Bar Develop.) 73.870	1504.80	751.10	5.7.3.5-1	Pass (2.00)
(Bar Develop.) 74.930	1487.20	813.77	5.7.3.5-1	Pass (1.83)
(SZB) 75.299	1472.77	835.79	5.7.3.5-1	Pass (1.76)
(FoS) 76.302	1433.42	896.48	5.7.3.5-1	Pass (1.60)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.10	183.08	5.7.3.5-2	Pass (2.31)
(SZB) 1.337	585.35	183.08	5.7.3.5-2	Pass (3.20)
(Bar Develop.) 1.705	644.65	183.08	5.7.3.5-2	Pass (3.52)
(Bar Develop.) 2.765	780.26	183.08	5.7.3.5-2	Pass (4.26)
(H) 3.833	811.86	183.08	5.7.3.5-2	Pass (4.43)
(SZB) 5.003	846.57	473.25	5.7.3.5-1	Pass (1.79)
(1.5H) 5.583	957.15	501.29	5.7.3.5-1	Pass (1.91)
(0.1L _s) 7.753	1129.34	612.69	5.7.3.5-1	Pass (1.84)
(SZB) 10.503	1339.06	756.69	5.7.3.5-1	Pass (1.77)
(0.2L _s) 15.506	1654.80	891.04	5.7.3.5-1	Pass (1.86)
(SZB) 18.753	1658.11	957.64	5.7.3.5-1	Pass (1.73)
(0.3L _s) 23.258	1661.94	994.98	5.7.3.5-1	Pass (1.67)
(SZB) 29.753	1664.47	993.93	5.7.3.5-1	Pass (1.67)
(HP) 30.571	1664.52	991.46	5.7.3.5-1	Pass (1.68)
(0.4L _s) 31.011	1664.52	1040.67	5.7.3.5-1	Pass (1.60)
(0.5L _s) 38.764	1664.52	1047.88	5.7.3.5-1	Pass (1.59)
(HP) 46.064	1664.41	980.18	5.7.3.5-1	Pass (1.70)
(0.6L _s) 46.517	1664.31	980.79	5.7.3.5-1	Pass (1.70)
(SZB) 46.883	1664.23	981.02	5.7.3.5-1	Pass (1.70)
(0.7L _s) 54.270	1659.64	883.07	5.7.3.5-1	Pass (1.88)
(SZB) 57.883	1655.75	821.26	5.7.3.5-1	Pass (2.02)
(0.8L _s) 62.022	1651.26	676.84	5.7.3.5-1	Pass (2.44)
(SZB) 66.133	1336.65	527.56	5.7.3.5-1	Pass (2.53)
(0.9L _s) 69.775	1598.40	458.58	5.7.3.5-1	Pass (3.49)
(1.5H) 71.052	1598.40	516.04	5.7.3.5-1	Pass (3.10)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 71.633	1598.40	545.08	5.7.3.5-1	Pass (2.93)
(H) 72.802	1598.40	597.08	5.7.3.5-1	Pass (2.68)
(Bar Develop.) 73.870	1504.80	646.12	5.7.3.5-1	Pass (2.33)
(Bar Develop.) 74.930	1487.20	700.51	5.7.3.5-1	Pass (2.12)
(SZB) 75.299	1472.77	719.55	5.7.3.5-1	Pass (2.05)
(FoS) 76.302	1433.42	771.95	5.7.3.5-1	Pass (1.86)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	64.978	142.588	Pass (2.19)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	64.978	142.588	Pass (2.19)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	64.972	142.587	Pass (2.19)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	64.956	142.586	Pass (2.20)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	64.951	142.586	Pass (2.20)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	64.934	142.585	Pass (2.20)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	64.916	142.584	Pass (2.20)
(CS) 3.924	12.000	48.000	Pass	0.220	0.000	Pass	64.915	142.584	Pass (2.20)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	63.054	142.583	Pass (2.26)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	62.057	142.582	Pass (2.30)
(0.1L _s) 7.753	12.000	48.000	Pass	0.220	0.000	Pass	58.351	142.580	Pass (2.44)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	53.704	146.538	Pass (2.73)
(0.2L _s) 15.506	9.000	48.000	Pass	0.293	0.000	Pass	45.424	146.533	Pass (3.23)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	40.170	142.570	Pass (3.55)
(0.3L _s) 23.258	12.000	48.000	Pass	0.220	0.000	Pass	33.038	142.566	Pass (4.32)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	23.145	138.600	Pass (5.99)
(HP) 30.571	18.000	48.000	Pass	0.147	0.000	Pass	21.969	138.599	Pass (6.31)
(0.4L _s) 31.011	18.000	48.000	Pass	0.147	0.000	Pass	21.339	138.599	Pass (6.50)
(0.5L _s) 38.764	18.000	48.000	Pass	0.147	0.000	Pass	24.354	138.592	Pass (5.69)
(HP) 46.064	18.000	48.000	Pass	0.147	0.000	Pass	35.522	138.585	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(3.90)
(0.6L _s) 46.517	18.000	48.000	Pass	0.147	0.000	Pass	36.209	138.585	Pass (3.83)
(SZB) 46.883	18.000	48.000	Pass	0.147	0.000	Pass	36.765	138.584	Pass (3.77)
(0.7L _s) 54.270	12.000	48.000	Pass	0.220	0.000	Pass	47.953	142.538	Pass (2.97)
(SZB) 57.883	12.000	48.000	Pass	0.220	0.000	Pass	53.370	142.534	Pass (2.67)
(0.8L _s) 62.022	9.000	48.000	Pass	0.293	0.000	Pass	59.514	146.490	Pass (2.46)
(SZB) 66.133	9.000	48.000	Pass	0.293	0.000	Pass	65.546	146.487	Pass (2.23)
(0.9L _s) 69.775	12.000	48.000	Pass	0.220	0.000	Pass	70.808	142.523	Pass (2.01)
(1.5H) 71.052	12.000	48.000	Pass	0.220	0.000	Pass	72.638	142.522	Pass (1.96)
(SZB) 71.633	12.000	48.000	Pass	0.220	0.000	Pass	73.469	142.522	Pass (1.94)
(CS) 72.326	12.000	48.000	Pass	0.220	0.000	Pass	74.458	142.521	Pass (1.91)
(H) 72.802	12.000	48.000	Pass	0.220	0.000	Pass	74.448	142.520	Pass (1.91)
(Bar Develop.) 73.870	12.000	48.000	Pass	0.220	0.000	Pass	74.425	142.519	Pass (1.91)
(Bar Develop.) 74.930	12.000	48.000	Pass	0.220	0.000	Pass	74.401	142.518	Pass (1.92)
(SZB) 75.299	12.000	48.000	Pass	0.220	0.000	Pass	74.393	142.518	Pass (1.92)
(FoS) 76.302	12.000	48.000	Pass	0.220	0.000	Pass	74.371	142.517	Pass (1.92)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	62.113	142.588	Pass (2.30)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	62.113	142.588	Pass (2.30)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	62.108	142.587	Pass (2.30)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	62.093	142.586	Pass (2.30)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	62.087	142.586	Pass (2.30)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	62.071	142.585	Pass (2.30)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	62.054	142.584	Pass (2.30)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	60.287	142.583	Pass (2.37)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	59.341	142.582	Pass (2.40)
	12.000	48.000	Pass	0.220	0.000	Pass	55.816	142.580	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.1L _s) 7.753									(2.55)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	51.371	146.538	Pass (2.85)
(0.2L _s) 15.506	9.000	48.000	Pass	0.293	0.000	Pass	43.409	146.533	Pass (3.38)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	38.313	142.570	Pass (3.72)
(0.3L _s) 23.258	12.000	48.000	Pass	0.220	0.000	Pass	31.373	142.566	Pass (4.54)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	21.672	138.600	Pass (6.40)
(HP) 30.571	18.000	48.000	Pass	0.147	0.000	Pass	20.519	138.599	Pass (6.75)
(0.4L _s) 31.011	18.000	48.000	Pass	0.147	0.000	Pass	19.899	138.599	Pass (6.97)
(0.5L _s) 38.764	18.000	48.000	Pass	0.147	0.000	Pass	21.098	138.592	Pass (6.57)
(HP) 46.064	18.000	48.000	Pass	0.147	0.000	Pass	33.454	138.585	Pass (4.14)
(0.6L _s) 46.517	18.000	48.000	Pass	0.147	0.000	Pass	34.199	138.585	Pass (4.05)
(SZB) 46.883	18.000	48.000	Pass	0.147	0.000	Pass	34.799	138.584	Pass (3.98)
(0.7L _s) 54.270	12.000	48.000	Pass	0.220	0.000	Pass	46.578	142.538	Pass (3.06)
(SZB) 57.883	12.000	48.000	Pass	0.220	0.000	Pass	52.096	142.534	Pass (2.74)
(0.8L _s) 62.022	9.000	48.000	Pass	0.293	0.000	Pass	58.204	146.490	Pass (2.52)
(SZB) 66.133	9.000	48.000	Pass	0.293	0.000	Pass	64.054	146.487	Pass (2.29)
(0.9L _s) 69.775	12.000	48.000	Pass	0.220	0.000	Pass	69.039	142.523	Pass (2.06)
(1.5H) 71.052	12.000	48.000	Pass	0.220	0.000	Pass	70.749	142.522	Pass (2.01)
(SZB) 71.633	12.000	48.000	Pass	0.220	0.000	Pass	71.521	142.522	Pass (1.99)
(H) 72.802	12.000	48.000	Pass	0.220	0.000	Pass	72.428	142.520	Pass (1.97)
(Bar Develop.) 73.870	12.000	48.000	Pass	0.220	0.000	Pass	72.405	142.519	Pass (1.97)
(Bar Develop.) 74.930	12.000	48.000	Pass	0.220	0.000	Pass	72.383	142.518	Pass (1.97)
(SZB) 75.299	12.000	48.000	Pass	0.220	0.000	Pass	72.375	142.518	Pass (1.97)
(FoS) 76.302	12.000	48.000	Pass	0.220	0.000	Pass	72.353	142.517	Pass (1.97)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.163 in

Minimum live load deflection along girder = -0.227 in

Maximum live load deflection along girder = 0.095 in

Status = **Pass**

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 3.924	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.753	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.506	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.258	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.571	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 31.011	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.764	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.064	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.517	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.883	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.270	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.883	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 62.022	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.133	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.775	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.052	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 71.633	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 72.326	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 72.802	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.870	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.930	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.299	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.302	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.753	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.506	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.258	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.571	#4	18.000	18.000	1.500	0.267	0.000	Pass
(0.4L _s) 31.011	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.764	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.064	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.517	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.883	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.270	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.883	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 62.022	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.133	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.775	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.052	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 71.633	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 72.802	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.870	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.930	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.299	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.302	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.30	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be

equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
1	G	12.300	11.750	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
1	G	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.124
Lower Bound Camber at 60 days, 50% of D_{60}	1.668
Average Camber at 60 days, 75% of D_{60}	2.502
Upper Bound Camber at 60 days, D_{60}	3.337

Spec Check Report

For

Span 1 Girder K

March 14, 2021 2:30:51 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.492	Pass (1.20)	162.492	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.281 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.221 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.066	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.281 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	No	Yes	Pass (1.35)
7.330	(0.1L _r) 7.747	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	No	Yes	Pass (1.34)
15.077	(0.2L _r) 15.494	0.121	-3.623	-0.581	0.589	-0.460	-3.034	No	Yes	Pass (1.29)
22.824	(0.3L _r) 23.240	0.503	-3.980	-0.762	0.773	-0.259	-3.206	No	Yes	Pass (1.22)
(HP) 30.571	(HP, 0.4L _r) 30.987	0.876	-4.317	-0.871	0.884	0.005	-3.433	No	Yes	Pass (1.14)
38.317		0.877	-4.320	-0.908	0.921	-0.031	-3.400	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.734									(1.15)
(HP) 46.064	(HP, 0.6L _r) 46.481	0.876	-4.317	-0.871	0.884	0.005	-3.433	No	Yes	Pass (1.14)
53.811	(0.7L _r) 54.228	0.503	-3.980	-0.762	0.773	-0.259	-3.206	No	Yes	Pass (1.22)
61.558	(0.8L _r) 61.975	0.121	-3.623	-0.581	0.589	-0.460	-3.034	No	Yes	Pass (1.29)
69.305	(0.9L _r) 69.721	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	No	Yes	Pass (1.34)
(PSXFR) 74.052	(PSXFR) 74.468	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	No	Yes	Pass (1.35)
(STLF) 77.052	(STLF, 1.0L _r) 77.468	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.281 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	0.200	-	No	Yes	Pass (-)
7.330	(0.1L _r) 7.747	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	0.200	-	No	Yes	Pass (-)
15.077	(0.2L _r) 15.494	0.121	-3.623	-0.581	0.589	-0.460	-3.034	0.200	-	No	Yes	Pass (-)
22.824	(0.3L _r) 23.240	0.503	-3.980	-0.762	0.773	-0.259	-3.206	0.200	-	No	Yes	Pass (-)
(HP) 30.571	(HP, 0.4L _r) 30.987	0.876	-4.317	-0.871	0.884	0.005	-3.433	0.200	-	No	Yes	Pass (10+)
38.317	(0.5L _r) 38.734	0.877	-4.320	-0.908	0.921	-0.031	-3.400	0.200	-	No	Yes	Pass (-)
(HP) 46.064	(HP, 0.6L _r) 46.481	0.876	-4.317	-0.871	0.884	0.005	-3.433	0.200	-	No	Yes	Pass (10+)
53.811	(0.7L _r) 54.228	0.503	-3.980	-0.762	0.773	-0.259	-3.206	0.200	-	No	Yes	Pass (-)
61.558	(0.8L _r) 61.975	0.121	-3.623	-0.581	0.589	-0.460	-3.034	0.200	-	No	Yes	Pass (-)
69.305	(0.9L _r) 69.721	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.052	(PSXFR) 74.468	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	0.200	-	No	Yes	Pass (-)
(STLF) 77.052	(STLF, 1.0L _r) 77.468	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.127 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.434	-2.582	-0.271	0.275	-0.705	-2.307	No	Yes	Pass (1.56)
(0.1L _s) 7.753	-0.212	-2.810	-0.755	0.766	-0.967	-2.044	No	Yes	Pass (1.76)
(0.2L _s) 15.506	0.123	-3.153	-1.340	1.359	-1.217	-1.793	No	Yes	Pass (2.01)
(0.3L _s) 23.258	0.458	-3.488	-1.755	1.780	-1.297	-1.707	No	Yes	Pass (2.11)
(HP) 30.571	0.769	-3.788	-1.990	2.019	-1.221	-1.769	No	Yes	Pass (2.04)
(0.4L _s) 31.011	0.769	-3.789	-2.000	2.028	-1.230	-1.761	No	Yes	Pass (2.04)
(0.5L _s) 38.764	0.771	-3.797	-2.075	2.105	-1.304	-1.692	No	Yes	Pass (2.13)
(HP) 46.064	0.769	-3.788	-1.990	2.019	-1.221	-1.769	No	Yes	Pass (2.04)
(0.6L _s) 46.517	0.750	-3.770	-1.980	2.009	-1.230	-1.761	No	Yes	Pass (2.04)
(0.7L _s) 54.269	0.419	-3.450	-1.716	1.740	-1.297	-1.709	No	Yes	Pass (2.11)
(0.8L _s) 62.022	0.085	-3.113	-1.281	1.300	-1.197	-1.814	No	Yes	Pass (1.99)
(0.9L _s) 69.775	-0.250	-2.771	-0.677	0.687	-0.927	-2.084	No	Yes	Pass (1.73)
(PSXFR) 74.052	-0.434	-2.582	-0.271	0.275	-0.705	-2.307	No	Yes	Pass (1.56)
76.635	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.127 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
(PSXFR) 2.583	-0.434	-2.582	-0.271	0.275	-0.705	-2.307	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.810	-0.755	0.766	-0.967	-2.044	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.506	0.123	-3.153	-1.340	1.359	-1.217	-1.793	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.258	0.458	-3.488	-1.755	1.780	-1.297	-1.707	-	0.537	No	Yes	Pass (-)
(HP) 30.571	0.769	-3.788	-1.990	2.019	-1.221	-1.769	-	0.537	No	Yes	Pass (-)
(0.4L _s) 31.011	0.769	-3.789	-2.000	2.028	-1.230	-1.761	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.764	0.771	-3.797	-2.075	2.105	-1.304	-1.692	-	0.537	No	Yes	Pass (-)
(HP) 46.064	0.769	-3.788	-1.990	2.019	-1.221	-1.769	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.517	0.750	-3.770	-1.980	2.009	-1.230	-1.761	-	0.537	No	Yes	Pass (-)
(0.7L _s) 54.269	0.419	-3.450	-1.716	1.740	-1.297	-1.709	-	0.537	No	Yes	Pass (-)
(0.8L _s) 62.022	0.085	-3.113	-1.281	1.300	-1.197	-1.814	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.250	-2.771	-0.677	0.687	-0.927	-2.084	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.052	-0.434	-2.582	-0.271	0.275	-0.705	-2.307	-	0.537	No	Yes	Pass (-)
76.635	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.221 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.285	0.325	-0.720	-2.259	No	Yes	Pass (1.59)
(0.1L _s) 7.753	-0.212	-2.820	-0.795	0.904	-1.007	-1.916	No	Yes	Pass (1.88)
(0.2L _s) 15.506	0.124	-3.172	-1.408	1.591	-1.284	-1.581	No	Yes	Pass (2.28)
(0.3L _s) 23.258	0.461	-3.517	-1.839	2.062	-1.377	-1.455	No	Yes	Pass (2.47)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 30.571	0.776	-3.824	-2.078	2.308	-1.302	-1.516	No	Yes	Pass (2.37)
(0.4L _s) 31.011	0.777	-3.825	-2.088	2.317	-1.311	-1.508	No	Yes	Pass (2.39)
(0.5L _s) 38.764	0.777	-3.829	-2.155	2.356	-1.377	-1.473	No	Yes	Pass (2.44)
(HP) 46.064	0.774	-3.812	-2.052	2.196	-1.278	-1.616	No	Yes	Pass (2.23)
(0.6L _s) 46.517	0.755	-3.793	-2.040	2.180	-1.286	-1.613	No	Yes	Pass (2.23)
(0.7L _s) 54.269	0.420	-3.457	-1.744	1.787	-1.324	-1.670	No	Yes	Pass (2.16)
(0.8L _s) 62.022	0.084	-3.107	-1.266	1.179	-1.182	-1.928	No	Yes	Pass (1.87)
(0.9L _s) 69.775	-0.248	-2.752	-0.609	0.342	-0.857	-2.410	No	Yes	Pass (1.49)
(PSXFR) 74.052	-0.430	-2.558	-0.170	-0.221	-0.601	-2.778	No	Yes	Pass (1.30)
76.635	-0.075	-0.339	0.121	-0.595	0.046	-0.934	No	Yes	Pass (3.85)

Interval 17: Open to Traffic : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]** $f'_c = 8.000$ KSICompression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.221 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.329	0.303	-0.764	-2.281	No	Yes	Pass (2.10)
(0.1L _s) 7.753	-0.212	-2.820	-0.913	0.838	-1.126	-1.982	No	Yes	Pass (2.42)
(0.2L _s) 15.506	0.124	-3.172	-1.607	1.459	-1.484	-1.713	No	Yes	Pass (2.80)
(0.3L _s) 23.258	0.461	-3.517	-2.085	1.865	-1.624	-1.652	No	Yes	Pass (2.91)
(HP) 30.571	0.776	-3.824	-2.345	2.049	-1.569	-1.775	No	Yes	Pass (2.70)
(0.4L _s) 31.011	0.777	-3.825	-2.355	2.054	-1.578	-1.771	No	Yes	Pass (2.71)
(0.5L _s) 38.764	0.777	-3.829	-2.417	2.028	-1.639	-1.802	No	Yes	Pass (2.66)
(HP) 46.064	0.774	-3.812	-2.289	1.805	-1.515	-2.006	No	Yes	Pass (2.39)
(0.6L _s) 46.517	0.755	-3.793	-2.275	1.785	-1.520	-2.008	No	Yes	Pass (2.39)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.7L _s) 54.269	0.420	-3.457	-1.925	1.327	-1.505	-2.130	No	Yes	Pass (2.25)
(0.8L _s) 62.022	0.084	-3.107	-1.373	0.655	-1.289	-2.452	No	Yes	Pass (1.96)
(0.9L _s) 69.775	-0.248	-2.752	-0.649	-0.377	-0.898	-3.129	No	Yes	Pass (1.53)
(PSXFR) 74.052	-0.430	-2.558	-0.184	-1.175	-0.614	-3.733	No	Yes	Pass (1.29)
76.635	-0.075	-0.339	0.118	-1.700	0.043	-2.040	No	Yes	Pass (2.35)

Interval 17: Open to Traffic : Service I Tension without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Tension Stresses [5.9.2.3.2b]

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.221 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.435	-2.585	-0.283	0.336	-0.717	-2.248	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.820	-0.788	0.935	-1.000	-1.884	No	Yes	Pass (-)
(0.2L _s) 15.506	0.124	-3.172	-1.395	1.647	-1.271	-1.525	No	Yes	Pass (-)
(0.3L _s) 23.258	0.461	-3.517	-1.821	2.135	-1.360	-1.382	No	Yes	Pass (-)
(HP) 30.571	0.776	-3.824	-2.059	2.392	-1.282	-1.432	No	Yes	Pass (-)
(0.4L _s) 31.011	0.777	-3.825	-2.068	2.401	-1.291	-1.424	No	Yes	Pass (-)
(0.5L _s) 38.764	0.777	-3.829	-2.134	2.444	-1.357	-1.386	No	Yes	Pass (-)
(HP) 46.064	0.774	-3.812	-2.032	2.280	-1.258	-1.532	No	Yes	Pass (-)
(0.6L _s) 46.517	0.755	-3.793	-2.021	2.263	-1.266	-1.529	No	Yes	Pass (-)
(0.7L _s) 54.269	0.420	-3.457	-1.727	1.861	-1.307	-1.597	No	Yes	Pass (-)
(0.8L _s) 62.022	0.084	-3.107	-1.253	1.235	-1.169	-1.872	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.248	-2.752	-0.596	0.398	-0.844	-2.354	No	Yes	Pass (-)
(PSXFR) 74.052	-0.430	-2.558	-0.154	-0.151	-0.584	-2.709	No	Yes	Pass (-)
76.635	-0.075	-0.339	0.140	-0.513	0.065	-0.852	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.435	-2.585	-0.279	0.482	-0.713	-2.102	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.820	-0.776	1.331	-0.988	-1.489	No	Yes	Pass (-)
(0.2L _s) 15.506	0.124	-3.172	-1.370	2.315	-1.246	-0.858	No	Yes	Pass (-)
(0.3L _s) 23.258	0.461	-3.517	-1.785	2.960	-1.323	-0.557	No	Yes	Pass (-)
(HP) 30.571	0.776	-3.824	-2.011	3.285	-1.234	-0.539	No	Yes	Pass (-)
(0.4L _s) 31.011	0.777	-3.825	-2.019	3.295	-1.242	-0.530	No	Yes	Pass (-)
(0.5L _s) 38.764	0.777	-3.829	-2.073	3.320	-1.296	-0.509	No	Yes	Pass (-)
(HP) 46.064	0.774	-3.812	-1.960	3.073	-1.186	-0.739	No	Yes	Pass (-)
(0.6L _s) 46.517	0.755	-3.793	-1.947	3.048	-1.193	-0.745	No	Yes	Pass (-)
(0.7L _s) 54.269	0.420	-3.457	-1.642	2.466	-1.221	-0.991	No	Yes	Pass (-)
(0.8L _s) 62.022	0.084	-3.107	-1.156	1.593	-1.071	-1.513	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.248	-2.752	-0.462	0.534	-0.711	-2.218	No	Yes	Pass (-)
(PSXFR) 74.052	-0.430	-2.558	0.023	-0.105	-0.408	-2.663	No	Yes	Pass (-)
76.635	-0.075	-0.339	0.345	-0.502	0.270	-0.841	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression**Fatigue I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

Compression stress limit = $-0.4f'_c = -3.200 \text{ KSI}$

Concrete strength required to satisfy this requirement = 4.148 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.164	0.153	-0.381	-1.140	No	Yes	Pass (2.81)
(0.1L _s) 7.753	-0.212	-2.820	-0.454	0.422	-0.560	-0.988	No	Yes	Pass (3.24)
(0.2L _s) 15.506	0.124	-3.172	-0.795	0.736	-0.733	-0.850	No	Yes	Pass (3.76)
(0.3L _s) 23.258	0.461	-3.517	-1.033	0.942	-0.802	-0.817	No	Yes	Pass (3.92)
(HP) 30.571	0.776	-3.824	-1.158	1.037	-0.770	-0.875	No	Yes	Pass (3.66)
(0.4L _s) 31.011	0.777	-3.825	-1.163	1.040	-0.774	-0.873	No	Yes	Pass (3.67)
(0.5L _s) 38.764	0.777	-3.829	-1.190	1.030	-0.801	-0.885	No	Yes	Pass (3.62)
(HP) 46.064	0.774	-3.812	-1.133	0.921	-0.746	-0.984	No	Yes	Pass (3.25)
(0.6L _s) 46.517	0.755	-3.793	-1.127	0.912	-0.749	-0.985	No	Yes	Pass (3.25)
(0.7L _s) 54.269	0.420	-3.457	-0.956	0.686	-0.746	-1.043	No	Yes	Pass (3.07)
(0.8L _s) 62.022	0.084	-3.107	-0.682	0.352	-0.640	-1.201	No	Yes	Pass (2.66)
(0.9L _s) 69.775	-0.248	-2.752	-0.308	-0.090	-0.433	-1.466	No	Yes	Pass (2.18)
(PSXFR) 74.052	-0.430	-2.558	-0.085	-0.380	-0.300	-1.659	No	Yes	Pass (1.93)
76.635	-0.075	-0.339	0.060	-0.571	0.023	-0.741	No	Yes	Pass (4.32)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2143.10	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.753	1595.55	4501.08	2122.08	Pass (2.12)	Pass (2.82)
(0.2L _s) 15.506	2747.82	5417.35	3654.59	Pass (1.48)	Pass (1.97)
(0.3L _s) 23.258	3470.70	5774.27	3969.54	Pass (1.45)	Pass (1.66)
(0.4L _s) 31.011	3823.24	6105.87	4202.02	Pass (1.45)	Pass (1.60)
(0.5L _s) 38.764	3803.46	6105.88	4182.77	Pass (1.46)	Pass (1.61)
(0.6L _s) 46.517	3438.88	6085.62	4176.02	Pass (1.46)	Pass (1.77)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.7L _s) 54.269	2702.03	5733.05	3593.70	Pass (1.60)	Pass (2.12)
(0.8L _s) 62.022	1658.19	5376.52	2205.39	Pass (2.44)	Pass (3.24)
(0.9L _s) 69.775	529.24	4362.01	703.89	Pass (6.20)	Pass (8.24)
(1.0L _s) 77.528	-396.53	1891.00	-527.38	Pass (-)	Pass (-)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2143.10	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.753	1505.29	4501.08	2122.08	Pass (2.12)	Pass (2.99)
(0.2L _s) 15.506	2576.69	5417.35	3654.59	Pass (1.48)	Pass (2.10)
(0.3L _s) 23.258	3257.92	5774.27	3969.54	Pass (1.45)	Pass (1.77)
(0.4L _s) 31.011	3585.85	6105.87	4202.02	Pass (1.45)	Pass (1.70)
(0.5L _s) 38.764	3595.59	6105.88	4182.77	Pass (1.46)	Pass (1.70)
(0.6L _s) 46.517	3222.19	6085.62	4176.02	Pass (1.46)	Pass (1.89)
(0.7L _s) 54.269	2518.84	5733.05	3593.70	Pass (1.60)	Pass (2.28)
(0.8L _s) 62.022	1520.08	5376.52	2205.39	Pass (2.44)	Pass (3.54)
(0.9L _s) 69.775	247.98	4362.01	703.89	Pass (6.20)	Pass (10+)
(1.0L _s) 77.528	-396.53	1891.00	-527.38	Pass (-)	Pass (-)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.29	-5411.66	1.11	Pass (-)	Pass (-)
(0.1L _s) 7.753	-8.38	-5319.78	-11.15	Pass (10+)	Pass (10+)
(0.2L _s) 15.506	-48.57	-5243.85	-64.59	Pass (10+)	Pass (10+)
(0.3L _s) 23.258	-120.55	-5187.39	-160.34	Pass	Pass

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
				(10+)	(10+)
(0.4L _s) 31.011	-224.34	-5151.96	-298.37	Pass (10+)	Pass (10+)
(0.5L _s) 38.764	-359.93	-5140.24	-478.70	Pass (10+)	Pass (10+)
(0.6L _s) 46.517	-527.32	-5152.43	-701.33	Pass (7.35)	Pass (9.77)
(0.7L _s) 54.269	-726.50	-5188.77	-966.25	Pass (5.37)	Pass (7.14)
(0.8L _s) 62.022	-981.94	-5247.06	-1196.67	Pass (4.38)	Pass (5.34)
(0.9L _s) 69.775	-1535.82	-5326.63	-1196.67	Pass (4.45)	Pass (3.47)
(FoS) 76.302	-2479.13	-5411.47	-1196.67	Pass (4.52)	Pass (2.18)
(1.0L _s) 77.528	-2659.67	-4043.87	-1196.67	Pass (3.38)	Pass (1.52)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.84	-5411.66	1.11	Pass (-)	Pass (-)
(0.1L _s) 7.753	4.24	-5319.78	-11.15	Pass (10+)	Pass (-)
(0.2L _s) 15.506	-23.33	-5243.85	-64.59	Pass (10+)	Pass (10+)
(0.3L _s) 23.258	-82.69	-5187.39	-160.34	Pass (10+)	Pass (10+)
(0.4L _s) 31.011	-173.86	-5151.96	-298.37	Pass (10+)	Pass (10+)
(0.5L _s) 38.764	-296.83	-5140.24	-478.70	Pass (10+)	Pass (10+)
(0.6L _s) 46.517	-451.59	-5152.43	-701.33	Pass (7.35)	Pass (10+)
(0.7L _s) 54.269	-638.16	-5188.77	-966.25	Pass (5.37)	Pass (8.13)
(0.8L _s) 62.022	-881.11	-5247.06	-1196.67	Pass (4.38)	Pass (5.96)
(0.9L _s) 69.775	-1271.17	-5326.63	-1196.67	Pass (4.45)	Pass (4.19)
(FoS) 76.302	-2042.59	-5411.47	-1196.67	Pass (4.52)	Pass (2.65)
(1.0L _s) 77.528	-2185.85	-4043.87	-1196.67	Pass (3.38)	Pass (1.85)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(CS) 3.924	Yes	Yes	235.81	569.17	Pass (2.41)
(SZB) 5.003	Yes	Yes	229.15	417.71	Pass (1.82)
(1.5H) 5.583	Yes	Yes	225.58	421.05	Pass (1.87)
(0.1L _s) 7.753	Yes	Yes	212.29	405.53	Pass (1.91)
(SZB) 10.503	Yes	Yes	195.60	307.53	Pass (1.57)
(0.2L _s) 15.506	Yes	Yes	165.79	314.64	Pass (1.90)
(SZB) 18.753	Yes	Yes	146.83	273.55	Pass (1.86)
(0.3L _s) 23.258	Yes	Yes	121.01	279.51	Pass (2.31)
(SZB) 29.753	Yes	Yes	85.06	243.33	Pass (2.86)
(HP) 30.571	Yes	Yes	80.78	244.88	Pass (3.03)
(0.4L _s) 31.011	Yes	Yes	78.49	219.66	Pass (2.80)
(0.5L _s) 38.764	Yes	Yes	89.17	219.38	Pass (2.46)
(HP) 46.064	Yes	Yes	131.69	247.09	Pass (1.88)
(0.6L _s) 46.517	Yes	Yes	134.33	246.53	Pass (1.84)
(SZB) 46.882	Yes	Yes	136.47	246.09	Pass (1.80)
(0.7L _s) 54.269	Yes	Yes	179.86	286.48	Pass (1.59)
(SZB) 57.882	Yes	Yes	201.14	284.91	Pass (1.42)
(0.8L _s) 62.022	Yes	Yes	225.48	329.36	Pass (1.46)
(SZB) 66.132	Yes	Yes	249.61	323.22	Pass (1.29)
(0.9L _s) 69.775	Yes	Yes	270.84	423.73	Pass (1.56)
(1.5H) 71.052	Yes	Yes	278.27	415.84	Pass (1.49)
(SZB) 71.632	Yes	Yes	281.65	421.71	Pass (1.50)
(CS) 72.326	Yes	Yes	285.68	564.29	Pass (1.98)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.003	Yes	Yes	219.05	419.59	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.92)
(1.5H) 5.583	Yes	Yes	215.67	423.10	Pass (1.96)
(0.1L _s) 7.753	Yes	Yes	203.04	408.01	Pass (2.01)
(SZB) 10.503	Yes	Yes	187.08	310.28	Pass (1.66)
(0.2L _s) 15.506	Yes	Yes	158.42	318.17	Pass (2.01)
(SZB) 18.753	Yes	Yes	140.03	277.00	Pass (1.98)
(0.3L _s) 23.258	Yes	Yes	114.91	283.23	Pass (2.46)
(SZB) 29.753	Yes	Yes	79.66	247.35	Pass (3.10)
(HP) 30.571	No	Yes	75.46	248.79	Pass (3.30)
(0.4L _s) 31.011	Yes	Yes	73.20	223.44	Pass (3.05)
(0.5L _s) 38.764	Yes	Yes	77.20	223.07	Pass (2.89)
(HP) 46.064	Yes	Yes	124.02	250.88	Pass (2.02)
(0.6L _s) 46.517	Yes	Yes	126.87	250.29	Pass (1.97)
(SZB) 46.882	Yes	Yes	129.17	249.83	Pass (1.93)
(0.7L _s) 54.269	Yes	Yes	174.77	290.01	Pass (1.66)
(SZB) 57.882	Yes	Yes	196.44	288.25	Pass (1.47)
(0.8L _s) 62.022	Yes	Yes	220.67	332.70	Pass (1.51)
(SZB) 66.132	Yes	Yes	244.13	327.80	Pass (1.34)
(0.9L _s) 69.775	Yes	Yes	264.31	432.13	Pass (1.63)
(1.5H) 71.052	Yes	Yes	271.28	426.22	Pass (1.57)
(SZB) 71.632	Yes	Yes	274.43	432.84	Pass (1.58)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.01	192.07	5.7.3.5-2	Pass (2.20)
(SZB) 1.337	584.92	192.07	5.7.3.5-2	Pass (3.05)
(Bar Develop.) 1.705	644.12	192.07	5.7.3.5-2	Pass (3.35)
(Bar Develop.) 2.765	778.83	192.07	5.7.3.5-2	Pass (4.05)
(H) 3.833	810.55	192.07	5.7.3.5-2	Pass (4.22)
(CS) 3.924	813.24	431.42	5.7.3.5-1	Pass (1.89)
(SZB) 5.003	845.34	496.34	5.7.3.5-1	Pass (1.70)
(1.5H) 5.583	955.77	526.04	5.7.3.5-1	Pass (1.82)
(0.1L _s) 7.753	1127.87	644.56	5.7.3.5-1	Pass (1.75)
(SZB) 10.503	1337.57	806.49	5.7.3.5-1	Pass (1.66)
(0.2L _s) 15.506	1653.21	946.25	5.7.3.5-1	Pass (1.75)
(SZB) 18.753	1656.60	1022.87	5.7.3.5-1	Pass (1.62)
(0.3L _s) 23.258	1660.96	1057.68	5.7.3.5-1	Pass (1.57)
(SZB) 29.753	1664.27	1063.17	5.7.3.5-1	Pass (1.57)
(HP) 30.571	1664.44	1058.24	5.7.3.5-1	Pass (1.57)
(0.4L _s) 31.011	1664.44	1106.08	5.7.3.5-1	Pass (1.50)
(0.5L _s) 38.764	1664.44	1111.47	5.7.3.5-1	Pass (1.50)
(HP) 46.064	1664.43	1052.08	5.7.3.5-1	Pass (1.58)
(0.6L _s) 46.517	1664.34	1052.27	5.7.3.5-1	Pass (1.58)
(SZB) 46.882	1664.26	1052.16	5.7.3.5-1	Pass (1.58)
(0.7L _s) 54.269	1660.17	947.82	5.7.3.5-1	Pass (1.75)
(SZB) 57.882	1656.52	882.97	5.7.3.5-1	Pass (1.88)
(0.8L _s) 62.022	1652.18	736.53	5.7.3.5-1	Pass (2.24)
(SZB) 66.132	1337.49	610.47	5.7.3.5-1	Pass (2.19)
(0.9L _s) 69.775	1598.40	542.01	5.7.3.5-1	Pass (2.95)
(1.5H) 71.052	1598.40	608.71	5.7.3.5-1	Pass (2.63)
(SZB) 71.632	1598.40	641.20	5.7.3.5-1	Pass (2.49)
(CS) 72.326	1598.40	677.00	5.7.3.5-1	Pass (2.36)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(H) 72.802	1598.40	700.15	5.7.3.5-1	Pass (2.28)
(Bar Develop.) 73.870	1598.40	759.18	5.7.3.5-1	Pass (2.11)
(Bar Develop.) 74.930	1580.80	822.12	5.7.3.5-1	Pass (1.92)
(SZB) 75.298	1566.37	844.23	5.7.3.5-1	Pass (1.86)
(FoS) 76.302	1527.02	905.18	5.7.3.5-1	Pass (1.69)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.01	181.73	5.7.3.5-2	Pass (2.33)
(SZB) 1.337	584.92	181.73	5.7.3.5-2	Pass (3.22)
(Bar Develop.) 1.705	644.12	181.73	5.7.3.5-2	Pass (3.54)
(Bar Develop.) 2.765	778.83	181.73	5.7.3.5-2	Pass (4.29)
(H) 3.833	810.55	181.73	5.7.3.5-2	Pass (4.46)
(SZB) 5.003	845.34	469.97	5.7.3.5-1	Pass (1.80)
(1.5H) 5.583	955.77	497.85	5.7.3.5-1	Pass (1.92)
(0.1L _s) 7.753	1127.87	608.59	5.7.3.5-1	Pass (1.85)
(SZB) 10.503	1337.57	750.85	5.7.3.5-1	Pass (1.78)
(0.2L _s) 15.506	1653.21	887.78	5.7.3.5-1	Pass (1.86)
(SZB) 18.753	1656.60	954.00	5.7.3.5-1	Pass (1.74)
(0.3L _s) 23.258	1660.96	991.53	5.7.3.5-1	Pass (1.68)
(SZB) 29.753	1664.27	990.60	5.7.3.5-1	Pass (1.68)
(HP) 30.571	1664.44	988.15	5.7.3.5-1	Pass (1.68)
(0.4L _s) 31.011	1664.44	1037.35	5.7.3.5-1	Pass (1.60)
(0.5L _s) 38.764	1664.44	1043.97	5.7.3.5-1	Pass (1.59)
(HP) 46.064	1664.43	978.04	5.7.3.5-1	Pass (1.70)
(0.6L _s) 46.517	1664.34	978.84	5.7.3.5-1	Pass (1.70)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 46.882	1664.26	979.22	5.7.3.5-1	Pass (1.70)
(0.7L _s) 54.269	1660.17	885.27	5.7.3.5-1	Pass (1.88)
(SZB) 57.882	1656.52	826.00	5.7.3.5-1	Pass (2.01)
(0.8L _s) 62.022	1652.18	684.89	5.7.3.5-1	Pass (2.41)
(SZB) 66.132	1337.49	540.31	5.7.3.5-1	Pass (2.48)
(0.9L _s) 69.775	1598.40	463.61	5.7.3.5-1	Pass (3.45)
(1.5H) 71.052	1598.40	521.68	5.7.3.5-1	Pass (3.06)
(SZB) 71.632	1598.40	550.96	5.7.3.5-1	Pass (2.90)
(H) 72.802	1598.40	603.08	5.7.3.5-1	Pass (2.65)
(Bar Develop.) 73.870	1598.40	654.19	5.7.3.5-1	Pass (2.44)
(Bar Develop.) 74.930	1580.80	708.83	5.7.3.5-1	Pass (2.23)
(SZB) 75.298	1566.37	727.95	5.7.3.5-1	Pass (2.15)
(FoS) 76.302	1527.02	780.61	5.7.3.5-1	Pass (1.96)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(CS) 3.924	12.000	48.000	Pass	0.220	0.000	Pass	63.855	142.546	Pass (2.23)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	62.051	142.546	Pass (2.30)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	61.084	142.546	Pass (2.33)
(0.1L _s) 7.753	12.000	48.000	Pass	0.220	0.000	Pass	57.485	142.546	Pass (2.48)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	52.966	146.506	Pass (2.77)
	9.000	48.000	Pass	0.293	0.000	Pass	44.895	146.506	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.2L _s) 15.506									(3.26)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	39.759	142.546	Pass (3.59)
(0.3L _s) 23.258	12.000	48.000	Pass	0.220	0.000	Pass	32.768	142.546	Pass (4.35)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	23.034	138.586	Pass (6.02)
(HP) 30.571	18.000	48.000	Pass	0.147	0.000	Pass	21.875	138.586	Pass (6.34)
(0.4L _s) 31.011	18.000	48.000	Pass	0.147	0.000	Pass	21.253	138.586	Pass (6.52)
(0.5L _s) 38.764	18.000	48.000	Pass	0.147	0.000	Pass	24.146	138.586	Pass (5.74)
(HP) 46.064	18.000	48.000	Pass	0.147	0.000	Pass	35.660	138.586	Pass (3.89)
(0.6L _s) 46.517	18.000	48.000	Pass	0.147	0.000	Pass	36.375	138.586	Pass (3.81)
(SZB) 46.882	18.000	48.000	Pass	0.147	0.000	Pass	36.954	138.586	Pass (3.75)
(0.7L _s) 54.269	12.000	48.000	Pass	0.220	0.000	Pass	48.705	142.546	Pass (2.93)
(SZB) 57.882	12.000	48.000	Pass	0.220	0.000	Pass	54.466	142.546	Pass (2.62)
(0.8L _s) 62.022	9.000	48.000	Pass	0.293	0.000	Pass	61.058	146.506	Pass (2.40)
(SZB) 66.132	9.000	48.000	Pass	0.293	0.000	Pass	67.592	146.506	Pass (2.17)
(0.9L _s) 69.775	12.000	48.000	Pass	0.220	0.000	Pass	73.342	142.546	Pass (1.94)
(1.5H) 71.052	12.000	48.000	Pass	0.220	0.000	Pass	75.353	142.546	Pass (1.89)
(SZB) 71.632	12.000	48.000	Pass	0.220	0.000	Pass	76.268	142.546	Pass (1.87)
(CS) 72.326	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.546	Pass (1.84)
(H) 72.802	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.546	Pass (1.84)
(Bar Develop.) 73.870	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.547	Pass (1.84)
(Bar Develop.) 74.930	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.547	Pass (1.84)
(SZB) 75.298	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.547	Pass (1.84)
(FoS) 76.302	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.547	Pass (1.84)
76.635	12.000	48.000	Pass	0.220	0.000	Pass	77.359	142.547	Pass (1.84)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	61.029	142.546	Pass (2.34)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	59.317	142.546	Pass (2.40)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	58.400	142.546	Pass (2.44)
(0.1L _s) 7.753	12.000	48.000	Pass	0.220	0.000	Pass	54.979	142.546	Pass (2.59)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	50.659	146.506	Pass (2.89)
(0.2L _s) 15.506	9.000	48.000	Pass	0.293	0.000	Pass	42.899	146.506	Pass (3.42)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	37.918	142.546	Pass (3.76)
(0.3L _s) 23.258	12.000	48.000	Pass	0.220	0.000	Pass	31.116	142.546	Pass (4.58)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	21.571	138.586	Pass (6.42)
(HP) 30.571	18.000	48.000	Pass	0.147	0.000	Pass	20.434	138.586	Pass (6.78)
(0.4L _s) 31.011	18.000	48.000	Pass	0.147	0.000	Pass	19.822	138.586	Pass (6.99)
(0.5L _s) 38.764	18.000	48.000	Pass	0.147	0.000	Pass	20.904	138.586	Pass (6.63)
(HP) 46.064	18.000	48.000	Pass	0.147	0.000	Pass	33.583	138.586	Pass (4.13)
(0.6L _s) 46.517	18.000	48.000	Pass	0.147	0.000	Pass	34.355	138.586	Pass (4.03)
(SZB) 46.882	18.000	48.000	Pass	0.147	0.000	Pass	34.978	138.586	Pass (3.96)
(0.7L _s) 54.269	12.000	48.000	Pass	0.220	0.000	Pass	47.326	142.546	Pass (3.01)
(SZB) 57.882	12.000	48.000	Pass	0.220	0.000	Pass	53.194	142.546	Pass (2.68)
(0.8L _s) 62.022	9.000	48.000	Pass	0.293	0.000	Pass	59.756	146.506	Pass (2.45)
(SZB) 66.132	9.000	48.000	Pass	0.293	0.000	Pass	66.107	146.506	Pass (2.22)
(0.9L _s) 69.775	12.000	48.000	Pass	0.220	0.000	Pass	71.574	142.546	Pass (1.99)
(1.5H) 71.052	12.000	48.000	Pass	0.220	0.000	Pass	73.460	142.546	Pass (1.94)
(SZB) 71.632	12.000	48.000	Pass	0.220	0.000	Pass	74.314	142.546	Pass (1.92)
(H) 72.802	12.000	48.000	Pass	0.220	0.000	Pass	75.331	142.546	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(1.89)
(Bar Develop.) 73.870	12.000	48.000	Pass	0.220	0.000	Pass	75.331	142.547	Pass (1.89)
(Bar Develop.) 74.930	12.000	48.000	Pass	0.220	0.000	Pass	75.331	142.547	Pass (1.89)
(SZB) 75.298	12.000	48.000	Pass	0.220	0.000	Pass	75.331	142.547	Pass (1.89)
(FoS) 76.302	12.000	48.000	Pass	0.220	0.000	Pass	75.331	142.547	Pass (1.89)
76.635	12.000	48.000	Pass	0.220	0.000	Pass	75.331	142.547	Pass (1.89)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.163 in

Minimum live load deflection along girder = -0.227 in

Maximum live load deflection along girder = 0.095 in

Status = Pass

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 3.924	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.753	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.506	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.258	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.571	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 31.011	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.764	#4	18.000	18.000	1.500	0.267	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(HP) 46.064	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.517	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.882	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.269	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.882	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 62.022	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.132	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.775	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.052	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 71.632	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 72.326	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 72.802	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.870	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.930	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.298	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.302	#4	3.000	18.000	1.500	1.600	0.125	Pass
76.635	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.753	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.506	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.258	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.571	#4	18.000	18.000	1.500	0.267	0.000	Pass
(0.4L _s) 31.011	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.764	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.064	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.517	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.882	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.269	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.882	#4	12.000	18.000	1.500	0.400	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(0.8L _s) 62.022	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.132	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.775	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.052	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 71.632	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 72.802	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.870	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.930	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.298	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.302	#4	3.000	18.000	1.500	1.600	0.125	Pass
76.635	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.30	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
1	K	12.300	12.000	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
1	K	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.117
Lower Bound Camber at 60 days, 50% of D ₆₀	1.668
Average Camber at 60 days, 75% of D ₆₀	2.502
Upper Bound Camber at 60 days, D ₆₀	3.337

Spec Check Report

For

Span 1 Girder L

March 14, 2021 2:31:36 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.872	Pass (1.19)	162.872	Pass (1.19)

Required Concrete Strengths

Required f'_{ci} = 5.281 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.461 KSI $\Rightarrow$ 6.500 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.155	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.281 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	No	Yes	Pass (1.35)
7.330	(0.1L _r) 7.747	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	No	Yes	Pass (1.34)
15.077	(0.2L _r) 15.494	0.121	-3.623	-0.581	0.589	-0.460	-3.034	No	Yes	Pass (1.29)
22.824	(0.3L _r) 23.240	0.503	-3.980	-0.762	0.773	-0.259	-3.206	No	Yes	Pass (1.22)
(HP) 30.571	(HP, 0.4L _r) 30.987	0.876	-4.317	-0.871	0.884	0.005	-3.433	No	Yes	Pass (1.14)
38.317		0.877	-4.320	-0.908	0.921	-0.031	-3.400	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.734									(1.15)
(HP) 46.064	(HP, 0.6L _r) 46.481	0.876	-4.317	-0.871	0.884	0.005	-3.433	No	Yes	Pass (1.14)
53.811	(0.7L _r) 54.228	0.503	-3.980	-0.762	0.773	-0.259	-3.206	No	Yes	Pass (1.22)
61.558	(0.8L _r) 61.974	0.121	-3.623	-0.581	0.589	-0.460	-3.034	No	Yes	Pass (1.29)
69.305	(0.9L _r) 69.721	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	No	Yes	Pass (1.34)
(PSXFR) 74.051	(PSXFR) 74.468	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	No	Yes	Pass (1.35)
(STLF) 77.051	(STLF, 1.0L _r) 77.468	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.281 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) -0.417	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 2.583	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	0.200	-	No	Yes	Pass (-)
7.330	(0.1L _r) 7.747	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	0.200	-	No	Yes	Pass (-)
15.077	(0.2L _r) 15.494	0.121	-3.623	-0.581	0.589	-0.460	-3.034	0.200	-	No	Yes	Pass (-)
22.824	(0.3L _r) 23.240	0.503	-3.980	-0.762	0.773	-0.259	-3.206	0.200	-	No	Yes	Pass (-)
(HP) 30.571	(HP, 0.4L _r) 30.987	0.876	-4.317	-0.871	0.884	0.005	-3.433	0.200	-	No	Yes	Pass (10+)
38.317	(0.5L _r) 38.734	0.877	-4.320	-0.908	0.921	-0.031	-3.400	0.200	-	No	Yes	Pass (-)
(HP) 46.064	(HP, 0.6L _r) 46.481	0.876	-4.317	-0.871	0.884	0.005	-3.433	0.200	-	No	Yes	Pass (10+)
53.811	(0.7L _r) 54.228	0.503	-3.980	-0.762	0.773	-0.259	-3.206	0.200	-	No	Yes	Pass (-)
61.558	(0.8L _r) 61.974	0.121	-3.623	-0.581	0.589	-0.460	-3.034	0.200	-	No	Yes	Pass (-)
69.305	(0.9L _r) 69.721	-0.268	-3.252	-0.327	0.331	-0.595	-2.920	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.051	(PSXFR) 74.468	-0.508	-3.019	-0.135	0.137	-0.643	-2.882	0.200	-	No	Yes	Pass (-)
(STLF) 77.051	(STLF, 1.0L _r) 77.468	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.103 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.582	-0.288	0.292	-0.722	-2.291	No	Yes	Pass (1.57)
(0.1L _s) 7.753	-0.212	-2.812	-0.799	0.810	-1.010	-2.002	No	Yes	Pass (1.80)
(0.2L _s) 15.506	0.123	-3.157	-1.408	1.429	-1.285	-1.728	No	Yes	Pass (2.08)
(0.3L _s) 23.258	0.458	-3.494	-1.835	1.861	-1.377	-1.633	No	Yes	Pass (2.20)
(HP) 30.571	0.771	-3.797	-2.074	2.103	-1.303	-1.694	No	Yes	Pass (2.13)
(0.4L _s) 31.011	0.771	-3.798	-2.083	2.113	-1.312	-1.685	No	Yes	Pass (2.14)
(0.5L _s) 38.764	0.773	-3.806	-2.155	2.186	-1.382	-1.620	No	Yes	Pass (2.22)
(HP) 46.064	0.771	-3.796	-2.064	2.094	-1.293	-1.702	No	Yes	Pass (2.11)
(0.6L _s) 46.517	0.752	-3.778	-2.054	2.083	-1.302	-1.695	No	Yes	Pass (2.12)
(0.7L _s) 54.269	0.420	-3.455	-1.778	1.804	-1.359	-1.651	No	Yes	Pass (2.18)
(0.8L _s) 62.022	0.085	-3.116	-1.329	1.348	-1.244	-1.768	No	Yes	Pass (2.04)
(0.9L _s) 69.775	-0.250	-2.772	-0.703	0.714	-0.954	-2.058	No	Yes	Pass (1.75)
(PSXFR) 74.051	-0.434	-2.582	-0.282	0.286	-0.716	-2.296	No	Yes	Pass (1.57)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.103 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 2.583	-0.435	-2.582	-0.288	0.292	-0.722	-2.291	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.812	-0.799	0.810	-1.010	-2.002	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.506	0.123	-3.157	-1.408	1.429	-1.285	-1.728	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.258	0.458	-3.494	-1.835	1.861	-1.377	-1.633	-	0.537	No	Yes	Pass (-)
(HP) 30.571	0.771	-3.797	-2.074	2.103	-1.303	-1.694	-	0.537	No	Yes	Pass (-)
(0.4L _s) 31.011	0.771	-3.798	-2.083	2.113	-1.312	-1.685	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.764	0.773	-3.806	-2.155	2.186	-1.382	-1.620	-	0.537	No	Yes	Pass (-)
(HP) 46.064	0.771	-3.796	-2.064	2.094	-1.293	-1.702	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.517	0.752	-3.778	-2.054	2.083	-1.302	-1.695	-	0.537	No	Yes	Pass (-)
(0.7L _s) 54.269	0.420	-3.455	-1.778	1.804	-1.359	-1.651	-	0.537	No	Yes	Pass (-)
(0.8L _s) 62.022	0.085	-3.116	-1.329	1.348	-1.244	-1.768	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.250	-2.772	-0.703	0.714	-0.954	-2.058	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.051	-0.434	-2.582	-0.282	0.286	-0.716	-2.296	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.461 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.302	0.342	-0.737	-2.243	No	Yes	Pass (1.61)
(0.1L _s) 7.753	-0.212	-2.822	-0.839	0.948	-1.051	-1.874	No	Yes	Pass (1.92)
(0.2L _s) 15.506	0.124	-3.177	-1.476	1.660	-1.352	-1.516	No	Yes	Pass (2.37)
(0.3L _s) 23.258	0.462	-3.524	-1.920	2.144	-1.458	-1.380	No	Yes	Pass (2.47)
(HP) 30.571	0.778	-3.833	-2.165	2.394	-1.387	-1.439	No	Yes	Pass (2.50)
(0.4L _s) 31.011	0.778	-3.834	-2.174	2.403	-1.396	-1.432	No	Yes	Pass (2.51)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.5L _s) 38.764	0.779	-3.838	-2.240	2.439	-1.460	-1.399	No	Yes	Pass (2.47)
(HP) 46.064	0.776	-3.820	-2.130	2.272	-1.354	-1.548	No	Yes	Pass (2.33)
(0.6L _s) 46.517	0.756	-3.801	-2.117	2.255	-1.361	-1.546	No	Yes	Pass (2.33)
(0.7L _s) 54.269	0.421	-3.462	-1.808	1.851	-1.388	-1.611	No	Yes	Pass (2.23)
(0.8L _s) 62.022	0.084	-3.109	-1.313	1.227	-1.229	-1.883	No	Yes	Pass (1.91)
(0.9L _s) 69.775	-0.249	-2.753	-0.635	0.369	-0.883	-2.384	No	Yes	Pass (1.51)
(PSXFR) 74.051	-0.431	-2.558	-0.181	-0.209	-0.612	-2.768	No	Yes	Pass (1.30)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.461 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.351	0.318	-0.786	-2.267	No	Yes	Pass (2.12)
(0.1L _s) 7.753	-0.212	-2.822	-0.971	0.874	-1.183	-1.947	No	Yes	Pass (2.47)
(0.2L _s) 15.506	0.124	-3.177	-1.700	1.513	-1.576	-1.663	No	Yes	Pass (2.89)
(0.3L _s) 23.258	0.462	-3.524	-2.199	1.923	-1.737	-1.601	No	Yes	Pass (2.76)
(HP) 30.571	0.778	-3.833	-2.476	2.103	-1.698	-1.730	No	Yes	Pass (2.77)
(0.4L _s) 31.011	0.778	-3.834	-2.486	2.108	-1.708	-1.726	No	Yes	Pass (2.78)
(0.5L _s) 38.764	0.779	-3.838	-2.550	2.070	-1.771	-1.768	No	Yes	Pass (2.71)
(HP) 46.064	0.776	-3.820	-2.412	1.833	-1.636	-1.987	No	Yes	Pass (2.42)
(0.6L _s) 46.517	0.756	-3.801	-2.397	1.812	-1.641	-1.989	No	Yes	Pass (2.41)
(0.7L _s) 54.269	0.421	-3.462	-2.022	1.334	-1.602	-2.128	No	Yes	Pass (2.26)
(0.8L _s) 62.022	0.084	-3.109	-1.437	0.618	-1.353	-2.492	No	Yes	Pass (1.93)
(0.9L _s) 69.775	-0.249	-2.753	-0.680	-0.468	-0.929	-3.221	No	Yes	Pass (1.49)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 74.051	-0.431	-2.558	-0.197	-1.318	-0.627	-3.877	No	Yes	Pass (1.24)

Interval 17: Open to Traffic : Service I Tension without live load**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000$ KSI

Concrete strength required to satisfy this requirement = 6.461 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.435	-2.585	-0.299	0.354	-0.734	-2.232	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.822	-0.831	0.979	-1.044	-1.842	No	Yes	Pass (-)
(0.2L _s) 15.506	0.124	-3.177	-1.463	1.716	-1.339	-1.460	No	Yes	Pass (-)
(0.3L _s) 23.258	0.462	-3.524	-1.902	2.217	-1.440	-1.307	No	Yes	Pass (-)
(HP) 30.571	0.778	-3.833	-2.144	2.478	-1.366	-1.356	No	Yes	Pass (-)
(0.4L _s) 31.011	0.778	-3.834	-2.154	2.487	-1.375	-1.347	No	Yes	Pass (-)
(0.5L _s) 38.764	0.779	-3.838	-2.218	2.527	-1.439	-1.311	No	Yes	Pass (-)
(HP) 46.064	0.776	-3.820	-2.109	2.357	-1.333	-1.463	No	Yes	Pass (-)
(0.6L _s) 46.517	0.756	-3.801	-2.096	2.339	-1.340	-1.462	No	Yes	Pass (-)
(0.7L _s) 54.269	0.421	-3.462	-1.790	1.925	-1.369	-1.538	No	Yes	Pass (-)
(0.8L _s) 62.022	0.084	-3.109	-1.300	1.283	-1.215	-1.827	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.249	-2.753	-0.622	0.424	-0.870	-2.329	No	Yes	Pass (-)
(PSXFR) 74.051	-0.431	-2.558	-0.165	-0.140	-0.595	-2.698	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
(PSXFR) 2.583	-0.435	-2.585	-0.295	0.517	-0.730	-2.068	No	Yes	Pass (-)
(0.1L _s) 7.753	-0.212	-2.822	-0.817	1.423	-1.030	-1.399	No	Yes	Pass (-)
(0.2L _s) 15.506	0.124	-3.177	-1.436	2.466	-1.312	-0.711	No	Yes	Pass (-)
(0.3L _s) 23.258	0.462	-3.524	-1.861	3.143	-1.399	-0.380	No	Yes	Pass (-)
(HP) 30.571	0.778	-3.833	-2.089	3.484	-1.310	-0.349	No	Yes	Pass (-)
(0.4L _s) 31.011	0.778	-3.834	-2.097	3.494	-1.318	-0.340	No	Yes	Pass (-)
(0.5L _s) 38.764	0.779	-3.838	-2.146	3.516	-1.367	-0.322	No	Yes	Pass (-)
(HP) 46.064	0.776	-3.820	-2.022	3.252	-1.247	-0.568	No	Yes	Pass (-)
(0.6L _s) 46.517	0.756	-3.801	-2.009	3.226	-1.253	-0.575	No	Yes	Pass (-)
(0.7L _s) 54.269	0.421	-3.462	-1.689	2.608	-1.269	-0.855	No	Yes	Pass (-)
(0.8L _s) 62.022	0.084	-3.109	-1.183	1.685	-1.098	-1.424	No	Yes	Pass (-)
(0.9L _s) 69.775	-0.249	-2.753	-0.465	0.577	-0.714	-2.176	No	Yes	Pass (-)
(PSXFR) 74.051	-0.431	-2.558	0.041	-0.088	-0.390	-2.646	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression

Fatigue I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.4f'_c = -3.200$ KSI

Concrete strength required to satisfy this requirement = 4.557 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)
(0.0L _s) 0.000	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
(PSXFR) 2.583	-0.435	-2.585	-0.185	0.155	-0.402	-1.137	No	Yes	Pass (2.81)
(0.1L _s) 7.753	-0.212	-2.822	-0.509	0.426	-0.615	-0.984	No	Yes	Pass (3.25)
(0.2L _s) 15.506	0.124	-3.177	-0.884	0.735	-0.822	-0.853	No	Yes	Pass (3.75)
(0.3L _s) 23.258	0.462	-3.524	-1.143	0.929	-0.912	-0.832	No	Yes	Pass (3.51)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 30.571	0.778	-3.833	-1.280	1.009	-0.891	-0.907	No	Yes	Pass (3.53)
(0.4L _s) 31.011	0.778	-3.834	-1.285	1.011	-0.895	-0.906	No	Yes	Pass (3.53)
(0.5L _s) 38.764	0.779	-3.838	-1.310	0.981	-0.920	-0.938	No	Yes	Pass (3.41)
(HP) 46.064	0.776	-3.820	-1.247	0.852	-0.859	-1.058	No	Yes	Pass (3.03)
(0.6L _s) 46.517	0.756	-3.801	-1.239	0.841	-0.861	-1.059	No	Yes	Pass (3.02)
(0.7L _s) 54.269	0.421	-3.462	-1.046	0.592	-0.836	-1.139	No	Yes	Pass (2.81)
(0.8L _s) 62.022	0.084	-3.109	-0.738	0.233	-0.696	-1.322	No	Yes	Pass (2.42)
(0.9L _s) 69.775	-0.249	-2.753	-0.324	-0.237	-0.448	-1.613	No	Yes	Pass (1.98)
(PSXFR) 74.051	-0.431	-2.558	-0.091	-0.544	-0.306	-1.823	No	Yes	Pass (1.76)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2143.78	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.753	1725.50	4505.21	2294.91	Pass (1.96)	Pass (2.61)
(0.2L _s) 15.506	2963.34	5417.38	3736.76	Pass (1.45)	Pass (1.83)
(0.3L _s) 23.258	3733.38	5769.08	3947.88	Pass (1.46)	Pass (1.55)
(0.4L _s) 31.011	4104.90	6090.46	4173.06	Pass (1.46)	Pass (1.48)
(0.5L _s) 38.764	4078.21	6083.41	4149.61	Pass (1.47)	Pass (1.49)
(0.6L _s) 46.517	3685.19	6060.66	4142.20	Pass (1.46)	Pass (1.64)
(0.7L _s) 54.269	2895.68	5707.35	3851.26	Pass (1.48)	Pass (1.97)
(0.8L _s) 62.022	1779.17	5360.58	2366.30	Pass (2.27)	Pass (3.01)
(0.9L _s) 69.775	581.50	4363.77	773.39	Pass (5.64)	Pass (7.50)
(1.0L _s) 77.528	-396.50	1891.00	-527.35	Pass (-)	Pass (-)

Positive Moment Capacity for Strength II Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	2143.78	0.00	Pass (∞)	Pass (∞)
(0.1L _s) 7.753	1629.57	4505.21	2294.91	Pass (1.96)	Pass (2.76)
(0.2L _s) 15.506	2780.70	5417.38	3736.76	Pass (1.45)	Pass (1.95)
(0.3L _s) 23.258	3506.52	5769.08	3947.88	Pass (1.46)	Pass (1.65)
(0.4L _s) 31.011	3851.91	6090.46	4173.06	Pass (1.46)	Pass (1.58)
(0.5L _s) 38.764	3858.00	6083.41	4149.61	Pass (1.47)	Pass (1.58)
(0.6L _s) 46.517	3453.67	6060.66	4142.20	Pass (1.46)	Pass (1.75)
(0.7L _s) 54.269	2698.99	5707.35	3851.26	Pass (1.48)	Pass (2.11)
(0.8L _s) 62.022	1628.94	5360.58	2366.30	Pass (2.27)	Pass (3.29)
(0.9L _s) 69.775	268.26	4363.77	773.39	Pass (5.64)	Pass (10+)
(1.0L _s) 77.528	-396.50	1891.00	-527.35	Pass (-)	Pass (-)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	-0.23	-5411.77	0.45	Pass (-)	Pass (10+)
(0.1L _s) 7.753	-20.65	-5322.49	-27.47	Pass (10+)	Pass (10+)
(0.2L _s) 15.506	-73.11	-5248.88	-97.23	Pass (10+)	Pass (10+)
(0.3L _s) 23.258	-157.36	-5194.12	-209.29	Pass (10+)	Pass (10+)
(0.4L _s) 31.011	-273.41	-5159.65	-363.64	Pass (10+)	Pass (10+)
(0.5L _s) 38.764	-421.27	-4852.03	-560.29	Pass (8.66)	Pass (10+)
(0.6L _s) 46.517	-600.93	-4862.92	-799.23	Pass (6.08)	Pass (8.09)
(0.7L _s) 54.269	-812.39	-4895.81	-1080.47	Pass (4.53)	Pass (6.03)
(0.8L _s) 62.022	-1113.95	-5251.37	-1169.49	Pass (4.49)	Pass (4.71)
(0.9L _s) 69.775	-1721.78	-5328.74	-1190.72	Pass (4.48)	Pass (3.09)
(FoS) 76.301	-2760.13	-5411.58	-1196.67	Pass (4.52)	Pass (1.96)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(1.0L _s) 77.528	-2959.89	-4043.89	-1196.67	Pass (3.38)	Pass (1.37)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)
(FoS) 0.333	0.34	-5411.77	0.45	Pass (-)	Pass (-)
(0.1L _s) 7.753	-7.39	-5322.49	-27.47	Pass (10+)	Pass (10+)
(0.2L _s) 15.506	-46.58	-5248.88	-97.23	Pass (10+)	Pass (10+)
(0.3L _s) 23.258	-117.58	-5194.12	-209.29	Pass (10+)	Pass (10+)
(0.4L _s) 31.011	-220.37	-5159.65	-363.64	Pass (10+)	Pass (10+)
(0.5L _s) 38.764	-354.96	-4852.03	-560.29	Pass (8.66)	Pass (10+)
(0.6L _s) 46.517	-521.36	-4862.92	-799.23	Pass (6.08)	Pass (9.33)
(0.7L _s) 54.269	-719.56	-4895.81	-1080.47	Pass (4.53)	Pass (6.80)
(0.8L _s) 62.022	-1006.15	-5251.37	-1169.49	Pass (4.49)	Pass (5.22)
(0.9L _s) 69.775	-1426.30	-5328.74	-1190.72	Pass (4.48)	Pass (3.74)
(FoS) 76.301	-2271.87	-5411.58	-1196.67	Pass (4.52)	Pass (2.38)
(1.0L _s) 77.528	-2433.58	-4043.89	-1196.67	Pass (3.38)	Pass (1.66)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n / V_u$)
(CS) 3.924	Yes	Yes	229.88	569.17	Pass (2.48)
(SZB) 5.003	Yes	Yes	223.17	416.30	Pass (1.87)
(1.5H) 5.583	Yes	Yes	219.57	419.42	Pass (1.91)
(0.1L _s) 7.753	Yes	Yes	206.23	403.30	Pass (1.96)
(SZB) 10.503	Yes	Yes	189.53	304.97	Pass (1.61)
(0.2L _s) 15.506	Yes	Yes	159.83	311.27	Pass (1.95)
(SZB) 18.753	Yes	Yes	141.02	270.14	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.92)
(0.3L _s) 23.258	Yes	Yes	115.51	275.65	Pass (2.39)
(SZB) 29.753	Yes	Yes	80.14	234.71	Pass (2.93)
(HP) 30.571	Yes	Yes	75.94	238.58	Pass (3.14)
(0.4L _s) 31.011	Yes	Yes	73.69	201.29	Pass (2.73)
(0.5L _s) 38.764	Yes	Yes	83.88	199.23	Pass (2.38)
(HP) 46.064	Yes	Yes	125.28	242.85	Pass (1.94)
(0.6L _s) 46.517	Yes	Yes	127.85	242.32	Pass (1.90)
(SZB) 46.882	Yes	Yes	129.93	241.90	Pass (1.86)
(0.7L _s) 54.269	Yes	Yes	172.18	282.70	Pass (1.64)
(SZB) 57.882	Yes	Yes	192.93	281.65	Pass (1.46)
(0.8L _s) 62.022	Yes	Yes	216.72	326.69	Pass (1.51)
(SZB) 66.132	Yes	Yes	240.38	322.14	Pass (1.34)
(0.9L _s) 69.775	Yes	Yes	261.28	419.58	Pass (1.61)
(1.5H) 71.051	Yes	Yes	268.61	411.33	Pass (1.53)
(SZB) 71.632	Yes	Yes	271.95	416.77	Pass (1.53)
(CS) 72.325	Yes	Yes	275.94	558.15	Pass (2.02)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.003	Yes	Yes	213.43	418.20	Pass (1.96)
(1.5H) 5.583	Yes	Yes	210.01	421.50	Pass (2.01)
(0.1L _s) 7.753	Yes	Yes	197.30	405.83	Pass (2.06)
(SZB) 10.503	Yes	Yes	181.31	307.77	Pass (1.70)
(0.2L _s) 15.506	Yes	Yes	152.73	314.86	Pass (2.06)
(SZB) 18.753	Yes	Yes	134.49	273.63	Pass (2.03)
(0.3L _s) 23.258	Yes	Yes	109.66	279.41	Pass (2.55)

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 29.753	Yes	Yes	74.99	243.15	Pass (3.24)
(HP) 30.571	No	Yes	70.87	244.51	Pass (3.45)
(0.4L _s) 31.011	Yes	Yes	68.65	219.14	Pass (3.19)
(0.5L _s) 38.764	Yes	Yes	72.60	218.57	Pass (3.01)
(HP) 46.064	Yes	Yes	117.90	246.68	Pass (2.09)
(0.6L _s) 46.517	Yes	Yes	120.65	246.13	Pass (2.04)
(SZB) 46.882	Yes	Yes	122.88	245.69	Pass (2.00)
(0.7L _s) 54.269	Yes	Yes	167.08	286.35	Pass (1.71)
(SZB) 57.882	Yes	Yes	188.15	285.13	Pass (1.52)
(0.8L _s) 62.022	Yes	Yes	211.79	330.23	Pass (1.56)
(SZB) 66.132	Yes	Yes	234.77	327.17	Pass (1.39)
(0.9L _s) 69.775	Yes	Yes	254.66	430.21	Pass (1.69)
(1.5H) 71.051	Yes	Yes	261.55	422.45	Pass (1.62)
(SZB) 71.632	Yes	Yes	264.67	428.66	Pass (1.62)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.32	185.80	5.7.3.5-2	Pass (2.28)
(SZB) 1.337	585.63	185.80	5.7.3.5-2	Pass (3.15)
(Bar Develop.) 1.705	644.97	185.80	5.7.3.5-2	Pass (3.47)
(Bar Develop.) 2.765	780.01	185.80	5.7.3.5-2	Pass (4.20)
(H) 3.833	811.69	185.80	5.7.3.5-2	Pass (4.37)
(CS) 3.924	814.37	445.03	5.7.3.5-1	Pass (1.83)
(SZB) 5.003	846.44	515.75	5.7.3.5-1	Pass (1.64)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(1.5H) 5.583	956.97	547.99	5.7.3.5-1	Pass (1.75)
(0.1L _s) 7.753	1129.09	676.86	5.7.3.5-1	Pass (1.67)
(SZB) 10.503	1338.77	844.94	5.7.3.5-1	Pass (1.58)
(0.2L _s) 15.506	1653.23	1004.47	5.7.3.5-1	Pass (1.65)
(SZB) 18.753	1656.62	1081.49	5.7.3.5-1	Pass (1.53)
(0.3L _s) 23.258	1660.59	1126.89	5.7.3.5-1	Pass (1.47)
(SZB) 29.753	1663.85	1135.91	5.7.3.5-1	Pass (1.46)
(HP) 30.571	1664.10	1131.09	5.7.3.5-1	Pass (1.47)
(0.4L _s) 31.011	1664.09	1177.52	5.7.3.5-1	Pass (1.41)
(0.5L _s) 38.764	1663.83	1181.14	5.7.3.5-1	Pass (1.41)
(HP) 46.064	1663.72	1109.76	5.7.3.5-1	Pass (1.50)
(0.6L _s) 46.517	1663.54	1109.35	5.7.3.5-1	Pass (1.50)
(SZB) 46.882	1663.40	1108.73	5.7.3.5-1	Pass (1.50)
(0.7L _s) 54.269	1658.08	990.40	5.7.3.5-1	Pass (1.67)
(SZB) 57.882	1654.77	915.89	5.7.3.5-1	Pass (1.81)
(0.8L _s) 62.022	1650.94	756.51	5.7.3.5-1	Pass (2.18)
(SZB) 66.132	1338.07	616.62	5.7.3.5-1	Pass (2.17)
(0.9L _s) 69.775	1598.40	579.65	5.7.3.5-1	Pass (2.76)
(1.5H) 71.051	1598.40	651.88	5.7.3.5-1	Pass (2.45)
(SZB) 71.632	1598.40	686.61	5.7.3.5-1	Pass (2.33)
(CS) 72.325	1598.40	725.23	5.7.3.5-1	Pass (2.20)
(H) 72.801	1598.40	750.49	5.7.3.5-1	Pass (2.13)
(Bar Develop.) 73.869	1598.40	813.72	5.7.3.5-1	Pass (1.96)
(Bar Develop.) 74.930	1580.80	881.84	5.7.3.5-1	Pass (1.79)
(SZB) 75.298	1566.37	905.77	5.7.3.5-1	Pass (1.73)
(FoS) 76.301	1527.02	971.74	5.7.3.5-1	Pass (1.57)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 0.333	423.32	175.85	5.7.3.5-2	Pass (2.41)
(SZB) 1.337	585.63	175.85	5.7.3.5-2	Pass (3.33)
(Bar Develop.) 1.705	644.97	175.85	5.7.3.5-2	Pass (3.67)
(Bar Develop.) 2.765	780.01	175.85	5.7.3.5-2	Pass (4.44)
(H) 3.833	811.69	175.85	5.7.3.5-2	Pass (4.62)
(SZB) 5.003	846.44	488.78	5.7.3.5-1	Pass (1.73)
(1.5H) 5.583	956.97	519.07	5.7.3.5-1	Pass (1.84)
(0.1L _s) 7.753	1129.09	639.54	5.7.3.5-1	Pass (1.77)
(SZB) 10.503	1338.77	787.39	5.7.3.5-1	Pass (1.70)
(0.2L _s) 15.506	1653.23	942.85	5.7.3.5-1	Pass (1.75)
(SZB) 18.753	1656.62	1009.57	5.7.3.5-1	Pass (1.64)
(0.3L _s) 23.258	1660.59	1056.99	5.7.3.5-1	Pass (1.57)
(SZB) 29.753	1663.85	1059.03	5.7.3.5-1	Pass (1.57)
(HP) 30.571	1664.10	1056.87	5.7.3.5-1	Pass (1.57)
(0.4L _s) 31.011	1664.09	1106.30	5.7.3.5-1	Pass (1.50)
(0.5L _s) 38.764	1663.83	1112.90	5.7.3.5-1	Pass (1.50)
(HP) 46.064	1663.72	1032.10	5.7.3.5-1	Pass (1.61)
(0.6L _s) 46.517	1663.54	1032.25	5.7.3.5-1	Pass (1.61)
(SZB) 46.882	1663.40	1032.09	5.7.3.5-1	Pass (1.61)
(0.7L _s) 54.269	1658.08	923.78	5.7.3.5-1	Pass (1.79)
(SZB) 57.882	1654.77	854.88	5.7.3.5-1	Pass (1.94)
(0.8L _s) 62.022	1650.94	700.81	5.7.3.5-1	Pass (2.36)
(SZB) 66.132	1338.07	539.29	5.7.3.5-1	Pass (2.48)
(0.9L _s) 69.775	1598.40	493.08	5.7.3.5-1	Pass (3.24)
(1.5H) 71.051	1598.40	555.20	5.7.3.5-1	Pass (2.88)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 71.632	1598.40	586.39	5.7.3.5-1	Pass (2.73)
(H) 72.801	1598.40	642.69	5.7.3.5-1	Pass (2.49)
(Bar Develop.) 73.869	1598.40	696.98	5.7.3.5-1	Pass (2.29)
(Bar Develop.) 74.930	1580.80	755.79	5.7.3.5-1	Pass (2.09)
(SZB) 75.298	1566.37	776.37	5.7.3.5-1	Pass (2.02)
(FoS) 76.301	1527.02	833.02	5.7.3.5-1	Pass (1.83)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.629	Pass (2.29)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.629	Pass (2.29)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.627	Pass (2.29)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.622	Pass (2.29)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.620	Pass (2.29)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.615	Pass (2.29)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.610	Pass (2.29)
(CS) 3.924	12.000	48.000	Pass	0.220	0.000	Pass	62.248	142.609	Pass (2.29)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	60.431	142.604	Pass (2.36)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	59.457	142.602	Pass (2.40)
(0.1L _s) 7.753	12.000	48.000	Pass	0.220	0.000	Pass	55.844	142.592	Pass (2.55)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	51.322	146.541	Pass (2.86)
(0.2L _s) 15.506	9.000	48.000	Pass	0.293	0.000	Pass	43.281	146.523	Pass (3.39)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	38.187	142.552	Pass (3.73)
(0.3L _s) 23.258	12.000	48.000	Pass	0.220	0.000	Pass	31.214	142.539	Pass (4.57)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	21.560	138.565	Pass (6.43)
(HP) 30.571	18.000	48.000	Pass	0.147	0.000	Pass	20.421	138.564	Pass (6.79)
(0.4L _s) 31.011	18.000	48.000	Pass	0.147	0.000	Pass	19.810	138.563	Pass (6.99)
(0.5L _s) 38.764	18.000	48.000	Pass	0.147	0.000	Pass	22.481	138.553	Pass (6.16)
(HP) 46.064	18.000	48.000	Pass	0.147	0.000	Pass	33.543	138.550	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(4.13)
(0.6L _s) 46.517	18.000	48.000	Pass	0.147	0.000	Pass	34.232	138.550	Pass (4.05)
(SZB) 46.882	18.000	48.000	Pass	0.147	0.000	Pass	34.788	138.550	Pass (3.98)
(0.7L _s) 54.269	12.000	48.000	Pass	0.220	0.000	Pass	46.157	142.514	Pass (3.09)
(SZB) 57.882	12.000	48.000	Pass	0.220	0.000	Pass	51.786	142.518	Pass (2.75)
(0.8L _s) 62.022	9.000	48.000	Pass	0.293	0.000	Pass	58.292	146.485	Pass (2.51)
(SZB) 66.132	9.000	48.000	Pass	0.293	0.000	Pass	64.823	146.493	Pass (2.26)
(0.9L _s) 69.775	12.000	48.000	Pass	0.220	0.000	Pass	70.651	142.542	Pass (2.02)
(1.5H) 71.051	12.000	48.000	Pass	0.220	0.000	Pass	72.708	142.545	Pass (1.96)
(SZB) 71.632	12.000	48.000	Pass	0.220	0.000	Pass	73.642	142.547	Pass (1.94)
(CS) 72.325	12.000	48.000	Pass	0.220	0.000	Pass	74.720	142.549	Pass (1.91)
(H) 72.801	12.000	48.000	Pass	0.220	0.000	Pass	74.720	142.550	Pass (1.91)
(Bar Develop.) 73.869	12.000	48.000	Pass	0.220	0.000	Pass	74.720	142.553	Pass (1.91)
(Bar Develop.) 74.930	12.000	48.000	Pass	0.220	0.000	Pass	74.720	142.557	Pass (1.91)
(SZB) 75.298	12.000	48.000	Pass	0.220	0.000	Pass	74.720	142.558	Pass (1.91)
(FoS) 76.301	12.000	48.000	Pass	0.220	0.000	Pass	74.720	142.561	Pass (1.91)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.000	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.629	Pass (2.40)
(0.0L _s) 0.000	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.629	Pass (2.40)
(FoS) 0.333	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.627	Pass (2.40)
(SZB) 1.337	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.622	Pass (2.40)
(Bar Develop.) 1.705	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.620	Pass (2.40)
(Bar Develop.) 2.765	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.615	Pass (2.40)
(H) 3.833	12.000	48.000	Pass	0.220	0.000	Pass	59.523	142.610	Pass (2.40)
(SZB) 5.003	12.000	48.000	Pass	0.220	0.000	Pass	57.794	142.604	Pass (2.47)
(1.5H) 5.583	12.000	48.000	Pass	0.220	0.000	Pass	56.869	142.602	Pass (2.51)
	12.000	48.000	Pass	0.220	0.000	Pass	53.427	142.592	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(0.1L _s) 7.753									(2.67)
(SZB) 10.503	9.000	48.000	Pass	0.293	0.000	Pass	49.097	146.541	Pass (2.98)
(0.2L _s) 15.506	9.000	48.000	Pass	0.293	0.000	Pass	41.359	146.523	Pass (3.54)
(SZB) 18.753	12.000	48.000	Pass	0.220	0.000	Pass	36.418	142.552	Pass (3.91)
(0.3L _s) 23.258	12.000	48.000	Pass	0.220	0.000	Pass	29.633	142.539	Pass (4.81)
(SZB) 29.753	18.000	48.000	Pass	0.147	0.000	Pass	20.174	138.565	Pass (6.87)
(HP) 30.571	18.000	48.000	Pass	0.147	0.000	Pass	19.057	138.564	Pass (7.27)
(0.4L _s) 31.011	18.000	48.000	Pass	0.147	0.000	Pass	18.458	138.563	Pass (7.51)
(0.5L _s) 38.764	18.000	48.000	Pass	0.147	0.000	Pass	19.457	138.553	Pass (7.12)
(HP) 46.064	18.000	48.000	Pass	0.147	0.000	Pass	31.566	138.550	Pass (4.39)
(0.6L _s) 46.517	18.000	48.000	Pass	0.147	0.000	Pass	32.305	138.550	Pass (4.29)
(SZB) 46.882	18.000	48.000	Pass	0.147	0.000	Pass	32.901	138.550	Pass (4.21)
(0.7L _s) 54.269	12.000	48.000	Pass	0.220	0.000	Pass	44.790	142.514	Pass (3.18)
(SZB) 57.882	12.000	48.000	Pass	0.220	0.000	Pass	50.504	142.518	Pass (2.82)
(0.8L _s) 62.022	9.000	48.000	Pass	0.293	0.000	Pass	56.965	146.485	Pass (2.57)
(SZB) 66.132	9.000	48.000	Pass	0.293	0.000	Pass	63.310	146.493	Pass (2.31)
(0.9L _s) 69.775	12.000	48.000	Pass	0.220	0.000	Pass	68.860	142.542	Pass (2.07)
(1.5H) 71.051	12.000	48.000	Pass	0.220	0.000	Pass	70.795	142.545	Pass (2.01)
(SZB) 71.632	12.000	48.000	Pass	0.220	0.000	Pass	71.670	142.547	Pass (1.99)
(H) 72.801	12.000	48.000	Pass	0.220	0.000	Pass	72.676	142.550	Pass (1.96)
(Bar Develop.) 73.869	12.000	48.000	Pass	0.220	0.000	Pass	72.676	142.553	Pass (1.96)
(Bar Develop.) 74.930	12.000	48.000	Pass	0.220	0.000	Pass	72.676	142.557	Pass (1.96)
(SZB) 75.298	12.000	48.000	Pass	0.220	0.000	Pass	72.676	142.558	Pass (1.96)
(FoS) 76.301	12.000	48.000	Pass	0.220	0.000	Pass	72.676	142.561	Pass (1.96)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.163 in

Minimum live load deflection along girder = -0.227 in

Maximum live load deflection along girder = 0.095 in

Status = **Pass**

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 3.924	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.753	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.506	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.258	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.571	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 31.011	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.764	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.064	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.517	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.882	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.269	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.882	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 62.022	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.132	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.775	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.051	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 71.632	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 72.325	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 72.801	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.869	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.930	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.298	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.301	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.000	#4	3.000	18.000	1.500	1.600	0.000	Pass
(0.0L _s) 0.000	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 0.333	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 1.337	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 1.705	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.765	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 3.833	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.003	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 5.583	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.753	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 10.503	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.506	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 18.753	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.258	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 29.753	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 30.571	#4	18.000	18.000	1.500	0.267	0.000	Pass
(0.4L _s) 31.011	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.764	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.064	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.517	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 46.882	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.269	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 57.882	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 62.022	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.132	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.775	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.051	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 71.632	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 72.801	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 73.869	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.930	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.298	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.301	#4	3.000	18.000	1.500	1.600	0.125	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.30	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be

equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
1	L	12.300	11.750	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
1	L	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.189
Lower Bound Camber at 60 days, 50% of D_{60}	1.668
Average Camber at 60 days, 75% of D_{60}	2.502
Upper Bound Camber at 60 days, D_{60}	3.337

Spec Check Report

For

Span 2 Girder A

March 14, 2021 2:33:46 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	163.053	Pass (1.19)	163.053	Pass (1.19)

Required Concrete Strengths

Required $f'_{ci} = 5.296 \text{ KSI} \Rightarrow 5.300 \text{ KSI}$

Actual $f'_{ci} = 6.000 \text{ KSI}$

Required $f'_c = 6.600 \text{ KSI} \Rightarrow 6.700 \text{ KSI}$

Actual $f'_c = 8.000 \text{ KSI}$

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.207	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

$f'_{ci} = 6.000 \text{ KSI}$

Compression stress limit = $-0.65f'_{ci} = -3.900 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.296 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) 0.443	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 3.443	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
8.143	(0.1L _r) 7.700	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	No	Yes	Pass (1.33)
15.842	(0.2L _r) 15.400	0.121	-3.622	-0.574	0.582	-0.453	-3.040	No	Yes	Pass (1.28)
23.542	(0.3L _r) 23.099	0.503	-3.979	-0.753	0.764	-0.250	-3.215	No	Yes	Pass (1.21)
(HP) 31.242	(HP, 0.4L _r) 30.799	0.876	-4.316	-0.861	0.873	0.015	-3.442	No	Yes	Pass (1.13)
38.942		0.877	-4.319	-0.897	0.910	-0.020	-3.410	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.499									(1.14)
(HP) 46.641	(HP, 0.6L _r) 46.199	0.876	-4.316	-0.861	0.873	0.015	-3.442	No	Yes	Pass (1.13)
54.341	(0.7L _r) 53.898	0.503	-3.979	-0.753	0.764	-0.250	-3.215	No	Yes	Pass (1.21)
62.041	(0.8L _r) 61.598	0.121	-3.622	-0.574	0.582	-0.453	-3.040	No	Yes	Pass (1.28)
69.741	(0.9L _r) 69.298	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	No	Yes	Pass (1.33)
(PSXFR) 74.440	(PSXFR) 73.998	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
(STLF) 77.440	(STLF, 1.0L _r) 76.998	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.296 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) 0.443	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 3.443	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
8.143	(0.1L _r) 7.700	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	0.200	-	No	Yes	Pass (-)
15.842	(0.2L _r) 15.400	0.121	-3.622	-0.574	0.582	-0.453	-3.040	0.200	-	No	Yes	Pass (-)
23.542	(0.3L _r) 23.099	0.503	-3.979	-0.753	0.764	-0.250	-3.215	0.200	-	No	Yes	Pass (-)
(HP) 31.242	(HP, 0.4L _r) 30.799	0.876	-4.316	-0.861	0.873	0.015	-3.442	0.200	-	No	Yes	Pass (10+)
38.942	(0.5L _r) 38.499	0.877	-4.319	-0.897	0.910	-0.020	-3.410	0.200	-	No	Yes	Pass (-)
(HP) 46.641	(HP, 0.6L _r) 46.199	0.876	-4.316	-0.861	0.873	0.015	-3.442	0.200	-	No	Yes	Pass (10+)
54.341	(0.7L _r) 53.898	0.503	-3.979	-0.753	0.764	-0.250	-3.215	0.200	-	No	Yes	Pass (-)
62.041	(0.8L _r) 61.598	0.121	-3.622	-0.574	0.582	-0.453	-3.040	0.200	-	No	Yes	Pass (-)
69.741	(0.9L _r) 69.298	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.440	(PSXFR) 73.998	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
(STLF) 77.440	(STLF, 1.0L _r) 76.998	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.101 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 3.443	-0.434	-2.583	-0.287	0.291	-0.721	-2.292	No	Yes	Pass (1.57)
(0.1L _s) 7.702	-0.249	-2.774	-0.717	0.728	-0.967	-2.046	No	Yes	Pass (1.76)
(0.2L _s) 15.405	0.086	-3.119	-1.359	1.378	-1.273	-1.741	No	Yes	Pass (2.07)
(0.3L _s) 23.107	0.421	-3.459	-1.821	1.847	-1.400	-1.612	No	Yes	Pass (2.23)
(0.4L _s) 30.809	0.753	-3.784	-2.102	2.132	-1.348	-1.652	No	Yes	Pass (2.18)
(HP) 31.242	0.772	-3.801	-2.112	2.142	-1.340	-1.659	No	Yes	Pass (2.17)
(0.5L _s) 38.512	0.774	-3.811	-2.200	2.232	-1.426	-1.579	No	Yes	Pass (2.28)
(0.6L _s) 46.214	0.772	-3.802	-2.116	2.146	-1.344	-1.655	No	Yes	Pass (2.17)
(HP) 46.641	0.772	-3.801	-2.106	2.136	-1.334	-1.664	No	Yes	Pass (2.16)
(0.7L _s) 53.917	0.458	-3.496	-1.851	1.878	-1.393	-1.618	No	Yes	Pass (2.23)
(0.8L _s) 61.619	0.123	-3.157	-1.407	1.428	-1.284	-1.729	No	Yes	Pass (2.08)
(0.9L _s) 69.321	-0.212	-2.812	-0.789	0.800	-1.001	-2.012	No	Yes	Pass (1.79)
(PSXFR) 74.440	-0.434	-2.583	-0.283	0.287	-0.717	-2.296	No	Yes	Pass (1.57)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.101 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.860	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
(PSXFR) 3.443	-0.434	-2.583	-0.287	0.291	-0.721	-2.292	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(0.1L _s) 7.702	-0.249	-2.774	-0.717	0.728	-0.967	-2.046	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.405	0.086	-3.119	-1.359	1.378	-1.273	-1.741	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.107	0.421	-3.459	-1.821	1.847	-1.400	-1.612	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.809	0.753	-3.784	-2.102	2.132	-1.348	-1.652	-	0.537	No	Yes	Pass (-)
(HP) 31.242	0.772	-3.801	-2.112	2.142	-1.340	-1.659	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.512	0.774	-3.811	-2.200	2.232	-1.426	-1.579	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.214	0.772	-3.802	-2.116	2.146	-1.344	-1.655	-	0.537	No	Yes	Pass (-)
(HP) 46.641	0.772	-3.801	-2.106	2.136	-1.334	-1.664	-	0.537	No	Yes	Pass (-)
(0.7L _s) 53.917	0.458	-3.496	-1.851	1.878	-1.393	-1.618	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.619	0.123	-3.157	-1.407	1.428	-1.284	-1.729	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.812	-0.789	0.800	-1.001	-2.012	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.583	-0.283	0.287	-0.717	-2.296	-	0.537	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.600 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.127	-0.592	0.052	-0.932	No	Yes	Pass (3.86)
(PSXFR) 3.443	-0.430	-2.559	-0.183	-0.201	-0.613	-2.760	No	Yes	Pass (1.30)
(0.1L _s) 7.702	-0.247	-2.755	-0.648	0.387	-0.896	-2.369	No	Yes	Pass (1.52)
(0.2L _s) 15.405	0.086	-3.112	-1.344	1.259	-1.258	-1.854	No	Yes	Pass (1.94)
(0.3L _s) 23.107	0.422	-3.467	-1.849	1.893	-1.427	-1.573	No	Yes	Pass (2.29)
(0.4L _s) 30.809	0.758	-3.806	-2.161	2.300	-1.403	-1.506	No	Yes	Pass (2.39)
(HP) 31.242	0.777	-3.825	-2.172	2.317	-1.396	-1.508	No	Yes	Pass (2.39)
(0.5L _s) 38.512	0.780	-3.843	-2.279	2.480	-1.498	-1.363	No	Yes	Pass (2.40)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.6L _s) 46.214	0.779	-3.837	-2.202	2.431	-1.423	-1.406	No	Yes	Pass (2.53)
(HP) 46.641	0.779	-3.836	-2.192	2.422	-1.414	-1.415	No	Yes	Pass (2.54)
(0.7L _s) 53.917	0.462	-3.524	-1.934	2.156	-1.472	-1.369	No	Yes	Pass (2.45)
(0.8L _s) 61.619	0.124	-3.176	-1.477	1.657	-1.353	-1.519	No	Yes	Pass (2.37)
(0.9L _s) 69.321	-0.212	-2.821	-0.831	0.937	-1.044	-1.884	No	Yes	Pass (1.91)
(PSXFR) 74.440	-0.434	-2.586	-0.299	0.338	-0.734	-2.247	No	Yes	Pass (1.60)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.6f'_c = -4.800 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 6.600 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.123	-1.985	0.048	-2.324	No	Yes	Pass (2.07)
(PSXFR) 3.443	-0.430	-2.559	-0.201	-1.401	-0.631	-3.960	No	Yes	Pass (1.21)
(0.1L _s) 7.702	-0.247	-2.755	-0.700	-0.516	-0.948	-3.271	No	Yes	Pass (1.47)
(0.2L _s) 15.405	0.086	-3.112	-1.477	0.603	-1.391	-2.510	No	Yes	Pass (1.91)
(0.3L _s) 23.107	0.422	-3.467	-2.074	1.319	-1.652	-2.147	No	Yes	Pass (2.24)
(0.4L _s) 30.809	0.758	-3.806	-2.452	1.808	-1.694	-1.998	No	Yes	Pass (2.40)
(HP) 31.242	0.777	-3.825	-2.467	1.829	-1.690	-1.996	No	Yes	Pass (2.41)
(0.5L _s) 38.512	0.780	-3.843	-2.604	2.058	-1.824	-1.784	No	Yes	Pass (2.63)
(0.6L _s) 46.214	0.779	-3.837	-2.534	2.094	-1.755	-1.743	No	Yes	Pass (2.73)
(HP) 46.641	0.779	-3.836	-2.524	2.089	-1.745	-1.747	No	Yes	Pass (2.75)
(0.7L _s) 53.917	0.462	-3.524	-2.244	1.903	-1.782	-1.622	No	Yes	Pass (2.69)
(0.8L _s) 61.619	0.124	-3.176	-1.736	1.488	-1.612	-1.688	No	Yes	Pass (2.84)
(0.9L _s) 69.321	-0.212	-2.821	-0.991	0.852	-1.204	-1.969	No	Yes	Pass (2.44)
(PSXFR) 74.440	-0.434	-2.586	-0.361	0.310	-0.795	-2.276	No	Yes	Pass (2.11)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 17: Open to Traffic : Service I Tension without live load**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000$ KSI

Concrete strength required to satisfy this requirement = 6.600 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.147	-0.511	0.072	-0.850	No	Yes	Pass (-)
(PSXFR) 3.443	-0.430	-2.559	-0.166	-0.131	-0.596	-2.691	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.247	-2.755	-0.635	0.442	-0.883	-2.314	No	Yes	Pass (-)
(0.2L _s) 15.405	0.086	-3.112	-1.331	1.314	-1.245	-1.798	No	Yes	Pass (-)
(0.3L _s) 23.107	0.422	-3.467	-1.832	1.966	-1.410	-1.501	No	Yes	Pass (-)
(0.4L _s) 30.809	0.758	-3.806	-2.141	2.383	-1.383	-1.423	No	Yes	Pass (-)
(HP) 31.242	0.777	-3.825	-2.153	2.400	-1.376	-1.425	No	Yes	Pass (-)
(0.5L _s) 38.512	0.780	-3.843	-2.258	2.566	-1.478	-1.277	No	Yes	Pass (-)
(0.6L _s) 46.214	0.779	-3.837	-2.183	2.514	-1.404	-1.324	No	Yes	Pass (-)
(HP) 46.641	0.779	-3.836	-2.173	2.504	-1.394	-1.332	No	Yes	Pass (-)
(0.7L _s) 53.917	0.462	-3.524	-1.917	2.228	-1.455	-1.296	No	Yes	Pass (-)
(0.8L _s) 61.619	0.124	-3.176	-1.463	1.712	-1.339	-1.464	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.821	-0.824	0.968	-1.036	-1.853	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.586	-0.297	0.350	-0.731	-2.236	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]** $f'_c = 8.000$ KSITension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.421	-0.497	0.346	-0.836	No	Yes	Pass (-)
(PSXFR) 3.443	-0.430	-2.559	0.067	-0.074	-0.363	-2.633	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.247	-2.755	-0.463	0.613	-0.711	-2.142	No	Yes	Pass (-)
(0.2L _s) 15.405	0.086	-3.112	-1.209	1.762	-1.123	-1.350	No	Yes	Pass (-)
(0.3L _s) 23.107	0.422	-3.467	-1.725	2.723	-1.303	-0.744	No	Yes	Pass (-)
(0.4L _s) 30.809	0.758	-3.806	-2.050	3.365	-1.292	-0.442	No	Yes	Pass (-)
(HP) 31.242	0.777	-3.825	-2.063	3.390	-1.286	-0.434	No	Yes	Pass (-)
(0.5L _s) 38.512	0.780	-3.843	-2.180	3.662	-1.400	-0.181	No	Yes	Pass (-)
(0.6L _s) 46.214	0.779	-3.837	-2.120	3.632	-1.341	-0.206	No	Yes	Pass (-)
(HP) 46.641	0.779	-3.836	-2.111	3.621	-1.333	-0.216	No	Yes	Pass (-)
(0.7L _s) 53.917	0.462	-3.524	-1.870	3.260	-1.408	-0.264	No	Yes	Pass (-)
(0.8L _s) 61.619	0.124	-3.176	-1.431	2.551	-1.307	-0.625	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.821	-0.807	1.467	-1.019	-1.354	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.586	-0.291	0.535	-0.725	-2.050	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression

Fatigue I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.4f'_c = -3.200$ KSI

Concrete strength required to satisfy this requirement = 4.693 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.064	-0.806	0.026	-0.976	No	Yes	Pass (3.28)
(PSXFR) 3.443	-0.430	-2.559	-0.091	-0.598	-0.306	-1.877	No	Yes	Pass (1.70)
(0.1L _s) 7.702	-0.247	-2.755	-0.331	-0.281	-0.455	-1.659	No	Yes	Pass (1.93)
(0.2L _s) 15.405	0.086	-3.112	-0.759	0.204	-0.717	-1.352	No	Yes	Pass (2.37)
(0.3L _s) 23.107	0.422	-3.467	-1.074	0.574	-0.863	-1.159	No	Yes	Pass (2.76)
(0.4L _s) 30.809	0.758	-3.806	-1.269	0.831	-0.890	-1.072	No	Yes	Pass (2.98)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 31.242	0.777	-3.825	-1.277	0.842	-0.888	-1.070	No	Yes	Pass (2.99)
(0.5L _s) 38.512	0.780	-3.843	-1.339	0.974	-0.949	-0.947	No	Yes	Pass (3.37)
(0.6L _s) 46.214	0.779	-3.837	-1.312	1.003	-0.923	-0.916	No	Yes	Pass (3.47)
(HP) 46.641	0.779	-3.836	-1.308	1.001	-0.918	-0.917	No	Yes	Pass (3.49)
(0.7L _s) 53.917	0.462	-3.524	-1.170	0.918	-0.939	-0.844	No	Yes	Pass (3.41)
(0.8L _s) 61.619	0.124	-3.176	-0.908	0.722	-0.846	-0.866	No	Yes	Pass (3.69)
(0.9L _s) 69.321	-0.212	-2.821	-0.524	0.415	-0.630	-0.996	No	Yes	Pass (3.21)
(PSXFR) 74.440	-0.434	-2.586	-0.192	0.151	-0.409	-1.142	No	Yes	Pass (2.80)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-391.56	1889.51	-520.78	Pass (-)	Pass (-)
(0.1L _s) 7.702	631.53	4357.68	839.94	Pass (5.19)	Pass (6.90)
(0.2L _s) 15.405	1896.66	5378.19	2522.55	Pass (2.13)	Pass (2.84)
(0.3L _s) 23.107	3083.05	5736.00	3899.74	Pass (1.47)	Pass (1.86)
(0.4L _s) 30.809	3919.82	6088.11	4152.74	Pass (1.47)	Pass (1.55)
(0.5L _s) 38.512	4331.56	6107.60	4158.12	Pass (1.47)	Pass (1.41)
(0.6L _s) 46.214	4352.82	6107.59	4179.17	Pass (1.46)	Pass (1.40)
(0.7L _s) 53.917	3950.22	5770.74	3944.90	Pass (1.46)	Pass (1.46)
(0.8L _s) 61.619	3128.52	5400.19	3724.80	Pass (1.45)	Pass (1.73)
(0.9L _s) 69.321	1816.22	4472.70	2415.57	Pass (1.85)	Pass (2.46)
(1.0L _s) 77.024	0.00	2139.09	0.00	Pass (∞)	Pass (∞)

Positive Moment Capacity for Strength II Limit State

[5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-391.56	1889.51	-520.78	Pass (-)	Pass (-)
(0.1L _s) 7.702	282.25	4357.68	839.94	Pass (5.19)	Pass (10+)
(0.2L _s) 15.405	1731.77	5378.19	2522.55	Pass (2.13)	Pass (3.11)
(0.3L _s) 23.107	2872.31	5736.00	3899.74	Pass (1.47)	Pass (2.00)
(0.4L _s) 30.809	3673.94	6088.11	4152.74	Pass (1.47)	Pass (1.66)
(0.5L _s) 38.512	4100.26	6107.60	4158.12	Pass (1.47)	Pass (1.49)
(0.6L _s) 46.214	4084.70	6107.59	4179.17	Pass (1.46)	Pass (1.50)
(0.7L _s) 53.917	3710.50	5770.74	3944.90	Pass (1.46)	Pass (1.56)
(0.8L _s) 61.619	2934.88	5400.19	3724.80	Pass (1.45)	Pass (1.84)
(0.9L _s) 69.321	1715.12	4472.70	2415.57	Pass (1.85)	Pass (2.61)
(1.0L _s) 77.024	0.00	2139.09	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-3110.89	-4106.60	-1148.77	Pass (3.57)	Pass (1.32)
(FoS) 1.193	-2906.98	-5100.36	-1153.63	Pass (4.42)	Pass (1.75)
(0.1L _s) 7.702	-1818.93	-5346.88	-1176.94	Pass (4.54)	Pass (2.94)
(0.2L _s) 15.405	-1191.30	-5286.04	-1197.61	Pass (4.41)	Pass (4.44)
(0.3L _s) 23.107	-909.22	-5241.44	-1199.94	Pass (4.37)	Pass (5.76)
(0.4L _s) 30.809	-685.17	-5213.51	-911.27	Pass (5.72)	Pass (7.61)
(0.5L _s) 38.512	-510.73	-5204.29	-679.28	Pass (7.66)	Pass (10+)
(0.6L _s) 46.214	-345.81	-5213.52	-459.93	Pass (10+)	Pass (10+)
(0.7L _s) 53.917	-212.27	-5241.06	-282.32	Pass (10+)	Pass (10+)
(0.8L _s) 61.619	-110.13	-5284.46	-146.47	Pass (10+)	Pass (10+)
(0.9L _s) 69.321	-39.37	-5034.02	-52.36	Pass (10+)	Pass (10+)
(FoS) 76.690	-1.05	-4789.19	-1.40	Pass (10+)	Pass (10+)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(1.0L _s) 77.024	0.00	-4792.34	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2563.59	-4106.60	-1148.77	Pass (3.57)	Pass (1.60)
(FoS) 1.193	-2402.08	-5100.36	-1153.63	Pass (4.42)	Pass (2.12)
(0.1L _s) 7.702	-1516.45	-5346.88	-1176.94	Pass (4.54)	Pass (3.53)
(0.2L _s) 15.405	-1080.11	-5286.04	-1197.61	Pass (4.41)	Pass (4.89)
(0.3L _s) 23.107	-811.93	-5241.44	-1199.94	Pass (4.37)	Pass (6.46)
(0.4L _s) 30.809	-601.77	-5213.51	-911.27	Pass (5.72)	Pass (8.66)
(0.5L _s) 38.512	-440.26	-5204.29	-679.28	Pass (7.66)	Pass (10+)
(0.6L _s) 46.214	-289.43	-5213.52	-459.93	Pass (10+)	Pass (10+)
(0.7L _s) 53.917	-169.99	-5241.06	-282.32	Pass (10+)	Pass (10+)
(0.8L _s) 61.619	-81.94	-5284.46	-146.47	Pass (10+)	Pass (10+)
(0.9L _s) 69.321	-25.27	-5034.02	-52.36	Pass (10+)	Pass (10+)
(FoS) 76.690	-0.44	-4789.19	-1.40	Pass (10+)	Pass (10+)
(1.0L _s) 77.024	0.00	-4792.34	0.00	Pass (∞)	Pass (∞)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n / V_u$)
(CS) 5.178	Yes	Yes	292.70	553.53	Pass (1.89)
(SZB) 5.862	Yes	Yes	288.68	413.00	Pass (1.43)
(1.5H) 6.443	Yes	Yes	285.26	407.92	Pass (1.43)
(0.1L _s) 7.702	Yes	Yes	277.83	416.40	Pass (1.50)
(SZB) 11.362	Yes	Yes	256.11	319.57	Pass (1.25)
(0.2L _s) 15.405	Yes	Yes	231.82	324.27	Pass (1.40)
(SZB) 19.612	Yes	Yes	206.36	279.20	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.35)
(0.3L _s) 23.107	Yes	Yes	185.11	280.20	Pass (1.51)
(SZB) 30.612	Yes	Yes	139.34	231.06	Pass (1.66)
(0.4L _s) 30.809	Yes	Yes	138.14	230.54	Pass (1.67)
(HP) 31.242	Yes	Yes	135.51	229.56	Pass (1.69)
(0.5L _s) 38.512	Yes	Yes	91.37	173.48	Pass (1.90)
(0.6L _s) 46.214	Yes	Yes	82.19	174.55	Pass (2.12)
(HP) 46.641	Yes	Yes	84.53	207.53	Pass (2.46)
(SZB) 47.271	Yes	Yes	87.99	205.23	Pass (2.33)
(0.7L _s) 53.917	Yes	Yes	126.43	242.69	Pass (1.92)
(SZB) 58.271	Yes	Yes	152.40	258.24	Pass (1.69)
(0.8L _s) 61.619	Yes	Yes	172.66	307.16	Pass (1.78)
(SZB) 66.521	Yes	Yes	202.79	302.38	Pass (1.49)
(0.9L _s) 69.321	Yes	Yes	220.22	400.94	Pass (1.82)
(1.5H) 71.440	Yes	Yes	233.50	417.25	Pass (1.79)
(SZB) 72.021	Yes	Yes	237.14	414.33	Pass (1.75)
(CS) 73.100	Yes	Yes	243.93	569.31	Pass (2.33)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.862	Yes	Yes	281.65	424.71	Pass (1.51)
(1.5H) 6.443	Yes	Yes	278.46	418.90	Pass (1.50)
(0.1L _s) 7.702	Yes	Yes	271.48	426.84	Pass (1.57)
(SZB) 11.362	Yes	Yes	250.82	324.85	Pass (1.30)
(0.2L _s) 15.405	Yes	Yes	227.18	327.97	Pass (1.44)
(SZB) 19.612	Yes	Yes	201.81	282.80	Pass (1.40)
(0.3L _s) 23.107	Yes	Yes	180.12	283.92	Pass (1.58)

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 30.612	Yes	Yes	131.97	243.37	Pass (1.84)
(0.4L _s) 30.809	Yes	Yes	130.67	243.60	Pass (1.86)
(HP) 31.242	Yes	Yes	127.83	244.13	Pass (1.91)
(0.5L _s) 38.512	Yes	Yes	79.19	201.15	Pass (2.54)
(0.6L _s) 46.214	Yes	Yes	76.75	204.23	Pass (2.66)
(HP) 46.641	Yes	Yes	79.06	241.63	Pass (3.06)
(SZB) 47.271	Yes	Yes	82.47	240.56	Pass (2.92)
(0.7L _s) 53.917	Yes	Yes	120.19	275.97	Pass (2.30)
(SZB) 58.271	Yes	Yes	145.50	270.04	Pass (1.86)
(0.8L _s) 61.619	Yes	Yes	165.18	310.81	Pass (1.88)
(SZB) 66.521	Yes	Yes	194.17	305.27	Pass (1.57)
(0.9L _s) 69.321	Yes	Yes	210.87	403.53	Pass (1.91)
(1.5H) 71.440	Yes	Yes	223.50	419.40	Pass (1.88)
(SZB) 72.021	Yes	Yes	226.96	416.29	Pass (1.83)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.193	1433.42	1021.89	5.7.3.5-1	Pass (1.40)
(SZB) 2.196	1472.77	953.32	5.7.3.5-1	Pass (1.54)
(Bar Develop.) 2.564	1487.20	928.46	5.7.3.5-1	Pass (1.60)
(Bar Develop.) 3.625	1504.80	857.70	5.7.3.5-1	Pass (1.75)
(H) 4.693	1598.40	795.43	5.7.3.5-1	Pass (2.01)
(CS) 5.178	1598.40	768.37	5.7.3.5-1	Pass (2.08)
(SZB) 5.862	1598.40	728.54	5.7.3.5-1	Pass (2.19)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(1.5H) 6.443	1598.40	692.20	5.7.3.5-1	Pass (2.31)
(0.1L _s) 7.702	1598.40	617.52	5.7.3.5-1	Pass (2.59)
(SZB) 11.362	1338.54	674.38	5.7.3.5-1	Pass (1.98)
(0.2L _s) 15.405	1652.27	820.93	5.7.3.5-1	Pass (2.01)
(SZB) 19.612	1656.83	989.82	5.7.3.5-1	Pass (1.67)
(0.3L _s) 23.107	1660.35	1066.03	5.7.3.5-1	Pass (1.56)
(SZB) 30.612	1664.35	1187.58	5.7.3.5-1	Pass (1.40)
(0.4L _s) 30.809	1664.39	1187.87	5.7.3.5-1	Pass (1.40)
(HP) 31.242	1664.48	1188.25	5.7.3.5-1	Pass (1.40)
(0.5L _s) 38.512	1664.49	1249.91	5.7.3.5-1	Pass (1.33)
(0.6L _s) 46.214	1664.48	1245.29	5.7.3.5-1	Pass (1.34)
(HP) 46.641	1664.48	1201.04	5.7.3.5-1	Pass (1.39)
(SZB) 47.271	1664.35	1204.92	5.7.3.5-1	Pass (1.38)
(0.7L _s) 53.917	1660.73	1194.60	5.7.3.5-1	Pass (1.39)
(SZB) 58.271	1655.84	1164.49	5.7.3.5-1	Pass (1.42)
(0.8L _s) 61.619	1651.88	1068.47	5.7.3.5-1	Pass (1.55)
(SZB) 66.521	1337.24	911.31	5.7.3.5-1	Pass (1.47)
(0.9L _s) 69.321	1125.64	717.14	5.7.3.5-1	Pass (1.57)
(1.5H) 71.440	955.32	582.81	5.7.3.5-1	Pass (1.64)
(SZB) 72.021	844.89	548.48	5.7.3.5-1	Pass (1.54)
(CS) 73.100	812.79	473.46	5.7.3.5-1	Pass (1.72)
(H) 73.190	810.10	199.41	5.7.3.5-2	Pass (4.06)
(Bar Develop.) 74.258	778.36	199.41	5.7.3.5-2	Pass (3.90)
(Bar Develop.) 75.319	643.18	199.41	5.7.3.5-2	Pass (3.23)
(SZB) 75.687	584.94	199.41	5.7.3.5-2	Pass (2.93)
(FoS) 76.690	423.15	199.41	5.7.3.5-2	Pass (2.12)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.193	1433.42	879.91	5.7.3.5-1	Pass (1.63)
(SZB) 2.196	1472.77	821.04	5.7.3.5-1	Pass (1.79)
(Bar Develop.) 2.564	1487.20	799.65	5.7.3.5-1	Pass (1.86)
(Bar Develop.) 3.625	1504.80	738.59	5.7.3.5-1	Pass (2.04)
(H) 4.693	1598.40	685.09	5.7.3.5-1	Pass (2.33)
(SZB) 5.862	1598.40	626.33	5.7.3.5-1	Pass (2.55)
(1.5H) 6.443	1598.40	593.73	5.7.3.5-1	Pass (2.69)
(0.1L _s) 7.702	1598.40	529.82	5.7.3.5-1	Pass (3.02)
(SZB) 11.362	1338.54	591.89	5.7.3.5-1	Pass (2.26)
(0.2L _s) 15.405	1652.27	761.68	5.7.3.5-1	Pass (2.17)
(SZB) 19.612	1656.83	925.05	5.7.3.5-1	Pass (1.79)
(0.3L _s) 23.107	1660.35	996.02	5.7.3.5-1	Pass (1.67)
(SZB) 30.612	1664.35	1107.26	5.7.3.5-1	Pass (1.50)
(0.4L _s) 30.809	1664.39	1107.29	5.7.3.5-1	Pass (1.50)
(HP) 31.242	1664.48	1107.07	5.7.3.5-1	Pass (1.50)
(0.5L _s) 38.512	1664.49	1178.73	5.7.3.5-1	Pass (1.41)
(0.6L _s) 46.214	1664.48	1172.56	5.7.3.5-1	Pass (1.42)
(HP) 46.641	1664.48	1124.29	5.7.3.5-1	Pass (1.48)
(SZB) 47.271	1664.35	1126.06	5.7.3.5-1	Pass (1.48)
(0.7L _s) 53.917	1660.73	1124.58	5.7.3.5-1	Pass (1.48)
(SZB) 58.271	1655.84	1088.30	5.7.3.5-1	Pass (1.52)
(0.8L _s) 61.619	1651.88	1003.12	5.7.3.5-1	Pass (1.65)
(SZB) 66.521	1337.24	850.43	5.7.3.5-1	Pass (1.57)
(0.9L _s) 69.321	1125.64	677.94	5.7.3.5-1	Pass (1.66)
(1.5H) 71.440	955.32	552.40	5.7.3.5-1	Pass (1.73)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 72.021	844.89	520.16	5.7.3.5-1	Pass (1.62)
(H) 73.190	810.10	189.04	5.7.3.5-2	Pass (4.29)
(Bar Develop.) 74.258	778.36	189.04	5.7.3.5-2	Pass (4.12)
(Bar Develop.) 75.319	643.18	189.04	5.7.3.5-2	Pass (3.40)
(SZB) 75.687	584.94	189.04	5.7.3.5-2	Pass (3.09)
(FoS) 76.690	423.15	189.04	5.7.3.5-2	Pass (2.24)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.860	12.000	48.000	Pass	0.220	0.000	Pass	78.378	142.511	Pass (1.82)
(FoS) 1.193	12.000	48.000	Pass	0.220	0.000	Pass	78.406	142.512	Pass (1.82)
(SZB) 2.196	12.000	48.000	Pass	0.220	0.000	Pass	78.487	142.515	Pass (1.82)
(Bar Develop.) 2.564	12.000	48.000	Pass	0.220	0.000	Pass	78.516	142.516	Pass (1.82)
(Bar Develop.) 3.625	12.000	48.000	Pass	0.220	0.000	Pass	78.597	142.519	Pass (1.81)
(H) 4.693	12.000	48.000	Pass	0.220	0.000	Pass	78.675	142.522	Pass (1.81)
(CS) 5.178	12.000	48.000	Pass	0.220	0.000	Pass	78.709	142.524	Pass (1.81)
(SZB) 5.862	12.000	48.000	Pass	0.220	0.000	Pass	77.675	142.526	Pass (1.83)
(1.5H) 6.443	12.000	48.000	Pass	0.220	0.000	Pass	76.792	142.527	Pass (1.86)
(0.1L _s) 7.702	12.000	48.000	Pass	0.220	0.000	Pass	74.870	142.531	Pass (1.90)
(SZB) 11.362	9.000	48.000	Pass	0.293	0.000	Pass	69.201	146.499	Pass (2.12)
(0.2L _s) 15.405	9.000	48.000	Pass	0.293	0.000	Pass	62.789	146.507	Pass (2.33)
(SZB) 19.612	12.000	48.000	Pass	0.220	0.000	Pass	55.925	142.554	Pass (2.55)
(0.3L _s) 23.107	12.000	48.000	Pass	0.220	0.000	Pass	50.164	142.558	Pass (2.84)
(SZB) 30.612	18.000	48.000	Pass	0.147	0.000	Pass	37.761	138.603	Pass (3.67)
(0.4L _s) 30.809	18.000	48.000	Pass	0.147	0.000	Pass	37.436	138.603	Pass (3.70)
(HP) 31.242	18.000	48.000	Pass	0.147	0.000	Pass	36.723	138.603	Pass (3.77)
(0.5L _s) 38.512	18.000	48.000	Pass	0.147	0.000	Pass	24.762	138.602	Pass (5.60)
(0.6L _s) 46.214	18.000	48.000	Pass	0.147	0.000	Pass	22.273	138.595	Pass (6.22)
(HP) 46.641	18.000	48.000	Pass	0.147	0.000	Pass	22.908	138.594	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(6.05)
(SZB) 47.271	18.000	48.000	Pass	0.147	0.000	Pass	23.846	138.594	Pass (5.81)
(0.7L _s) 53.917	12.000	48.000	Pass	0.220	0.000	Pass	34.190	142.542	Pass (4.17)
(SZB) 58.271	12.000	48.000	Pass	0.220	0.000	Pass	41.090	142.532	Pass (3.47)
(0.8L _s) 61.619	9.000	48.000	Pass	0.293	0.000	Pass	46.425	146.483	Pass (3.16)
(SZB) 66.521	9.000	48.000	Pass	0.293	0.000	Pass	54.259	146.468	Pass (2.70)
(0.9L _s) 69.321	12.000	48.000	Pass	0.220	0.000	Pass	58.734	142.499	Pass (2.43)
(1.5H) 71.440	12.000	48.000	Pass	0.220	0.000	Pass	62.106	142.491	Pass (2.29)
(SZB) 72.021	12.000	48.000	Pass	0.220	0.000	Pass	63.026	142.489	Pass (2.26)
(CS) 73.100	12.000	48.000	Pass	0.220	0.000	Pass	64.734	142.484	Pass (2.20)
(H) 73.190	12.000	48.000	Pass	0.220	0.000	Pass	64.725	142.484	Pass (2.20)
(Bar Develop.) 74.258	12.000	48.000	Pass	0.220	0.000	Pass	64.626	142.480	Pass (2.20)
(Bar Develop.) 75.319	12.000	48.000	Pass	0.220	0.000	Pass	64.523	142.475	Pass (2.21)
(SZB) 75.687	12.000	48.000	Pass	0.220	0.000	Pass	64.486	142.474	Pass (2.21)
(FoS) 76.690	12.000	48.000	Pass	0.220	0.000	Pass	64.384	142.470	Pass (2.21)
(1.0L _s) 77.024	12.000	48.000	Pass	0.220	0.000	Pass	64.350	142.468	Pass (2.21)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.860	12.000	48.000	Pass	0.220	0.000	Pass	76.424	142.511	Pass (1.86)
(FoS) 1.193	12.000	48.000	Pass	0.220	0.000	Pass	76.451	142.512	Pass (1.86)
(SZB) 2.196	12.000	48.000	Pass	0.220	0.000	Pass	76.530	142.515	Pass (1.86)
(Bar Develop.) 2.564	12.000	48.000	Pass	0.220	0.000	Pass	76.558	142.516	Pass (1.86)
(Bar Develop.) 3.625	12.000	48.000	Pass	0.220	0.000	Pass	76.637	142.519	Pass (1.86)
(H) 4.693	12.000	48.000	Pass	0.220	0.000	Pass	76.713	142.522	Pass (1.86)
(SZB) 5.862	12.000	48.000	Pass	0.220	0.000	Pass	75.784	142.526	Pass (1.88)
(1.5H) 6.443	12.000	48.000	Pass	0.220	0.000	Pass	74.961	142.527	Pass (1.90)
(0.1L _s) 7.702	12.000	48.000	Pass	0.220	0.000	Pass	73.160	142.531	Pass (1.95)
(SZB) 11.362	9.000	48.000	Pass	0.293	0.000	Pass	67.772	146.499	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(2.16)
(0.2L _s) 15.405	9.000	48.000	Pass	0.293	0.000	Pass	61.532	146.507	Pass (2.38)
(SZB) 19.612	12.000	48.000	Pass	0.220	0.000	Pass	54.691	142.554	Pass (2.61)
(0.3L _s) 23.107	12.000	48.000	Pass	0.220	0.000	Pass	48.814	142.558	Pass (2.92)
(SZB) 30.612	18.000	48.000	Pass	0.147	0.000	Pass	35.763	138.603	Pass (3.88)
(0.4L _s) 30.809	18.000	48.000	Pass	0.147	0.000	Pass	35.413	138.603	Pass (3.91)
(HP) 31.242	18.000	48.000	Pass	0.147	0.000	Pass	34.644	138.603	Pass (4.00)
(0.5L _s) 38.512	18.000	48.000	Pass	0.147	0.000	Pass	21.460	138.602	Pass (6.46)
(0.6L _s) 46.214	18.000	48.000	Pass	0.147	0.000	Pass	20.801	138.595	Pass (6.66)
(HP) 46.641	18.000	48.000	Pass	0.147	0.000	Pass	21.425	138.594	Pass (6.47)
(SZB) 47.271	18.000	48.000	Pass	0.147	0.000	Pass	22.348	138.594	Pass (6.20)
(0.7L _s) 53.917	12.000	48.000	Pass	0.220	0.000	Pass	32.505	142.542	Pass (4.39)
(SZB) 58.271	12.000	48.000	Pass	0.220	0.000	Pass	39.229	142.532	Pass (3.63)
(0.8L _s) 61.619	9.000	48.000	Pass	0.293	0.000	Pass	44.412	146.483	Pass (3.30)
(SZB) 66.521	9.000	48.000	Pass	0.293	0.000	Pass	51.954	146.468	Pass (2.82)
(0.9L _s) 69.321	12.000	48.000	Pass	0.220	0.000	Pass	56.238	142.499	Pass (2.53)
(1.5H) 71.440	12.000	48.000	Pass	0.220	0.000	Pass	59.446	142.491	Pass (2.40)
(SZB) 72.021	12.000	48.000	Pass	0.220	0.000	Pass	60.319	142.489	Pass (2.36)
(H) 73.190	12.000	48.000	Pass	0.220	0.000	Pass	61.929	142.484	Pass (2.30)
(Bar Develop.) 74.258	12.000	48.000	Pass	0.220	0.000	Pass	61.834	142.480	Pass (2.30)
(Bar Develop.) 75.319	12.000	48.000	Pass	0.220	0.000	Pass	61.736	142.475	Pass (2.31)
(SZB) 75.687	12.000	48.000	Pass	0.220	0.000	Pass	61.701	142.474	Pass (2.31)
(FoS) 76.690	12.000	48.000	Pass	0.220	0.000	Pass	61.603	142.470	Pass (2.31)
(1.0L _s) 77.024	12.000	48.000	Pass	0.220	0.000	Pass	61.570	142.468	Pass (2.31)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.155 in

Minimum live load deflection along girder = -0.222 in

Maximum live load deflection along girder = 0.093 in

Status = **Pass****Constructability Checks**

Girder Dimensions Detailing Check [5.12.3.2.2]

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)	Status
0.860	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.193	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.196	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.564	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.625	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.693	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 5.178	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.862	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.443	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.702	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.362	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.405	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.612	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.107	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.612	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.809	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.242	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.512	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.214	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.641	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 47.271	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.917	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.271	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.619	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.521	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.321	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.440	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.021	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 73.100	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 73.190	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.258	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.319	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.687	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.690	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.024	#4	3.000	18.000	1.500	1.600	0.125	Pass

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)	Status
0.860	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.193	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.196	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.564	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.625	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.693	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.862	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.443	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.702	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.362	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.405	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.612	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.107	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.612	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.809	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.242	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.512	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.214	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.641	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 47.271	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.917	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.271	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.619	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.521	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.321	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.440	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.021	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 73.190	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.258	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.319	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.687	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.690	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.024	#4	3.000	18.000	1.500	1.600	0.125	Pass

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.32	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes

Span	Girder	Provided (in)	Required (in)	Status	Notes
2	A	12.300	11.250	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
2	A	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.211
Lower Bound Camber at 60 days, 50% of D_{60}	1.657
Average Camber at 60 days, 75% of D_{60}	2.486
Upper Bound Camber at 60 days, D_{60}	3.314

Spec Check Report

For

Span 2 Girder B

March 14, 2021 2:35:04 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.466	Pass (1.20)	162.466	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.296 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.209 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.058	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.296 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) 0.443	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 3.443	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
8.143	(0.1L _r) 7.700	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	No	Yes	Pass (1.33)
15.842	(0.2L _r) 15.400	0.121	-3.622	-0.574	0.582	-0.453	-3.040	No	Yes	Pass (1.28)
23.542	(0.3L _r) 23.099	0.503	-3.979	-0.753	0.764	-0.250	-3.215	No	Yes	Pass (1.21)
(HP) 31.242	(HP, 0.4L _r) 30.799	0.876	-4.316	-0.861	0.873	0.015	-3.442	No	Yes	Pass (1.13)
38.942		0.877	-4.319	-0.897	0.910	-0.020	-3.410	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.499									(1.14)
(HP) 46.641	(HP, 0.6L _r) 46.199	0.876	-4.316	-0.861	0.873	0.015	-3.442	No	Yes	Pass (1.13)
54.341	(0.7L _r) 53.898	0.503	-3.979	-0.753	0.764	-0.250	-3.215	No	Yes	Pass (1.21)
62.041	(0.8L _r) 61.598	0.121	-3.622	-0.574	0.582	-0.453	-3.040	No	Yes	Pass (1.28)
69.741	(0.9L _r) 69.298	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	No	Yes	Pass (1.33)
(PSXFR) 74.440	(PSXFR) 73.998	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
(STLF) 77.440	(STLF, 1.0L _r) 76.998	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.296 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) 0.443	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 3.443	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
8.143	(0.1L _r) 7.700	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	0.200	-	No	Yes	Pass (-)
15.842	(0.2L _r) 15.400	0.121	-3.622	-0.574	0.582	-0.453	-3.040	0.200	-	No	Yes	Pass (-)
23.542	(0.3L _r) 23.099	0.503	-3.979	-0.753	0.764	-0.250	-3.215	0.200	-	No	Yes	Pass (-)
(HP) 31.242	(HP, 0.4L _r) 30.799	0.876	-4.316	-0.861	0.873	0.015	-3.442	0.200	-	No	Yes	Pass (10+)
38.942	(0.5L _r) 38.499	0.877	-4.319	-0.897	0.910	-0.020	-3.410	0.200	-	No	Yes	Pass (-)
(HP) 46.641	(HP, 0.6L _r) 46.199	0.876	-4.316	-0.861	0.873	0.015	-3.442	0.200	-	No	Yes	Pass (10+)
54.341	(0.7L _r) 53.898	0.503	-3.979	-0.753	0.764	-0.250	-3.215	0.200	-	No	Yes	Pass (-)
62.041	(0.8L _r) 61.598	0.121	-3.622	-0.574	0.582	-0.453	-3.040	0.200	-	No	Yes	Pass (-)
69.741	(0.9L _r) 69.298	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.440	(PSXFR) 73.998	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
(STLF) 77.440	(STLF, 1.0L _r) 76.998	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.127 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 3.443	-0.434	-2.582	-0.272	0.275	-0.705	-2.307	No	Yes	Pass (1.56)
(0.1L _s) 7.702	-0.249	-2.772	-0.678	0.688	-0.927	-2.084	No	Yes	Pass (1.73)
(0.2L _s) 15.405	0.086	-3.114	-1.281	1.299	-1.195	-1.815	No	Yes	Pass (1.98)
(0.3L _s) 23.107	0.420	-3.450	-1.715	1.739	-1.295	-1.711	No	Yes	Pass (2.10)
(0.4L _s) 30.809	0.751	-3.771	-1.979	2.007	-1.228	-1.763	No	Yes	Pass (2.04)
(HP) 31.242	0.769	-3.788	-1.989	2.017	-1.220	-1.770	No	Yes	Pass (2.03)
(0.5L _s) 38.512	0.771	-3.797	-2.073	2.103	-1.302	-1.694	No	Yes	Pass (2.13)
(0.6L _s) 46.214	0.769	-3.789	-1.998	2.027	-1.229	-1.762	No	Yes	Pass (2.04)
(HP) 46.641	0.769	-3.788	-1.989	2.017	-1.220	-1.770	No	Yes	Pass (2.03)
(0.7L _s) 53.917	0.457	-3.487	-1.753	1.778	-1.296	-1.709	No	Yes	Pass (2.11)
(0.8L _s) 61.619	0.123	-3.152	-1.338	1.357	-1.215	-1.795	No	Yes	Pass (2.01)
(0.9L _s) 69.321	-0.212	-2.810	-0.754	0.764	-0.965	-2.046	No	Yes	Pass (1.76)
(PSXFR) 74.440	-0.434	-2.582	-0.272	0.275	-0.705	-2.307	No	Yes	Pass (1.56)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.127 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.860	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 3.443	-0.434	-2.582	-0.272	0.275	-0.705	-2.307	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.249	-2.772	-0.678	0.688	-0.927	-2.084	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.405	0.086	-3.114	-1.281	1.299	-1.195	-1.815	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.107	0.420	-3.450	-1.715	1.739	-1.295	-1.711	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.809	0.751	-3.771	-1.979	2.007	-1.228	-1.763	-	0.537	No	Yes	Pass (-)
(HP) 31.242	0.769	-3.788	-1.989	2.017	-1.220	-1.770	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.512	0.771	-3.797	-2.073	2.103	-1.302	-1.694	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.214	0.769	-3.789	-1.998	2.027	-1.229	-1.762	-	0.537	No	Yes	Pass (-)
(HP) 46.641	0.769	-3.788	-1.989	2.017	-1.220	-1.770	-	0.537	No	Yes	Pass (-)
(0.7L _s) 53.917	0.457	-3.487	-1.753	1.778	-1.296	-1.709	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.619	0.123	-3.152	-1.338	1.357	-1.215	-1.795	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.810	-0.754	0.764	-0.965	-2.046	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.582	-0.272	0.275	-0.705	-2.307	-	0.537	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.209 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.119	-0.588	0.044	-0.928	No	Yes	Pass (3.88)
(PSXFR) 3.443	-0.430	-2.559	-0.173	-0.214	-0.603	-2.773	No	Yes	Pass (1.30)
(0.1L _s) 7.702	-0.247	-2.753	-0.611	0.348	-0.858	-2.406	No	Yes	Pass (1.50)
(0.2L _s) 15.405	0.085	-3.108	-1.266	1.180	-1.180	-1.928	No	Yes	Pass (1.87)
(0.3L _s) 23.107	0.421	-3.458	-1.743	1.785	-1.322	-1.672	No	Yes	Pass (2.15)
(0.4L _s) 30.809	0.755	-3.793	-2.038	2.176	-1.283	-1.617	No	Yes	Pass (2.23)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 31.242	0.774	-3.811	-2.049	2.191	-1.275	-1.620	No	Yes	Pass (2.22)
(0.5L _s) 38.512	0.777	-3.829	-2.152	2.351	-1.374	-1.478	No	Yes	Pass (2.44)
(0.6L _s) 46.214	0.776	-3.824	-2.084	2.311	-1.308	-1.513	No	Yes	Pass (2.38)
(HP) 46.641	0.776	-3.823	-2.075	2.303	-1.299	-1.521	No	Yes	Pass (2.37)
(0.7L _s) 53.917	0.461	-3.516	-1.835	2.056	-1.374	-1.460	No	Yes	Pass (2.47)
(0.8L _s) 61.619	0.124	-3.172	-1.404	1.585	-1.281	-1.586	No	Yes	Pass (2.27)
(0.9L _s) 69.321	-0.212	-2.819	-0.793	0.900	-1.005	-1.919	No	Yes	Pass (1.88)
(PSXFR) 74.440	-0.434	-2.585	-0.286	0.326	-0.720	-2.260	No	Yes	Pass (1.59)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.209 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.116	-1.693	0.041	-2.032	No	Yes	Pass (2.36)
(PSXFR) 3.443	-0.430	-2.559	-0.186	-1.167	-0.616	-3.726	No	Yes	Pass (1.29)
(0.1L _s) 7.702	-0.247	-2.753	-0.651	-0.371	-0.898	-3.124	No	Yes	Pass (1.54)
(0.2L _s) 15.405	0.085	-3.108	-1.372	0.656	-1.286	-2.451	No	Yes	Pass (1.96)
(0.3L _s) 23.107	0.421	-3.458	-1.922	1.327	-1.501	-2.131	No	Yes	Pass (2.25)
(0.4L _s) 30.809	0.755	-3.793	-2.271	1.783	-1.515	-2.010	No	Yes	Pass (2.39)
(HP) 31.242	0.774	-3.811	-2.284	1.802	-1.510	-2.009	No	Yes	Pass (2.39)
(0.5L _s) 38.512	0.777	-3.829	-2.412	2.025	-1.634	-1.804	No	Yes	Pass (2.66)
(0.6L _s) 46.214	0.776	-3.824	-2.349	2.050	-1.573	-1.774	No	Yes	Pass (2.71)
(HP) 46.641	0.776	-3.823	-2.340	2.045	-1.564	-1.778	No	Yes	Pass (2.70)
(0.7L _s) 53.917	0.461	-3.516	-2.079	1.860	-1.618	-1.656	No	Yes	Pass (2.90)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.8L _s) 61.619	0.124	-3.172	-1.602	1.455	-1.479	-1.717	No	Yes	Pass (2.80)
(0.9L _s) 69.321	-0.212	-2.819	-0.910	0.835	-1.122	-1.985	No	Yes	Pass (2.42)
(PSXFR) 74.440	-0.434	-2.585	-0.329	0.304	-0.764	-2.281	No	Yes	Pass (2.10)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Tension without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Tension Stresses [5.9.2.3.2b]

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.209 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.138	-0.507	0.063	-0.846	No	Yes	Pass (-)
(PSXFR) 3.443	-0.430	-2.559	-0.157	-0.145	-0.586	-2.704	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.247	-2.753	-0.598	0.402	-0.845	-2.351	No	Yes	Pass (-)
(0.2L _s) 15.405	0.085	-3.108	-1.253	1.235	-1.168	-1.873	No	Yes	Pass (-)
(0.3L _s) 23.107	0.421	-3.458	-1.726	1.858	-1.305	-1.600	No	Yes	Pass (-)
(0.4L _s) 30.809	0.755	-3.793	-2.019	2.259	-1.263	-1.535	No	Yes	Pass (-)
(HP) 31.242	0.774	-3.811	-2.030	2.275	-1.256	-1.537	No	Yes	Pass (-)
(0.5L _s) 38.512	0.777	-3.829	-2.132	2.437	-1.354	-1.391	No	Yes	Pass (-)
(0.6L _s) 46.214	0.776	-3.824	-2.065	2.394	-1.288	-1.430	No	Yes	Pass (-)
(HP) 46.641	0.776	-3.823	-2.056	2.385	-1.279	-1.438	No	Yes	Pass (-)
(0.7L _s) 53.917	0.461	-3.516	-1.818	2.128	-1.357	-1.388	No	Yes	Pass (-)
(0.8L _s) 61.619	0.124	-3.172	-1.391	1.641	-1.268	-1.531	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.819	-0.785	0.931	-0.998	-1.888	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.585	-0.283	0.337	-0.717	-2.248	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.342	-0.496	0.267	-0.835	No	Yes	Pass (-)
(PSXFR) 3.443	-0.430	-2.559	0.019	-0.099	-0.411	-2.658	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.247	-2.753	-0.465	0.538	-0.713	-2.215	No	Yes	Pass (-)
(0.2L _s) 15.405	0.085	-3.108	-1.156	1.592	-1.071	-1.516	No	Yes	Pass (-)
(0.3L _s) 23.107	0.421	-3.458	-1.641	2.461	-1.220	-0.997	No	Yes	Pass (-)
(0.4L _s) 30.809	0.755	-3.793	-1.946	3.040	-1.191	-0.753	No	Yes	Pass (-)
(HP) 31.242	0.774	-3.811	-1.958	3.063	-1.184	-0.748	No	Yes	Pass (-)
(0.5L _s) 38.512	0.777	-3.829	-2.071	3.310	-1.294	-0.519	No	Yes	Pass (-)
(0.6L _s) 46.214	0.776	-3.824	-2.016	3.284	-1.240	-0.541	No	Yes	Pass (-)
(HP) 46.641	0.776	-3.823	-2.008	3.274	-1.232	-0.550	No	Yes	Pass (-)
(0.7L _s) 53.917	0.461	-3.516	-1.782	2.949	-1.321	-0.567	No	Yes	Pass (-)
(0.8L _s) 61.619	0.124	-3.172	-1.367	2.305	-1.244	-0.866	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.819	-0.773	1.325	-0.986	-1.495	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.585	-0.279	0.483	-0.713	-2.102	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression**Fatigue I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

Compression stress limit = $-0.4f'_c = -3.200 \text{ KSI}$

Concrete strength required to satisfy this requirement = 4.138 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.060	-0.567	0.022	-0.737	No	Yes	Pass (4.34)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 3.443	-0.430	-2.559	-0.086	-0.376	-0.301	-1.655	No	Yes	Pass (1.93)
(0.1L _s) 7.702	-0.247	-2.753	-0.309	-0.087	-0.433	-1.463	No	Yes	Pass (2.19)
(0.2L _s) 15.405	0.085	-3.108	-0.682	0.353	-0.639	-1.200	No	Yes	Pass (2.67)
(0.3L _s) 23.107	0.421	-3.458	-0.955	0.686	-0.745	-1.043	No	Yes	Pass (3.07)
(0.4L _s) 30.809	0.755	-3.793	-1.124	0.910	-0.747	-0.986	No	Yes	Pass (3.24)
(HP) 31.242	0.774	-3.811	-1.131	0.920	-0.744	-0.986	No	Yes	Pass (3.25)
(0.5L _s) 38.512	0.777	-3.829	-1.187	1.028	-0.798	-0.887	No	Yes	Pass (3.61)
(0.6L _s) 46.214	0.776	-3.824	-1.160	1.037	-0.772	-0.875	No	Yes	Pass (3.66)
(HP) 46.641	0.776	-3.823	-1.155	1.035	-0.767	-0.877	No	Yes	Pass (3.65)
(0.7L _s) 53.917	0.461	-3.516	-1.030	0.939	-0.799	-0.819	No	Yes	Pass (3.91)
(0.8L _s) 61.619	0.124	-3.172	-0.793	0.734	-0.731	-0.852	No	Yes	Pass (3.75)
(0.9L _s) 69.321	-0.212	-2.819	-0.452	0.420	-0.558	-0.989	No	Yes	Pass (3.23)
(PSXFR) 74.440	-0.434	-2.585	-0.164	0.153	-0.381	-1.140	No	Yes	Pass (2.81)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-391.56	1891.09	-520.78	Pass (-)	Pass (-)
(0.1L _s) 7.702	532.14	4361.99	707.74	Pass (6.16)	Pass (8.20)
(0.2L _s) 15.405	1655.11	5379.49	2201.30	Pass (2.44)	Pass (3.25)
(0.3L _s) 23.107	2693.49	5735.94	3582.34	Pass (1.60)	Pass (2.13)
(0.4L _s) 30.809	3426.22	6088.08	4178.00	Pass (1.46)	Pass (1.78)
(0.5L _s) 38.512	3788.27	6107.57	4184.00	Pass (1.46)	Pass (1.61)
(0.6L _s) 46.214	3807.12	6107.57	4203.30	Pass (1.45)	Pass (1.60)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.7L _s) 53.917	3455.35	5775.89	3970.68	Pass (1.45)	Pass (1.67)
(0.8L _s) 61.619	2735.37	5419.06	3638.04	Pass (1.49)	Pass (1.98)
(0.9L _s) 69.321	1588.02	4496.13	2112.07	Pass (2.13)	Pass (2.83)
(1.0L _s) 77.024	0.00	2143.21	0.00	Pass (∞)	Pass (∞)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-391.56	1891.09	-520.78	Pass (-)	Pass (-)
(0.1L _s) 7.702	251.93	4361.99	707.74	Pass (6.16)	Pass (10+)
(0.2L _s) 15.405	1516.78	5379.49	2201.30	Pass (2.44)	Pass (3.55)
(0.3L _s) 23.107	2511.60	5735.94	3582.34	Pass (1.60)	Pass (2.28)
(0.4L _s) 30.809	3211.55	6088.08	4178.00	Pass (1.46)	Pass (1.90)
(0.5L _s) 38.512	3582.75	6107.57	4184.00	Pass (1.46)	Pass (1.70)
(0.6L _s) 46.214	3571.93	6107.57	4203.30	Pass (1.45)	Pass (1.71)
(0.7L _s) 53.917	3244.78	5775.89	3970.68	Pass (1.45)	Pass (1.78)
(0.8L _s) 61.619	2565.76	5419.06	3638.04	Pass (1.49)	Pass (2.11)
(0.9L _s) 69.321	1498.68	4496.13	2112.07	Pass (2.13)	Pass (3.00)
(1.0L _s) 77.024	0.00	2143.21	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2645.12	-4041.49	-1199.94	Pass (3.37)	Pass (1.53)
(FoS) 1.193	-2470.00	-5412.37	-1199.94	Pass (4.51)	Pass (2.19)
(0.1L _s) 7.702	-1529.51	-5343.67	-1199.94	Pass (4.45)	Pass (3.49)
(0.2L _s) 15.405	-980.22	-5279.55	-1199.94	Pass (4.40)	Pass (5.39)
(0.3L _s) 23.107	-724.53	-5232.35	-963.63	Pass	Pass

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
				(5.43)	(7.22)
(0.4L _s) 30.809	-526.86	-5202.77	-700.73	Pass (7.42)	Pass (9.88)
(0.5L _s) 38.512	-358.88	-5193.00	-477.31	Pass (10+)	Pass (10+)
(0.6L _s) 46.214	-224.32	-5202.81	-298.35	Pass (10+)	Pass (10+)
(0.7L _s) 53.917	-121.16	-5231.99	-161.14	Pass (10+)	Pass (10+)
(0.8L _s) 61.619	-49.38	-5277.90	-65.68	Pass (10+)	Pass (10+)
(0.9L _s) 69.321	-9.00	-5338.99	-11.97	Pass (10+)	Pass (10+)
(FoS) 76.690	0.26	-5412.55	1.06	Pass (-)	Pass (-)
(1.0L _s) 77.024	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2180.42	-4041.49	-1199.94	Pass (3.37)	Pass (1.85)
(FoS) 1.193	-2041.25	-5412.37	-1199.94	Pass (4.51)	Pass (2.65)
(0.1L _s) 7.702	-1271.71	-5343.67	-1199.94	Pass (4.45)	Pass (4.20)
(0.2L _s) 15.405	-880.39	-5279.55	-1199.94	Pass (4.40)	Pass (6.00)
(0.3L _s) 23.107	-637.18	-5232.35	-963.63	Pass (5.43)	Pass (8.21)
(0.4L _s) 30.809	-451.99	-5202.77	-700.73	Pass (7.42)	Pass (10+)
(0.5L _s) 38.512	-296.57	-5193.00	-477.31	Pass (10+)	Pass (10+)
(0.6L _s) 46.214	-174.48	-5202.81	-298.35	Pass (10+)	Pass (10+)
(0.7L _s) 53.917	-83.78	-5231.99	-161.14	Pass (10+)	Pass (10+)
(0.8L _s) 61.619	-24.46	-5277.90	-65.68	Pass (10+)	Pass (10+)
(0.9L _s) 69.321	3.46	-5338.99	-11.97	Pass (10+)	Pass (-)
(FoS) 76.690	0.80	-5412.55	1.06	Pass (-)	Pass (-)
(1.0L _s) 77.024	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(CS) 5.176	Yes	Yes	282.80	566.47	Pass (2.00)
(SZB) 5.862	Yes	Yes	278.88	423.55	Pass (1.52)
(1.5H) 6.443	Yes	Yes	275.55	417.75	Pass (1.52)
(0.1L _s) 7.702	Yes	Yes	268.34	425.83	Pass (1.59)
(SZB) 11.362	Yes	Yes	247.29	323.50	Pass (1.31)
(0.2L _s) 15.405	Yes	Yes	223.83	329.85	Pass (1.47)
(SZB) 19.612	Yes	Yes	199.31	285.39	Pass (1.43)
(0.3L _s) 23.107	Yes	Yes	178.88	286.96	Pass (1.60)
(SZB) 30.612	Yes	Yes	134.98	246.76	Pass (1.83)
(0.4L _s) 30.809	Yes	Yes	133.83	247.00	Pass (1.85)
(HP) 31.242	Yes	Yes	131.31	247.54	Pass (1.89)
(0.5L _s) 38.512	Yes	Yes	89.02	219.67	Pass (2.47)
(0.6L _s) 46.214	Yes	Yes	78.64	219.96	Pass (2.80)
(HP) 46.641	Yes	Yes	80.88	245.33	Pass (3.03)
(SZB) 47.271	Yes	Yes	84.21	244.12	Pass (2.90)
(0.7L _s) 53.917	Yes	Yes	121.23	279.94	Pass (2.31)
(SZB) 58.271	Yes	Yes	146.37	274.10	Pass (1.87)
(0.8L _s) 61.619	Yes	Yes	166.05	315.07	Pass (1.90)
(SZB) 66.521	Yes	Yes	195.44	307.76	Pass (1.57)
(0.9L _s) 69.321	Yes	Yes	212.53	405.81	Pass (1.91)
(1.5H) 71.440	Yes	Yes	225.58	421.19	Pass (1.87)
(SZB) 72.021	Yes	Yes	229.18	417.86	Pass (1.82)
(CS) 73.100	Yes	Yes	235.87	569.32	Pass (2.41)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.862	Yes	Yes	271.82	434.49	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.60)
(1.5H) 6.443	Yes	Yes	268.72	427.94	Pass (1.59)
(0.1L _s) 7.702	Yes	Yes	261.95	434.27	Pass (1.66)
(SZB) 11.362	Yes	Yes	241.95	328.03	Pass (1.36)
(0.2L _s) 15.405	Yes	Yes	219.13	333.19	Pass (1.52)
(SZB) 19.612	Yes	Yes	194.72	288.74	Pass (1.48)
(0.3L _s) 23.107	Yes	Yes	173.89	290.48	Pass (1.67)
(SZB) 30.612	Yes	Yes	127.72	250.48	Pass (1.96)
(0.4L _s) 30.809	Yes	Yes	126.48	250.74	Pass (1.98)
(HP) 31.242	Yes	Yes	123.76	251.31	Pass (2.03)
(0.5L _s) 38.512	Yes	Yes	77.13	223.33	Pass (2.90)
(0.6L _s) 46.214	Yes	Yes	73.32	223.71	Pass (3.05)
(HP) 46.641	No	Yes	75.53	249.22	Pass (3.30)
(SZB) 47.271	Yes	Yes	78.79	248.09	Pass (3.15)
(0.7L _s) 53.917	Yes	Yes	115.11	283.64	Pass (2.46)
(SZB) 58.271	Yes	Yes	139.58	277.54	Pass (1.99)
(0.8L _s) 61.619	Yes	Yes	158.69	318.58	Pass (2.01)
(SZB) 66.521	Yes	Yes	186.96	310.51	Pass (1.66)
(0.9L _s) 69.321	Yes	Yes	203.32	408.28	Pass (2.01)
(1.5H) 71.440	Yes	Yes	215.74	423.24	Pass (1.96)
(SZB) 72.021	Yes	Yes	219.15	419.73	Pass (1.92)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.193	1527.02	899.75	5.7.3.5-1	Pass (1.70)
(SZB) 2.196	1566.37	838.51	5.7.3.5-1	Pass (1.87)
(Bar Develop.) 2.564	1580.80	816.31	5.7.3.5-1	Pass (1.94)
(Bar Develop.) 3.625	1598.40	753.18	5.7.3.5-1	Pass (2.12)
(H) 4.693	1598.40	694.28	5.7.3.5-1	Pass (2.30)
(CS) 5.176	1598.40	670.58	5.7.3.5-1	Pass (2.38)
(SZB) 5.862	1598.40	635.11	5.7.3.5-1	Pass (2.52)
(1.5H) 6.443	1598.40	602.59	5.7.3.5-1	Pass (2.65)
(0.1L _s) 7.702	1598.40	536.57	5.7.3.5-1	Pass (2.98)
(SZB) 11.362	1337.59	607.13	5.7.3.5-1	Pass (2.20)
(0.2L _s) 15.405	1652.36	731.58	5.7.3.5-1	Pass (2.26)
(SZB) 19.612	1656.81	880.08	5.7.3.5-1	Pass (1.88)
(0.3L _s) 23.107	1660.33	942.72	5.7.3.5-1	Pass (1.76)
(SZB) 30.612	1664.34	1047.15	5.7.3.5-1	Pass (1.59)
(0.4L _s) 30.809	1664.38	1047.18	5.7.3.5-1	Pass (1.59)
(HP) 31.242	1664.47	1047.00	5.7.3.5-1	Pass (1.59)
(0.5L _s) 38.512	1664.48	1107.00	5.7.3.5-1	Pass (1.50)
(0.6L _s) 46.214	1664.48	1101.66	5.7.3.5-1	Pass (1.51)
(HP) 46.641	1664.48	1053.53	5.7.3.5-1	Pass (1.58)
(SZB) 47.271	1664.35	1057.46	5.7.3.5-1	Pass (1.57)
(0.7L _s) 53.917	1661.09	1053.10	5.7.3.5-1	Pass (1.58)
(SZB) 58.271	1656.89	1019.88	5.7.3.5-1	Pass (1.62)
(0.8L _s) 61.619	1653.36	942.33	5.7.3.5-1	Pass (1.75)
(SZB) 66.521	1337.67	805.99	5.7.3.5-1	Pass (1.66)
(0.9L _s) 69.321	1126.10	642.25	5.7.3.5-1	Pass (1.75)
(1.5H) 71.440	955.82	526.12	5.7.3.5-1	Pass (1.82)
(SZB) 72.021	845.37	496.42	5.7.3.5-1	Pass (1.70)
(CS) 73.100	813.26	431.49	5.7.3.5-1	Pass (1.88)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(H) 73.190	810.57	191.83	5.7.3.5-2	Pass (4.23)
(Bar Develop.) 74.258	778.85	191.83	5.7.3.5-2	Pass (4.06)
(Bar Develop.) 75.319	644.11	191.83	5.7.3.5-2	Pass (3.36)
(SZB) 75.687	584.90	191.83	5.7.3.5-2	Pass (3.05)
(FoS) 76.690	423.00	191.83	5.7.3.5-2	Pass (2.21)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.193	1527.02	777.39	5.7.3.5-1	Pass (1.96)
(SZB) 2.196	1566.37	724.38	5.7.3.5-1	Pass (2.16)
(Bar Develop.) 2.564	1580.80	705.12	5.7.3.5-1	Pass (2.24)
(Bar Develop.) 3.625	1598.40	650.21	5.7.3.5-1	Pass (2.46)
(H) 4.693	1598.40	599.21	5.7.3.5-1	Pass (2.67)
(SZB) 5.862	1598.40	546.99	5.7.3.5-1	Pass (2.92)
(1.5H) 6.443	1598.40	517.70	5.7.3.5-1	Pass (3.09)
(0.1L _s) 7.702	1598.40	460.42	5.7.3.5-1	Pass (3.47)
(SZB) 11.362	1337.59	537.85	5.7.3.5-1	Pass (2.49)
(0.2L _s) 15.405	1652.36	680.11	5.7.3.5-1	Pass (2.43)
(SZB) 19.612	1656.81	823.17	5.7.3.5-1	Pass (2.01)
(0.3L _s) 23.107	1660.33	880.77	5.7.3.5-1	Pass (1.89)
(SZB) 30.612	1664.34	974.76	5.7.3.5-1	Pass (1.71)
(0.4L _s) 30.809	1664.38	974.53	5.7.3.5-1	Pass (1.71)
(HP) 31.242	1664.47	973.77	5.7.3.5-1	Pass (1.71)
(0.5L _s) 38.512	1664.48	1040.23	5.7.3.5-1	Pass (1.60)
(0.6L _s) 46.214	1664.48	1033.51	5.7.3.5-1	Pass (1.61)
(HP) 46.641	1664.48	984.05	5.7.3.5-1	Pass (1.69)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 47.271	1664.35	986.06	5.7.3.5-1	Pass (1.69)
(0.7L _s) 53.917	1661.09	987.57	5.7.3.5-1	Pass (1.68)
(SZB) 58.271	1656.89	951.43	5.7.3.5-1	Pass (1.74)
(0.8L _s) 61.619	1653.36	884.33	5.7.3.5-1	Pass (1.87)
(SZB) 66.521	1337.67	750.53	5.7.3.5-1	Pass (1.78)
(0.9L _s) 69.321	1126.10	606.59	5.7.3.5-1	Pass (1.86)
(1.5H) 71.440	955.82	498.07	5.7.3.5-1	Pass (1.92)
(SZB) 72.021	845.37	470.19	5.7.3.5-1	Pass (1.80)
(H) 73.190	810.57	181.56	5.7.3.5-2	Pass (4.46)
(Bar Develop.) 74.258	778.85	181.56	5.7.3.5-2	Pass (4.29)
(Bar Develop.) 75.319	644.11	181.56	5.7.3.5-2	Pass (3.55)
(SZB) 75.687	584.90	181.56	5.7.3.5-2	Pass (3.22)
(FoS) 76.690	423.00	181.56	5.7.3.5-2	Pass (2.33)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.860	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(FoS) 1.193	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(SZB) 2.196	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(Bar Develop.) 2.564	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(Bar Develop.) 3.625	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(H) 4.693	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(CS) 5.176	12.000	48.000	Pass	0.220	0.000	Pass	76.639	142.549	Pass (1.86)
(SZB) 5.862	12.000	48.000	Pass	0.220	0.000	Pass	75.576	142.549	Pass (1.89)
(1.5H) 6.443	12.000	48.000	Pass	0.220	0.000	Pass	74.675	142.549	Pass (1.91)
(0.1L _s) 7.702	12.000	48.000	Pass	0.220	0.000	Pass	72.719	142.549	Pass (1.96)
(SZB) 11.362	9.000	48.000	Pass	0.293	0.000	Pass	67.016	146.509	Pass (2.19)
(0.2L _s) 15.405	9.000	48.000	Pass	0.293	0.000	Pass	60.657	146.509	Pass (2.42)
(SZB) 19.612	12.000	48.000	Pass	0.220	0.000	Pass	54.013	142.549	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(2.64)
(0.3L _s) 23.107	12.000	48.000	Pass	0.220	0.000	Pass	48.476	142.549	Pass (2.94)
(SZB) 30.612	18.000	48.000	Pass	0.147	0.000	Pass	36.580	138.589	Pass (3.79)
(0.4L _s) 30.809	18.000	48.000	Pass	0.147	0.000	Pass	36.268	138.589	Pass (3.82)
(HP) 31.242	18.000	48.000	Pass	0.147	0.000	Pass	35.586	138.589	Pass (3.89)
(0.5L _s) 38.512	18.000	48.000	Pass	0.147	0.000	Pass	24.124	138.589	Pass (5.74)
(0.6L _s) 46.214	18.000	48.000	Pass	0.147	0.000	Pass	21.311	138.589	Pass (6.50)
(HP) 46.641	18.000	48.000	Pass	0.147	0.000	Pass	21.920	138.589	Pass (6.32)
(SZB) 47.271	18.000	48.000	Pass	0.147	0.000	Pass	22.820	138.589	Pass (6.07)
(0.7L _s) 53.917	12.000	48.000	Pass	0.220	0.000	Pass	32.854	142.549	Pass (4.34)
(SZB) 58.271	12.000	48.000	Pass	0.220	0.000	Pass	39.666	142.549	Pass (3.59)
(0.8L _s) 61.619	9.000	48.000	Pass	0.293	0.000	Pass	45.000	146.509	Pass (3.26)
(SZB) 66.521	9.000	48.000	Pass	0.293	0.000	Pass	52.965	146.509	Pass (2.77)
(0.9L _s) 69.321	12.000	48.000	Pass	0.220	0.000	Pass	57.597	142.549	Pass (2.47)
(1.5H) 71.440	12.000	48.000	Pass	0.220	0.000	Pass	61.134	142.549	Pass (2.33)
(SZB) 72.021	12.000	48.000	Pass	0.220	0.000	Pass	62.107	142.549	Pass (2.30)
(CS) 73.100	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
(H) 73.190	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
(Bar Develop.) 74.258	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
(Bar Develop.) 75.319	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
(SZB) 75.687	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
(FoS) 76.690	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
(1.0L _s) 77.024	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)
77.024	12.000	48.000	Pass	0.220	0.000	Pass	63.921	142.549	Pass (2.23)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.860	12.000	48.000	Pass	0.220	0.000	Pass	74.655	142.549	Pass (1.91)
(FoS) 1.193	12.000	48.000	Pass	0.220	0.000	Pass	74.655	142.549	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(1.91)
(SZB) 2.196	12.000	48.000	Pass	0.220	0.000	Pass	74.655	142.549	Pass (1.91)
(Bar Develop.) 2.564	12.000	48.000	Pass	0.220	0.000	Pass	74.655	142.549	Pass (1.91)
(Bar Develop.) 3.625	12.000	48.000	Pass	0.220	0.000	Pass	74.655	142.549	Pass (1.91)
(H) 4.693	12.000	48.000	Pass	0.220	0.000	Pass	74.655	142.549	Pass (1.91)
(SZB) 5.862	12.000	48.000	Pass	0.220	0.000	Pass	73.664	142.549	Pass (1.94)
(1.5H) 6.443	12.000	48.000	Pass	0.220	0.000	Pass	72.823	142.549	Pass (1.96)
(0.1L _s) 7.702	12.000	48.000	Pass	0.220	0.000	Pass	70.989	142.549	Pass (2.01)
(SZB) 11.362	9.000	48.000	Pass	0.293	0.000	Pass	65.568	146.509	Pass (2.23)
(0.2L _s) 15.405	9.000	48.000	Pass	0.293	0.000	Pass	59.385	146.509	Pass (2.47)
(SZB) 19.612	12.000	48.000	Pass	0.220	0.000	Pass	52.769	142.549	Pass (2.70)
(0.3L _s) 23.107	12.000	48.000	Pass	0.220	0.000	Pass	47.125	142.549	Pass (3.02)
(SZB) 30.612	18.000	48.000	Pass	0.147	0.000	Pass	34.612	138.589	Pass (4.00)
(0.4L _s) 30.809	18.000	48.000	Pass	0.147	0.000	Pass	34.276	138.589	Pass (4.04)
(HP) 31.242	18.000	48.000	Pass	0.147	0.000	Pass	33.539	138.589	Pass (4.13)
(0.5L _s) 38.512	18.000	48.000	Pass	0.147	0.000	Pass	20.903	138.589	Pass (6.63)
(0.6L _s) 46.214	18.000	48.000	Pass	0.147	0.000	Pass	19.870	138.589	Pass (6.97)
(HP) 46.641	18.000	48.000	Pass	0.147	0.000	Pass	20.468	138.589	Pass (6.77)
(SZB) 47.271	18.000	48.000	Pass	0.147	0.000	Pass	21.353	138.589	Pass (6.49)
(0.7L _s) 53.917	12.000	48.000	Pass	0.220	0.000	Pass	31.196	142.549	Pass (4.57)
(SZB) 58.271	12.000	48.000	Pass	0.220	0.000	Pass	37.827	142.549	Pass (3.77)
(0.8L _s) 61.619	9.000	48.000	Pass	0.293	0.000	Pass	43.005	146.509	Pass (3.41)
(SZB) 66.521	9.000	48.000	Pass	0.293	0.000	Pass	50.668	146.509	Pass (2.89)
(0.9L _s) 69.321	12.000	48.000	Pass	0.220	0.000	Pass	55.101	142.549	Pass (2.59)
(1.5H) 71.440	12.000	48.000	Pass	0.220	0.000	Pass	58.466	142.549	Pass (2.44)
(SZB) 72.021	12.000	48.000	Pass	0.220	0.000	Pass	59.389	142.549	Pass (2.40)
(H) 73.190	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)
(Bar Develop.) 74.258	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(Bar Develop.) 75.319	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)
(SZB) 75.687	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)
(FoS) 76.690	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)
(1.0L _s) 77.024	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)
77.024	12.000	48.000	Pass	0.220	0.000	Pass	61.110	142.549	Pass (2.33)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.155 in

Minimum live load deflection along girder = -0.222 in

Maximum live load deflection along girder = 0.093 in

Status = Pass

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.860	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.193	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.196	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.564	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.625	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.693	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 5.176	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.862	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.443	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.702	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.362	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.405	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.612	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.107	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.612	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.809	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.242	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.512	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.214	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.641	#4	18.000	18.000	1.500	0.267	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(SZB) 47.271	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.917	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.271	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.619	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.521	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.321	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.440	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.021	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 73.100	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 73.190	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.258	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.319	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.687	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.690	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.024	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.024	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.860	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.193	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.196	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.564	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.625	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.693	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.862	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.443	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.702	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.362	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.405	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.612	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.107	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.612	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.809	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.242	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.512	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.214	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.641	#4	18.000	18.000	1.500	0.267	0.000	Pass
(SZB) 47.271	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.917	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.271	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.619	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.521	#4	9.000	18.000	1.500	0.533	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(0.9L _s) 69.321	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.440	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.021	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 73.190	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.258	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.319	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.687	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.690	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.024	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.024	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.32	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
2	B	12.300	11.500	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
2	B	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.108
Lower Bound Camber at 60 days, 50% of D ₆₀	1.657
Average Camber at 60 days, 75% of D ₆₀	2.486
Upper Bound Camber at 60 days, D ₆₀	3.314

Spec Check Report

For

Span 2 Girder F

March 14, 2021 2:36:18 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



**Washington State
Department of Transportation**



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.472	Pass (1.20)	162.472	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.296 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.198 KSI $\Rightarrow$ 6.200 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.055	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.296 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) 0.443	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 3.443	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
8.143	(0.1L _r) 7.700	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	No	Yes	Pass (1.33)
15.842	(0.2L _r) 15.400	0.121	-3.622	-0.574	0.582	-0.453	-3.040	No	Yes	Pass (1.28)
23.542	(0.3L _r) 23.099	0.503	-3.979	-0.753	0.764	-0.250	-3.215	No	Yes	Pass (1.21)
(HP) 31.242	(HP, 0.4L _r) 30.799	0.876	-4.316	-0.861	0.873	0.015	-3.442	No	Yes	Pass (1.13)
38.942		0.877	-4.319	-0.897	0.910	-0.020	-3.410	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.499									(1.14)
(HP) 46.641	(HP, 0.6L _r) 46.199	0.876	-4.316	-0.861	0.873	0.015	-3.442	No	Yes	Pass (1.13)
54.341	(0.7L _r) 53.898	0.503	-3.979	-0.753	0.764	-0.250	-3.215	No	Yes	Pass (1.21)
62.041	(0.8L _r) 61.598	0.121	-3.622	-0.574	0.582	-0.453	-3.040	No	Yes	Pass (1.28)
69.741	(0.9L _r) 69.298	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	No	Yes	Pass (1.33)
(PSXFR) 74.440	(PSXFR) 73.998	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	No	Yes	Pass (1.35)
(STLF) 77.440	(STLF, 1.0L _r) 76.998	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.296 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) 0.443	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 3.443	(PSXFR) 3.000	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
8.143	(0.1L _r) 7.700	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	0.200	-	No	Yes	Pass (-)
15.842	(0.2L _r) 15.400	0.121	-3.622	-0.574	0.582	-0.453	-3.040	0.200	-	No	Yes	Pass (-)
23.542	(0.3L _r) 23.099	0.503	-3.979	-0.753	0.764	-0.250	-3.215	0.200	-	No	Yes	Pass (-)
(HP) 31.242	(HP, 0.4L _r) 30.799	0.876	-4.316	-0.861	0.873	0.015	-3.442	0.200	-	No	Yes	Pass (10+)
38.942	(0.5L _r) 38.499	0.877	-4.319	-0.897	0.910	-0.020	-3.410	0.200	-	No	Yes	Pass (-)
(HP) 46.641	(HP, 0.6L _r) 46.199	0.876	-4.316	-0.861	0.873	0.015	-3.442	0.200	-	No	Yes	Pass (10+)
54.341	(0.7L _r) 53.898	0.503	-3.979	-0.753	0.764	-0.250	-3.215	0.200	-	No	Yes	Pass (-)
62.041	(0.8L _r) 61.598	0.121	-3.622	-0.574	0.582	-0.453	-3.040	0.200	-	No	Yes	Pass (-)
69.741	(0.9L _r) 69.298	-0.268	-3.252	-0.323	0.327	-0.591	-2.924	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.440	(PSXFR) 73.998	-0.507	-3.020	-0.134	0.136	-0.641	-2.884	0.200	-	No	Yes	Pass (-)
(STLF) 77.440	(STLF, 1.0L _r) 76.998	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.129 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 3.443	-0.434	-2.582	-0.273	0.277	-0.707	-2.305	No	Yes	Pass (1.56)
(0.1L _s) 7.702	-0.249	-2.772	-0.681	0.691	-0.930	-2.081	No	Yes	Pass (1.73)
(0.2L _s) 15.405	0.086	-3.115	-1.286	1.305	-1.201	-1.810	No	Yes	Pass (1.99)
(0.3L _s) 23.107	0.420	-3.451	-1.720	1.745	-1.300	-1.706	No	Yes	Pass (2.11)
(0.4L _s) 30.809	0.751	-3.771	-1.983	2.011	-1.232	-1.760	No	Yes	Pass (2.05)
(HP) 31.242	0.769	-3.788	-1.992	2.021	-1.223	-1.767	No	Yes	Pass (2.04)
(0.5L _s) 38.512	0.771	-3.797	-2.075	2.105	-1.304	-1.693	No	Yes	Pass (2.13)
(0.6L _s) 46.214	0.769	-3.789	-1.997	2.026	-1.228	-1.763	No	Yes	Pass (2.04)
(HP) 46.641	0.769	-3.788	-1.988	2.016	-1.219	-1.771	No	Yes	Pass (2.03)
(0.7L _s) 53.917	0.457	-3.487	-1.750	1.775	-1.293	-1.712	No	Yes	Pass (2.10)
(0.8L _s) 61.619	0.123	-3.152	-1.334	1.353	-1.211	-1.799	No	Yes	Pass (2.00)
(0.9L _s) 69.321	-0.212	-2.810	-0.751	0.761	-0.962	-2.049	No	Yes	Pass (1.76)
(PSXFR) 74.440	-0.434	-2.582	-0.270	0.274	-0.704	-2.308	No	Yes	Pass (1.56)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.129 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.860	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 3.443	-0.434	-2.582	-0.273	0.277	-0.707	-2.305	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.249	-2.772	-0.681	0.691	-0.930	-2.081	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.405	0.086	-3.115	-1.286	1.305	-1.201	-1.810	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.107	0.420	-3.451	-1.720	1.745	-1.300	-1.706	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.809	0.751	-3.771	-1.983	2.011	-1.232	-1.760	-	0.537	No	Yes	Pass (-)
(HP) 31.242	0.769	-3.788	-1.992	2.021	-1.223	-1.767	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.512	0.771	-3.797	-2.075	2.105	-1.304	-1.693	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.214	0.769	-3.789	-1.997	2.026	-1.228	-1.763	-	0.537	No	Yes	Pass (-)
(HP) 46.641	0.769	-3.788	-1.988	2.016	-1.219	-1.771	-	0.537	No	Yes	Pass (-)
(0.7L _s) 53.917	0.457	-3.487	-1.750	1.775	-1.293	-1.712	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.619	0.123	-3.152	-1.334	1.353	-1.211	-1.799	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.810	-0.751	0.761	-0.962	-2.049	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.582	-0.270	0.274	-0.704	-2.308	-	0.537	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.198 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.114	-0.586	0.039	-0.925	No	Yes	Pass (3.89)
(PSXFR) 3.443	-0.430	-2.559	-0.178	-0.210	-0.608	-2.769	No	Yes	Pass (1.30)
(0.1L _s) 7.702	-0.247	-2.754	-0.617	0.352	-0.864	-2.401	No	Yes	Pass (1.50)
(0.2L _s) 15.405	0.085	-3.108	-1.272	1.186	-1.186	-1.922	No	Yes	Pass (1.87)
(0.3L _s) 23.107	0.421	-3.458	-1.747	1.791	-1.326	-1.667	No	Yes	Pass (2.16)
(0.4L _s) 30.809	0.755	-3.794	-2.041	2.180	-1.286	-1.614	No	Yes	Pass (2.23)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 31.242	0.774	-3.812	-2.052	2.195	-1.278	-1.617	No	Yes	Pass (2.23)
(0.5L _s) 38.512	0.777	-3.829	-2.153	2.353	-1.376	-1.476	No	Yes	Pass (2.44)
(0.6L _s) 46.214	0.776	-3.824	-2.084	2.310	-1.307	-1.514	No	Yes	Pass (2.38)
(HP) 46.641	0.776	-3.823	-2.075	2.302	-1.298	-1.522	No	Yes	Pass (2.37)
(0.7L _s) 53.917	0.461	-3.516	-1.833	2.053	-1.372	-1.462	No	Yes	Pass (2.46)
(0.8L _s) 61.619	0.124	-3.171	-1.402	1.582	-1.279	-1.589	No	Yes	Pass (2.27)
(0.9L _s) 69.321	-0.212	-2.819	-0.791	0.897	-1.003	-1.922	No	Yes	Pass (1.87)
(PSXFR) 74.440	-0.434	-2.585	-0.285	0.325	-0.719	-2.261	No	Yes	Pass (1.59)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.198 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.111	-1.686	0.036	-2.025	No	Yes	Pass (2.37)
(PSXFR) 3.443	-0.430	-2.559	-0.191	-1.160	-0.621	-3.719	No	Yes	Pass (1.29)
(0.1L _s) 7.702	-0.247	-2.754	-0.656	-0.364	-0.903	-3.117	No	Yes	Pass (1.54)
(0.2L _s) 15.405	0.085	-3.108	-1.375	0.663	-1.289	-2.445	No	Yes	Pass (1.96)
(0.3L _s) 23.107	0.421	-3.458	-1.924	1.333	-1.503	-2.125	No	Yes	Pass (2.26)
(0.4L _s) 30.809	0.755	-3.794	-2.272	1.787	-1.516	-2.006	No	Yes	Pass (2.39)
(HP) 31.242	0.774	-3.812	-2.285	1.806	-1.511	-2.005	No	Yes	Pass (2.39)
(0.5L _s) 38.512	0.777	-3.829	-2.413	2.025	-1.635	-1.804	No	Yes	Pass (2.66)
(0.6L _s) 46.214	0.776	-3.824	-2.351	2.048	-1.574	-1.776	No	Yes	Pass (2.70)
(HP) 46.641	0.776	-3.823	-2.341	2.043	-1.565	-1.780	No	Yes	Pass (2.70)
(0.7L _s) 53.917	0.461	-3.516	-2.081	1.857	-1.621	-1.659	No	Yes	Pass (2.89)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.8L _s) 61.619	0.124	-3.171	-1.605	1.451	-1.481	-1.721	No	Yes	Pass (2.79)
(0.9L _s) 69.321	-0.212	-2.819	-0.912	0.832	-1.124	-1.987	No	Yes	Pass (2.42)
(PSXFR) 74.440	-0.434	-2.585	-0.330	0.303	-0.764	-2.283	No	Yes	Pass (2.10)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Tension without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Tension Stresses [5.9.2.3.2b]

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.198 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.132	-0.505	0.058	-0.844	No	Yes	Pass (-)
(PSXFR) 3.443	-0.430	-2.559	-0.163	-0.141	-0.592	-2.700	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.247	-2.754	-0.604	0.407	-0.852	-2.347	No	Yes	Pass (-)
(0.2L _s) 15.405	0.085	-3.108	-1.259	1.241	-1.174	-1.867	No	Yes	Pass (-)
(0.3L _s) 23.107	0.421	-3.458	-1.731	1.863	-1.310	-1.595	No	Yes	Pass (-)
(0.4L _s) 30.809	0.755	-3.794	-2.022	2.262	-1.267	-1.531	No	Yes	Pass (-)
(HP) 31.242	0.774	-3.812	-2.033	2.278	-1.259	-1.534	No	Yes	Pass (-)
(0.5L _s) 38.512	0.777	-3.829	-2.133	2.439	-1.356	-1.390	No	Yes	Pass (-)
(0.6L _s) 46.214	0.776	-3.824	-2.064	2.393	-1.288	-1.431	No	Yes	Pass (-)
(HP) 46.641	0.776	-3.823	-2.055	2.384	-1.279	-1.439	No	Yes	Pass (-)
(0.7L _s) 53.917	0.461	-3.516	-1.816	2.126	-1.355	-1.390	No	Yes	Pass (-)
(0.8L _s) 61.619	0.124	-3.171	-1.389	1.637	-1.265	-1.534	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.819	-0.783	0.929	-0.996	-1.891	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.585	-0.283	0.336	-0.717	-2.249	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.328	-0.494	0.253	-0.833	No	Yes	Pass (-)
(PSXFR) 3.443	-0.430	-2.559	0.006	-0.096	-0.423	-2.655	No	Yes	Pass (-)
(0.1L _s) 7.702	-0.247	-2.754	-0.476	0.543	-0.724	-2.211	No	Yes	Pass (-)
(0.2L _s) 15.405	0.085	-3.108	-1.165	1.596	-1.079	-1.511	No	Yes	Pass (-)
(0.3L _s) 23.107	0.421	-3.458	-1.648	2.465	-1.227	-0.993	No	Yes	Pass (-)
(0.4L _s) 30.809	0.755	-3.794	-1.950	3.043	-1.195	-0.751	No	Yes	Pass (-)
(HP) 31.242	0.774	-3.812	-1.962	3.066	-1.188	-0.746	No	Yes	Pass (-)
(0.5L _s) 38.512	0.777	-3.829	-2.073	3.311	-1.295	-0.518	No	Yes	Pass (-)
(0.6L _s) 46.214	0.776	-3.824	-2.016	3.284	-1.239	-0.540	No	Yes	Pass (-)
(HP) 46.641	0.776	-3.823	-2.007	3.274	-1.231	-0.549	No	Yes	Pass (-)
(0.7L _s) 53.917	0.461	-3.516	-1.779	2.948	-1.318	-0.568	No	Yes	Pass (-)
(0.8L _s) 61.619	0.124	-3.171	-1.364	2.304	-1.240	-0.867	No	Yes	Pass (-)
(0.9L _s) 69.321	-0.212	-2.819	-0.771	1.324	-0.983	-1.495	No	Yes	Pass (-)
(PSXFR) 74.440	-0.434	-2.585	-0.278	0.482	-0.712	-2.103	No	Yes	Pass (-)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.024	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression**Fatigue I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

Compression stress limit = $-0.4f'_c = -3.200 \text{ KSI}$

Concrete strength required to satisfy this requirement = 4.131 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.860	-0.075	-0.339	0.057	-0.565	0.020	-0.734	No	Yes	Pass (4.36)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 3.443	-0.430	-2.559	-0.089	-0.373	-0.304	-1.652	No	Yes	Pass (1.94)
(0.1L _s) 7.702	-0.247	-2.754	-0.312	-0.083	-0.436	-1.460	No	Yes	Pass (2.19)
(0.2L _s) 15.405	0.085	-3.108	-0.684	0.357	-0.641	-1.197	No	Yes	Pass (2.67)
(0.3L _s) 23.107	0.421	-3.458	-0.956	0.689	-0.745	-1.040	No	Yes	Pass (3.08)
(0.4L _s) 30.809	0.755	-3.794	-1.125	0.912	-0.747	-0.984	No	Yes	Pass (3.25)
(HP) 31.242	0.774	-3.812	-1.131	0.922	-0.744	-0.984	No	Yes	Pass (3.25)
(0.5L _s) 38.512	0.777	-3.829	-1.188	1.028	-0.799	-0.886	No	Yes	Pass (3.61)
(0.6L _s) 46.214	0.776	-3.824	-1.161	1.037	-0.772	-0.875	No	Yes	Pass (3.66)
(HP) 46.641	0.776	-3.823	-1.156	1.034	-0.768	-0.878	No	Yes	Pass (3.65)
(0.7L _s) 53.917	0.461	-3.516	-1.031	0.938	-0.800	-0.820	No	Yes	Pass (3.90)
(0.8L _s) 61.619	0.124	-3.171	-0.794	0.732	-0.732	-0.854	No	Yes	Pass (3.75)
(0.9L _s) 69.321	-0.212	-2.819	-0.453	0.419	-0.559	-0.991	No	Yes	Pass (3.23)
(PSXFR) 74.440	-0.434	-2.585	-0.165	0.152	-0.382	-1.140	No	Yes	Pass (2.81)
(1.0L _s) 77.024	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
77.024	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-391.56	1891.98	-520.78	Pass (-)	Pass (-)
(0.1L _s) 7.702	534.89	4372.32	711.41	Pass (6.15)	Pass (8.17)
(0.2L _s) 15.405	1659.18	5390.57	2206.71	Pass (2.44)	Pass (3.25)
(0.3L _s) 23.107	2697.76	5743.83	3588.02	Pass (1.60)	Pass (2.13)
(0.4L _s) 30.809	3429.61	6091.82	4180.23	Pass (1.46)	Pass (1.78)
(0.5L _s) 38.512	3790.13	6108.16	4184.16	Pass (1.46)	Pass (1.61)
(0.6L _s) 46.214	3807.22	6104.96	4201.40	Pass (1.45)	Pass (1.60)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.7L _s) 53.917	3453.96	5769.15	3966.78	Pass (1.45)	Pass (1.67)
(0.8L _s) 61.619	2733.17	5408.88	3635.11	Pass (1.49)	Pass (1.98)
(0.9L _s) 69.321	1586.14	4485.81	2109.56	Pass (2.13)	Pass (2.83)
(1.0L _s) 77.024	0.00	2141.88	0.00	Pass (∞)	Pass (∞)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-391.56	1891.98	-520.78	Pass (-)	Pass (-)
(0.1L _s) 7.702	254.71	4372.32	711.41	Pass (6.15)	Pass (10+)
(0.2L _s) 15.405	1520.87	5390.57	2206.71	Pass (2.44)	Pass (3.54)
(0.3L _s) 23.107	2515.86	5743.83	3588.02	Pass (1.60)	Pass (2.28)
(0.4L _s) 30.809	3214.92	6091.82	4180.23	Pass (1.46)	Pass (1.89)
(0.5L _s) 38.512	3584.57	6108.16	4184.16	Pass (1.46)	Pass (1.70)
(0.6L _s) 46.214	3572.00	6104.96	4201.40	Pass (1.45)	Pass (1.71)
(0.7L _s) 53.917	3243.33	5769.15	3966.78	Pass (1.45)	Pass (1.78)
(0.8L _s) 61.619	2563.51	5408.88	3635.11	Pass (1.49)	Pass (2.11)
(0.9L _s) 69.321	1496.77	4485.81	2109.56	Pass (2.13)	Pass (3.00)
(1.0L _s) 77.024	0.00	2141.88	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				ϕM_n Min $\leq \phi M_n$ ($\phi M_n / \phi M_n$ Min)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2646.23	-4046.43	-1231.70	Pass (3.29)	Pass (1.53)
(FoS) 1.193	-2471.04	-5721.01	-1230.75	Pass (4.65)	Pass (2.32)
(0.1L _s) 7.702	-1530.17	-5648.36	-1225.59	Pass (4.61)	Pass (3.69)
(0.2L _s) 15.405	-980.24	-5580.53	-1219.48	Pass (4.58)	Pass (5.69)
(0.3L _s) 23.107	-724.36	-5530.58	-963.40	Pass	Pass

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
				(5.74)	(7.64)
(0.4L _s) 30.809	-526.71	-5203.88	-700.53	Pass (7.43)	Pass (9.88)
(0.5L _s) 38.512	-360.45	-5194.11	-479.41	Pass (10+)	Pass (10+)
(0.6L _s) 46.214	-225.59	-5203.82	-300.03	Pass (10+)	Pass (10+)
(0.7L _s) 53.917	-122.11	-5232.83	-162.40	Pass (10+)	Pass (10+)
(0.8L _s) 61.619	-50.02	-5278.51	-66.52	Pass (10+)	Pass (10+)
(0.9L _s) 69.321	-9.31	-5339.32	-12.39	Pass (10+)	Pass (10+)
(FoS) 76.690	0.25	-5412.56	1.05	Pass (-)	Pass (-)
(1.0L _s) 77.024	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2181.58	-4046.43	-1231.70	Pass (3.29)	Pass (1.85)
(FoS) 1.193	-2041.88	-5721.01	-1230.75	Pass (4.65)	Pass (2.80)
(0.1L _s) 7.702	-1272.11	-5648.36	-1225.59	Pass (4.61)	Pass (4.44)
(0.2L _s) 15.405	-880.44	-5580.53	-1219.48	Pass (4.58)	Pass (6.34)
(0.3L _s) 23.107	-637.04	-5530.58	-963.40	Pass (5.74)	Pass (8.68)
(0.4L _s) 30.809	-451.87	-5203.88	-700.53	Pass (7.43)	Pass (10+)
(0.5L _s) 38.512	-298.08	-5194.11	-479.41	Pass (10+)	Pass (10+)
(0.6L _s) 46.214	-175.69	-5203.82	-300.03	Pass (10+)	Pass (10+)
(0.7L _s) 53.917	-84.68	-5232.83	-162.40	Pass (10+)	Pass (10+)
(0.8L _s) 61.619	-25.07	-5278.51	-66.52	Pass (10+)	Pass (10+)
(0.9L _s) 69.321	3.16	-5339.32	-12.39	Pass (10+)	Pass (-)
(FoS) 76.690	0.79	-5412.56	1.05	Pass (-)	Pass (-)
(1.0L _s) 77.024	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(CS) 5.156	Yes	Yes	277.23	566.36	Pass (2.04)
(SZB) 5.862	Yes	Yes	273.36	423.67	Pass (1.55)
(1.5H) 6.443	Yes	Yes	270.17	418.12	Pass (1.55)
(0.1L _s) 7.702	Yes	Yes	263.24	425.85	Pass (1.62)
(SZB) 11.362	Yes	Yes	243.00	323.64	Pass (1.33)
(0.2L _s) 15.405	Yes	Yes	220.37	330.52	Pass (1.50)
(SZB) 19.612	Yes	Yes	196.64	285.85	Pass (1.45)
(0.3L _s) 23.107	Yes	Yes	176.80	287.33	Pass (1.63)
(SZB) 30.612	Yes	Yes	133.99	246.92	Pass (1.84)
(0.4L _s) 30.809	Yes	Yes	132.86	247.16	Pass (1.86)
(HP) 31.242	Yes	Yes	130.40	247.69	Pass (1.90)
(0.5L _s) 38.512	Yes	Yes	88.82	219.68	Pass (2.47)
(0.6L _s) 46.214	Yes	Yes	78.89	219.83	Pass (2.79)
(HP) 46.641	Yes	Yes	81.13	245.20	Pass (3.02)
(SZB) 47.271	Yes	Yes	84.45	243.98	Pass (2.89)
(0.7L _s) 53.917	Yes	Yes	121.42	279.68	Pass (2.30)
(SZB) 58.271	Yes	Yes	146.49	273.78	Pass (1.87)
(0.8L _s) 61.619	Yes	Yes	166.12	314.63	Pass (1.89)
(SZB) 66.521	Yes	Yes	195.40	307.86	Pass (1.58)
(0.9L _s) 69.321	Yes	Yes	212.42	405.94	Pass (1.91)
(1.5H) 71.440	Yes	Yes	225.41	421.30	Pass (1.87)
(SZB) 72.021	Yes	Yes	228.98	417.96	Pass (1.83)
(CS) 73.100	Yes	Yes	235.64	569.32	Pass (2.42)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.862	Yes	Yes	266.27	434.22	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.63)
(1.5H) 6.443	Yes	Yes	263.30	427.96	Pass (1.63)
(0.1L _s) 7.702	Yes	Yes	256.82	434.77	Pass (1.69)
(SZB) 11.362	Yes	Yes	237.61	328.20	Pass (1.38)
(0.2L _s) 15.405	Yes	Yes	215.63	333.87	Pass (1.55)
(SZB) 19.612	Yes	Yes	192.03	289.21	Pass (1.51)
(0.3L _s) 23.107	Yes	Yes	171.82	290.85	Pass (1.69)
(SZB) 30.612	Yes	Yes	126.75	250.65	Pass (1.98)
(0.4L _s) 30.809	Yes	Yes	125.54	250.90	Pass (2.00)
(HP) 31.242	Yes	Yes	122.87	251.46	Pass (2.05)
(0.5L _s) 38.512	Yes	Yes	76.94	223.34	Pass (2.90)
(0.6L _s) 46.214	Yes	Yes	73.57	223.59	Pass (3.04)
(HP) 46.641	Yes	Yes	75.78	249.09	Pass (3.29)
(SZB) 47.271	Yes	Yes	79.04	247.95	Pass (3.14)
(0.7L _s) 53.917	Yes	Yes	115.30	283.38	Pass (2.46)
(SZB) 58.271	Yes	Yes	139.71	277.22	Pass (1.98)
(0.8L _s) 61.619	Yes	Yes	158.75	318.14	Pass (2.00)
(SZB) 66.521	Yes	Yes	186.92	310.61	Pass (1.66)
(0.9L _s) 69.321	Yes	Yes	203.21	408.40	Pass (2.01)
(1.5H) 71.440	Yes	Yes	215.56	423.34	Pass (1.96)
(SZB) 72.021	Yes	Yes	218.95	419.83	Pass (1.92)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.193	1620.62	898.86	5.7.3.5-1	Pass (1.80)
(SZB) 2.196	1659.97	837.15	5.7.3.5-1	Pass (1.98)
(Bar Develop.) 2.564	1674.40	814.79	5.7.3.5-1	Pass (2.06)
(Bar Develop.) 3.625	1692.00	751.18	5.7.3.5-1	Pass (2.25)
(H) 4.693	1692.00	691.97	5.7.3.5-1	Pass (2.45)
(CS) 5.156	1692.00	669.10	5.7.3.5-1	Pass (2.53)
(SZB) 5.862	1692.00	632.37	5.7.3.5-1	Pass (2.68)
(1.5H) 6.443	1692.00	599.90	5.7.3.5-1	Pass (2.82)
(0.1L _s) 7.702	1692.00	533.55	5.7.3.5-1	Pass (3.17)
(SZB) 11.362	1338.45	599.48	5.7.3.5-1	Pass (2.23)
(0.2L _s) 15.405	1653.28	724.63	5.7.3.5-1	Pass (2.28)
(SZB) 19.612	1657.65	874.90	5.7.3.5-1	Pass (1.89)
(0.3L _s) 23.107	1660.92	938.79	5.7.3.5-1	Pass (1.77)
(SZB) 30.612	1664.43	1045.48	5.7.3.5-1	Pass (1.59)
(0.4L _s) 30.809	1664.47	1045.57	5.7.3.5-1	Pass (1.59)
(HP) 31.242	1664.52	1045.49	5.7.3.5-1	Pass (1.59)
(0.5L _s) 38.512	1664.49	1107.22	5.7.3.5-1	Pass (1.50)
(0.6L _s) 46.214	1664.42	1102.34	5.7.3.5-1	Pass (1.51)
(HP) 46.641	1664.41	1054.21	5.7.3.5-1	Pass (1.58)
(SZB) 47.271	1664.27	1058.14	5.7.3.5-1	Pass (1.57)
(0.7L _s) 53.917	1660.60	1053.74	5.7.3.5-1	Pass (1.58)
(SZB) 58.271	1656.14	1020.76	5.7.3.5-1	Pass (1.62)
(0.8L _s) 61.619	1652.54	942.87	5.7.3.5-1	Pass (1.75)
(SZB) 66.521	1336.90	805.13	5.7.3.5-1	Pass (1.66)
(0.9L _s) 69.321	1125.35	641.52	5.7.3.5-1	Pass (1.75)
(1.5H) 71.440	955.09	525.47	5.7.3.5-1	Pass (1.82)
(SZB) 72.021	844.71	495.79	5.7.3.5-1	Pass (1.70)
(CS) 73.100	812.63	430.95	5.7.3.5-1	Pass (1.89)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(H) 73.190	809.94	191.61	5.7.3.5-2	Pass (4.23)
(Bar Develop.) 74.258	778.18	191.61	5.7.3.5-2	Pass (4.06)
(Bar Develop.) 75.319	643.78	191.61	5.7.3.5-2	Pass (3.36)
(SZB) 75.687	584.70	191.61	5.7.3.5-2	Pass (3.05)
(FoS) 76.690	422.93	191.61	5.7.3.5-2	Pass (2.21)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.193	1620.62	775.51	5.7.3.5-1	Pass (2.09)
(SZB) 2.196	1659.97	722.08	5.7.3.5-1	Pass (2.30)
(Bar Develop.) 2.564	1674.40	702.68	5.7.3.5-1	Pass (2.38)
(Bar Develop.) 3.625	1692.00	647.34	5.7.3.5-1	Pass (2.61)
(H) 4.693	1692.00	596.07	5.7.3.5-1	Pass (2.84)
(SZB) 5.862	1692.00	543.48	5.7.3.5-1	Pass (3.11)
(1.5H) 6.443	1692.00	514.27	5.7.3.5-1	Pass (3.29)
(0.1L _s) 7.702	1692.00	456.94	5.7.3.5-1	Pass (3.70)
(SZB) 11.362	1338.45	529.97	5.7.3.5-1	Pass (2.53)
(0.2L _s) 15.405	1653.28	673.12	5.7.3.5-1	Pass (2.46)
(SZB) 19.612	1657.65	817.99	5.7.3.5-1	Pass (2.03)
(0.3L _s) 23.107	1660.92	876.86	5.7.3.5-1	Pass (1.89)
(SZB) 30.612	1664.43	973.17	5.7.3.5-1	Pass (1.71)
(0.4L _s) 30.809	1664.47	972.98	5.7.3.5-1	Pass (1.71)
(HP) 31.242	1664.52	972.33	5.7.3.5-1	Pass (1.71)
(0.5L _s) 38.512	1664.49	1040.44	5.7.3.5-1	Pass (1.60)
(0.6L _s) 46.214	1664.42	1034.15	5.7.3.5-1	Pass (1.61)
(HP) 46.641	1664.41	984.69	5.7.3.5-1	Pass (1.69)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 47.271	1664.27	986.70	5.7.3.5-1	Pass (1.69)
(0.7L _s) 53.917	1660.60	988.14	5.7.3.5-1	Pass (1.68)
(SZB) 58.271	1656.14	952.23	5.7.3.5-1	Pass (1.74)
(0.8L _s) 61.619	1652.54	884.78	5.7.3.5-1	Pass (1.87)
(SZB) 66.521	1336.90	749.66	5.7.3.5-1	Pass (1.78)
(0.9L _s) 69.321	1125.35	605.85	5.7.3.5-1	Pass (1.86)
(1.5H) 71.440	955.09	497.42	5.7.3.5-1	Pass (1.92)
(SZB) 72.021	844.71	469.56	5.7.3.5-1	Pass (1.80)
(H) 73.190	809.94	181.34	5.7.3.5-2	Pass (4.47)
(Bar Develop.) 74.258	778.18	181.34	5.7.3.5-2	Pass (4.29)
(Bar Develop.) 75.319	643.78	181.34	5.7.3.5-2	Pass (3.55)
(SZB) 75.687	584.70	181.34	5.7.3.5-2	Pass (3.22)
(FoS) 76.690	422.93	181.34	5.7.3.5-2	Pass (2.33)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.860	12.000	48.000	Pass	0.220	0.000	Pass	75.674	142.574	Pass (1.88)
(FoS) 1.193	12.000	48.000	Pass	0.220	0.000	Pass	75.670	142.574	Pass (1.88)
(SZB) 2.196	12.000	48.000	Pass	0.220	0.000	Pass	75.656	142.574	Pass (1.88)
(Bar Develop.) 2.564	12.000	48.000	Pass	0.220	0.000	Pass	75.651	142.573	Pass (1.88)
(Bar Develop.) 3.625	12.000	48.000	Pass	0.220	0.000	Pass	75.637	142.573	Pass (1.88)
(H) 4.693	12.000	48.000	Pass	0.220	0.000	Pass	75.622	142.572	Pass (1.89)
(CS) 5.156	12.000	48.000	Pass	0.220	0.000	Pass	75.616	142.572	Pass (1.89)
(SZB) 5.862	12.000	48.000	Pass	0.220	0.000	Pass	74.551	142.571	Pass (1.91)
(1.5H) 6.443	12.000	48.000	Pass	0.220	0.000	Pass	73.673	142.571	Pass (1.94)
(0.1L _s) 7.702	12.000	48.000	Pass	0.220	0.000	Pass	71.768	142.570	Pass (1.99)
(SZB) 11.362	9.000	48.000	Pass	0.293	0.000	Pass	66.206	146.528	Pass (2.21)
(0.2L _s) 15.405	9.000	48.000	Pass	0.293	0.000	Pass	59.995	146.525	Pass (2.44)
(SZB) 19.612	12.000	48.000	Pass	0.220	0.000	Pass	53.493	142.562	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(2.67)
(0.3L _s) 23.107	12.000	48.000	Pass	0.220	0.000	Pass	48.066	142.560	Pass (2.97)
(SZB) 30.612	18.000	48.000	Pass	0.147	0.000	Pass	36.375	138.595	Pass (3.81)
(0.4L _s) 30.809	18.000	48.000	Pass	0.147	0.000	Pass	36.068	138.595	Pass (3.84)
(HP) 31.242	18.000	48.000	Pass	0.147	0.000	Pass	35.396	138.595	Pass (3.92)
(0.5L _s) 38.512	18.000	48.000	Pass	0.147	0.000	Pass	24.078	138.590	Pass (5.76)
(0.6L _s) 46.214	18.000	48.000	Pass	0.147	0.000	Pass	21.354	138.585	Pass (6.49)
(HP) 46.641	18.000	48.000	Pass	0.147	0.000	Pass	21.959	138.585	Pass (6.31)
(SZB) 47.271	18.000	48.000	Pass	0.147	0.000	Pass	22.855	138.584	Pass (6.06)
(0.7L _s) 53.917	12.000	48.000	Pass	0.220	0.000	Pass	32.816	142.540	Pass (4.34)
(SZB) 58.271	12.000	48.000	Pass	0.220	0.000	Pass	39.559	142.537	Pass (3.60)
(0.8L _s) 61.619	9.000	48.000	Pass	0.293	0.000	Pass	44.828	146.495	Pass (3.27)
(SZB) 66.521	9.000	48.000	Pass	0.293	0.000	Pass	52.679	146.492	Pass (2.78)
(0.9L _s) 69.321	12.000	48.000	Pass	0.220	0.000	Pass	57.235	142.530	Pass (2.49)
(1.5H) 71.440	12.000	48.000	Pass	0.220	0.000	Pass	60.709	142.529	Pass (2.35)
(SZB) 72.021	12.000	48.000	Pass	0.220	0.000	Pass	61.664	142.528	Pass (2.31)
(CS) 73.100	12.000	48.000	Pass	0.220	0.000	Pass	63.444	142.528	Pass (2.25)
(H) 73.190	12.000	48.000	Pass	0.220	0.000	Pass	63.443	142.528	Pass (2.25)
(Bar Develop.) 74.258	12.000	48.000	Pass	0.220	0.000	Pass	63.429	142.527	Pass (2.25)
(Bar Develop.) 75.319	12.000	48.000	Pass	0.220	0.000	Pass	63.415	142.526	Pass (2.25)
(SZB) 75.687	12.000	48.000	Pass	0.220	0.000	Pass	63.411	142.526	Pass (2.25)
(FoS) 76.690	12.000	48.000	Pass	0.220	0.000	Pass	63.398	142.525	Pass (2.25)
(1.0L _s) 77.024	12.000	48.000	Pass	0.220	0.000	Pass	63.393	142.525	Pass (2.25)
77.024	12.000	48.000	Pass	0.220	0.000	Pass	63.393	142.525	Pass (2.25)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.860	12.000	48.000	Pass	0.220	0.000	Pass	73.666	142.574	Pass (1.94)
(FoS) 1.193	12.000	48.000	Pass	0.220	0.000	Pass	73.662	142.574	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(1.94)
(SZB) 2.196	12.000	48.000	Pass	0.220	0.000	Pass	73.649	142.574	Pass (1.94)
(Bar Develop.) 2.564	12.000	48.000	Pass	0.220	0.000	Pass	73.644	142.573	Pass (1.94)
(Bar Develop.) 3.625	12.000	48.000	Pass	0.220	0.000	Pass	73.630	142.573	Pass (1.94)
(H) 4.693	12.000	48.000	Pass	0.220	0.000	Pass	73.616	142.572	Pass (1.94)
(SZB) 5.862	12.000	48.000	Pass	0.220	0.000	Pass	72.618	142.571	Pass (1.96)
(1.5H) 6.443	12.000	48.000	Pass	0.220	0.000	Pass	71.799	142.571	Pass (1.99)
(0.1L _s) 7.702	12.000	48.000	Pass	0.220	0.000	Pass	70.016	142.570	Pass (2.04)
(SZB) 11.362	9.000	48.000	Pass	0.293	0.000	Pass	64.737	146.528	Pass (2.26)
(0.2L _s) 15.405	9.000	48.000	Pass	0.293	0.000	Pass	58.706	146.525	Pass (2.50)
(SZB) 19.612	12.000	48.000	Pass	0.220	0.000	Pass	52.239	142.562	Pass (2.73)
(0.3L _s) 23.107	12.000	48.000	Pass	0.220	0.000	Pass	46.710	142.560	Pass (3.05)
(SZB) 30.612	18.000	48.000	Pass	0.147	0.000	Pass	34.411	138.595	Pass (4.03)
(0.4L _s) 30.809	18.000	48.000	Pass	0.147	0.000	Pass	34.080	138.595	Pass (4.07)
(HP) 31.242	18.000	48.000	Pass	0.147	0.000	Pass	33.354	138.595	Pass (4.16)
(0.5L _s) 38.512	18.000	48.000	Pass	0.147	0.000	Pass	20.856	138.590	Pass (6.65)
(0.6L _s) 46.214	18.000	48.000	Pass	0.147	0.000	Pass	19.914	138.585	Pass (6.96)
(HP) 46.641	18.000	48.000	Pass	0.147	0.000	Pass	20.509	138.585	Pass (6.76)
(SZB) 47.271	18.000	48.000	Pass	0.147	0.000	Pass	21.390	138.584	Pass (6.48)
(0.7L _s) 53.917	12.000	48.000	Pass	0.220	0.000	Pass	31.162	142.540	Pass (4.57)
(SZB) 58.271	12.000	48.000	Pass	0.220	0.000	Pass	37.727	142.537	Pass (3.78)
(0.8L _s) 61.619	9.000	48.000	Pass	0.293	0.000	Pass	42.841	146.495	Pass (3.42)
(SZB) 66.521	9.000	48.000	Pass	0.293	0.000	Pass	50.393	146.492	Pass (2.91)
(0.9L _s) 69.321	12.000	48.000	Pass	0.220	0.000	Pass	54.752	142.530	Pass (2.60)
(1.5H) 71.440	12.000	48.000	Pass	0.220	0.000	Pass	58.057	142.529	Pass (2.45)
(SZB) 72.021	12.000	48.000	Pass	0.220	0.000	Pass	58.963	142.528	Pass (2.42)
(H) 73.190	12.000	48.000	Pass	0.220	0.000	Pass	60.649	142.528	Pass (2.35)
(Bar Develop.) 74.258	12.000	48.000	Pass	0.220	0.000	Pass	60.636	142.527	Pass (2.35)

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(Bar Develop.) 75.319	12.000	48.000	Pass	0.220	0.000	Pass	60.623	142.526	Pass (2.35)
(SZB) 75.687	12.000	48.000	Pass	0.220	0.000	Pass	60.619	142.526	Pass (2.35)
(FoS) 76.690	12.000	48.000	Pass	0.220	0.000	Pass	60.606	142.525	Pass (2.35)
(1.0L _s) 77.024	12.000	48.000	Pass	0.220	0.000	Pass	60.602	142.525	Pass (2.35)
77.024	12.000	48.000	Pass	0.220	0.000	Pass	60.602	142.525	Pass (2.35)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.155 in

Minimum live load deflection along girder = -0.222 in

Maximum live load deflection along girder = 0.093 in

Status = Pass

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.860	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.193	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.196	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.564	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.625	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.693	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 5.156	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.862	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.443	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.702	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.362	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.405	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.612	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.107	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.612	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.809	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.242	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.512	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.214	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.641	#4	18.000	18.000	1.500	0.267	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(SZB) 47.271	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.917	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.271	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.619	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.521	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.321	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.440	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.021	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 73.100	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 73.190	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.258	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.319	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.687	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.690	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.024	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.024	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.860	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.193	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.196	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.564	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.625	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.693	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.862	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.443	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.702	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.362	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.405	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.612	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.107	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.612	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.809	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.242	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.512	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.214	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.641	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 47.271	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 53.917	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.271	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.619	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.521	#4	9.000	18.000	1.500	0.533	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(0.9L _s) 69.321	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.440	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.021	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 73.190	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.258	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.319	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 75.687	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 76.690	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.024	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.024	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.32	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
2	F	12.300	11.500	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
2	F	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.110
Lower Bound Camber at 60 days, 50% of D ₆₀	1.657
Average Camber at 60 days, 75% of D ₆₀	2.486
Upper Bound Camber at 60 days, D ₆₀	3.314

Spec Check Report

For

Span 2 Girder G

March 14, 2021 2:38:28 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.456	Pass (1.20)	162.456	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.286 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.223 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.066	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.286 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) 0.446	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 3.446	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	No	Yes	Pass (1.35)
8.178	(0.1L _r) 7.732	-0.268	-3.252	-0.326	0.330	-0.593	-2.922	No	Yes	Pass (1.33)
15.910	(0.2L _r) 15.463	0.121	-3.623	-0.579	0.587	-0.458	-3.036	No	Yes	Pass (1.28)
23.641	(0.3L _r) 23.195	0.503	-3.979	-0.760	0.770	-0.256	-3.209	No	Yes	Pass (1.22)
(HP) 31.373	(HP, 0.4L _r) 30.927	0.876	-4.316	-0.868	0.880	0.008	-3.436	No	Yes	Pass (1.14)
39.105		0.877	-4.320	-0.904	0.917	-0.027	-3.403	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.658									(1.15)
(HP) 46.836	(HP, 0.6L _r) 46.390	0.876	-4.316	-0.868	0.880	0.008	-3.436	No	Yes	Pass (1.14)
54.568	(0.7L _r) 54.121	0.503	-3.979	-0.760	0.770	-0.256	-3.209	No	Yes	Pass (1.22)
62.300	(0.8L _r) 61.853	0.121	-3.623	-0.579	0.587	-0.458	-3.036	No	Yes	Pass (1.28)
70.031	(0.9L _r) 69.585	-0.268	-3.252	-0.326	0.330	-0.593	-2.922	No	Yes	Pass (1.33)
(PSXFR) 74.763	(PSXFR) 74.316	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	No	Yes	Pass (1.35)
(STLF) 77.763	(STLF, 1.0L _r) 77.316	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.286 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) 0.446	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 3.446	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	0.200	-	No	Yes	Pass (-)
8.178	(0.1L _r) 7.732	-0.268	-3.252	-0.326	0.330	-0.593	-2.922	0.200	-	No	Yes	Pass (-)
15.910	(0.2L _r) 15.463	0.121	-3.623	-0.579	0.587	-0.458	-3.036	0.200	-	No	Yes	Pass (-)
23.641	(0.3L _r) 23.195	0.503	-3.979	-0.760	0.770	-0.256	-3.209	0.200	-	No	Yes	Pass (-)
(HP) 31.373	(HP, 0.4L _r) 30.927	0.876	-4.316	-0.868	0.880	0.008	-3.436	0.200	-	No	Yes	Pass (10+)
39.105	(0.5L _r) 38.658	0.877	-4.320	-0.904	0.917	-0.027	-3.403	0.200	-	No	Yes	Pass (-)
(HP) 46.836	(HP, 0.6L _r) 46.390	0.876	-4.316	-0.868	0.880	0.008	-3.436	0.200	-	No	Yes	Pass (10+)
54.568	(0.7L _r) 54.121	0.503	-3.979	-0.760	0.770	-0.256	-3.209	0.200	-	No	Yes	Pass (-)
62.300	(0.8L _r) 61.853	0.121	-3.623	-0.579	0.587	-0.458	-3.036	0.200	-	No	Yes	Pass (-)
70.031	(0.9L _r) 69.585	-0.268	-3.252	-0.326	0.330	-0.593	-2.922	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.763	(PSXFR) 74.316	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	0.200	-	No	Yes	Pass (-)
(STLF) 77.763	(STLF, 1.0L _r) 77.316	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.131 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 3.446	-0.434	-2.582	-0.272	0.276	-0.706	-2.306	No	Yes	Pass (1.56)
(0.1L _s) 7.735	-0.249	-2.772	-0.681	0.691	-0.930	-2.081	No	Yes	Pass (1.73)
(0.2L _s) 15.469	0.086	-3.114	-1.285	1.303	-1.199	-1.812	No	Yes	Pass (1.99)
(0.3L _s) 23.204	0.420	-3.450	-1.717	1.741	-1.297	-1.709	No	Yes	Pass (2.11)
(0.4L _s) 30.938	0.751	-3.770	-1.978	2.007	-1.228	-1.764	No	Yes	Pass (2.04)
(HP) 31.373	0.769	-3.788	-1.988	2.017	-1.219	-1.771	No	Yes	Pass (2.03)
(0.5L _s) 38.673	0.771	-3.797	-2.070	2.100	-1.299	-1.697	No	Yes	Pass (2.12)
(0.6L _s) 46.408	0.769	-3.788	-1.993	2.021	-1.223	-1.767	No	Yes	Pass (2.04)
(HP) 46.836	0.769	-3.787	-1.983	2.012	-1.214	-1.775	No	Yes	Pass (2.03)
(0.7L _s) 54.142	0.457	-3.486	-1.746	1.771	-1.289	-1.715	No	Yes	Pass (2.10)
(0.8L _s) 61.877	0.123	-3.152	-1.332	1.351	-1.209	-1.801	No	Yes	Pass (2.00)
(0.9L _s) 69.612	-0.212	-2.810	-0.750	0.760	-0.961	-2.049	No	Yes	Pass (1.76)
(PSXFR) 74.763	-0.434	-2.582	-0.269	0.273	-0.703	-2.309	No	Yes	Pass (1.56)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.131 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.863	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 3.446	-0.434	-2.582	-0.272	0.276	-0.706	-2.306	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.735	-0.249	-2.772	-0.681	0.691	-0.930	-2.081	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.469	0.086	-3.114	-1.285	1.303	-1.199	-1.812	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.204	0.420	-3.450	-1.717	1.741	-1.297	-1.709	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.938	0.751	-3.770	-1.978	2.007	-1.228	-1.764	-	0.537	No	Yes	Pass (-)
(HP) 31.373	0.769	-3.788	-1.988	2.017	-1.219	-1.771	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.673	0.771	-3.797	-2.070	2.100	-1.299	-1.697	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.408	0.769	-3.788	-1.993	2.021	-1.223	-1.767	-	0.537	No	Yes	Pass (-)
(HP) 46.836	0.769	-3.787	-1.983	2.012	-1.214	-1.775	-	0.537	No	Yes	Pass (-)
(0.7L _s) 54.142	0.457	-3.486	-1.746	1.771	-1.289	-1.715	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.877	0.123	-3.152	-1.332	1.351	-1.209	-1.801	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.612	-0.212	-2.810	-0.750	0.760	-0.961	-2.049	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.763	-0.434	-2.582	-0.269	0.273	-0.703	-2.309	-	0.537	No	Yes	Pass (-)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.223 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.116	-0.594	0.041	-0.933	No	Yes	Pass (3.86)
(PSXFR) 3.446	-0.430	-2.558	-0.175	-0.218	-0.606	-2.777	No	Yes	Pass (1.30)
(0.1L _s) 7.735	-0.247	-2.753	-0.615	0.346	-0.862	-2.407	No	Yes	Pass (1.50)
(0.2L _s) 15.469	0.085	-3.108	-1.269	1.181	-1.184	-1.927	No	Yes	Pass (1.87)
(0.3L _s) 23.204	0.421	-3.458	-1.744	1.786	-1.323	-1.672	No	Yes	Pass (2.15)
(0.4L _s) 30.938	0.755	-3.793	-2.037	2.175	-1.282	-1.618	No	Yes	Pass (2.22)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 31.373	0.774	-3.811	-2.048	2.190	-1.274	-1.621	No	Yes	Pass (2.22)
(0.5L _s) 38.673	0.777	-3.828	-2.149	2.349	-1.372	-1.480	No	Yes	Pass (2.43)
(0.6L _s) 46.408	0.776	-3.824	-2.080	2.307	-1.304	-1.517	No	Yes	Pass (2.37)
(HP) 46.836	0.776	-3.823	-2.071	2.299	-1.295	-1.524	No	Yes	Pass (2.36)
(0.7L _s) 54.142	0.461	-3.516	-1.831	2.051	-1.370	-1.464	No	Yes	Pass (2.46)
(0.8L _s) 61.877	0.124	-3.171	-1.401	1.581	-1.277	-1.590	No	Yes	Pass (2.26)
(0.9L _s) 69.612	-0.212	-2.819	-0.790	0.897	-1.003	-1.922	No	Yes	Pass (1.87)
(PSXFR) 74.763	-0.435	-2.585	-0.284	0.324	-0.719	-2.261	No	Yes	Pass (1.59)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.223 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.113	-1.702	0.038	-2.041	No	Yes	Pass (2.35)
(PSXFR) 3.446	-0.430	-2.558	-0.188	-1.176	-0.619	-3.734	No	Yes	Pass (1.29)
(0.1L _s) 7.735	-0.247	-2.753	-0.654	-0.375	-0.901	-3.128	No	Yes	Pass (1.53)
(0.2L _s) 15.469	0.085	-3.108	-1.373	0.653	-1.288	-2.455	No	Yes	Pass (1.96)
(0.3L _s) 23.204	0.421	-3.458	-1.921	1.324	-1.501	-2.134	No	Yes	Pass (2.25)
(0.4L _s) 30.938	0.755	-3.793	-2.269	1.779	-1.514	-2.015	No	Yes	Pass (2.38)
(HP) 31.373	0.774	-3.811	-2.282	1.798	-1.509	-2.014	No	Yes	Pass (2.38)
(0.5L _s) 38.673	0.777	-3.828	-2.410	2.018	-1.633	-1.811	No	Yes	Pass (2.65)
(0.6L _s) 46.408	0.776	-3.824	-2.349	2.042	-1.572	-1.781	No	Yes	Pass (2.69)
(HP) 46.836	0.776	-3.823	-2.339	2.038	-1.563	-1.785	No	Yes	Pass (2.69)
(0.7L _s) 54.142	0.461	-3.516	-2.080	1.853	-1.619	-1.663	No	Yes	Pass (2.89)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.8L _s) 61.877	0.124	-3.171	-1.605	1.449	-1.481	-1.723	No	Yes	Pass (2.79)
(0.9L _s) 69.612	-0.212	-2.819	-0.912	0.831	-1.125	-1.988	No	Yes	Pass (2.41)
(PSXFR) 74.763	-0.435	-2.585	-0.329	0.301	-0.764	-2.283	No	Yes	Pass (2.10)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Tension without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Tension Stresses [5.9.2.3.2b]

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.223 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.134	-0.512	0.060	-0.851	No	Yes	Pass (-)
(PSXFR) 3.446	-0.430	-2.558	-0.160	-0.149	-0.590	-2.707	No	Yes	Pass (-)
(0.1L _s) 7.735	-0.247	-2.753	-0.602	0.402	-0.850	-2.351	No	Yes	Pass (-)
(0.2L _s) 15.469	0.085	-3.108	-1.256	1.236	-1.171	-1.871	No	Yes	Pass (-)
(0.3L _s) 23.204	0.421	-3.458	-1.727	1.859	-1.306	-1.599	No	Yes	Pass (-)
(0.4L _s) 30.938	0.755	-3.793	-2.018	2.259	-1.262	-1.535	No	Yes	Pass (-)
(HP) 31.373	0.774	-3.811	-2.029	2.274	-1.255	-1.537	No	Yes	Pass (-)
(0.5L _s) 38.673	0.777	-3.828	-2.129	2.436	-1.351	-1.393	No	Yes	Pass (-)
(0.6L _s) 46.408	0.776	-3.824	-2.060	2.391	-1.284	-1.433	No	Yes	Pass (-)
(HP) 46.836	0.776	-3.823	-2.051	2.382	-1.275	-1.441	No	Yes	Pass (-)
(0.7L _s) 54.142	0.461	-3.516	-1.813	2.125	-1.352	-1.391	No	Yes	Pass (-)
(0.8L _s) 61.877	0.124	-3.171	-1.387	1.637	-1.264	-1.534	No	Yes	Pass (-)
(0.9L _s) 69.612	-0.212	-2.819	-0.783	0.929	-0.995	-1.890	No	Yes	Pass (-)
(PSXFR) 74.763	-0.435	-2.585	-0.281	0.335	-0.716	-2.250	No	Yes	Pass (-)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.332	-0.501	0.257	-0.840	No	Yes	Pass (-)
(PSXFR) 3.446	-0.430	-2.558	0.011	-0.103	-0.419	-2.661	No	Yes	Pass (-)
(0.1L _s) 7.735	-0.247	-2.753	-0.473	0.538	-0.720	-2.215	No	Yes	Pass (-)
(0.2L _s) 15.469	0.085	-3.108	-1.161	1.594	-1.076	-1.514	No	Yes	Pass (-)
(0.3L _s) 23.204	0.421	-3.458	-1.643	2.464	-1.222	-0.994	No	Yes	Pass (-)
(0.4L _s) 30.938	0.755	-3.793	-1.945	3.042	-1.190	-0.751	No	Yes	Pass (-)
(HP) 31.373	0.774	-3.811	-1.956	3.066	-1.183	-0.746	No	Yes	Pass (-)
(0.5L _s) 38.673	0.777	-3.828	-2.067	3.312	-1.290	-0.517	No	Yes	Pass (-)
(0.6L _s) 46.408	0.776	-3.824	-2.011	3.285	-1.235	-0.539	No	Yes	Pass (-)
(HP) 46.836	0.776	-3.823	-2.003	3.275	-1.226	-0.548	No	Yes	Pass (-)
(0.7L _s) 54.142	0.461	-3.516	-1.776	2.950	-1.315	-0.566	No	Yes	Pass (-)
(0.8L _s) 61.877	0.124	-3.171	-1.362	2.306	-1.238	-0.865	No	Yes	Pass (-)
(0.9L _s) 69.612	-0.212	-2.819	-0.770	1.325	-0.983	-1.494	No	Yes	Pass (-)
(PSXFR) 74.763	-0.435	-2.585	-0.277	0.481	-0.712	-2.103	No	Yes	Pass (-)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.346	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression**Fatigue I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

Compression stress limit = $-0.4f'_c = -3.200 \text{ KSI}$

Concrete strength required to satisfy this requirement = 4.148 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.058	-0.572	0.020	-0.741	No	Yes	Pass (4.32)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 3.446	-0.430	-2.558	-0.088	-0.380	-0.303	-1.659	No	Yes	Pass (1.93)
(0.1L _s) 7.735	-0.247	-2.753	-0.311	-0.089	-0.435	-1.466	No	Yes	Pass (2.18)
(0.2L _s) 15.469	0.085	-3.108	-0.683	0.352	-0.640	-1.202	No	Yes	Pass (2.66)
(0.3L _s) 23.204	0.421	-3.458	-0.955	0.684	-0.744	-1.045	No	Yes	Pass (3.06)
(0.4L _s) 30.938	0.755	-3.793	-1.124	0.908	-0.746	-0.988	No	Yes	Pass (3.24)
(HP) 31.373	0.774	-3.811	-1.130	0.918	-0.743	-0.988	No	Yes	Pass (3.24)
(0.5L _s) 38.673	0.777	-3.828	-1.186	1.025	-0.798	-0.889	No	Yes	Pass (3.60)
(0.6L _s) 46.408	0.776	-3.824	-1.159	1.034	-0.771	-0.878	No	Yes	Pass (3.64)
(HP) 46.836	0.776	-3.823	-1.155	1.031	-0.767	-0.880	No	Yes	Pass (3.64)
(0.7L _s) 54.142	0.461	-3.516	-1.030	0.936	-0.800	-0.822	No	Yes	Pass (3.89)
(0.8L _s) 61.877	0.124	-3.171	-0.794	0.731	-0.732	-0.855	No	Yes	Pass (3.74)
(0.9L _s) 69.612	-0.212	-2.819	-0.453	0.419	-0.559	-0.991	No	Yes	Pass (3.23)
(PSXFR) 74.763	-0.435	-2.585	-0.164	0.152	-0.381	-1.141	No	Yes	Pass (2.81)
(1.0L _s) 77.346	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
77.346	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-396.55	1891.94	-527.41	Pass (-)	Pass (-)
(0.1L _s) 7.735	531.49	4374.93	706.88	Pass (6.19)	Pass (8.23)
(0.2L _s) 15.469	1659.09	5389.58	2206.59	Pass (2.44)	Pass (3.25)
(0.3L _s) 23.204	2699.67	5742.81	3590.56	Pass (1.60)	Pass (2.13)
(0.4L _s) 30.938	3433.53	6090.93	4180.42	Pass (1.46)	Pass (1.77)
(0.5L _s) 38.673	3795.43	6107.28	4184.55	Pass (1.46)	Pass (1.61)
(0.6L _s) 46.408	3813.37	6104.07	4201.76	Pass (1.45)	Pass (1.60)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.7L _s) 54.142	3460.22	5768.07	3967.01	Pass (1.45)	Pass (1.67)
(0.8L _s) 61.877	2738.56	5407.80	3642.29	Pass (1.48)	Pass (1.97)
(0.9L _s) 69.612	1589.61	4488.72	2114.18	Pass (2.12)	Pass (2.82)
(1.0L _s) 77.346	0.00	2141.77	0.00	Pass (∞)	Pass (∞)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-396.55	1891.94	-527.41	Pass (-)	Pass (-)
(0.1L _s) 7.735	250.07	4374.93	706.88	Pass (6.19)	Pass (10+)
(0.2L _s) 15.469	1520.70	5389.58	2206.59	Pass (2.44)	Pass (3.54)
(0.3L _s) 23.204	2516.75	5742.81	3590.56	Pass (1.60)	Pass (2.28)
(0.4L _s) 30.938	3217.40	6090.93	4180.42	Pass (1.46)	Pass (1.89)
(0.5L _s) 38.673	3588.28	6107.28	4184.55	Pass (1.46)	Pass (1.70)
(0.6L _s) 46.408	3576.57	6104.07	4201.76	Pass (1.45)	Pass (1.71)
(0.7L _s) 54.142	3248.10	5768.07	3967.01	Pass (1.45)	Pass (1.78)
(0.8L _s) 61.877	2567.87	5407.80	3642.29	Pass (1.48)	Pass (2.11)
(0.9L _s) 69.612	1499.64	4488.72	2114.18	Pass (2.12)	Pass (2.99)
(1.0L _s) 77.346	0.00	2141.77	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2669.72	-4048.69	-1230.05	Pass (3.29)	Pass (1.52)
(FoS) 1.196	-2493.07	-5720.05	-1229.10	Pass (4.65)	Pass (2.29)
(0.1L _s) 7.735	-1544.79	-5630.00	-1223.93	Pass (4.60)	Pass (3.64)
(0.2L _s) 15.469	-991.93	-5545.88	-1217.80	Pass (4.55)	Pass (5.59)
(0.3L _s) 23.204	-733.38	-5189.77	-975.40	Pass	Pass

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
				(5.32)	(7.08)
(0.4L _s) 30.938	-533.66	-5153.60	-709.76	Pass (7.26)	Pass (9.66)
(0.5L _s) 38.673	-365.58	-5141.45	-486.23	Pass (10+)	Pass (10+)
(0.6L _s) 46.408	-229.16	-5153.10	-304.79	Pass (10+)	Pass (10+)
(0.7L _s) 54.142	-124.39	-5188.37	-165.44	Pass (10+)	Pass (10+)
(0.8L _s) 61.877	-51.28	-5244.59	-68.20	Pass (10+)	Pass (10+)
(0.9L _s) 69.612	-9.81	-5320.22	-13.05	Pass (10+)	Pass (10+)
(FoS) 77.013	0.23	-5411.67	1.03	Pass (-)	Pass (-)
(1.0L _s) 77.346	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2193.92	-4048.69	-1230.05	Pass (3.29)	Pass (1.85)
(FoS) 1.196	-2055.73	-5720.05	-1229.10	Pass (4.65)	Pass (2.78)
(0.1L _s) 7.735	-1279.95	-5630.00	-1223.93	Pass (4.60)	Pass (4.40)
(0.2L _s) 15.469	-890.20	-5545.88	-1217.80	Pass (4.55)	Pass (6.23)
(0.3L _s) 23.204	-644.36	-5189.77	-975.40	Pass (5.32)	Pass (8.05)
(0.4L _s) 30.938	-457.35	-5153.60	-709.76	Pass (7.26)	Pass (10+)
(0.5L _s) 38.673	-301.99	-5141.45	-486.23	Pass (10+)	Pass (10+)
(0.6L _s) 46.408	-178.29	-5153.10	-304.79	Pass (10+)	Pass (10+)
(0.7L _s) 54.142	-86.24	-5188.37	-165.44	Pass (10+)	Pass (10+)
(0.8L _s) 61.877	-25.84	-5244.59	-68.20	Pass (10+)	Pass (10+)
(0.9L _s) 69.612	2.91	-5320.22	-13.05	Pass (10+)	Pass (-)
(FoS) 77.013	0.78	-5411.67	1.03	Pass (-)	Pass (-)
(1.0L _s) 77.346	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(CS) 5.151	Yes	Yes	277.25	564.26	Pass (2.04)
(SZB) 5.866	Yes	Yes	273.35	421.90	Pass (1.54)
(1.5H) 6.446	Yes	Yes	270.16	416.28	Pass (1.54)
(0.1L _s) 7.735	Yes	Yes	263.10	423.87	Pass (1.61)
(SZB) 11.366	Yes	Yes	243.10	323.64	Pass (1.33)
(0.2L _s) 15.469	Yes	Yes	220.24	330.37	Pass (1.50)
(SZB) 19.616	Yes	Yes	196.98	285.69	Pass (1.45)
(0.3L _s) 23.204	Yes	Yes	176.73	287.16	Pass (1.62)
(SZB) 30.616	Yes	Yes	134.72	246.57	Pass (1.83)
(0.4L _s) 30.938	Yes	Yes	132.89	246.95	Pass (1.86)
(HP) 31.373	Yes	Yes	130.43	247.49	Pass (1.90)
(0.5L _s) 38.673	Yes	Yes	88.97	219.56	Pass (2.47)
(0.6L _s) 46.408	Yes	Yes	78.77	219.71	Pass (2.79)
(HP) 46.836	Yes	Yes	81.01	244.97	Pass (3.02)
(SZB) 47.594	Yes	Yes	84.97	243.52	Pass (2.87)
(0.7L _s) 54.142	Yes	Yes	121.19	279.45	Pass (2.31)
(SZB) 58.594	Yes	Yes	146.67	273.47	Pass (1.86)
(0.8L _s) 61.877	Yes	Yes	165.82	314.40	Pass (1.90)
(SZB) 66.844	Yes	Yes	195.35	307.75	Pass (1.58)
(0.9L _s) 69.612	Yes	Yes	212.11	405.78	Pass (1.91)
(1.5H) 71.763	Yes	Yes	225.24	421.23	Pass (1.87)
(SZB) 72.344	Yes	Yes	228.81	417.89	Pass (1.83)
(CS) 73.422	Yes	Yes	235.44	569.22	Pass (2.42)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.866	Yes	Yes	266.14	432.63	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.63)
(1.5H) 6.446	Yes	Yes	263.18	426.30	Pass (1.62)
(0.1L _s) 7.735	Yes	Yes	256.57	433.40	Pass (1.69)
(SZB) 11.366	Yes	Yes	237.60	328.25	Pass (1.38)
(0.2L _s) 15.469	Yes	Yes	215.40	333.74	Pass (1.55)
(SZB) 19.616	Yes	Yes	192.27	289.05	Pass (1.50)
(0.3L _s) 23.204	Yes	Yes	171.64	290.70	Pass (1.69)
(SZB) 30.616	Yes	Yes	127.43	250.32	Pass (1.96)
(0.4L _s) 30.938	Yes	Yes	125.46	250.72	Pass (2.00)
(HP) 31.373	Yes	Yes	122.80	251.28	Pass (2.05)
(0.5L _s) 38.673	Yes	Yes	76.98	223.25	Pass (2.90)
(0.6L _s) 46.408	Yes	Yes	73.47	223.49	Pass (3.04)
(HP) 46.836	Yes	Yes	75.67	248.88	Pass (3.29)
(SZB) 47.594	Yes	Yes	79.56	247.52	Pass (3.11)
(0.7L _s) 54.142	Yes	Yes	115.08	283.17	Pass (2.46)
(SZB) 58.594	Yes	Yes	139.88	276.92	Pass (1.98)
(0.8L _s) 61.877	Yes	Yes	158.45	317.93	Pass (2.01)
(SZB) 66.844	Yes	Yes	186.84	310.50	Pass (1.66)
(0.9L _s) 69.612	Yes	Yes	202.86	408.27	Pass (2.01)
(1.5H) 71.763	Yes	Yes	215.35	423.29	Pass (1.97)
(SZB) 72.344	Yes	Yes	218.73	419.77	Pass (1.92)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.196	1620.62	905.12	5.7.3.5-1	Pass (1.79)
(SZB) 2.200	1659.97	843.61	5.7.3.5-1	Pass (1.97)
(Bar Develop.) 2.568	1674.40	821.30	5.7.3.5-1	Pass (2.04)
(Bar Develop.) 3.628	1692.00	757.80	5.7.3.5-1	Pass (2.23)
(H) 4.696	1692.00	698.27	5.7.3.5-1	Pass (2.42)
(CS) 5.151	1692.00	675.91	5.7.3.5-1	Pass (2.50)
(SZB) 5.866	1692.00	638.85	5.7.3.5-1	Pass (2.65)
(1.5H) 6.446	1692.00	606.44	5.7.3.5-1	Pass (2.79)
(0.1L _s) 7.735	1692.00	538.74	5.7.3.5-1	Pass (3.14)
(SZB) 11.366	1338.31	597.42	5.7.3.5-1	Pass (2.24)
(0.2L _s) 15.469	1653.20	724.63	5.7.3.5-1	Pass (2.28)
(SZB) 19.616	1657.48	873.44	5.7.3.5-1	Pass (1.90)
(0.3L _s) 23.204	1660.84	939.51	5.7.3.5-1	Pass (1.77)
(SZB) 30.616	1664.38	1046.81	5.7.3.5-1	Pass (1.59)
(0.4L _s) 30.938	1664.45	1047.01	5.7.3.5-1	Pass (1.59)
(HP) 31.373	1664.52	1046.98	5.7.3.5-1	Pass (1.59)
(0.5L _s) 38.673	1664.47	1108.92	5.7.3.5-1	Pass (1.50)
(0.6L _s) 46.408	1664.39	1104.00	5.7.3.5-1	Pass (1.51)
(HP) 46.836	1664.39	1056.08	5.7.3.5-1	Pass (1.58)
(SZB) 47.594	1664.23	1060.71	5.7.3.5-1	Pass (1.57)
(0.7L _s) 54.142	1660.52	1055.61	5.7.3.5-1	Pass (1.57)
(SZB) 58.594	1655.96	1021.58	5.7.3.5-1	Pass (1.62)
(0.8L _s) 61.877	1652.46	944.51	5.7.3.5-1	Pass (1.75)
(SZB) 66.844	1336.77	804.62	5.7.3.5-1	Pass (1.66)
(0.9L _s) 69.612	1126.41	642.46	5.7.3.5-1	Pass (1.75)
(1.5H) 71.763	954.99	525.00	5.7.3.5-1	Pass (1.82)
(SZB) 72.344	844.62	495.34	5.7.3.5-1	Pass (1.71)
(CS) 73.422	812.54	430.57	5.7.3.5-1	Pass (1.89)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(H) 73.513	809.85	191.62	5.7.3.5-2	Pass (4.23)
(Bar Develop.) 74.581	778.09	191.62	5.7.3.5-2	Pass (4.06)
(Bar Develop.) 75.642	643.72	191.62	5.7.3.5-2	Pass (3.36)
(SZB) 76.010	584.65	191.62	5.7.3.5-2	Pass (3.05)
(FoS) 77.013	422.92	191.62	5.7.3.5-2	Pass (2.21)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.196	1620.62	779.44	5.7.3.5-1	Pass (2.08)
(SZB) 2.200	1659.97	726.26	5.7.3.5-1	Pass (2.29)
(Bar Develop.) 2.568	1674.40	706.96	5.7.3.5-1	Pass (2.37)
(Bar Develop.) 3.628	1692.00	651.81	5.7.3.5-1	Pass (2.60)
(H) 4.696	1692.00	600.26	5.7.3.5-1	Pass (2.82)
(SZB) 5.866	1692.00	547.72	5.7.3.5-1	Pass (3.09)
(1.5H) 6.446	1692.00	518.56	5.7.3.5-1	Pass (3.26)
(0.1L _s) 7.735	1692.00	460.05	5.7.3.5-1	Pass (3.68)
(SZB) 11.366	1338.31	527.18	5.7.3.5-1	Pass (2.54)
(0.2L _s) 15.469	1653.20	672.87	5.7.3.5-1	Pass (2.46)
(SZB) 19.616	1657.48	816.38	5.7.3.5-1	Pass (2.03)
(0.3L _s) 23.204	1660.84	877.08	5.7.3.5-1	Pass (1.89)
(SZB) 30.616	1664.38	974.06	5.7.3.5-1	Pass (1.71)
(0.4L _s) 30.938	1664.45	973.82	5.7.3.5-1	Pass (1.71)
(HP) 31.373	1664.52	973.21	5.7.3.5-1	Pass (1.71)
(0.5L _s) 38.673	1664.47	1041.59	5.7.3.5-1	Pass (1.60)
(0.6L _s) 46.408	1664.39	1035.40	5.7.3.5-1	Pass (1.61)
(HP) 46.836	1664.39	986.15	5.7.3.5-1	Pass (1.69)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 47.594	1664.23	988.47	5.7.3.5-1	Pass (1.68)
(0.7L _s) 54.142	1660.52	989.60	5.7.3.5-1	Pass (1.68)
(SZB) 58.594	1655.96	952.77	5.7.3.5-1	Pass (1.74)
(0.8L _s) 61.877	1652.46	886.09	5.7.3.5-1	Pass (1.86)
(SZB) 66.844	1336.77	749.01	5.7.3.5-1	Pass (1.78)
(0.9L _s) 69.612	1126.41	606.58	5.7.3.5-1	Pass (1.86)
(1.5H) 71.763	954.99	496.84	5.7.3.5-1	Pass (1.92)
(SZB) 72.344	844.62	469.01	5.7.3.5-1	Pass (1.80)
(H) 73.513	809.85	181.30	5.7.3.5-2	Pass (4.47)
(Bar Develop.) 74.581	778.09	181.30	5.7.3.5-2	Pass (4.29)
(Bar Develop.) 75.642	643.72	181.30	5.7.3.5-2	Pass (3.55)
(SZB) 76.010	584.65	181.30	5.7.3.5-2	Pass (3.22)
(FoS) 77.013	422.92	181.30	5.7.3.5-2	Pass (2.33)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.863	12.000	48.000	Pass	0.220	0.000	Pass	75.650	142.573	Pass (1.88)
(FoS) 1.196	12.000	48.000	Pass	0.220	0.000	Pass	75.646	142.573	Pass (1.88)
(SZB) 2.200	12.000	48.000	Pass	0.220	0.000	Pass	75.632	142.572	Pass (1.89)
(Bar Develop.) 2.568	12.000	48.000	Pass	0.220	0.000	Pass	75.627	142.572	Pass (1.89)
(Bar Develop.) 3.628	12.000	48.000	Pass	0.220	0.000	Pass	75.613	142.571	Pass (1.89)
(H) 4.696	12.000	48.000	Pass	0.220	0.000	Pass	75.598	142.571	Pass (1.89)
(CS) 5.151	12.000	48.000	Pass	0.220	0.000	Pass	75.592	142.570	Pass (1.89)
(SZB) 5.866	12.000	48.000	Pass	0.220	0.000	Pass	74.519	142.570	Pass (1.91)
(1.5H) 6.446	12.000	48.000	Pass	0.220	0.000	Pass	73.644	142.569	Pass (1.94)
(0.1L _s) 7.735	12.000	48.000	Pass	0.220	0.000	Pass	71.703	142.569	Pass (1.99)
(SZB) 11.366	9.000	48.000	Pass	0.293	0.000	Pass	66.209	146.526	Pass (2.21)
(0.2L _s) 15.469	9.000	48.000	Pass	0.293	0.000	Pass	59.936	146.524	Pass (2.44)
(SZB) 19.616	12.000	48.000	Pass	0.220	0.000	Pass	53.566	142.561	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(2.66)
(0.3L _s) 23.204	12.000	48.000	Pass	0.220	0.000	Pass	48.028	142.559	Pass (2.97)
(SZB) 30.616	18.000	48.000	Pass	0.147	0.000	Pass	36.559	138.594	Pass (3.79)
(0.4L _s) 30.938	18.000	48.000	Pass	0.147	0.000	Pass	36.061	138.594	Pass (3.84)
(HP) 31.373	18.000	48.000	Pass	0.147	0.000	Pass	35.390	138.593	Pass (3.92)
(0.5L _s) 38.673	18.000	48.000	Pass	0.147	0.000	Pass	24.108	138.589	Pass (5.75)
(0.6L _s) 46.408	18.000	48.000	Pass	0.147	0.000	Pass	21.312	138.584	Pass (6.50)
(HP) 46.836	18.000	48.000	Pass	0.147	0.000	Pass	21.915	138.583	Pass (6.32)
(SZB) 47.594	18.000	48.000	Pass	0.147	0.000	Pass	22.984	138.583	Pass (6.03)
(0.7L _s) 54.142	12.000	48.000	Pass	0.220	0.000	Pass	32.740	142.539	Pass (4.35)
(SZB) 58.594	12.000	48.000	Pass	0.220	0.000	Pass	39.590	142.536	Pass (3.60)
(0.8L _s) 61.877	9.000	48.000	Pass	0.293	0.000	Pass	44.729	146.494	Pass (3.28)
(SZB) 66.844	9.000	48.000	Pass	0.293	0.000	Pass	52.642	146.490	Pass (2.78)
(0.9L _s) 69.612	12.000	48.000	Pass	0.220	0.000	Pass	57.125	142.529	Pass (2.50)
(1.5H) 71.763	12.000	48.000	Pass	0.220	0.000	Pass	60.637	142.527	Pass (2.35)
(SZB) 72.344	12.000	48.000	Pass	0.220	0.000	Pass	61.589	142.527	Pass (2.31)
(CS) 73.422	12.000	48.000	Pass	0.220	0.000	Pass	63.362	142.526	Pass (2.25)
(H) 73.513	12.000	48.000	Pass	0.220	0.000	Pass	63.361	142.526	Pass (2.25)
(Bar Develop.) 74.581	12.000	48.000	Pass	0.220	0.000	Pass	63.347	142.526	Pass (2.25)
(Bar Develop.) 75.642	12.000	48.000	Pass	0.220	0.000	Pass	63.333	142.525	Pass (2.25)
(SZB) 76.010	12.000	48.000	Pass	0.220	0.000	Pass	63.329	142.525	Pass (2.25)
(FoS) 77.013	12.000	48.000	Pass	0.220	0.000	Pass	63.316	142.524	Pass (2.25)
(1.0L _s) 77.346	12.000	48.000	Pass	0.220	0.000	Pass	63.311	142.524	Pass (2.25)
77.346	12.000	48.000	Pass	0.220	0.000	Pass	63.311	142.524	Pass (2.25)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.863	12.000	48.000	Pass	0.220	0.000	Pass	73.611	142.573	Pass (1.94)
(FoS) 1.196	12.000	48.000	Pass	0.220	0.000	Pass	73.606	142.573	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(1.94)
(SZB) 2.200	12.000	48.000	Pass	0.220	0.000	Pass	73.593	142.572	Pass (1.94)
(Bar Develop.) 2.568	12.000	48.000	Pass	0.220	0.000	Pass	73.588	142.572	Pass (1.94)
(Bar Develop.) 3.628	12.000	48.000	Pass	0.220	0.000	Pass	73.574	142.571	Pass (1.94)
(H) 4.696	12.000	48.000	Pass	0.220	0.000	Pass	73.560	142.571	Pass (1.94)
(SZB) 5.866	12.000	48.000	Pass	0.220	0.000	Pass	72.556	142.570	Pass (1.96)
(1.5H) 6.446	12.000	48.000	Pass	0.220	0.000	Pass	71.741	142.569	Pass (1.99)
(0.1L _s) 7.735	12.000	48.000	Pass	0.220	0.000	Pass	69.923	142.569	Pass (2.04)
(SZB) 11.366	9.000	48.000	Pass	0.293	0.000	Pass	64.708	146.526	Pass (2.26)
(0.2L _s) 15.469	9.000	48.000	Pass	0.293	0.000	Pass	58.620	146.524	Pass (2.50)
(SZB) 19.616	12.000	48.000	Pass	0.220	0.000	Pass	52.284	142.561	Pass (2.73)
(0.3L _s) 23.204	12.000	48.000	Pass	0.220	0.000	Pass	46.645	142.559	Pass (3.06)
(SZB) 30.616	18.000	48.000	Pass	0.147	0.000	Pass	34.583	138.594	Pass (4.01)
(0.4L _s) 30.938	18.000	48.000	Pass	0.147	0.000	Pass	34.045	138.594	Pass (4.07)
(HP) 31.373	18.000	48.000	Pass	0.147	0.000	Pass	33.320	138.593	Pass (4.16)
(0.5L _s) 38.673	18.000	48.000	Pass	0.147	0.000	Pass	20.858	138.589	Pass (6.64)
(0.6L _s) 46.408	18.000	48.000	Pass	0.147	0.000	Pass	19.878	138.584	Pass (6.97)
(HP) 46.836	18.000	48.000	Pass	0.147	0.000	Pass	20.471	138.583	Pass (6.77)
(SZB) 47.594	18.000	48.000	Pass	0.147	0.000	Pass	21.521	138.583	Pass (6.44)
(0.7L _s) 54.142	12.000	48.000	Pass	0.220	0.000	Pass	31.090	142.539	Pass (4.58)
(SZB) 58.594	12.000	48.000	Pass	0.220	0.000	Pass	37.755	142.536	Pass (3.78)
(0.8L _s) 61.877	9.000	48.000	Pass	0.293	0.000	Pass	42.741	146.494	Pass (3.43)
(SZB) 66.844	9.000	48.000	Pass	0.293	0.000	Pass	50.349	146.490	Pass (2.91)
(0.9L _s) 69.612	12.000	48.000	Pass	0.220	0.000	Pass	54.636	142.529	Pass (2.61)
(1.5H) 71.763	12.000	48.000	Pass	0.220	0.000	Pass	57.975	142.527	Pass (2.46)
(SZB) 72.344	12.000	48.000	Pass	0.220	0.000	Pass	58.876	142.527	Pass (2.42)
(H) 73.513	12.000	48.000	Pass	0.220	0.000	Pass	60.557	142.526	Pass (2.35)
(Bar Develop.) 74.581	12.000	48.000	Pass	0.220	0.000	Pass	60.544	142.526	Pass (2.35)

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(Bar Develop.) 75.642	12.000	48.000	Pass	0.220	0.000	Pass	60.531	142.525	Pass (2.35)
(SZB) 76.010	12.000	48.000	Pass	0.220	0.000	Pass	60.526	142.525	Pass (2.35)
(FoS) 77.013	12.000	48.000	Pass	0.220	0.000	Pass	60.514	142.524	Pass (2.36)
(1.0L _s) 77.346	12.000	48.000	Pass	0.220	0.000	Pass	60.510	142.524	Pass (2.36)
77.346	12.000	48.000	Pass	0.220	0.000	Pass	60.510	142.524	Pass (2.36)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.160 in

Minimum live load deflection along girder = -0.225 in

Maximum live load deflection along girder = 0.095 in

Status = Pass

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.863	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.196	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.200	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.568	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.628	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.696	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 5.151	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.866	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.446	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.735	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.366	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.469	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.616	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.204	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.616	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.938	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.373	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.673	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.408	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.836	#4	18.000	18.000	1.500	0.267	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(SZB) 47.594	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.142	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.594	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.877	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.844	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.612	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.763	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.344	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 73.422	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 73.513	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.581	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.642	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 76.010	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 77.013	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.346	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.346	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.863	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.196	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.200	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.568	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.628	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.696	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.866	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.446	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.735	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.366	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.469	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.616	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.204	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.616	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.938	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.373	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.673	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.408	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.836	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 47.594	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.142	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.594	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.877	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.844	#4	9.000	18.000	1.500	0.533	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(0.9L _s) 69.612	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.763	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.344	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 73.513	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.581	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.642	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 76.010	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 77.013	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.346	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.346	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.31	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
2	G	12.300	12.000	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
2	G	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.109
Lower Bound Camber at 60 days, 50% of D ₆₀	1.665
Average Camber at 60 days, 75% of D ₆₀	2.497
Upper Bound Camber at 60 days, D ₆₀	3.329

Spec Check Report

For

Span 2 Girder K

March 14, 2021 2:39:28 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.422	Pass (1.20)	162.422	Pass (1.20)

Required Concrete Strengths

Required f'_{ci} = 5.286 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.230 KSI $\Rightarrow$ 6.300 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.066	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.286 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) 0.446	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 3.446	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	No	Yes	Pass (1.35)
8.178	(0.1L _r) 7.731	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	No	Yes	Pass (1.33)
15.909	(0.2L _r) 15.463	0.121	-3.623	-0.579	0.587	-0.458	-3.036	No	Yes	Pass (1.28)
23.640	(0.3L _r) 23.194	0.503	-3.979	-0.759	0.770	-0.256	-3.209	No	Yes	Pass (1.22)
(HP) 31.371	(HP, 0.4L _r) 30.925	0.876	-4.316	-0.868	0.880	0.008	-3.436	No	Yes	Pass (1.14)
39.103		0.877	-4.320	-0.904	0.917	-0.027	-3.403	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.656									(1.15)
(HP) 46.834	(HP, 0.6L _r) 46.388	0.876	-4.316	-0.868	0.880	0.008	-3.436	No	Yes	Pass (1.14)
54.565	(0.7L _r) 54.119	0.503	-3.979	-0.759	0.770	-0.256	-3.209	No	Yes	Pass (1.22)
62.297	(0.8L _r) 61.850	0.121	-3.623	-0.579	0.587	-0.458	-3.036	No	Yes	Pass (1.28)
70.028	(0.9L _r) 69.581	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	No	Yes	Pass (1.33)
(PSXFR) 74.759	(PSXFR) 74.313	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	No	Yes	Pass (1.35)
(STLF) 77.759	(STLF, 1.0L _r) 77.313	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.286 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) 0.446	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 3.446	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	0.200	-	No	Yes	Pass (-)
8.178	(0.1L _r) 7.731	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	0.200	-	No	Yes	Pass (-)
15.909	(0.2L _r) 15.463	0.121	-3.623	-0.579	0.587	-0.458	-3.036	0.200	-	No	Yes	Pass (-)
23.640	(0.3L _r) 23.194	0.503	-3.979	-0.759	0.770	-0.256	-3.209	0.200	-	No	Yes	Pass (-)
(HP) 31.371	(HP, 0.4L _r) 30.925	0.876	-4.316	-0.868	0.880	0.008	-3.436	0.200	-	No	Yes	Pass (10+)
39.103	(0.5L _r) 38.656	0.877	-4.320	-0.904	0.917	-0.027	-3.403	0.200	-	No	Yes	Pass (-)
(HP) 46.834	(HP, 0.6L _r) 46.388	0.876	-4.316	-0.868	0.880	0.008	-3.436	0.200	-	No	Yes	Pass (10+)
54.565	(0.7L _r) 54.119	0.503	-3.979	-0.759	0.770	-0.256	-3.209	0.200	-	No	Yes	Pass (-)
62.297	(0.8L _r) 61.850	0.121	-3.623	-0.579	0.587	-0.458	-3.036	0.200	-	No	Yes	Pass (-)
70.028	(0.9L _r) 69.581	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.759	(PSXFR) 74.313	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	0.200	-	No	Yes	Pass (-)
(STLF) 77.759	(STLF, 1.0L _r) 77.313	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.130 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 3.446	-0.434	-2.582	-0.270	0.273	-0.704	-2.308	No	Yes	Pass (1.56)
(0.1L _s) 7.734	-0.249	-2.772	-0.675	0.685	-0.924	-2.087	No	Yes	Pass (1.73)
(0.2L _s) 15.468	0.086	-3.114	-1.275	1.294	-1.190	-1.820	No	Yes	Pass (1.98)
(0.3L _s) 23.203	0.420	-3.450	-1.706	1.731	-1.286	-1.719	No	Yes	Pass (2.09)
(0.4L _s) 30.937	0.750	-3.769	-1.969	1.997	-1.218	-1.772	No	Yes	Pass (2.03)
(HP) 31.371	0.769	-3.787	-1.978	2.007	-1.210	-1.780	No	Yes	Pass (2.02)
(0.5L _s) 38.671	0.771	-3.796	-2.062	2.092	-1.292	-1.704	No	Yes	Pass (2.11)
(0.6L _s) 46.405	0.769	-3.788	-1.988	2.016	-1.219	-1.772	No	Yes	Pass (2.03)
(HP) 46.834	0.769	-3.787	-1.978	2.007	-1.210	-1.780	No	Yes	Pass (2.02)
(0.7L _s) 54.140	0.457	-3.486	-1.744	1.769	-1.287	-1.717	No	Yes	Pass (2.10)
(0.8L _s) 61.874	0.123	-3.152	-1.332	1.351	-1.209	-1.801	No	Yes	Pass (2.00)
(0.9L _s) 69.608	-0.212	-2.810	-0.751	0.761	-0.962	-2.049	No	Yes	Pass (1.76)
(PSXFR) 74.759	-0.434	-2.582	-0.270	0.273	-0.704	-2.308	No	Yes	Pass (1.56)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.130 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.863	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 3.446	-0.434	-2.582	-0.270	0.273	-0.704	-2.308	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.734	-0.249	-2.772	-0.675	0.685	-0.924	-2.087	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.468	0.086	-3.114	-1.275	1.294	-1.190	-1.820	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.203	0.420	-3.450	-1.706	1.731	-1.286	-1.719	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.937	0.750	-3.769	-1.969	1.997	-1.218	-1.772	-	0.537	No	Yes	Pass (-)
(HP) 31.371	0.769	-3.787	-1.978	2.007	-1.210	-1.780	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.671	0.771	-3.796	-2.062	2.092	-1.292	-1.704	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.405	0.769	-3.788	-1.988	2.016	-1.219	-1.772	-	0.537	No	Yes	Pass (-)
(HP) 46.834	0.769	-3.787	-1.978	2.007	-1.210	-1.780	-	0.537	No	Yes	Pass (-)
(0.7L _s) 54.140	0.457	-3.486	-1.744	1.769	-1.287	-1.717	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.874	0.123	-3.152	-1.332	1.351	-1.209	-1.801	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.608	-0.212	-2.810	-0.751	0.761	-0.962	-2.049	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.759	-0.434	-2.582	-0.270	0.273	-0.704	-2.308	-	0.537	No	Yes	Pass (-)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	0.537	-	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.230 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.122	-0.596	0.047	-0.936	No	Yes	Pass (3.85)
(PSXFR) 3.446	-0.430	-2.558	-0.168	-0.223	-0.599	-2.781	No	Yes	Pass (1.29)
(0.1L _s) 7.734	-0.247	-2.753	-0.606	0.339	-0.854	-2.414	No	Yes	Pass (1.49)
(0.2L _s) 15.468	0.085	-3.107	-1.259	1.171	-1.174	-1.936	No	Yes	Pass (1.86)
(0.3L _s) 23.203	0.421	-3.457	-1.734	1.775	-1.313	-1.682	No	Yes	Pass (2.14)
(0.4L _s) 30.937	0.755	-3.792	-2.028	2.165	-1.273	-1.627	No	Yes	Pass (2.21)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 31.371	0.774	-3.810	-2.040	2.181	-1.266	-1.629	No	Yes	Pass (2.21)
(0.5L _s) 38.671	0.777	-3.828	-2.142	2.341	-1.365	-1.487	No	Yes	Pass (2.42)
(0.6L _s) 46.405	0.776	-3.823	-2.075	2.302	-1.299	-1.521	No	Yes	Pass (2.37)
(HP) 46.834	0.776	-3.822	-2.066	2.294	-1.290	-1.529	No	Yes	Pass (2.35)
(0.7L _s) 54.140	0.461	-3.515	-1.828	2.049	-1.367	-1.467	No	Yes	Pass (2.45)
(0.8L _s) 61.874	0.124	-3.171	-1.399	1.581	-1.276	-1.591	No	Yes	Pass (2.26)
(0.9L _s) 69.608	-0.212	-2.819	-0.790	0.898	-1.003	-1.921	No	Yes	Pass (1.87)
(PSXFR) 74.759	-0.435	-2.585	-0.284	0.324	-0.719	-2.261	No	Yes	Pass (1.59)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Compression

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.230 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.119	-1.704	0.044	-2.043	No	Yes	Pass (2.35)
(PSXFR) 3.446	-0.430	-2.558	-0.182	-1.180	-0.612	-3.738	No	Yes	Pass (1.28)
(0.1L _s) 7.734	-0.247	-2.753	-0.647	-0.382	-0.894	-3.135	No	Yes	Pass (1.53)
(0.2L _s) 15.468	0.085	-3.107	-1.366	0.644	-1.281	-2.463	No	Yes	Pass (1.95)
(0.3L _s) 23.203	0.421	-3.457	-1.915	1.313	-1.494	-2.144	No	Yes	Pass (2.24)
(0.4L _s) 30.937	0.755	-3.792	-2.263	1.769	-1.508	-2.023	No	Yes	Pass (2.37)
(HP) 31.371	0.774	-3.810	-2.276	1.788	-1.503	-2.022	No	Yes	Pass (2.37)
(0.5L _s) 38.671	0.777	-3.828	-2.404	2.011	-1.627	-1.817	No	Yes	Pass (2.64)
(0.6L _s) 46.405	0.776	-3.823	-2.342	2.038	-1.566	-1.786	No	Yes	Pass (2.69)
(HP) 46.834	0.776	-3.822	-2.333	2.033	-1.557	-1.789	No	Yes	Pass (2.68)
(0.7L _s) 54.140	0.461	-3.515	-2.074	1.851	-1.613	-1.665	No	Yes	Pass (2.88)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.8L _s) 61.874	0.124	-3.171	-1.599	1.449	-1.475	-1.723	No	Yes	Pass (2.79)
(0.9L _s) 69.608	-0.212	-2.819	-0.908	0.832	-1.121	-1.987	No	Yes	Pass (2.42)
(PSXFR) 74.759	-0.435	-2.585	-0.328	0.302	-0.762	-2.283	No	Yes	Pass (2.10)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (10+)

Interval 17: Open to Traffic : Service I Tension without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Tension Stresses [5.9.2.3.2b]

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.230 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.141	-0.514	0.066	-0.853	No	Yes	Pass (-)
(PSXFR) 3.446	-0.430	-2.558	-0.152	-0.153	-0.582	-2.711	No	Yes	Pass (-)
(0.1L _s) 7.734	-0.247	-2.753	-0.593	0.395	-0.841	-2.358	No	Yes	Pass (-)
(0.2L _s) 15.468	0.085	-3.107	-1.246	1.227	-1.161	-1.880	No	Yes	Pass (-)
(0.3L _s) 23.203	0.421	-3.457	-1.717	1.849	-1.296	-1.608	No	Yes	Pass (-)
(0.4L _s) 30.937	0.755	-3.792	-2.009	2.249	-1.254	-1.543	No	Yes	Pass (-)
(HP) 31.371	0.774	-3.810	-2.020	2.265	-1.246	-1.545	No	Yes	Pass (-)
(0.5L _s) 38.671	0.777	-3.828	-2.121	2.428	-1.344	-1.399	No	Yes	Pass (-)
(0.6L _s) 46.405	0.776	-3.823	-2.055	2.386	-1.279	-1.438	No	Yes	Pass (-)
(HP) 46.834	0.776	-3.822	-2.046	2.377	-1.270	-1.445	No	Yes	Pass (-)
(0.7L _s) 54.140	0.461	-3.515	-1.810	2.122	-1.349	-1.393	No	Yes	Pass (-)
(0.8L _s) 61.874	0.124	-3.171	-1.386	1.637	-1.262	-1.535	No	Yes	Pass (-)
(0.9L _s) 69.608	-0.212	-2.819	-0.783	0.929	-0.995	-1.890	No	Yes	Pass (-)
(PSXFR) 74.759	-0.435	-2.585	-0.281	0.335	-0.716	-2.250	No	Yes	Pass (-)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.347	-0.503	0.272	-0.842	No	Yes	Pass (-)
(PSXFR) 3.446	-0.430	-2.558	0.026	-0.108	-0.404	-2.666	No	Yes	Pass (-)
(0.1L _s) 7.734	-0.247	-2.753	-0.459	0.531	-0.706	-2.222	No	Yes	Pass (-)
(0.2L _s) 15.468	0.085	-3.107	-1.148	1.584	-1.063	-1.523	No	Yes	Pass (-)
(0.3L _s) 23.203	0.421	-3.457	-1.631	2.452	-1.210	-1.005	No	Yes	Pass (-)
(0.4L _s) 30.937	0.755	-3.792	-1.935	3.030	-1.180	-0.762	No	Yes	Pass (-)
(HP) 31.371	0.774	-3.810	-1.947	3.053	-1.173	-0.757	No	Yes	Pass (-)
(0.5L _s) 38.671	0.777	-3.828	-2.060	3.300	-1.283	-0.528	No	Yes	Pass (-)
(0.6L _s) 46.405	0.776	-3.823	-2.006	3.275	-1.230	-0.548	No	Yes	Pass (-)
(HP) 46.834	0.776	-3.822	-1.998	3.265	-1.222	-0.557	No	Yes	Pass (-)
(0.7L _s) 54.140	0.461	-3.515	-1.773	2.942	-1.312	-0.574	No	Yes	Pass (-)
(0.8L _s) 61.874	0.124	-3.171	-1.362	2.301	-1.238	-0.870	No	Yes	Pass (-)
(0.9L _s) 69.608	-0.212	-2.819	-0.771	1.323	-0.983	-1.497	No	Yes	Pass (-)
(PSXFR) 74.759	-0.435	-2.585	-0.277	0.480	-0.712	-2.104	No	Yes	Pass (-)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.342	-0.076	-0.343	0.000	0.000	-0.076	-0.343	Yes	No	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression**Fatigue I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

Compression stress limit = $-0.4f'_c = -3.200 \text{ KSI}$

Concrete strength required to satisfy this requirement = 4.154 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.061	-0.573	0.023	-0.743	No	Yes	Pass (4.31)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 3.446	-0.430	-2.558	-0.084	-0.383	-0.299	-1.662	No	Yes	Pass (1.93)
(0.1L _s) 7.734	-0.247	-2.753	-0.307	-0.093	-0.431	-1.469	No	Yes	Pass (2.18)
(0.2L _s) 15.468	0.085	-3.107	-0.679	0.347	-0.636	-1.206	No	Yes	Pass (2.65)
(0.3L _s) 23.203	0.421	-3.457	-0.951	0.679	-0.741	-1.049	No	Yes	Pass (3.05)
(0.4L _s) 30.937	0.755	-3.792	-1.121	0.904	-0.743	-0.992	No	Yes	Pass (3.23)
(HP) 31.371	0.774	-3.810	-1.127	0.913	-0.740	-0.992	No	Yes	Pass (3.23)
(0.5L _s) 38.671	0.777	-3.828	-1.183	1.022	-0.795	-0.892	No	Yes	Pass (3.59)
(0.6L _s) 46.405	0.776	-3.823	-1.156	1.032	-0.768	-0.880	No	Yes	Pass (3.64)
(HP) 46.834	0.776	-3.822	-1.152	1.029	-0.764	-0.882	No	Yes	Pass (3.63)
(0.7L _s) 54.140	0.461	-3.515	-1.027	0.935	-0.796	-0.823	No	Yes	Pass (3.89)
(0.8L _s) 61.874	0.124	-3.171	-0.791	0.731	-0.729	-0.855	No	Yes	Pass (3.74)
(0.9L _s) 69.608	-0.212	-2.819	-0.451	0.419	-0.557	-0.990	No	Yes	Pass (3.23)
(PSXFR) 74.759	-0.435	-2.585	-0.163	0.152	-0.381	-1.140	No	Yes	Pass (2.81)
(1.0L _s) 77.342	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
77.342	-0.076	-0.343	0.000	0.000	-0.038	-0.171	Yes	No	Pass (10+)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-396.53	1890.89	-527.38	Pass (-)	Pass (-)
(0.1L _s) 7.734	525.73	4362.21	699.22	Pass (6.24)	Pass (8.30)
(0.2L _s) 15.468	1648.29	5375.52	2192.22	Pass (2.45)	Pass (3.26)
(0.3L _s) 23.203	2685.26	5731.88	3571.39	Pass (1.60)	Pass (2.13)
(0.4L _s) 30.937	3417.69	6084.58	4177.30	Pass (1.46)	Pass (1.78)
(0.5L _s) 38.671	3780.08	6104.10	4183.61	Pass (1.46)	Pass (1.61)
(0.6L _s) 46.405	3799.83	6104.11	4202.81	Pass (1.45)	Pass (1.61)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.7L _s) 54.140	3449.49	5771.88	3970.10	Pass (1.45)	Pass (1.67)
(0.8L _s) 61.874	2731.17	5415.18	3632.46	Pass (1.49)	Pass (1.98)
(0.9L _s) 69.608	1585.93	4496.79	2109.28	Pass (2.13)	Pass (2.84)
(1.0L _s) 77.342	0.00	2142.86	0.00	Pass (∞)	Pass (∞)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-396.53	1890.89	-527.38	Pass (-)	Pass (-)
(0.1L _s) 7.734	245.70	4362.21	699.22	Pass (6.24)	Pass (10+)
(0.2L _s) 15.468	1510.41	5375.52	2192.22	Pass (2.45)	Pass (3.56)
(0.3L _s) 23.203	2502.93	5731.88	3571.39	Pass (1.60)	Pass (2.29)
(0.4L _s) 30.937	3202.22	6084.58	4177.30	Pass (1.46)	Pass (1.90)
(0.5L _s) 38.671	3573.48	6104.10	4183.61	Pass (1.46)	Pass (1.71)
(0.6L _s) 46.405	3563.73	6104.11	4202.81	Pass (1.45)	Pass (1.71)
(0.7L _s) 54.140	3238.01	5771.88	3970.10	Pass (1.45)	Pass (1.78)
(0.8L _s) 61.874	2561.00	5415.18	3632.46	Pass (1.49)	Pass (2.11)
(0.9L _s) 69.608	1496.21	4496.79	2109.28	Pass (2.13)	Pass (3.01)
(1.0L _s) 77.342	0.00	2142.86	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2659.67	-4043.83	-1193.07	Pass (3.39)	Pass (1.52)
(FoS) 1.196	-2483.65	-5411.45	-1193.07	Pass (4.54)	Pass (2.18)
(0.1L _s) 7.734	-1538.60	-5326.22	-1193.10	Pass (4.46)	Pass (3.46)
(0.2L _s) 15.468	-987.67	-5246.59	-1193.14	Pass (4.40)	Pass (5.31)
(0.3L _s) 23.203	-731.84	-5188.24	-973.35	Pass	Pass

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
				(5.33)	(7.09)
(0.4L _s) 30.937	-532.34	-5151.86	-708.02	Pass (7.28)	Pass (9.68)
(0.5L _s) 38.671	-364.50	-5139.69	-484.78	Pass (10+)	Pass (10+)
(0.6L _s) 46.405	-228.30	-5151.47	-303.64	Pass (10+)	Pass (10+)
(0.7L _s) 54.140	-123.75	-5187.00	-164.59	Pass (10+)	Pass (10+)
(0.8L _s) 61.874	-50.85	-5243.59	-67.63	Pass (10+)	Pass (10+)
(0.9L _s) 69.608	-9.60	-5319.68	-12.77	Pass (10+)	Pass (10+)
(FoS) 77.009	0.24	-5411.64	1.05	Pass (-)	Pass (-)
(1.0L _s) 77.342	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2185.85	-4043.83	-1193.07	Pass (3.39)	Pass (1.85)
(FoS) 1.196	-2048.13	-5411.45	-1193.07	Pass (4.54)	Pass (2.64)
(0.1L _s) 7.734	-1274.85	-5326.22	-1193.10	Pass (4.46)	Pass (4.18)
(0.2L _s) 15.468	-886.16	-5246.59	-1193.14	Pass (4.40)	Pass (5.92)
(0.3L _s) 23.203	-642.88	-5188.24	-973.35	Pass (5.33)	Pass (8.07)
(0.4L _s) 30.937	-456.10	-5151.86	-708.02	Pass (7.28)	Pass (10+)
(0.5L _s) 38.671	-300.96	-5139.69	-484.78	Pass (10+)	Pass (10+)
(0.6L _s) 46.405	-177.47	-5151.47	-303.64	Pass (10+)	Pass (10+)
(0.7L _s) 54.140	-85.63	-5187.00	-164.59	Pass (10+)	Pass (10+)
(0.8L _s) 61.874	-25.44	-5243.59	-67.63	Pass (10+)	Pass (10+)
(0.9L _s) 69.608	3.11	-5319.68	-12.77	Pass (10+)	Pass (-)
(FoS) 77.009	0.79	-5411.64	1.05	Pass (-)	Pass (-)
(1.0L _s) 77.342	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(CS) 5.171	Yes	Yes	275.72	565.60	Pass (2.05)
(SZB) 5.866	Yes	Yes	271.97	422.80	Pass (1.55)
(1.5H) 6.446	Yes	Yes	268.82	416.86	Pass (1.55)
(0.1L _s) 7.734	Yes	Yes	261.82	424.81	Pass (1.62)
(SZB) 11.366	Yes	Yes	242.00	323.98	Pass (1.34)
(0.2L _s) 15.468	Yes	Yes	219.32	330.02	Pass (1.50)
(SZB) 19.616	Yes	Yes	196.23	285.48	Pass (1.45)
(0.3L _s) 23.203	Yes	Yes	176.12	287.00	Pass (1.63)
(SZB) 30.616	Yes	Yes	134.35	246.56	Pass (1.84)
(0.4L _s) 30.937	Yes	Yes	132.53	246.95	Pass (1.86)
(HP) 31.371	Yes	Yes	130.09	247.49	Pass (1.90)
(0.5L _s) 38.671	Yes	Yes	88.85	219.65	Pass (2.47)
(0.6L _s) 46.405	Yes	Yes	78.77	219.91	Pass (2.79)
(HP) 46.834	Yes	Yes	81.05	245.17	Pass (3.03)
(SZB) 47.590	Yes	Yes	85.07	243.73	Pass (2.87)
(0.7L _s) 54.140	Yes	Yes	122.04	279.72	Pass (2.29)
(SZB) 58.590	Yes	Yes	148.20	273.76	Pass (1.85)
(0.8L _s) 61.874	Yes	Yes	167.96	314.75	Pass (1.87)
(SZB) 66.840	Yes	Yes	198.55	307.60	Pass (1.55)
(0.9L _s) 69.608	Yes	Yes	216.00	405.54	Pass (1.88)
(1.5H) 71.759	Yes	Yes	229.71	420.92	Pass (1.83)
(SZB) 72.340	Yes	Yes	233.44	417.57	Pass (1.79)
(CS) 73.419	Yes	Yes	240.39	569.22	Pass (2.37)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.866	Yes	Yes	264.77	434.00	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.64)
(1.5H) 6.446	Yes	Yes	261.83	427.30	Pass (1.63)
(0.1L _s) 7.734	Yes	Yes	255.29	434.70	Pass (1.70)
(SZB) 11.366	Yes	Yes	236.48	328.58	Pass (1.39)
(0.2L _s) 15.468	Yes	Yes	214.48	333.37	Pass (1.55)
(SZB) 19.616	Yes	Yes	191.51	288.84	Pass (1.51)
(0.3L _s) 23.203	Yes	Yes	171.04	290.54	Pass (1.70)
(SZB) 30.616	Yes	Yes	127.08	250.30	Pass (1.97)
(0.4L _s) 30.937	Yes	Yes	125.12	250.71	Pass (2.00)
(HP) 31.371	Yes	Yes	122.48	251.27	Pass (2.05)
(0.5L _s) 38.671	Yes	Yes	76.90	223.34	Pass (2.90)
(0.6L _s) 46.405	Yes	Yes	73.46	223.68	Pass (3.04)
(HP) 46.834	No	Yes	75.69	249.08	Pass (3.29)
(SZB) 47.590	Yes	Yes	79.64	247.73	Pass (3.11)
(0.7L _s) 54.140	Yes	Yes	115.89	283.44	Pass (2.45)
(SZB) 58.590	Yes	Yes	141.34	277.21	Pass (1.96)
(0.8L _s) 61.874	Yes	Yes	160.50	318.27	Pass (1.98)
(SZB) 66.840	Yes	Yes	189.93	310.35	Pass (1.63)
(0.9L _s) 69.608	Yes	Yes	206.62	408.02	Pass (1.97)
(1.5H) 71.759	Yes	Yes	219.67	422.98	Pass (1.93)
(SZB) 72.340	Yes	Yes	223.20	419.45	Pass (1.88)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.196	1527.02	897.25	5.7.3.5-1	Pass (1.70)
(SZB) 2.200	1566.37	836.39	5.7.3.5-1	Pass (1.87)
(Bar Develop.) 2.568	1580.80	814.32	5.7.3.5-1	Pass (1.94)
(Bar Develop.) 3.628	1598.40	751.49	5.7.3.5-1	Pass (2.13)
(H) 4.696	1598.40	692.40	5.7.3.5-1	Pass (2.31)
(CS) 5.171	1598.40	669.28	5.7.3.5-1	Pass (2.39)
(SZB) 5.866	1598.40	633.71	5.7.3.5-1	Pass (2.52)
(1.5H) 6.446	1598.40	601.53	5.7.3.5-1	Pass (2.66)
(0.1L _s) 7.734	1598.40	534.65	5.7.3.5-1	Pass (2.99)
(SZB) 11.366	1337.23	592.55	5.7.3.5-1	Pass (2.26)
(0.2L _s) 15.468	1652.04	720.78	5.7.3.5-1	Pass (2.29)
(SZB) 19.616	1656.38	869.44	5.7.3.5-1	Pass (1.91)
(0.3L _s) 23.203	1660.04	935.46	5.7.3.5-1	Pass (1.77)
(SZB) 30.616	1664.23	1042.81	5.7.3.5-1	Pass (1.60)
(0.4L _s) 30.937	1664.30	1043.01	5.7.3.5-1	Pass (1.60)
(HP) 31.371	1664.39	1042.99	5.7.3.5-1	Pass (1.60)
(0.5L _s) 38.671	1664.40	1105.18	5.7.3.5-1	Pass (1.51)
(0.6L _s) 46.405	1664.39	1100.38	5.7.3.5-1	Pass (1.51)
(HP) 46.834	1664.39	1052.50	5.7.3.5-1	Pass (1.58)
(SZB) 47.590	1664.24	1057.18	5.7.3.5-1	Pass (1.57)
(0.7L _s) 54.140	1660.80	1052.96	5.7.3.5-1	Pass (1.58)
(SZB) 58.590	1656.47	1021.27	5.7.3.5-1	Pass (1.62)
(0.8L _s) 61.874	1653.05	943.63	5.7.3.5-1	Pass (1.75)
(SZB) 66.840	1337.32	809.67	5.7.3.5-1	Pass (1.65)
(0.9L _s) 69.608	1126.93	645.32	5.7.3.5-1	Pass (1.75)
(1.5H) 71.759	955.52	528.77	5.7.3.5-1	Pass (1.81)
(SZB) 72.340	845.10	499.34	5.7.3.5-1	Pass (1.69)
(CS) 73.419	813.00	435.04	5.7.3.5-1	Pass (1.87)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(H) 73.509	810.31	196.59	5.7.3.5-2	Pass (4.12)
(Bar Develop.) 74.577	778.58	196.59	5.7.3.5-2	Pass (3.96)
(Bar Develop.) 75.638	643.95	196.59	5.7.3.5-2	Pass (3.28)
(SZB) 76.006	584.79	196.59	5.7.3.5-2	Pass (2.97)
(FoS) 77.009	422.96	196.59	5.7.3.5-2	Pass (2.15)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.196	1527.02	772.82	5.7.3.5-1	Pass (1.98)
(SZB) 2.200	1566.37	720.22	5.7.3.5-1	Pass (2.17)
(Bar Develop.) 2.568	1580.80	701.13	5.7.3.5-1	Pass (2.25)
(Bar Develop.) 3.628	1598.40	646.57	5.7.3.5-1	Pass (2.47)
(H) 4.696	1598.40	595.38	5.7.3.5-1	Pass (2.68)
(SZB) 5.866	1598.40	543.51	5.7.3.5-1	Pass (2.94)
(1.5H) 6.446	1598.40	514.54	5.7.3.5-1	Pass (3.11)
(0.1L _s) 7.734	1598.40	456.74	5.7.3.5-1	Pass (3.50)
(SZB) 11.366	1337.23	522.60	5.7.3.5-1	Pass (2.56)
(0.2L _s) 15.468	1652.04	669.08	5.7.3.5-1	Pass (2.47)
(SZB) 19.616	1656.38	812.45	5.7.3.5-1	Pass (2.04)
(0.3L _s) 23.203	1660.04	873.12	5.7.3.5-1	Pass (1.90)
(SZB) 30.616	1664.23	970.21	5.7.3.5-1	Pass (1.72)
(0.4L _s) 30.937	1664.30	969.98	5.7.3.5-1	Pass (1.72)
(HP) 31.371	1664.39	969.38	5.7.3.5-1	Pass (1.72)
(0.5L _s) 38.671	1664.40	1038.01	5.7.3.5-1	Pass (1.60)
(0.6L _s) 46.405	1664.39	1031.95	5.7.3.5-1	Pass (1.61)
(HP) 46.834	1664.39	982.74	5.7.3.5-1	Pass (1.69)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 47.590	1664.24	985.13	5.7.3.5-1	Pass (1.69)
(0.7L _s) 54.140	1660.80	987.11	5.7.3.5-1	Pass (1.68)
(SZB) 58.590	1656.47	952.54	5.7.3.5-1	Pass (1.74)
(0.8L _s) 61.874	1653.05	885.35	5.7.3.5-1	Pass (1.87)
(SZB) 66.840	1337.32	753.97	5.7.3.5-1	Pass (1.77)
(0.9L _s) 69.608	1126.93	609.40	5.7.3.5-1	Pass (1.85)
(1.5H) 71.759	955.52	500.52	5.7.3.5-1	Pass (1.91)
(SZB) 72.340	845.10	472.90	5.7.3.5-1	Pass (1.79)
(H) 73.509	810.31	186.10	5.7.3.5-2	Pass (4.35)
(Bar Develop.) 74.577	778.58	186.10	5.7.3.5-2	Pass (4.18)
(Bar Develop.) 75.638	643.95	186.10	5.7.3.5-2	Pass (3.46)
(SZB) 76.006	584.79	186.10	5.7.3.5-2	Pass (3.14)
(FoS) 77.009	422.96	186.10	5.7.3.5-2	Pass (2.27)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.863	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(FoS) 1.196	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(SZB) 2.200	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(Bar Develop.) 2.568	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(Bar Develop.) 3.628	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(H) 4.696	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(CS) 5.171	12.000	48.000	Pass	0.220	0.000	Pass	74.598	142.544	Pass (1.91)
(SZB) 5.866	12.000	48.000	Pass	0.220	0.000	Pass	73.582	142.544	Pass (1.94)
(1.5H) 6.446	12.000	48.000	Pass	0.220	0.000	Pass	72.730	142.544	Pass (1.96)
(0.1L _s) 7.734	12.000	48.000	Pass	0.220	0.000	Pass	70.838	142.544	Pass (2.01)
(SZB) 11.366	9.000	48.000	Pass	0.293	0.000	Pass	65.474	146.504	Pass (2.24)
(0.2L _s) 15.468	9.000	48.000	Pass	0.293	0.000	Pass	59.339	146.504	Pass (2.47)
(SZB) 19.616	12.000	48.000	Pass	0.220	0.000	Pass	53.092	142.544	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(2.68)
(0.3L _s) 23.203	12.000	48.000	Pass	0.220	0.000	Pass	47.652	142.544	Pass (2.99)
(SZB) 30.616	18.000	48.000	Pass	0.147	0.000	Pass	36.349	138.584	Pass (3.81)
(0.4L _s) 30.937	18.000	48.000	Pass	0.147	0.000	Pass	35.859	138.584	Pass (3.86)
(HP) 31.371	18.000	48.000	Pass	0.147	0.000	Pass	35.196	138.584	Pass (3.94)
(0.5L _s) 38.671	18.000	48.000	Pass	0.147	0.000	Pass	24.040	138.584	Pass (5.76)
(0.6L _s) 46.405	18.000	48.000	Pass	0.147	0.000	Pass	21.314	138.584	Pass (6.50)
(HP) 46.834	18.000	48.000	Pass	0.147	0.000	Pass	21.929	138.584	Pass (6.32)
(SZB) 47.590	18.000	48.000	Pass	0.147	0.000	Pass	23.017	138.584	Pass (6.02)
(0.7L _s) 54.140	12.000	48.000	Pass	0.220	0.000	Pass	33.021	142.544	Pass (4.32)
(SZB) 58.590	12.000	48.000	Pass	0.220	0.000	Pass	40.099	142.544	Pass (3.55)
(0.8L _s) 61.874	9.000	48.000	Pass	0.293	0.000	Pass	45.444	146.504	Pass (3.22)
(SZB) 66.840	9.000	48.000	Pass	0.293	0.000	Pass	53.723	146.504	Pass (2.73)
(0.9L _s) 69.608	12.000	48.000	Pass	0.220	0.000	Pass	58.444	142.544	Pass (2.44)
(1.5H) 71.759	12.000	48.000	Pass	0.220	0.000	Pass	62.155	142.544	Pass (2.29)
(SZB) 72.340	12.000	48.000	Pass	0.220	0.000	Pass	63.162	142.544	Pass (2.26)
(CS) 73.419	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
(H) 73.509	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
(Bar Develop.) 74.577	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
(Bar Develop.) 75.638	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
(SZB) 76.006	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
(FoS) 77.009	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
(1.0L _s) 77.342	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)
77.342	12.000	48.000	Pass	0.220	0.000	Pass	65.043	142.544	Pass (2.19)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.863	12.000	48.000	Pass	0.220	0.000	Pass	72.578	142.544	Pass (1.96)
(FoS) 1.196	12.000	48.000	Pass	0.220	0.000	Pass	72.578	142.544	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(1.96)
(SZB) 2.200	12.000	48.000	Pass	0.220	0.000	Pass	72.578	142.544	Pass (1.96)
(Bar Develop.) 2.568	12.000	48.000	Pass	0.220	0.000	Pass	72.578	142.544	Pass (1.96)
(Bar Develop.) 3.628	12.000	48.000	Pass	0.220	0.000	Pass	72.578	142.544	Pass (1.96)
(H) 4.696	12.000	48.000	Pass	0.220	0.000	Pass	72.578	142.544	Pass (1.96)
(SZB) 5.866	12.000	48.000	Pass	0.220	0.000	Pass	71.634	142.544	Pass (1.99)
(1.5H) 6.446	12.000	48.000	Pass	0.220	0.000	Pass	70.840	142.544	Pass (2.01)
(0.1L _s) 7.734	12.000	48.000	Pass	0.220	0.000	Pass	69.070	142.544	Pass (2.06)
(SZB) 11.366	9.000	48.000	Pass	0.293	0.000	Pass	63.982	146.504	Pass (2.29)
(0.2L _s) 15.468	9.000	48.000	Pass	0.293	0.000	Pass	58.029	146.504	Pass (2.52)
(SZB) 19.616	12.000	48.000	Pass	0.220	0.000	Pass	51.816	142.544	Pass (2.75)
(0.3L _s) 23.203	12.000	48.000	Pass	0.220	0.000	Pass	46.276	142.544	Pass (3.08)
(SZB) 30.616	18.000	48.000	Pass	0.147	0.000	Pass	34.383	138.584	Pass (4.03)
(0.4L _s) 30.937	18.000	48.000	Pass	0.147	0.000	Pass	33.854	138.584	Pass (4.09)
(HP) 31.371	18.000	48.000	Pass	0.147	0.000	Pass	33.137	138.584	Pass (4.18)
(0.5L _s) 38.671	18.000	48.000	Pass	0.147	0.000	Pass	20.805	138.584	Pass (6.66)
(0.6L _s) 46.405	18.000	48.000	Pass	0.147	0.000	Pass	19.876	138.584	Pass (6.97)
(HP) 46.834	18.000	48.000	Pass	0.147	0.000	Pass	20.480	138.584	Pass (6.77)
(SZB) 47.590	18.000	48.000	Pass	0.147	0.000	Pass	21.549	138.584	Pass (6.43)
(0.7L _s) 54.140	12.000	48.000	Pass	0.220	0.000	Pass	31.355	142.544	Pass (4.55)
(SZB) 58.590	12.000	48.000	Pass	0.220	0.000	Pass	38.242	142.544	Pass (3.73)
(0.8L _s) 61.874	9.000	48.000	Pass	0.293	0.000	Pass	43.427	146.504	Pass (3.37)
(SZB) 66.840	9.000	48.000	Pass	0.293	0.000	Pass	51.390	146.504	Pass (2.85)
(0.9L _s) 69.608	12.000	48.000	Pass	0.220	0.000	Pass	55.906	142.544	Pass (2.55)
(1.5H) 71.759	12.000	48.000	Pass	0.220	0.000	Pass	59.436	142.544	Pass (2.40)
(SZB) 72.340	12.000	48.000	Pass	0.220	0.000	Pass	60.392	142.544	Pass (2.36)
(H) 73.509	12.000	48.000	Pass	0.220	0.000	Pass	62.176	142.544	Pass (2.29)
(Bar Develop.) 74.577	12.000	48.000	Pass	0.220	0.000	Pass	62.176	142.544	Pass (2.29)

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(Bar Develop.) 75.638	12.000	48.000	Pass	0.220	0.000	Pass	62.176	142.544	Pass (2.29)
(SZB) 76.006	12.000	48.000	Pass	0.220	0.000	Pass	62.176	142.544	Pass (2.29)
(FoS) 77.009	12.000	48.000	Pass	0.220	0.000	Pass	62.177	142.544	Pass (2.29)
(1.0L _s) 77.342	12.000	48.000	Pass	0.220	0.000	Pass	62.177	142.544	Pass (2.29)
77.342	12.000	48.000	Pass	0.220	0.000	Pass	62.177	142.544	Pass (2.29)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.160 in

Minimum live load deflection along girder = -0.225 in

Maximum live load deflection along girder = 0.095 in

Status = Pass

Constructability Checks**Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.863	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.196	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.200	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.568	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.628	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.696	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 5.171	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.866	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.446	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.734	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.366	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.468	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.616	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.203	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.616	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.937	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.371	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.671	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.405	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.834	#4	18.000	18.000	1.500	0.267	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(SZB) 47.590	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.140	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.590	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.874	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.840	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.608	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.759	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.340	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 73.419	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 73.509	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.577	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.638	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 76.006	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 77.009	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.342	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.342	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.863	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.196	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.200	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.568	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.628	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.696	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.866	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.446	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.734	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.366	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.468	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.616	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.203	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.616	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.937	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.371	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.671	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.405	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.834	#4	18.000	18.000	1.500	0.267	0.000	Pass
(SZB) 47.590	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.140	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.590	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.874	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.840	#4	9.000	18.000	1.500	0.533	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(0.9L _s) 69.608	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.759	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.340	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 73.509	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.577	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.638	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 76.006	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 77.009	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.342	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.342	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.31	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
2	K	12.300	12.000	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
2	K	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.103
Lower Bound Camber at 60 days, 50% of D ₆₀	1.665
Average Camber at 60 days, 75% of D ₆₀	2.497
Upper Bound Camber at 60 days, D ₆₀	3.329

Spec Check Report

For

Span 2 Girder L

March 14, 2021 2:40:24 pm

PGSuper™ (x64)

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Version 5.0.5 - Built on Aug 17 2020



Project Properties

Bridge Name	Belford over Happy Canyon Creek
Bridge ID	
Company	FHU
Engineer	A. Plankis
Job Number	115360
Comments	IDC for Belford Ave over Happy Canyon Creek. Updated for latest design codes, and for full bridge width.
File	I:\115360-01 - Compark at Belford\CADD\Bridge\Calculations\IDC\Girders\Belford over HCC_maxH IDC.pgs

Specification Check Summary

The Specification Check was Successful

Specification Checks

Specification: CDOT

Stress Limitations on Prestressing Tendons [5.9.2.2]

Strand Stresses

Loss Stage	Stress Limit (KSI)	Straight		Harped	
		Strand Stress (KSI)	Status (C/D)	Strand Stress (KSI)	Status (C/D)
At Jacking (f_{pj})	202.500	202.500	Pass (1.00)	202.500	Pass (1.00)
After All Losses and Elastic Gains including Live Load (f_{pe})	194.400	162.942	Pass (1.19)	162.942	Pass (1.19)

Required Concrete Strengths

Required f'_{ci} = 5.286 KSI $\Rightarrow$ 5.300 KSI

Actual f'_{ci} = 6.000 KSI

Required f'_c = 6.456 KSI $\Rightarrow$ 6.500 KSI

Actual f'_c = 8.000 KSI

Continuity [5.12.3.3.5]

	f_b (KSI)	Boundary Condition	Is Compressive?
Abut 1	0.000	Hinged	No
Pier 2	-1.155	Continuous	Yes
Abut 3	0.000	Hinged	No

f_b is the calculated stress at the bottom of the continuity diaphragm for the combination of superimposed permanent loads and 50% live load

Continuous connections are fully effective.

Continuity is accounted for in Service and Strength Limit States.

Interval 2: Prestress Release : Service I Compression

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Compression Stresses [5.9.2.3.1a]

f'_{ci} = 6.000 KSI

Compression stress limit = $-0.65f'_{ci}$ = -3.900 KSI

Concrete strength required to satisfy this requirement = 5.286 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(STRF) 0.446	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)
(PSXFR) 3.446	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	No	Yes	Pass (1.35)
8.178	(0.1L _r) 7.731	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	No	Yes	Pass (1.33)
15.909	(0.2L _r) 15.462	0.121	-3.623	-0.579	0.587	-0.458	-3.036	No	Yes	Pass (1.28)
23.640	(0.3L _r) 23.193	0.503	-3.979	-0.759	0.770	-0.256	-3.209	No	Yes	Pass (1.22)
(HP) 31.371	(HP, 0.4L _r) 30.925	0.876	-4.316	-0.868	0.880	0.008	-3.436	No	Yes	Pass (1.14)
39.102		0.877	-4.320	-0.904	0.917	-0.027	-3.403	No	Yes	Pass

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
	(0.5L _r) 38.656									(1.15)
(HP) 46.833	(HP, 0.6L _r) 46.387	0.876	-4.316	-0.868	0.880	0.008	-3.436	No	Yes	Pass (1.14)
54.565	(0.7L _r) 54.118	0.503	-3.979	-0.759	0.770	-0.256	-3.209	No	Yes	Pass (1.22)
62.296	(0.8L _r) 61.849	0.121	-3.623	-0.579	0.587	-0.458	-3.036	No	Yes	Pass (1.28)
70.027	(0.9L _r) 69.580	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	No	Yes	Pass (1.33)
(PSXFR) 74.758	(PSXFR) 74.312	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	No	Yes	Pass (1.35)
(STLF) 77.758	(STLF, 1.0L _r) 77.312	0.000	0.000	0.000	0.000	0.000	0.000	No	Yes	Pass (∞)

Interval 2: Prestress Release : Service I Tension

Service I

For Temporary Stresses before Losses [5.9.2.3.1]

Tension Stresses [5.9.2.3.1b]

$$f'_{ci} = 6.000 \text{ KSI}$$

Tension stress limit in areas other than the precompressed tensile zone = $0.0948\lambda\sqrt{f'_{ci}}$ but not more than 0.200 KSI = 0.200 KSI

Tension stress limit in areas with sufficient bonded reinforcement = $0.2400\lambda\sqrt{f'_{ci}} = 0.588 \text{ KSI}$

Concrete strength required to satisfy this requirement = 5.286 KSI

Location from Left Support (ft)	Location from End of Girder (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
		f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(STRF) 0.446	(STRF, 0.0L _r) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)
(PSXFR) 3.446	(PSXFR) 3.000	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	0.200	-	No	Yes	Pass (-)
8.178	(0.1L _r) 7.731	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	0.200	-	No	Yes	Pass (-)
15.909	(0.2L _r) 15.462	0.121	-3.623	-0.579	0.587	-0.458	-3.036	0.200	-	No	Yes	Pass (-)
23.640	(0.3L _r) 23.193	0.503	-3.979	-0.759	0.770	-0.256	-3.209	0.200	-	No	Yes	Pass (-)
(HP) 31.371	(HP, 0.4L _r) 30.925	0.876	-4.316	-0.868	0.880	0.008	-3.436	0.200	-	No	Yes	Pass (10+)
39.102	(0.5L _r) 38.656	0.877	-4.320	-0.904	0.917	-0.027	-3.403	0.200	-	No	Yes	Pass (-)
(HP) 46.833	(HP, 0.6L _r) 46.387	0.876	-4.316	-0.868	0.880	0.008	-3.436	0.200	-	No	Yes	Pass (10+)
54.565	(0.7L _r) 54.118	0.503	-3.979	-0.759	0.770	-0.256	-3.209	0.200	-	No	Yes	Pass (-)
62.296	(0.8L _r) 61.849	0.121	-3.623	-0.579	0.587	-0.458	-3.036	0.200	-	No	Yes	Pass (-)
70.027	(0.9L _r) 69.580	-0.268	-3.252	-0.325	0.330	-0.593	-2.922	0.200	-	No	Yes	Pass (-)
(PSXFR) 74.758	(PSXFR) 74.312	-0.508	-3.019	-0.135	0.137	-0.643	-2.883	0.200	-	No	Yes	Pass (-)
(STLF) 77.758	(STLF, 1.0L _r) 77.312	0.000	0.000	0.000	0.000	0.000	0.000	0.200	-	No	Yes	Pass (∞)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Compression stress limit} = -0.45f'_c = -3.600 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.095 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
(PSXFR) 3.446	-0.434	-2.583	-0.289	0.293	-0.723	-2.289	No	Yes	Pass (1.57)
(0.1L _s) 7.734	-0.249	-2.774	-0.722	0.732	-0.971	-2.041	No	Yes	Pass (1.76)
(0.2L _s) 15.468	0.086	-3.119	-1.357	1.376	-1.271	-1.743	No	Yes	Pass (2.07)
(0.3L _s) 23.202	0.421	-3.458	-1.808	1.834	-1.387	-1.624	No	Yes	Pass (2.22)
(0.4L _s) 30.937	0.753	-3.781	-2.079	2.109	-1.327	-1.672	No	Yes	Pass (2.15)
(HP) 31.371	0.771	-3.799	-2.089	2.119	-1.318	-1.679	No	Yes	Pass (2.14)
(0.5L _s) 38.671	0.773	-3.808	-2.174	2.205	-1.401	-1.603	No	Yes	Pass (2.25)
(0.6L _s) 46.405	0.771	-3.799	-2.093	2.123	-1.322	-1.676	No	Yes	Pass (2.15)
(HP) 46.833	0.771	-3.798	-2.084	2.114	-1.313	-1.685	No	Yes	Pass (2.14)
(0.7L _s) 54.139	0.458	-3.494	-1.837	1.864	-1.379	-1.631	No	Yes	Pass (2.21)
(0.8L _s) 61.873	0.123	-3.157	-1.405	1.425	-1.282	-1.731	No	Yes	Pass (2.08)
(0.9L _s) 69.607	-0.212	-2.812	-0.794	0.805	-1.006	-2.007	No	Yes	Pass (1.79)
(PSXFR) 74.758	-0.434	-2.582	-0.286	0.290	-0.720	-2.293	No	Yes	Pass (1.57)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 11: Cast Deck, Apply User Defined Loads : Service I Tension**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

$$\text{Tension stress limit in the precompressed tensile zone} = 0.1900\lambda\sqrt{f'_c} \text{ but not more than } 0.600 \text{ KSI} = 0.537 \text{ KSI}$$

$$\text{Concrete strength required to satisfy this requirement} = 5.095 \text{ KSI}$$

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
0.863	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Tension Limit		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top (KSI)	Bottom (KSI)	Top	Bottom	
(PSXFR) 3.446	-0.434	-2.583	-0.289	0.293	-0.723	-2.289	-	0.537	No	Yes	Pass (-)
(0.1L _s) 7.734	-0.249	-2.774	-0.722	0.732	-0.971	-2.041	-	0.537	No	Yes	Pass (-)
(0.2L _s) 15.468	0.086	-3.119	-1.357	1.376	-1.271	-1.743	-	0.537	No	Yes	Pass (-)
(0.3L _s) 23.202	0.421	-3.458	-1.808	1.834	-1.387	-1.624	-	0.537	No	Yes	Pass (-)
(0.4L _s) 30.937	0.753	-3.781	-2.079	2.109	-1.327	-1.672	-	0.537	No	Yes	Pass (-)
(HP) 31.371	0.771	-3.799	-2.089	2.119	-1.318	-1.679	-	0.537	No	Yes	Pass (-)
(0.5L _s) 38.671	0.773	-3.808	-2.174	2.205	-1.401	-1.603	-	0.537	No	Yes	Pass (-)
(0.6L _s) 46.405	0.771	-3.799	-2.093	2.123	-1.322	-1.676	-	0.537	No	Yes	Pass (-)
(HP) 46.833	0.771	-3.798	-2.084	2.114	-1.313	-1.685	-	0.537	No	Yes	Pass (-)
(0.7L _s) 54.139	0.458	-3.494	-1.837	1.864	-1.379	-1.631	-	0.537	No	Yes	Pass (-)
(0.8L _s) 61.873	0.123	-3.157	-1.405	1.425	-1.282	-1.731	-	0.537	No	Yes	Pass (-)
(0.9L _s) 69.607	-0.212	-2.812	-0.794	0.805	-1.006	-2.007	-	0.537	No	Yes	Pass (-)
(PSXFR) 74.758	-0.434	-2.582	-0.286	0.290	-0.720	-2.293	-	0.537	No	Yes	Pass (-)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)
77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	-	0.537	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service I Compression without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Compression Stresses [5.9.2.3.2a]

$f'_c = 8.000$ KSI

Compression stress limit = $-0.45f'_c = -3.600$ KSI

Concrete strength required to satisfy this requirement = 6.456 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.122	-0.596	0.047	-0.936	No	Yes	Pass (3.85)
(PSXFR) 3.446	-0.430	-2.559	-0.188	-0.203	-0.618	-2.762	No	Yes	Pass (1.30)
(0.1L _s) 7.734	-0.248	-2.755	-0.653	0.387	-0.901	-2.368	No	Yes	Pass (1.52)
(0.2L _s) 15.468	0.086	-3.112	-1.341	1.253	-1.255	-1.859	No	Yes	Pass (1.94)
(0.3L _s) 23.202	0.422	-3.465	-1.836	1.878	-1.414	-1.587	No	Yes	Pass (2.27)
(0.4L _s) 30.937	0.757	-3.804	-2.140	2.278	-1.383	-1.526	No	Yes	Pass (2.36)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(HP) 31.371	0.776	-3.822	-2.152	2.294	-1.376	-1.529	No	Yes	Pass (2.35)
(0.5L _s) 38.671	0.780	-3.840	-2.256	2.455	-1.476	-1.385	No	Yes	Pass (2.44)
(0.6L _s) 46.405	0.779	-3.835	-2.184	2.410	-1.405	-1.425	No	Yes	Pass (2.53)
(HP) 46.833	0.778	-3.834	-2.174	2.401	-1.396	-1.433	No	Yes	Pass (2.51)
(0.7L _s) 54.139	0.462	-3.523	-1.923	2.144	-1.461	-1.380	No	Yes	Pass (2.46)
(0.8L _s) 61.873	0.124	-3.176	-1.473	1.655	-1.349	-1.521	No	Yes	Pass (2.37)
(0.9L _s) 69.607	-0.213	-2.821	-0.834	0.942	-1.046	-1.879	No	Yes	Pass (1.92)
(PSXFR) 74.758	-0.435	-2.585	-0.300	0.340	-0.735	-2.245	No	Yes	Pass (1.60)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 17: Open to Traffic : Service I Compression**Service I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]** $f'_c = 8.000$ KSICompression stress limit = $-0.6f'_c = -4.800$ KSI

Concrete strength required to satisfy this requirement = 6.456 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.118	-1.884	0.043	-2.223	No	Yes	Pass (2.16)
(PSXFR) 3.446	-0.430	-2.559	-0.204	-1.315	-0.634	-3.874	No	Yes	Pass (1.24)
(0.1L _s) 7.734	-0.248	-2.755	-0.701	-0.451	-0.948	-3.206	No	Yes	Pass (1.50)
(0.2L _s) 15.468	0.086	-3.112	-1.466	0.639	-1.380	-2.473	No	Yes	Pass (1.94)
(0.3L _s) 23.202	0.422	-3.465	-2.046	1.358	-1.625	-2.107	No	Yes	Pass (2.28)
(0.4L _s) 30.937	0.757	-3.804	-2.417	1.831	-1.660	-1.973	No	Yes	Pass (2.43)
(HP) 31.371	0.776	-3.822	-2.432	1.851	-1.656	-1.971	No	Yes	Pass (2.44)
(0.5L _s) 38.671	0.780	-3.840	-2.570	2.082	-1.790	-1.758	No	Yes	Pass (2.68)
(0.6L _s) 46.405	0.779	-3.835	-2.504	2.112	-1.726	-1.723	No	Yes	Pass (2.78)
(HP) 46.833	0.778	-3.834	-2.494	2.107	-1.716	-1.727	No	Yes	Pass (2.78)
(0.7L _s) 54.139	0.462	-3.523	-2.215	1.920	-1.753	-1.603	No	Yes	Pass (2.74)

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(0.8L _s) 61.873	0.124	-3.176	-1.705	1.506	-1.581	-1.670	No	Yes	Pass (2.87)
(0.9L _s) 69.607	-0.213	-2.821	-0.971	0.867	-1.183	-1.954	No	Yes	Pass (2.46)
(PSXFR) 74.758	-0.435	-2.585	-0.351	0.315	-0.786	-2.270	No	Yes	Pass (2.11)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)
77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (10+)

Interval 17: Open to Traffic : Service I Tension without live load

Service I

Stresses at Service Limit State after Losses [5.9.2.3.2]

Tension Stresses [5.9.2.3.2b]

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.0000\lambda\sqrt{f'_c} = 0.000 \text{ KSI}$

Concrete strength required to satisfy this requirement = 6.456 KSI

Location from Left Support (ft)	Pre-tension		Service I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.141	-0.514	0.066	-0.853	No	Yes	Pass (-)
(PSXFR) 3.446	-0.430	-2.559	-0.171	-0.133	-0.602	-2.692	No	Yes	Pass (-)
(0.1L _s) 7.734	-0.248	-2.755	-0.640	0.442	-0.888	-2.313	No	Yes	Pass (-)
(0.2L _s) 15.468	0.086	-3.112	-1.328	1.309	-1.242	-1.803	No	Yes	Pass (-)
(0.3L _s) 23.202	0.422	-3.465	-1.818	1.952	-1.397	-1.514	No	Yes	Pass (-)
(0.4L _s) 30.937	0.757	-3.804	-2.120	2.362	-1.362	-1.442	No	Yes	Pass (-)
(HP) 31.371	0.776	-3.822	-2.131	2.378	-1.355	-1.444	No	Yes	Pass (-)
(0.5L _s) 38.671	0.780	-3.840	-2.235	2.543	-1.455	-1.297	No	Yes	Pass (-)
(0.6L _s) 46.405	0.779	-3.835	-2.163	2.494	-1.384	-1.341	No	Yes	Pass (-)
(HP) 46.833	0.778	-3.834	-2.154	2.485	-1.375	-1.349	No	Yes	Pass (-)
(0.7L _s) 54.139	0.462	-3.523	-1.905	2.217	-1.443	-1.306	No	Yes	Pass (-)
(0.8L _s) 61.873	0.124	-3.176	-1.459	1.711	-1.336	-1.465	No	Yes	Pass (-)
(0.9L _s) 69.607	-0.213	-2.821	-0.826	0.973	-1.039	-1.848	No	Yes	Pass (-)
(PSXFR) 74.758	-0.435	-2.585	-0.298	0.352	-0.732	-2.234	No	Yes	Pass (-)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)

Interval 17: Open to Traffic : Service III Tension**Service III****Stresses at Service Limit State after Losses [5.9.2.3.2]****Tension Stresses [5.9.2.3.2b]**

$$f'_c = 8.000 \text{ KSI}$$

Tension stress limit in the precompressed tensile zone = $0.1900\lambda\sqrt{f'_c}$ but not more than 0.600 KSI = 0.537 KSI

Location from Left Support (ft)	Pre-tension		Service III		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.381	-0.501	0.306	-0.841	No	Yes	Pass (-)
(PSXFR) 3.446	-0.430	-2.559	0.036	-0.080	-0.394	-2.639	No	Yes	Pass (-)
(0.1L _s) 7.734	-0.248	-2.755	-0.484	0.601	-0.731	-2.154	No	Yes	Pass (-)
(0.2L _s) 15.468	0.086	-3.112	-1.213	1.727	-1.127	-1.385	No	Yes	Pass (-)
(0.3L _s) 23.202	0.422	-3.465	-1.721	2.655	-1.299	-0.810	No	Yes	Pass (-)
(0.4L _s) 30.937	0.757	-3.804	-2.035	3.274	-1.278	-0.530	No	Yes	Pass (-)
(HP) 31.371	0.776	-3.822	-2.047	3.299	-1.271	-0.523	No	Yes	Pass (-)
(0.5L _s) 38.671	0.780	-3.840	-2.163	3.562	-1.384	-0.278	No	Yes	Pass (-)
(0.6L _s) 46.405	0.779	-3.835	-2.106	3.534	-1.327	-0.301	No	Yes	Pass (-)
(HP) 46.833	0.778	-3.834	-2.097	3.524	-1.319	-0.310	No	Yes	Pass (-)
(0.7L _s) 54.139	0.462	-3.523	-1.862	3.175	-1.401	-0.349	No	Yes	Pass (-)
(0.8L _s) 61.873	0.124	-3.176	-1.432	2.485	-1.308	-0.691	No	Yes	Pass (-)
(0.9L _s) 69.607	-0.213	-2.821	-0.812	1.431	-1.025	-1.390	No	Yes	Pass (-)
(PSXFR) 74.758	-0.435	-2.585	-0.293	0.521	-0.728	-2.065	No	Yes	Pass (-)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)
77.341	-0.076	-0.343	0.000	0.000	-0.076	-0.343	No	Yes	Pass (-)

Interval 17: Open to Traffic : Fatigue I Compression**Fatigue I****Stresses at Service Limit State after Losses [5.9.2.3.2]****Compression Stresses [5.9.2.3.2a]**

$$f'_c = 8.000 \text{ KSI}$$

Compression stress limit = $-0.4f'_c = -3.200 \text{ KSI}$

Concrete strength required to satisfy this requirement = 4.605 KSI

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
0.863	-0.075	-0.339	0.061	-0.770	0.023	-0.940	No	Yes	Pass (3.41)

Location from Left Support (ft)	Pre-tension		Fatigue I		Demand		Precompressed Tensile Zone		Status (C/D)
	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	f_t (KSI)	f_b (KSI)	Top	Bottom	
(PSXFR) 3.446	-0.430	-2.559	-0.094	-0.563	-0.309	-1.842	No	Yes	Pass (1.74)
(0.1L _s) 7.734	-0.248	-2.755	-0.334	-0.248	-0.457	-1.625	No	Yes	Pass (1.97)
(0.2L _s) 15.468	0.086	-3.112	-0.752	0.229	-0.709	-1.327	No	Yes	Pass (2.41)
(0.3L _s) 23.202	0.422	-3.465	-1.058	0.591	-0.847	-1.141	No	Yes	Pass (2.80)
(0.4L _s) 30.937	0.757	-3.804	-1.249	0.840	-0.871	-1.062	No	Yes	Pass (3.01)
(HP) 31.371	0.776	-3.822	-1.257	0.851	-0.869	-1.060	No	Yes	Pass (3.02)
(0.5L _s) 38.671	0.780	-3.840	-1.320	0.978	-0.930	-0.942	No	Yes	Pass (3.40)
(0.6L _s) 46.405	0.779	-3.835	-1.295	1.006	-0.906	-0.912	No	Yes	Pass (3.51)
(HP) 46.833	0.778	-3.834	-1.290	1.004	-0.901	-0.913	No	Yes	Pass (3.50)
(0.7L _s) 54.139	0.462	-3.523	-1.153	0.923	-0.922	-0.839	No	Yes	Pass (3.47)
(0.8L _s) 61.873	0.124	-3.176	-0.888	0.728	-0.826	-0.860	No	Yes	Pass (3.72)
(0.9L _s) 69.607	-0.213	-2.821	-0.509	0.421	-0.616	-0.989	No	Yes	Pass (3.23)
(PSXFR) 74.758	-0.435	-2.585	-0.185	0.154	-0.402	-1.139	No	Yes	Pass (2.81)
(1.0L _s) 77.341	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)
77.341	-0.076	-0.343	0.000	0.000	-0.038	-0.171	No	Yes	Pass (10+)

Principal Tensile Stresses in Webs

LRFD 5.9.2.3.3 - Principal Tensile Stresses in Webs limitations are not applicable.

Ultimate Moment Capacity

Positive Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-396.50	1890.89	-527.35	Pass (-)	Pass (-)
(0.1L _s) 7.734	607.19	4367.23	807.57	Pass (5.41)	Pass (7.19)
(0.2L _s) 15.468	1830.84	5375.56	2435.02	Pass (2.21)	Pass (2.94)
(0.3L _s) 23.202	2963.62	5731.94	3899.98	Pass (1.47)	Pass (1.93)
(0.4L _s) 30.937	3761.00	6078.26	4149.71	Pass (1.46)	Pass (1.62)
(0.5L _s) 38.671	4153.40	6092.54	4152.13	Pass (1.47)	Pass (1.47)
(0.6L _s) 46.405	4173.98	6091.77	4171.71	Pass (1.46)	Pass (1.46)

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.7L _s) 54.139	3790.68	5761.95	3942.38	Pass (1.46)	Pass (1.52)
(0.8L _s) 61.873	3005.47	5414.45	3735.42	Pass (1.45)	Pass (1.80)
(0.9L _s) 69.607	1748.06	4501.66	2324.93	Pass (1.94)	Pass (2.58)
(1.0L _s) 77.341	0.00	2143.70	0.00	Pass (∞)	Pass (∞)

Positive Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-396.50	1890.89	-527.35	Pass (-)	Pass (-)
(0.1L _s) 7.734	281.53	4367.23	807.57	Pass (5.41)	Pass (10+)
(0.2L _s) 15.468	1675.47	5375.56	2435.02	Pass (2.21)	Pass (3.21)
(0.3L _s) 23.202	2762.39	5731.94	3899.98	Pass (1.47)	Pass (2.07)
(0.4L _s) 30.937	3525.24	6078.26	4149.71	Pass (1.46)	Pass (1.72)
(0.5L _s) 38.671	3930.09	6092.54	4152.13	Pass (1.47)	Pass (1.55)
(0.6L _s) 46.405	3916.44	6091.77	4171.71	Pass (1.46)	Pass (1.56)
(0.7L _s) 54.139	3560.45	5761.95	3942.38	Pass (1.46)	Pass (1.62)
(0.8L _s) 61.873	2819.81	5414.45	3735.42	Pass (1.45)	Pass (1.92)
(0.9L _s) 69.607	1650.78	4501.66	2324.93	Pass (1.94)	Pass (2.73)
(1.0L _s) 77.341	0.00	2143.70	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength I Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2959.89	-4043.84	-1193.07	Pass (3.39)	Pass (1.37)
(FoS) 1.196	-2765.29	-5411.61	-1193.07	Pass (4.54)	Pass (1.96)
(0.1L _s) 7.734	-1725.45	-5329.34	-1193.10	Pass (4.47)	Pass (3.09)
(0.2L _s) 15.468	-1127.67	-5252.84	-1193.14	Pass (4.40)	Pass (4.66)
(0.3L _s) 23.202	-824.16	-5196.90	-1096.13	Pass	Pass

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
				(4.74)	(6.31)
(0.4L _s) 30.937	-611.48	-5162.03	-813.26	Pass (6.35)	Pass (8.44)
(0.5L _s) 38.671	-430.44	-5150.36	-572.49	Pass (9.00)	Pass (10+)
(0.6L _s) 46.405	-281.06	-5161.62	-373.81	Pass (10+)	Pass (10+)
(0.7L _s) 54.139	-163.32	-5195.67	-217.22	Pass (10+)	Pass (10+)
(0.8L _s) 61.873	-77.23	-5249.94	-102.72	Pass (10+)	Pass (10+)
(0.9L _s) 69.607	-22.79	-5323.04	-30.31	Pass (10+)	Pass (10+)
(FoS) 77.008	-0.33	-5411.79	-0.44	Pass (10+)	Pass (10+)
(1.0L _s) 77.341	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Negative Moment Capacity for Strength II Limit State [5.6]

Location from Left Support (ft)	M_u (kip-ft)	ϕM_n (kip-ft)	ϕM_n Min (kip-ft)	Status	
				$\phi M_n \text{ Min} \leq \phi M_n$ ($\phi M_n / \phi M_n \text{ Min}$)	$M_u \leq \phi M_n$ ($\phi M_n / M_u$)
(0.0L _s) 0.000	-2433.58	-4043.84	-1193.07	Pass (3.39)	Pass (1.66)
(FoS) 1.196	-2281.73	-5411.61	-1193.07	Pass (4.54)	Pass (2.37)
(0.1L _s) 7.734	-1433.40	-5329.34	-1193.10	Pass (4.47)	Pass (3.72)
(0.2L _s) 15.468	-1018.35	-5252.84	-1193.14	Pass (4.40)	Pass (5.16)
(0.3L _s) 23.202	-730.02	-5196.90	-1096.13	Pass (4.74)	Pass (7.12)
(0.4L _s) 30.937	-530.78	-5162.03	-813.26	Pass (6.35)	Pass (9.73)
(0.5L _s) 38.671	-363.20	-5150.36	-572.49	Pass (9.00)	Pass (10+)
(0.6L _s) 46.405	-227.26	-5161.62	-373.81	Pass (10+)	Pass (10+)
(0.7L _s) 54.139	-122.97	-5195.67	-217.22	Pass (10+)	Pass (10+)
(0.8L _s) 61.873	-50.33	-5249.94	-102.72	Pass (10+)	Pass (10+)
(0.9L _s) 69.607	-9.34	-5323.04	-30.31	Pass (10+)	Pass (10+)
(FoS) 77.008	0.25	-5411.79	-0.44	Pass (10+)	Pass (-)
(1.0L _s) 77.341	0.00	-5416.27	0.00	Pass (∞)	Pass (∞)

Ultimate Shear Capacity

Ultimate Shears for Strength I Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(CS) 5.173	Yes	Yes	274.10	558.56	Pass (2.04)
(SZB) 5.866	Yes	Yes	270.24	417.15	Pass (1.54)
(1.5H) 6.446	Yes	Yes	266.99	411.71	Pass (1.54)
(0.1L _s) 7.734	Yes	Yes	259.79	420.09	Pass (1.62)
(SZB) 11.366	Yes	Yes	239.44	321.49	Pass (1.34)
(0.2L _s) 15.468	Yes	Yes	216.33	326.43	Pass (1.51)
(SZB) 19.616	Yes	Yes	192.93	281.44	Pass (1.46)
(0.3L _s) 23.202	Yes	Yes	172.66	282.57	Pass (1.64)
(SZB) 30.616	Yes	Yes	130.76	241.57	Pass (1.85)
(0.4L _s) 30.937	Yes	Yes	128.95	241.92	Pass (1.88)
(HP) 31.371	Yes	Yes	126.50	242.42	Pass (1.92)
(0.5L _s) 38.671	Yes	Yes	85.36	190.94	Pass (2.24)
(0.6L _s) 46.405	Yes	Yes	77.10	191.95	Pass (2.49)
(HP) 46.833	Yes	Yes	79.37	227.57	Pass (2.87)
(SZB) 47.589	Yes	Yes	83.38	224.28	Pass (2.69)
(0.7L _s) 54.139	Yes	Yes	120.24	263.96	Pass (2.20)
(SZB) 58.589	Yes	Yes	146.35	268.90	Pass (1.84)
(0.8L _s) 61.873	Yes	Yes	166.10	310.12	Pass (1.87)
(SZB) 66.839	Yes	Yes	196.75	304.07	Pass (1.55)
(0.9L _s) 69.607	Yes	Yes	214.28	402.38	Pass (1.88)
(1.5H) 71.758	Yes	Yes	228.08	418.48	Pass (1.83)
(SZB) 72.339	Yes	Yes	231.84	415.42	Pass (1.79)
(CS) 73.418	Yes	Yes	238.85	569.21	Pass (2.38)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Ultimate Shears for Strength II Limit State [5.8]

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
(SZB) 5.866	Yes	Yes	263.02	428.94	Pass

Location from Left Support (ft)	Stirrups Required	Stirrups Provided	$ V_u $ (kip)	ϕV_n (kip)	Status ($\phi V_n/V_u$)
					(1.63)
(1.5H) 6.446	Yes	Yes	259.98	422.75	Pass (1.63)
(0.1L _s) 7.734	Yes	Yes	253.22	430.64	Pass (1.70)
(SZB) 11.366	Yes	Yes	233.88	326.57	Pass (1.40)
(0.2L _s) 15.468	Yes	Yes	211.43	330.03	Pass (1.56)
(SZB) 19.616	Yes	Yes	188.19	284.97	Pass (1.51)
(0.3L _s) 23.202	Yes	Yes	167.58	286.25	Pass (1.71)
(SZB) 30.616	Yes	Yes	123.63	245.38	Pass (1.98)
(0.4L _s) 30.937	Yes	Yes	121.68	245.75	Pass (2.02)
(HP) 31.371	Yes	Yes	119.04	246.27	Pass (2.07)
(0.5L _s) 38.671	Yes	Yes	73.76	217.84	Pass (2.95)
(0.6L _s) 46.405	Yes	Yes	71.93	218.10	Pass (3.03)
(HP) 46.833	Yes	Yes	74.15	243.50	Pass (3.28)
(SZB) 47.589	Yes	Yes	78.09	242.21	Pass (3.10)
(0.7L _s) 54.139	Yes	Yes	114.23	278.09	Pass (2.43)
(SZB) 58.589	Yes	Yes	139.63	272.40	Pass (1.95)
(0.8L _s) 61.873	Yes	Yes	158.80	313.72	Pass (1.98)
(SZB) 66.839	Yes	Yes	188.30	306.89	Pass (1.63)
(0.9L _s) 69.607	Yes	Yes	205.08	404.93	Pass (1.97)
(1.5H) 71.758	Yes	Yes	218.23	420.59	Pass (1.93)
(SZB) 72.339	Yes	Yes	221.80	417.34	Pass (1.88)

[LRFD 5.8.3.2] The reaction introduces compression into the end of the girder. Load between the CSS and the support is transferred directly to the support by compressive arching action without causing additional stresses in the stirrups. Hence, A_v/S in this region must be equal or greater than A_v/S at the critical section.

Longitudinal Reinforcement for Shear Check - Strength I [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.196	1527.02	971.21	5.7.3.5-1	Pass (1.57)
(SZB) 2.200	1566.37	904.61	5.7.3.5-1	Pass (1.73)
(Bar Develop.) 2.568	1580.80	880.46	5.7.3.5-1	Pass (1.80)
(Bar Develop.) 3.628	1598.40	811.73	5.7.3.5-1	Pass (1.97)
(H) 4.696	1598.40	748.56	5.7.3.5-1	Pass (2.14)
(CS) 5.173	1598.40	723.11	5.7.3.5-1	Pass (2.21)
(SZB) 5.866	1598.40	684.37	5.7.3.5-1	Pass (2.34)
(1.5H) 6.446	1598.40	649.54	5.7.3.5-1	Pass (2.46)
(0.1L _s) 7.734	1598.40	576.36	5.7.3.5-1	Pass (2.77)
(SZB) 11.366	1338.60	625.75	5.7.3.5-1	Pass (2.14)
(0.2L _s) 15.468	1652.06	769.66	5.7.3.5-1	Pass (2.15)
(SZB) 19.616	1656.40	932.07	5.7.3.5-1	Pass (1.78)
(0.3L _s) 23.202	1660.06	1007.62	5.7.3.5-1	Pass (1.65)
(SZB) 30.616	1664.10	1128.52	5.7.3.5-1	Pass (1.47)
(0.4L _s) 30.937	1664.16	1129.12	5.7.3.5-1	Pass (1.47)
(HP) 31.371	1664.24	1129.62	5.7.3.5-1	Pass (1.47)
(0.5L _s) 38.671	1664.14	1200.11	5.7.3.5-1	Pass (1.39)
(0.6L _s) 46.405	1664.12	1197.99	5.7.3.5-1	Pass (1.39)
(HP) 46.833	1664.12	1152.27	5.7.3.5-1	Pass (1.44)
(SZB) 47.589	1663.88	1156.81	5.7.3.5-1	Pass (1.44)
(0.7L _s) 54.139	1660.10	1147.59	5.7.3.5-1	Pass (1.45)
(SZB) 58.589	1656.04	1108.69	5.7.3.5-1	Pass (1.49)
(0.8L _s) 61.873	1653.00	1023.58	5.7.3.5-1	Pass (1.61)
(SZB) 66.839	1338.69	869.87	5.7.3.5-1	Pass (1.54)
(0.9L _s) 69.607	1128.38	691.47	5.7.3.5-1	Pass (1.63)
(1.5H) 71.758	956.96	561.94	5.7.3.5-1	Pass (1.70)
(SZB) 72.339	846.43	529.28	5.7.3.5-1	Pass (1.60)
(CS) 73.418	814.39	457.73	5.7.3.5-1	Pass (1.78)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(H) 73.508	811.71	194.66	5.7.3.5-2	Pass (4.17)
(Bar Develop.) 74.576	780.03	194.66	5.7.3.5-2	Pass (4.01)
(Bar Develop.) 75.637	645.01	194.66	5.7.3.5-2	Pass (3.31)
(SZB) 76.005	585.67	194.66	5.7.3.5-2	Pass (3.01)
(FoS) 77.008	423.34	194.66	5.7.3.5-2	Pass (2.17)

Longitudinal Reinforcement for Shear Check - Strength II [5.7.3.5]

$$A_s f_y + A_{ps} f_{ps} \geq \left[\frac{M_u}{d_v \phi_f} + 0.5 \frac{N_u}{\phi_a} + \left(\left| \frac{V_u}{\phi_v} - V_p \right| - 0.5 V_s \right) \cot \theta \right] \quad 5.7.3.5-1$$

$$A_s f_y + A_{ps} f_{ps} \geq \left(\frac{V_u}{\phi_v} - V_p - 0.5 V_s \right) \cot \theta \quad 5.7.3.5-2$$

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(FoS) 1.196	1527.02	833.79	5.7.3.5-1	Pass (1.83)
(SZB) 2.200	1566.37	776.40	5.7.3.5-1	Pass (2.02)
(Bar Develop.) 2.568	1580.80	755.59	5.7.3.5-1	Pass (2.09)
(Bar Develop.) 3.628	1598.40	696.11	5.7.3.5-1	Pass (2.30)
(H) 4.696	1598.40	641.73	5.7.3.5-1	Pass (2.49)
(SZB) 5.866	1598.40	585.06	5.7.3.5-1	Pass (2.73)
(1.5H) 6.446	1598.40	553.76	5.7.3.5-1	Pass (2.89)
(0.1L _s) 7.734	1598.40	490.77	5.7.3.5-1	Pass (3.26)
(SZB) 11.366	1338.60	547.33	5.7.3.5-1	Pass (2.45)
(0.2L _s) 15.468	1652.06	712.59	5.7.3.5-1	Pass (2.32)
(SZB) 19.616	1656.40	869.75	5.7.3.5-1	Pass (1.90)
(0.3L _s) 23.202	1660.06	939.94	5.7.3.5-1	Pass (1.77)
(SZB) 30.616	1664.10	1050.72	5.7.3.5-1	Pass (1.58)
(0.4L _s) 30.937	1664.16	1050.91	5.7.3.5-1	Pass (1.58)
(HP) 31.371	1664.24	1050.86	5.7.3.5-1	Pass (1.58)
(0.5L _s) 38.671	1664.14	1132.02	5.7.3.5-1	Pass (1.47)
(0.6L _s) 46.405	1664.12	1126.65	5.7.3.5-1	Pass (1.48)
(HP) 46.833	1664.12	1077.19	5.7.3.5-1	Pass (1.54)

Location from Left Support (ft)	Capacity (kip)	Demand (kip)	Equation	Status (C/D)
(SZB) 47.589	1663.88	1079.26	5.7.3.5-1	Pass (1.54)
(0.7L _s) 54.139	1660.10	1077.63	5.7.3.5-1	Pass (1.54)
(SZB) 58.589	1656.04	1035.45	5.7.3.5-1	Pass (1.60)
(0.8L _s) 61.873	1653.00	960.86	5.7.3.5-1	Pass (1.72)
(SZB) 66.839	1338.69	811.18	5.7.3.5-1	Pass (1.65)
(0.9L _s) 69.607	1128.38	653.51	5.7.3.5-1	Pass (1.73)
(1.5H) 71.758	956.96	532.44	5.7.3.5-1	Pass (1.80)
(SZB) 72.339	846.43	501.78	5.7.3.5-1	Pass (1.69)
(H) 73.508	811.71	184.41	5.7.3.5-2	Pass (4.40)
(Bar Develop.) 74.576	780.03	184.41	5.7.3.5-2	Pass (4.23)
(Bar Develop.) 75.637	645.01	184.41	5.7.3.5-2	Pass (3.50)
(SZB) 76.005	585.67	184.41	5.7.3.5-2	Pass (3.18)
(FoS) 77.008	423.34	184.41	5.7.3.5-2	Pass (2.30)

Horizontal Interface Shears/Length for Strength I Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.863	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.628	Pass (1.92)
(FoS) 1.196	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.626	Pass (1.92)
(SZB) 2.200	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.621	Pass (1.92)
(Bar Develop.) 2.568	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.620	Pass (1.92)
(Bar Develop.) 3.628	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.615	Pass (1.92)
(H) 4.696	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.610	Pass (1.92)
(CS) 5.173	12.000	48.000	Pass	0.220	0.000	Pass	74.159	142.608	Pass (1.92)
(SZB) 5.866	12.000	48.000	Pass	0.220	0.000	Pass	73.114	142.605	Pass (1.95)
(1.5H) 6.446	12.000	48.000	Pass	0.220	0.000	Pass	72.235	142.603	Pass (1.97)
(0.1L _s) 7.734	12.000	48.000	Pass	0.220	0.000	Pass	70.288	142.597	Pass (2.03)
(SZB) 11.366	9.000	48.000	Pass	0.293	0.000	Pass	64.782	146.543	Pass (2.26)
(0.2L _s) 15.468	9.000	48.000	Pass	0.293	0.000	Pass	58.529	146.530	Pass (2.50)
(SZB) 19.616	12.000	48.000	Pass	0.220	0.000	Pass	52.200	142.557	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(2.73)
(0.3L _s) 23.202	12.000	48.000	Pass	0.220	0.000	Pass	46.715	142.548	Pass (3.05)
(SZB) 30.616	18.000	48.000	Pass	0.147	0.000	Pass	35.279	138.574	Pass (3.93)
(0.4L _s) 30.937	18.000	48.000	Pass	0.147	0.000	Pass	34.786	138.574	Pass (3.98)
(HP) 31.371	18.000	48.000	Pass	0.147	0.000	Pass	34.120	138.573	Pass (4.06)
(0.5L _s) 38.671	18.000	48.000	Pass	0.147	0.000	Pass	22.971	138.566	Pass (6.03)
(0.6L _s) 46.405	18.000	48.000	Pass	0.147	0.000	Pass	20.742	138.565	Pass (6.68)
(HP) 46.833	18.000	48.000	Pass	0.147	0.000	Pass	21.352	138.565	Pass (6.49)
(SZB) 47.589	18.000	48.000	Pass	0.147	0.000	Pass	22.432	138.565	Pass (6.18)
(0.7L _s) 54.139	12.000	48.000	Pass	0.220	0.000	Pass	32.402	142.531	Pass (4.40)
(SZB) 58.589	12.000	48.000	Pass	0.220	0.000	Pass	39.513	142.537	Pass (3.61)
(0.8L _s) 61.873	9.000	48.000	Pass	0.293	0.000	Pass	44.926	146.503	Pass (3.26)
(SZB) 66.839	9.000	48.000	Pass	0.293	0.000	Pass	53.236	146.514	Pass (2.75)
(0.9L _s) 69.607	12.000	48.000	Pass	0.220	0.000	Pass	57.978	142.562	Pass (2.46)
(1.5H) 71.758	12.000	48.000	Pass	0.220	0.000	Pass	61.713	142.568	Pass (2.31)
(SZB) 72.339	12.000	48.000	Pass	0.220	0.000	Pass	62.729	142.570	Pass (2.27)
(CS) 73.418	12.000	48.000	Pass	0.220	0.000	Pass	64.626	142.573	Pass (2.21)
(H) 73.508	12.000	48.000	Pass	0.220	0.000	Pass	64.626	142.574	Pass (2.21)
(Bar Develop.) 74.576	12.000	48.000	Pass	0.220	0.000	Pass	64.626	142.577	Pass (2.21)
(Bar Develop.) 75.637	12.000	48.000	Pass	0.220	0.000	Pass	64.627	142.581	Pass (2.21)
(SZB) 76.005	12.000	48.000	Pass	0.220	0.000	Pass	64.627	142.582	Pass (2.21)
(FoS) 77.008	12.000	48.000	Pass	0.220	0.000	Pass	64.627	142.586	Pass (2.21)
(1.0L _s) 77.341	12.000	48.000	Pass	0.220	0.000	Pass	64.627	142.587	Pass (2.21)
77.341	12.000	48.000	Pass	0.220	0.000	Pass	64.627	142.587	Pass (2.21)

Horizontal Interface Shears/Length for Strength II Limit State [5.7.4]

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
0.863	12.000	48.000	Pass	0.220	0.000	Pass	72.136	142.628	Pass (1.98)
(FoS) 1.196	12.000	48.000	Pass	0.220	0.000	Pass	72.136	142.626	Pass

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
									(1.98)
(SZB) 2.200	12.000	48.000	Pass	0.220	0.000	Pass	72.136	142.621	Pass (1.98)
(Bar Develop.) 2.568	12.000	48.000	Pass	0.220	0.000	Pass	72.136	142.620	Pass (1.98)
(Bar Develop.) 3.628	12.000	48.000	Pass	0.220	0.000	Pass	72.136	142.615	Pass (1.98)
(H) 4.696	12.000	48.000	Pass	0.220	0.000	Pass	72.136	142.610	Pass (1.98)
(SZB) 5.866	12.000	48.000	Pass	0.220	0.000	Pass	71.161	142.605	Pass (2.00)
(1.5H) 6.446	12.000	48.000	Pass	0.220	0.000	Pass	70.340	142.603	Pass (2.03)
(0.1L _s) 7.734	12.000	48.000	Pass	0.220	0.000	Pass	68.511	142.597	Pass (2.08)
(SZB) 11.366	9.000	48.000	Pass	0.293	0.000	Pass	63.277	146.543	Pass (2.32)
(0.2L _s) 15.468	9.000	48.000	Pass	0.293	0.000	Pass	57.205	146.530	Pass (2.56)
(SZB) 19.616	12.000	48.000	Pass	0.220	0.000	Pass	50.916	142.557	Pass (2.80)
(0.3L _s) 23.202	12.000	48.000	Pass	0.220	0.000	Pass	45.341	142.548	Pass (3.14)
(SZB) 30.616	18.000	48.000	Pass	0.147	0.000	Pass	33.355	138.574	Pass (4.15)
(0.4L _s) 30.937	18.000	48.000	Pass	0.147	0.000	Pass	32.826	138.574	Pass (4.22)
(HP) 31.371	18.000	48.000	Pass	0.147	0.000	Pass	32.108	138.573	Pass (4.32)
(0.5L _s) 38.671	18.000	48.000	Pass	0.147	0.000	Pass	19.851	138.566	Pass (6.98)
(0.6L _s) 46.405	18.000	48.000	Pass	0.147	0.000	Pass	19.350	138.565	Pass (7.16)
(HP) 46.833	18.000	48.000	Pass	0.147	0.000	Pass	19.949	138.565	Pass (6.95)
(SZB) 47.589	18.000	48.000	Pass	0.147	0.000	Pass	21.009	138.565	Pass (6.60)
(0.7L _s) 54.139	12.000	48.000	Pass	0.220	0.000	Pass	30.782	142.531	Pass (4.63)
(SZB) 58.589	12.000	48.000	Pass	0.220	0.000	Pass	37.701	142.537	Pass (3.78)
(0.8L _s) 61.873	9.000	48.000	Pass	0.293	0.000	Pass	42.952	146.503	Pass (3.41)
(SZB) 66.839	9.000	48.000	Pass	0.293	0.000	Pass	50.949	146.514	Pass (2.88)
(0.9L _s) 69.607	12.000	48.000	Pass	0.220	0.000	Pass	55.490	142.562	Pass (2.57)
(1.5H) 71.758	12.000	48.000	Pass	0.220	0.000	Pass	59.048	142.568	Pass (2.41)
(SZB) 72.339	12.000	48.000	Pass	0.220	0.000	Pass	60.013	142.570	Pass (2.38)
(H) 73.508	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.574	Pass (2.31)
(Bar Develop.) 74.576	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.577	Pass (2.31)

Location from Left Support (ft)	5.7.4.5			5.7.4.2			5.7.4.1		
	s (in)	s _{max} (in)	Status	a _{vf} (in ² /ft)	a _{vf min} (in ² /ft)	Status	v _{ui} (kip/ft)	φv _{ni} (kip/ft)	Status (φv _{ni} / v _{ui})
(Bar Develop.) 75.637	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.581	Pass (2.31)
(SZB) 76.005	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.582	Pass (2.31)
(FoS) 77.008	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.586	Pass (2.31)
(1.0L _s) 77.341	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.587	Pass (2.31)
77.341	12.000	48.000	Pass	0.220	0.000	Pass	61.816	142.587	Pass (2.31)

Live Load Deflection Check [2.5.2.6.2]

Allowable deflection span ratio = L/800

Allowable maximum deflection = ± 1.160 in

Minimum live load deflection along girder = -0.225 in

Maximum live load deflection along girder = 0.095 in

Status = **Pass****Constructability Checks****Girder Dimensions Detailing Check [5.12.3.2.2]**

Dimension	Minimum (in)	Actual (in)	Status
Top Flange Thickness	2.000	3.500	Pass
Web Thickness	5.000	7.000	Pass
Bottom Flange Thickness	5.000	6.500	Pass

Stirrup Detailing Check: Strength I [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.863	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.196	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.200	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.568	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.628	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.696	#4	4.000	18.000	1.500	1.200	0.125	Pass
(CS) 5.173	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.866	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.446	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.734	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.366	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.468	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.616	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.202	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.616	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.937	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.371	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.671	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.405	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.833	#4	18.000	18.000	1.500	0.267	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(SZB) 47.589	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.139	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.589	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.873	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.839	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.9L _s) 69.607	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.758	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.339	#4	6.000	18.000	1.500	0.800	0.125	Pass
(CS) 73.418	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 73.508	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.576	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.637	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 76.005	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 77.008	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.341	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.341	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Stirrup Detailing Check: Strength II [5.7.2.5, 5.7.2.6, 5.10.3.1.2]

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
0.863	#4	3.000	18.000	1.500	1.600	0.125	Pass
(FoS) 1.196	#4	3.000	18.000	1.500	1.600	0.125	Pass
(SZB) 2.200	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 2.568	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 3.628	#4	4.000	18.000	1.500	1.200	0.125	Pass
(H) 4.696	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 5.866	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 6.446	#4	6.000	18.000	1.500	0.800	0.125	Pass
(0.1L _s) 7.734	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 11.366	#4	9.000	18.000	1.500	0.533	0.125	Pass
(0.2L _s) 15.468	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 19.616	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.3L _s) 23.202	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 30.616	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.4L _s) 30.937	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 31.371	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.5L _s) 38.671	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.6L _s) 46.405	#4	18.000	18.000	1.500	0.267	0.125	Pass
(HP) 46.833	#4	18.000	18.000	1.500	0.267	0.125	Pass
(SZB) 47.589	#4	18.000	18.000	1.500	0.267	0.125	Pass
(0.7L _s) 54.139	#4	12.000	18.000	1.500	0.400	0.125	Pass
(SZB) 58.589	#4	12.000	18.000	1.500	0.400	0.125	Pass
(0.8L _s) 61.873	#4	9.000	18.000	1.500	0.533	0.125	Pass
(SZB) 66.839	#4	9.000	18.000	1.500	0.533	0.125	Pass

Location from Left Support (ft)	Bar Size	S (in)	S _{max} (in)	S _{min} (in)	A _v /S (in ² /ft)	A _v /S _{min} (in ² /ft)*	Status
(0.9L _s) 69.607	#4	6.000	18.000	1.500	0.800	0.125	Pass
(1.5H) 71.758	#4	6.000	18.000	1.500	0.800	0.125	Pass
(SZB) 72.339	#4	6.000	18.000	1.500	0.800	0.125	Pass
(H) 73.508	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 74.576	#4	4.000	18.000	1.500	1.200	0.125	Pass
(Bar Develop.) 75.637	#4	4.000	18.000	1.500	1.200	0.125	Pass
(SZB) 76.005	#4	4.000	18.000	1.500	1.200	0.125	Pass
(FoS) 77.008	#4	3.000	18.000	1.500	1.600	0.125	Pass
(1.0L _s) 77.341	#4	3.000	18.000	1.500	1.600	0.125	Pass
77.341	#4	3.000	18.000	1.500	1.600	0.000	Pass

* - Transverse reinforcement required if $V_u > 0.5\phi(V_c + V_p)$ [Eqn 5.7.2.3-1]

Hold Down Force

Hold Down Force (kip/strand)	Hold Down Force Limit (kip/strand)	Status
3.31	4.00	Pass

Haunch Geometry Checks

Note: Specification Checks for Haunch Geometry are Disabled in the Project Criteria. All Status values will be reported as N/A.

Slab Offset ("A" Dimension)

This table compares the input slab offset to the rounded computed slab offset required to have the least haunch depth be equal to the Fillet dimension. A failed status indicates that the top of the girder will encroach into the deck slab and the Slab Offset dimension should be refined.

Span	Girder	Provided (in)	Required (in)	Status	Notes
2	L	12.300	11.750	N/A	

Minimum Fillet Depth

This table compares the provided Fillet dimension to the minimum Fillet dimension specified in the girder library. A failed status indicates that the Fillet dimension is too small.

Span	Girder	Provided (in)	Required (in)	Status
2	L	1.000	1.000	N/A

Camber

	Camber (in)
Screed Camber, C at mid-span	1.201
Lower Bound Camber at 60 days, 50% of D ₆₀	1.665
Average Camber at 60 days, 75% of D ₆₀	2.497
Upper Bound Camber at 60 days, D ₆₀	3.329

I.1.6 Positive Moment Connection Design

Properties

Concrete Compressive Strength	$f_c := 4.5 \cdot \text{ksi}$	
Tributary Width	$b := 8 \text{ ft} + 4 \text{ in}$	(Girder G Span I Controls)
Height of Abut Diaphragm	$h := 4 \text{ ft} + 8.5 \text{ in}$	
Centroid Location from Bottom	$y_b := 34.375 \text{ in}$	(From PGSuper)
Composite Moment of Inertia	$I := 378887 \text{ in}^4$	(From PGSuper)

Cracking Moment

Modulus of Rupture	$f_r := 0.24 \cdot \sqrt{f_c \cdot \text{ksi}} = 0.509 \text{ ksi}$	(5.4.2.6)
Cracking Moment	$M_{cr} := f_r \cdot \frac{I}{y_b} = 467.631 \text{ kip} \cdot \text{ft}$	(E5.7.3.6.2-2)
	$1.2 M_{cr} = 561.157 \text{ kip} \cdot \text{ft}$	

Stress in Extended Strands

Total Length of Extended Strand	$l_{dsh} := 36 \text{ in}$	
Service Limit State Stress	$f_{psl} := \frac{l_{dsh} - 8 \text{ in}}{0.228 \text{ in}} \cdot \text{ksi} = 122.807 \text{ ksi}$	(E5.14.1.4.9c-1)
Strength Limit State Stress	$f_{pul} := \frac{l_{dsh} - 8 \text{ in}}{0.163 \text{ in}} \cdot \text{ksi} = 171.779 \text{ ksi}$	(E5.14.1.4.9c-2)
Service Limit State Limit	$f_{limit} := 150 \text{ ksi}$	(NCHRP Report 519)

```

if f_limit ≥ f_psl
    "OK"
else
    "NG"

```

Nominal Moment

Number of Extended Strands	$n_{str} := 10$	
Area per Strand	$A_{str} := 0.217 \text{ in}^2$	
Area of Extended Strands	$A_{ps} := n_{str} \cdot A_{str} = 2.17 \text{ in}^2$	
Center of Gravity of Ext. Strands	$y_{ps} := 2 \text{ in}$	
	$d := h - y_{ps} = 54.5 \text{ in}$	
	$a_{ser} := \frac{A_{ps} \cdot f_{psl}}{0.85 \cdot f_c \cdot b} = 0.697 \text{ in}$	
	$\phi M_{n,ser} := 0.9 \cdot A_{ps} \cdot f_{psl} \cdot \left(d - \frac{a_{ser}}{2} \right) = 1082.32 \text{ kip} \cdot \text{ft}$	

```

if φ M_n,ser ≥ 0.6 · M_cr
    "OK"
else
    "NG"

```

Strength Condition

$$a_{st} := \frac{A_{ps} \cdot f_{pul}}{0.85 \cdot f_c \cdot b} = 0.975 \text{ in}$$

$$\phi M_{n,st} := 0.9 \cdot A_{ps} \cdot f_{pul} \cdot \left(d - \frac{a_{st}}{2} \right) = 1510.037 \text{ kip} \cdot \text{ft}$$

if $\phi M_{n,st} \geq 1.2 \cdot M_{cr}$ "OK" else "NG"	= "OK"

I.2 Deck and Overhang Design

I.2.1 Deck Design

Project	<u>Belford Ave over Happy Canyon Creek</u>	Client	<u>Belford North Metro District</u>
Subject	<u>Deck Design Check</u>	Made By	<u>AJP</u> Date <u>01/12/21</u>
Item	<u>Deck Design - Typical Interior Span</u>		

MATERIAL PROPERTIES
[AASHTO LRFD]

$f_y =$	<u>60</u> ksi	$E_s =$	<u>29000</u> ksi	[5.4.3.2]
$f'_c =$	<u>4.5</u> ksi	$K_1 =$	<u>1.00</u>	[5.4.2.4]
$f_r =$	0.509 ksi	$E_c =$	4435 ksi	[5.4.2.6] [5.4.2.4]
$n =$	6.54 (29000 / 4435)	$\beta_1 =$	0.825	[5.6.1, 5.6.2.2]

GEOMETRY

$W_{bridge} =$	<u>94</u> ft	Total Bridge Width (out to out)
$L_s =$	<u>77.208333</u> ft	Maximum Span Length
$S_{girder} =$	<u>8.75</u> ft	Max Girder spacing (CL to CL)
$S_{girder.avg} =$	<u>7.83</u> ft	Standard Gir Spacing (CL to CL)
$L_{ovhg} =$	<u>4.25</u> ft	Overhang length (CL girder to edge of deck)
$b_f =$	<u>43</u> in	Girder top flange width
$b_w =$	<u>7</u> in	Girder web width
Rail Type	<u>Parker</u>	Bridge Rail
Overlay ?	<u>Y</u>	
$T_{slab} =$	<u>8</u> in	Total slab thickness (user input)
$T_{sws} =$	<u>0</u> in	Sacrificial deck thickness (1/2" for bare deck, 0" with overlay)
T =	8.00 in	Design thickness
$Clr_{top} =$	<u>2.00</u> in	Top Clear Cover of Design Thickness (2 in from total slab)
$Clr_{btm} =$	<u>1.00</u> in	Bottom Clear Cover (CDOT standard is 1.00 inch)

LOAD FACTORS
[1.3.2.1]

Load Combinations	γ_{DC}	γ_{DW}	γ_{LL}	γ_{CT}	[Table 3.4.1-1]
Service I	<u>1</u>	<u>1</u>	<u>1</u>	0	
Strength I	<u>1.25</u>	<u>1.5</u>	<u>1.75</u>	0	
Extreme Event II	<u>1.25</u>	<u>1.5</u>	<u>0.5</u>	<u>1</u>	

METHOD OF ANALYSIS

Approximate Method = "strip method" [4.6.2.1]

w_{eq} = width of equivalent interior strip

$+w_{eq} = 26.0 + 6.6 * S_{girder} =$ 83.75 in [Table 4.6.2.1.3-1]

$-w_{eq} = 48.0 + 3.0 * S_{girder} =$ 74.25 in [Table 4.6.2.1.3-1]

Alternately, this spreadsheet uses AASHTO LRFD Table A4-1 to determine Live Load Moments.

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Item	<u>Deck Design - Typical Interior Span</u>		

MATERIAL PROPERTIES

[AASHTO LRFD]

Distribution of Wheel Load

[4.6.2.1.5]

$$L_s / S = 8.82 > 1.5$$

all wheel loads shall be applied to the primary direction

For skewed decks see LRFD 9.7.1.3 for transverse bar placement.

Although skew is less than 25°, reinforcement will be placed perpendicular to girders and HCL

LOADS

$W_{conc} =$	<u>0.15</u> kcf	Concrete unit weight
$W_{DL, DC} =$	<u>0.100</u> k/ft	Per 1 foot wide strip. Use "Total Slab thickness"
$W_{asphalt} =$	<u>36.67</u> psf	Asphalt weight (initial or future)
$W_{utilities} =$	<u>5</u> psf	Utility weight (assumed)
$W_{DL, DW} =$	<u>0.042</u> k/ft	Per 1 foot wide strip

MOMENTS

Dead Load Moments

$M_{DL, DC} =$	0.77 k-ft	$W_{DL} \times S_{girder}^2 / 10$; assume continuous over girders
$M_{DL, DW} =$	0.32 k-ft	$W_{DL} \times S_{girder}^2 / 10$; assume continuous over girders

Live Load Moments

$+M_{LL+I} =$	6.14 k-ft	multiple presence factor & dynamic load allowance included [Table A4-1]
$d_{-M} =$	14.33 in	calculated distance from CL girder to design section for -M [4.6.2.1.6]
$d_{-M} =$	12 in	upper bound Table A4-1 for maximum negative live load moment
$d_{-M} =$	18 in	lower bound Table A4-1 for maximum negative live load moment
$-M_{LL+I} U =$	3.67 k-ft	trended upper bound
$-M_{LL+I} L =$	3.15 k-ft	trended lower bound
$-M_{LL+I} =$	3.47 k-ft	multiple presence factor & dynamic load allowance included [Table A4-1]

Maximum Positive Moments

$M =$	7.22 k-ft	Service 1 Load moment = $M_{DL, DC} + M_{DL, DW} + M_{LL+I}$
$M_u =$	12.18 k-ft	Factored ultimate moment = $\gamma_{pDC} M_{DL, DC} + \gamma_{pDW} M_{DL, DW} + \gamma_{pLL} M_{LL+I}$

Maximum Negative Moments

$M =$	4.55 k-ft	Service 1 Load moment = $M_{DL, DC} + M_{DL, DW} + M_{LL+I}$
$M_u =$	7.50 k-ft	Factored ultimate moment = $\gamma_{pDC} \times M_{DL, DC} + \gamma_{pDW} \times M_{DL, DW} + \gamma_{pLL} \times M_{LL+I}$

FATIGUE

[5.5.3.1]

Fatigue need not be investigated for concrete deck slabs in multigirder applications.

Project	<u>Belford Ave over Happy Canyon Creek</u>	Client	<u>Belford North Metro District</u>
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Item	<u>Deck Design - Typical Interior Span</u>		

MATERIAL PROPERTIES
POSITIVE MOMENT DESIGN
[AASHTO LRFD]
Transverse Reinforcement

Bar size = **# 5**
 $A_b = 0.31 \text{ in}^2$
 $d_{btm} = 6.69 \text{ in}$ Effective depth to transverse reinforcement, use "design thickness"

$A_{s \text{ req'd}} =$	0.42 in²/ft	→ Maximum:	# 5 @ 8.5 in	$A_s =$	0.44 in²/ft
Use :	# 5 @ 6.0 in	→	$A_{s \text{ prv'd}} =$	0.62 in²/ft	OK

Check Tensioned Controlled Assumption

$\alpha_1 = 0.85$ [5.6.2.2]
 $a = 0.810 \text{ in}$ $A_s f_y / \alpha_1 f'_c b$ [5.6.3.2]
 $c = 0.982 \text{ in}$ a/β_1 [5.6.2.2]
 Net Tensile Strain:
 $\epsilon_{cl} = 0.002$ Use $\phi = 0.9$ [5.5.4.2]
 $\epsilon_{tl} = 0.005$ [5.6.2.1]
 $\epsilon_s = 0.017$ $(d-c)/c * 0.003$
 $\phi M_n = 17.53 \text{ k-ft}$ $= \phi [A_s f_y (d - a/2)]$ [5.6.3.2.2-1]
 $\phi M_n = 17.53 \text{ k-ft}$ $>$ $M_u = 12.18 \text{ k-ft}$ **OK**

Check Minimum Reinforcement
[5.6.3.3]

$M_{cr} = \gamma_3 \gamma_1 f_r I_g / y_t$ Using "Design thickness, T"
 $\gamma_3 = 0.67$ specified min. yield str. to ultimate tensile str. reinf. ratio; A615, Grade 60 Reinf.
 $\gamma_1 = 1.6$ flexural cracking variability factor for all other concrete structures
 $f_r = 0.509 \text{ ksi}$
 $I_g = 512 \text{ in}^4$ Per 1 foot wide strip
 $y_t = 4.00 \text{ in}$
 $M_{cr} = 5.82 \text{ k-ft}$ **controls**
 $1.33M_u = 16.20 \text{ k-ft}$
 $\phi M_n = 17.53 \text{ k-ft}$ $>$ $M_{cr} = 5.82 \text{ k-ft}$ **OK**

Project	<u>Belford Ave over Happy Canyon Creek</u>	Client	<u>Belford North Metro District</u>
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Item	<u>Deck Design - Typical Interior Span</u>		

MATERIAL PROPERTIES
[AASHTO LRFD]
POSITIVE MOMENT DESIGN (Continued)
Control of Cracking by Distribution of Flexural Reinforcement
[5.6.3.4]

$$s \leq \frac{700 \gamma_e}{\beta_s f_s} - 2 d_c$$

$$\beta_s = 1 + \frac{d_c}{0.7 (h - d_c)} = 1.28$$

h = 8.00 in slab thickness

d_c = 1.31 in (1.00 in Cover + 0.625 in Bar diameter / 2)

γ_e = 0.75 1.0 for Class 1 exposure condition (cracks tolerated); 0.75 for Class 2 exposure

$$f_s = \frac{M_{service}}{A_{s,prvd} j d} = 22.99 \text{ ksi}$$

n = 6.54

$$\rho_{prvd} = 0.0077 \quad A_{s,prvd} / b d_{btm}$$

$$k = 0.271 \quad \sqrt{2n\rho + (n\rho)^2} - n\rho$$

j = 0.910 1 - k / 3

M_{service} = 86.70 k-in

$$s = 15.21 \text{ in} > s_{prvd} = 6 \text{ in} \quad \text{OK}$$

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Item	<u>Deck Design - Typical Interior Span</u>		

MATERIAL PROPERTIES
NEGATIVE MOMENT DESIGN
[AASHTO LRFD]
Transverse Reinforcement

Bar size = **# 5**
 $A_b = 0.31 \text{ in}^2$
 $d_{top} = 5.69 \text{ in}$ Effective depth to top transverse reinforcement, use "Design thickness"

$A_{s \text{ req'd}} =$	0.30 in²/ft	→ Maximum:	# 5 @ 12.0 in	$A_s =$	0.31 in²/ft
Use :	# 5 @ 6.0 in	→	$A_{s \text{ prv'd}} =$	0.62 in²/ft	OK

Check Tensioned Controlled Assumption

$\alpha_1 = 0.85$ [5.6.2.2]
 $a = 0.810$ $A_s f_y / \alpha_1 f'_c b$ [5.6.3.2]
 $c = 0.982$ a/β_1 [5.6.2.2]
 Net Tensile Strain:
 $\epsilon_{cl} = 0.002$ Use $\phi = 0.9$ [5.5.4.2]
 $\epsilon_{tl} = 0.005$ [5.6.2.1]
 $\epsilon_s = 0.014$ $(d-c)/c * 0.003$
 $\phi M_n = 14.74 \text{ k-ft}$ $= \phi [A_s f_y (d - a/2)]$ [5.6.3.2.2-1]
 $\phi M_n = 14.74 \text{ k-ft}$ $>$ $M_u = 7.50 \text{ k-ft}$ **OK**

Check Minimum Reinforcement
[5.6.3.3]

$M_{cr} = \gamma_3 \gamma_1 f_r I_g / y_t$ Using "Design thickness, T"
 $\gamma_3 = 0.67$ specified min. yield str. to ultimate tensile str. reinf. ratio; A615, Grade 60 Reinf.
 $\gamma_1 = 1.60$ flexural cracking variability factor for all other concrete structures
 $f_r = 0.509 \text{ ksi}$
 $I_g = 512 \text{ in}^4$ Per 1 foot wide strip
 $y_t = 4.00 \text{ in}$
 $M_{cr} = 5.82 \text{ k-ft}$ **controls**
 $1.33M_u = 9.98 \text{ k-ft}$
 $\phi M_n = 14.74 \text{ k-ft}$ $>$ $M_{cr} = 5.82 \text{ k-ft}$ **OK**

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MATERIAL PROPERTIES
[AASHTO LRFD]
NEGATIVE MOMENT DESIGN (Continued)
Control of Cracking by Distribution of Flexural Reinforcement
[5.6.3.4]

$$s \leq \frac{700 \gamma_e}{\beta_s f_s} - 2 d_c$$

$$\beta_s = 1 + \frac{d_c}{0.7 (h - d_c)} = 1.58$$

h = 8.00 in slab thickness

d_c = 2.31 in (2.00 in Cover + 0.625 in Bar diameter / 2)

γ_e = 0.75 1.0 for Class 1 exposure condition (cracks tolerated); 0.75 for Class 2 exposure

$$f_s = \frac{M_{service}}{A_{s,prvd} j d} = 17.15 \text{ ksi}$$

n = 6.54

ρ_{prvd} = 0.0091 A_{s, prvd} / b d_{btm}

k = 0.290 (2np + (np)²)^{1/2} - np

j = 0.903 1 - k / 3

M_{service} = 54.63 k-in

s = 14.74 in > s_{prvd} = 6.0 in OK

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Item	<u>Deck Design - Typical Interior Span</u>		

MATERIAL PROPERTIES
[AASHTO LRFD]
SHRINKAGE AND TEMPERATURE REINFORCEMENT
[5.10.6]
Longitudinal Reinforcement (Top mat)

Bar size = **# 4** (Use #4 @ 6" per CDOT BDM 9.6.1)

s = **6**
 $A_{s, \text{prv'd}} = 0.40 \text{ in}^2/\text{ft}$

$$A_s \geq \frac{1.3 b h}{2 (b + h) f_y} = 0.086 \text{ in}^2/\text{ft per face} \quad \text{OK} \quad [\text{Eq 5.10.6-1}]$$

$$0.11 \leq A_s \leq 0.6 \quad \text{OK} \quad [\text{Eq 5.10.6-2}]$$

DISTRIBUTION REINFORCEMENT (Positive Moment)
[9.7.3.2]
For primary reinforcement perpendicular to traffic

$$\% = 220 / S^{1/2}$$

S = **8.17** ft

Dist. b/t flange tips + flange overhang (to face of web) **[9.7.2.3]**

% = 77.0% >

Max. % = 67%

Use % = 67%
 $A_{s \text{ dist}} = 0.42 \text{ in}^2/\text{ft}$

% x $A_{s \text{ prv'd}}$ for Positive Moment

X = 0' - 10.75" from CL Girder to first bar

Between Girders
 $L_{\text{Dbars}} = 6.04 \text{ ft}$ Limit to place "D" bars: distance from 1/4 pt of flange to 1/4 pt of flange

 $\text{Spa}_{\text{max}} = 11$ CDOT BDM Figure 9-1

 $N_{\text{bars}} = 8 \text{ total @ Equal Spaces between girders}$
 $\text{Spa}_{\text{calc}} = 10.36 \text{ in}$ **OK**

Bar size = **# 5**
 $A_{\text{bar}} = 0.31 \text{ in}^2$
 $A_{s \text{ req'd}} = 2.51 \text{ in}^2$
 $N_{\text{bars, min}} = 9 \text{ total}$ **OK**
At Overhang: #5 @ 6 inches maximum
 $L_{\text{Dbars}} = 3.10 \text{ ft}$ Limit to place "D" bars: distance from 1/4 pt of flange to 3" from edge of deck

 $\text{Spa}_{\text{max}} = 6$ CDOT BDM Figure 9-1

 $N_{\text{bars}} = 8 \text{ total @ Equal Spaces at Overhang}$
 $\text{Spa}_{\text{calc}} = 5.32 \text{ in}$ **OK**

Bar size = **# 5**
 $A_{\text{bar}} = 0.31 \text{ in}^2$
 $A_{s \text{ req'd}} = 1.29 \text{ in}^2$
 $N_{\text{bars, min}} = 5 \text{ total}$ **OK**

I.2.2 Overhang Design

Project	Belford Ave over Happy Canyon Creek	Client	Belford North Metro District
Subject	Deck Design Check	Made By	AJP Date 01/12/21
Item	Deck Design - Overhang		

MATERIAL PROPERTIES

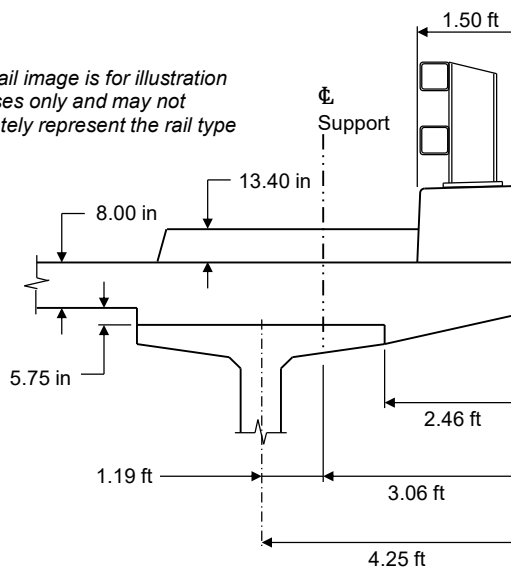
[AASHTO LRFD]

$f_y =$	60 ksi	$E_s =$	29000 ksi	[5.4.3.2]
$f'_c =$	4.5 ksi	$K_1 =$	1.00	[5.4.2.4]
$f_r =$	0.509 ksi	$E_c =$	4435 ksi	[5.4.2.6] [5.4.2.4]
$n =$	7.00 (29000 / 4435)	$\beta_1 =$	0.825	[5.7.3.2, 5.7.2.2]
		$w_{conc} =$	0.15 kcf	Concrete unit weight

GEOMETRY

$L_{ovhg} =$	4.25 ft	Overhang length (CL girder to edge of deck)	
$l_{support} =$	14.33 in	CL girder to CL of effective deck support	[4.6.2.1.6]
$b_f =$	43.00 in	Girder top flange width	
$t_{fmin} =$	3.5 in	Girder top flange min thickness	
Deck =	8.00 in	Design thickness	
Haunch =	5.75 in	Maximum Haunch Thickness	
Structural Haunch =	1.00 in	Minimum haunch thickness adding to structural capacity	
Sidewalk =	13.40 in	Sidewalk thickness (average)	
Rail Type =	Parker Rail		
Rail Width =	1.50 ft		
Rail CG from EOD =	7.51 in		
Rating =	TL-3		
Double Mat =	Y		

Note: Rail image is for illustration purposes only and may not accurately represent the rail type



LOAD FACTORS

Load Combinations	γ_{DC}	γ_{DW}	γ_{LL}	γ_{CT}	[Table 3.4.1-1]
Service I	1	1	1	0	
Strength I	1.25	1.5	1.75	0	
Extreme Event II	1.25	1.5	0.5	1	

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LOADS

Dead Loads:

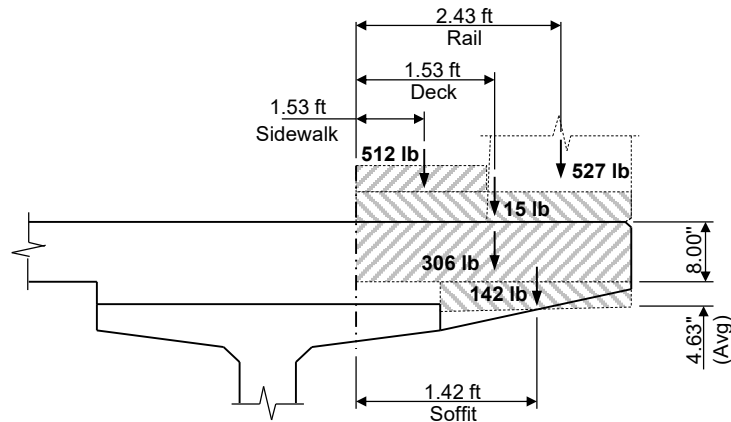
W_{Deck}	=	100 psf
W_{Soffit}	=	57.8125 psf
$W_{Sidewalk}$	=	167.5 psf
W_{Rail}	=	527.08 lb/ft

	w (k/ft)	Arm (ft)	Moment (k-ft/ft)	Shear (k/ft)
Deck	0.10	1.53	0.47	0.31
Soffit	0.06	1.42	0.20	0.14
Sidewalk	0.17	1.53	0.78	0.51
Rail	0.53	2.43	1.28	0.53
Total	0.85	3.20	2.73	1.49

Wearing Surface & Utilities:

$W_{Overlay}$	=	36.67 psf
$W_{Utilities}$	=	5.00 psf

Overlay	0.00	0.78	0.00	0.00
Utilities	0.01	1.53	0.02	0.02
Total	0.01	4.67	0.02	0.02



Live Loads:

Design Case 1 [Extreme Event II: Initial Longitudinal and Lateral Forces]

M	=	27.01 k-ft/ft
T	=	13.73 k/ft

Design Case 2 [Extreme Event II: Vertical Forces - After Design Case 1]

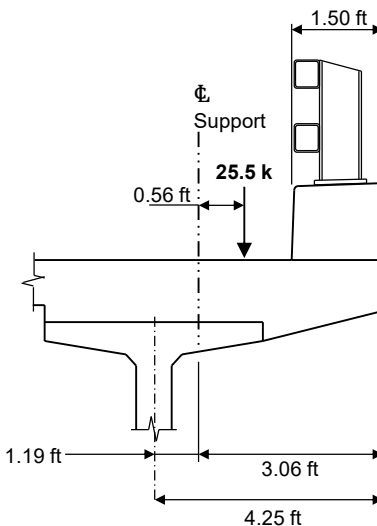
M	=	0.00 k-ft/ft
T	=	0.00 k/ft
V	=	1.00 k/ft

Project	Belford Ave over Happy Canyon Creek	Client	Belford North Metro District
Subject	Deck Design Check	Made By	AJP
Item	Deck Design - Overhang	Date	01/12/21

Design Case 3 - Truck Loads (Vertical)

Wheel Offset = 1 ft	Face of Rail to Nearest Wheel Line	[A13.4.1]
Arm = X = 0.555556 ft		[3.6.1.3.1]
P _{LL} = 16 kip	HL-93	[4.6.2.1.6]
Impact = 0.33	dynamic load analysis	[3.6.1.2.2]
P _{LL+I} = 25.54 kip	includes 1.2 multiple presence factor	[3.6.2.1]
E = 50.555556 in	45.0+10.0X	[T 3.6.1.1.2-1]
M = 0.56 k-ft/ft		[T 4.6.2.1.3-1]
w _{LL+I} = V = 1.000 k/ft		[3.6.1.3.4]

If deck over hang from CL of Girder to face of barrier is <6 ft, wheel loads may be replaced with a uniform load = 1klf



Note: Rail image is for illustration purposes only and may not accurately represent the rail type

DESIGN FORCES

Extreme Event II (Design Case 1):

$$\begin{aligned} M_u &= 30.734545 \text{ k-ft/ft} \\ T_u &= 13.734798 \text{ k/ft} \\ V_u &= 2.3811252 \text{ k/ft} \end{aligned}$$

Extreme Event II (Design Case 2):

$$\begin{aligned} M_u &= 3.7264532 \text{ k-ft/ft} \\ T_u &= 0 \text{ k/ft} \\ V_u &= 3.3811252 \text{ k/ft} \end{aligned}$$

Strength 1 (Design Case 3):

$$\begin{aligned} M_u &= 4.4208977 \text{ k-ft/ft} \\ T_u &= 0 \text{ k/ft} \\ V_u &= 3.6311252 \text{ k/ft} \end{aligned}$$

Project	Belford Ave over Happy Canyon Creek	Client	Belford North Metro District
Subject	Deck Design Check	Made By	AJP
Item	Deck Design - Overhang	Date	01/12/21

NEGATIVE MOMENT DESIGN

Transverse Reinforcement

Cl _r _{top} =	2.00 in	Clear cover of design section
Bar size =	# 5	Negative flexure bars from interior deck design
Bar Spa =	6.0 in	Negative flexure bars from interior deck design
Bar size =	# 5	Extra overhang bars if needed
A _b =	0.62 in ²	Combined area
d _{top} =	6.69 in	Effective depth to top transverse reinforcement, use "Design thickness" + "Structural Haunch"

Ex A _s req'd =	0.40 in ² /ft	→ Maximum:	# 5 @ 9.0 in	A _s =	0.41 in ² /ft

Use :	#5 @ 6 in and #5 @ 6.0 in	→	A _s prv'd =	1.24 in ² /ft	OK

Check Tensioned Controlled Assumption

α ₁ =	0.85		[5.7.3.2]
a =	1.621	A _s f _y / α ₁ f' _c b	[5.7.2.2]
c =	1.965	a/β ₁	

Net Tensile Strain:

ε _{cl} =	0.002	Use φ =	1.00	[5.5.4.2]
ε _{tl} =	0.005			
ε _s =	0.007	(d-c)/c * 0.003		

$$\phi M_n = 36.44 \text{ k-ft} = \phi [A_s f_y (d - a/2)]$$

$$\phi M_n = 36.44 \text{ k-ft} > M_u = 30.73 \text{ k-ft} \quad \text{OK}$$

Check Minimum Reinforcement

M _{cr} = f _r I _g / y _t	Using "Design thickness, T"	[5.7.3.3.2]
γ ₃ =	0.67	specified min. yield str. to ultimate tensile str. reinf. ratio; A615, Grade 60 Reinf.
γ ₁ =	1.6	flexural cracking variability factor for all other concrete structures

f _r =	0.509 ksi	
I _g =	512 in ⁴	Per 1 foot wide strip
y _t =	4.00 in	
M _{cr} =	5.82 k-ft	controls
1.33M _u =	40.88 k-ft	

$$\phi M_n = 36.44 \text{ k-ft} > M_{cr} = 5.82 \text{ k-ft} \quad \text{OK}$$

Project	Belford Ave over Happy Canyon Creek	Client	Belford North Metro District
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Item	Deck Design - Overhang	Date	01/12/21

TENSION DESIGN

Transverse Reinforcement

Top Mat:

Bar size =	# 5 @ 6.0 in	$A_b =$	0.31 in ²
Bundle Bar size =	5.000 @ 6.0 in	$A_b =$	0.31 in ²

Bottom Mat:

Bar size =	# 5 @ 6.0 in	$A_b =$	0.31 in ²

Tension Strength

[5.7.6.1]

$A_s =$	1.86 in ²
$\phi =$	1.00
$\phi P_n =$	111.60 k

$\phi P_n =$	111.60 k-ft	>	$T_u =$	13.73 k-ft	OK

COMBINED LOADING

$M_u / \phi M_n + T_u / \phi P_n < 1$

Extreme Event II (Design Case 1) =	0.97	OK
Extreme Event II (Design Case 2) =	0.10	OK
Strength I (Design Case 1) =	0.12	OK

SHEAR DESIGN

[5.8.3.3]

$\beta =$	2				
$b_v =$	12 in				
$d_v =$	5.88 in				
$\phi =$	0.90				[5.5.4.2]
$\phi V_n = \phi V_c =$	9.4550409 k	$0.0316 \beta f'_c{}^{1/2} b_v d_v$			[E 5.8.3.3-3]
$\phi V_n =$	79.340074 k	$0.25 f'_c b_v d_v$			[E 5.8.3.3-2]
$\phi V_n =$	9.4550409 k	>	$2V_u =$	7.2622504 k	OK [5.8.2.4]

MINIMUM SPACING OF REINFORCING BARS

[5.10.3.1]

Clr =	4.125 in	>	Min Clr =	1.5 in	OK

Project	Belford Ave over Happy Canyon Creek	Client	Belford North Metro District
Subject	Deck Design Check	Made By	AJP Date 01/12/21
Item	Deck Design - Overhang		

CHECK DEVELOPMENT LENGTH

Bar dia = 0.625 in
 l_{hb} = 11.20 in Basic hook development length [E 5.11.2.4.1-1]
Modification Factors [5.11.2.4.2]

λ_{rc} = 0.8 Side cover >2.5in & cover on bar extension >2in
 λ_{cw} = 1.2 Epoxy-coated reinforcing

l_{dh} = 10.75 in

Avail = 16 in > l_{dh} = 10.75 in OK

DETERMINE REINFORCING CUTOFF POINT

Moment at CL of Exterior Girder

Dead Loads:

w_{Deck} = 100 psf
 w_{Soffit} = 57.8125 psf
 $w_{Sidewalk}$ = 167.5 psf
 w_{Rail} = 527.08333 lb/ft

	w (k/ft)	Arm (ft)	Moment (k-ft/ft)	Shear (k/ft)
Deck	0.10	2.13	0.90	0.43
Soffit	0.06	2.61	0.37	0.14
Sidewalk	0.17	2.13	1.51	0.71
Rail	0.53	3.62	1.91	0.53
Total	0.85	5.51	4.70	1.81

Wearing Surface & Utilities:

$w_{Overlay}$ = 36.67 psf
 $w_{Utilities}$ = 5 psf

Overlay	0.00	1.38	0.00	0.00
Utilities	0.01	2.13	0.05	0.02
Total	0.01	9.03	0.05	0.02

Extreme Event II (Design Case 1): **M_u = 33.23 k-ft** (Controls)

Location when Extra Bars Not Needed

Gird Spa. = 7.83 ft
 ϕM_n in deck = 14.74 k-ft
Reduced for Tension = 12.92 k-ft
X = 3.19 ft

(Assumes linear moment diagram from $-M_u$ at exterior support to $+0.5M_u$ at first interior support)

$$M_u / \phi M_n + T_u / \phi P_n < 1$$

Development Length

Bar dia = 0.625 in
 l_{db} = 42.43 in
 λ_{cf} = 1.2
 λ_{rc} = 0.4
 l_d = 20.36 in

Basic Development Length [E 5.11.2.1.1-2]
Coating Factor [5.11.2.1.2]
Reinforcement Confinement Factor [C5.11.2.1.3]

Cutoff Point

d_{top} = 6.69 in
 $15*d_b$ = 9.375 in
 $1/20*Span$ = 4.7 in
Min Extension Length = 20.36 in

[5.11.121]

Cutoff Point = 4.89 ft Distance Past CL of Exterior Girder

Total Length of Bar = 8.97 ft (Not including hook)

I.2.3 Negative Moment Deck Steel Design

Ultimate Moment Values from PGSuper:

Moment, Mu

Location from Left Support (ft)	Design								
	Service I (kip-ft)	Service III (kip-ft)	Fatigue I (kip-ft)	Strength I			Strength II		
				Max (kip-ft)	Min (kip-ft)	* Deck (kip-ft)	Max (kip-ft)	Min (kip-ft)	* Deck (kip-ft)
(0.0L _s) 0.000	-496.07	-496.07	-248.04	-396.52	-2659.64	-2659.64	-396.52	-2185.78	-2185.78
(STRF) 0.446	-475.55	-476.82	-240.94	-374.08	-2593.54	-2593.54	-385.18	-2134.21	-2134.21
0.863	-456.36	-458.84	-234.38	-352.99	-2532.30	-2532.30	-374.68	-2086.30	-2086.29
(FoS) 1.196	-419.80	-423.27	-218.56	-316.95	-2457.13	-2483.61	-347.26	-2021.57	-2048.05
(SZB) 2.200	-310.84	-317.36	-171.74	-208.98	-2234.09	-2338.88	-266.10	-1829.42	-1934.22
(Bar Develop.) 2.568	-271.27	-278.96	-154.86	-169.55	-2153.48	-2286.48	-236.84	-1759.92	-1892.92
(PSXFR) 3.446	-177.66	-188.21	-115.20	-75.83	-1963.72	-2162.90	-168.11	-1595.77	-1794.95
(Bar Develop.) 3.628	-158.43	-169.58	-107.10	-56.48	-1924.90	-2137.58	-154.07	-1562.10	-1774.78
(H) 4.696	-44.88	-60.04	-60.33	67.11	-1708.12	-1917.30	-65.49	-1374.57	-1583.76
(SZB) 5.866	86.07	64.59	-10.66	238.55	-1503.62	-1772.20	50.63	-1195.19	-1463.78
(1.5H) 6.446	150.36	125.65	13.42	323.06	-1404.29	-1701.61	106.90	-1107.34	-1404.66
(0.1L _s) 7.735	290.84	258.84	82.37	508.41	-1179.28	-1538.53	228.39	-915.52	-1274.76
(SZB) 11.366	674.02	619.85	308.75	1020.27	-662.97	-1183.34	828.55	-526.71	-1047.08
(0.2L _s) 15.469	1104.64	1018.48	536.84	1615.56	-308.95	-987.52	1477.69	-207.46	-886.03
(SZB) 19.616	1512.89	1391.82	737.11	2194.25	-19.93	-832.66	2032.12	74.78	-737.96
(0.3L _s) 23.204	1813.30	1666.11	882.99	2641.50	178.45	-729.53	2459.17	267.27	-640.71
(SZB) 30.616	2281.94	2092.20	1099.81	3344.26	505.53	-538.02	3129.75	582.19	-461.36
(0.4L _s) 30.938	2297.19	2106.05	1106.49	3367.22	517.22	-530.35	3151.74	593.36	-454.22
(HP) 31.373	2317.09	2124.11	1115.15	3397.19	532.66	-520.10	3180.48	608.07	-444.68
(0.5L _s) 38.673	2534.58	2320.92	1195.05	3727.22	734.61	-362.83	3520.61	798.06	-299.39
(0.6L _s) 46.407	2541.12	2323.26	1213.46	3748.90	830.64	-226.96	3512.79	881.40	-176.21
(HP) 46.836	2534.95	2317.35	1211.41	3740.59	832.41	-220.36	3500.57	882.46	-170.31
(SZB) 47.592	2522.02	2305.08	1206.83	3722.84	834.63	-208.94	3475.79	883.44	-160.13
(0.7L _s) 54.142	2301.13	2100.52	1112.27	3404.81	805.29	-122.75	3193.31	843.35	-84.68
(SZB) 58.592	2055.32	1873.54	990.31	3048.09	735.65	-77.12	2861.55	766.41	-46.36
(0.8L _s) 61.876	1815.79	1653.62	875.64	2697.06	658.48	-50.18	2526.87	683.85	-24.80
(SZB) 66.842	1357.55	1234.68	661.22	2020.73	500.13	-20.27	1896.56	517.36	-3.04
(0.9L _s) 69.611	1051.38	955.57	514.60	1566.71	390.10	-9.26	1476.98	402.79	3.42
(1.5H) 71.762	788.00	715.84	387.22	1175.17	293.83	-3.51	1111.44	302.99	5.65
(SZB) 72.342	713.07	647.68	350.76	1063.63	266.23	-2.38	1006.80	274.44	5.83
(H) 73.512	557.26	506.03	274.65	831.56	208.57	-0.64	788.48	214.86	5.65
(Bar Develop.) 74.580	409.17	371.47	202.01	610.80	153.47	0.32	580.06	158.00	4.86
(PSXFR) 74.762	383.39	348.05	189.33	572.35	143.85	0.43	543.68	148.08	4.66
(Bar Develop.) 75.640	256.63	232.93	126.90	383.22	96.44	0.68	364.49	99.24	3.47
(SZB) 76.008	202.42	183.71	100.15	302.31	76.12	0.66	287.67	78.32	2.85
(FoS) 77.012	51.30	46.55	25.42	76.63	19.32	0.25	73.02	19.87	0.80
(1.0L _s) 77.345	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77.345	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(STLF) 77.762	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* Deck moment (Mu) is for negative moment deck design, and is from superimposed dead load and live load only.

Nominal Moment Capacities from PGSuper:

#9s @ 6"

$$\phi M_{n_9} := 0.9 \cdot 3685 \cdot \text{kip} \cdot \text{ft} = 3316.5 \text{ kip} \cdot \text{ft}$$

#4s @ 6"

$$\phi M_{n_4} := 0.9 \cdot 780 \cdot \text{kip} \cdot \text{ft} = 702 \text{ kip} \cdot \text{ft}$$

Use Linear Interpolation to Determine Location When Applied Moment is Equivalent to Nominal Moment:

Point when #9 no longer needed:

$$x_l := 25.78 \text{ ft}$$

(Linearly Interpolated in
Xcel, Span 2 controls)

Properties

Steel Yield Strength

$$f_y := 60 \cdot \text{ksi}$$

Deck Concrete Strength

$$f_c := 4.5 \cdot \text{ksi}$$

Concrete Cover to Top Bars

$$c_{top} := 2.0 \text{ in}$$

Bar Spacing

$$s := 6 \text{ in}$$

Determine Splice Lengths:

(5.10.8.2)

#4 Bars

Bar Area

$$A_{bar4} := 0.2 \cdot \text{in}^2$$

Bar Diameter

$$d_{bar4} := 0.5 \cdot \text{in}$$

Basic Development Length

$$l_{dh4} := 2.4 \cdot d_{bar4} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{ksi}}} = 33.9411 \text{ in} \quad (\text{E 5.10.8.2.1a-2})$$

Modification Factors

Coating Factor

$$\lambda_{cf,4} := 1.2 \quad (5.10.8.2.1b)$$

Reinforcement Confinement Factor

$$c_b := \min \left(c_{top} + \frac{d_{bar4}}{2}, \frac{s}{2} \right)$$

$$\lambda_{rc} := \min \left(\max \left(\frac{d_{bar4}}{c_b}, 0.4 \right), 1.0 \right) = 0.4 \quad (\text{E 5.10.8.2.1c-1})$$

(Assuming Atr is 0)

Total Development Length

$$l_{d4} := \lambda_{cf,4} \cdot \lambda_{rc} \cdot l_{dh4} = 1.3576 \text{ ft}$$

Splice Length for Class B Splice

$$l_{splice4} := \text{ceil} \left(1.3 \cdot \frac{l_{d4}}{\text{in}} \right) \text{ in} = 22 \text{ in} \quad (5.10.8.4.3a)$$

Determine Cut-off Length

Girder Height

$$h := 42 \cdot \text{in}$$

Top Deck Cover

$$\text{cover} := 2.0 \cdot \text{in}$$

Deck Thickness

$$t_{deck} := 8 \cdot \text{in}$$

Minimum Haunch

$$t_h := 2.5 \cdot \text{in}$$

#5 Bar Diameter (Top Transverse Steel)

$$d_{bar5} := 0.625 \cdot \text{in}$$

Effective Depth of Deck:

$$d_e := h + t_{deck} + t_h - \text{cover} - 0.5 \cdot d_{bar4} - d_{bar5} = 49.625 \text{ in}$$

Clear span of Bridge

$$L_{span} := 45.74 \text{ ft}$$

Cutoff Length for #4 Bars

$$l_{cut4} := \max \left(15 \cdot d_{bar4}, \frac{l}{20} \cdot L_{span}, d_e, l_{d4} \right) = 4.1354 \text{ ft} \quad (\text{LRFD 5.10.8.1.2a})$$

Minimum Distance #4s must extend from CL Pier

$$d_4 := x_l + l_{cut4} = 29.9154 \text{ ft}$$

Other Splice Lengths Needed

#5 Bars

Bar Area

$$A_{bars} := 0.31 \cdot in^2$$

Bar Diameter

$$d_{bars} := 0.625 \text{ in}$$

Basic Development Length

$$l_{d5} := 2.4 \cdot d_{bars} \cdot \frac{f_y}{\sqrt{f_c \cdot ksi}} = 42.4264 \text{ in} \quad (E 5.10.8.2.1a-2)$$

Modification Factors

Coating Factor

$$\lambda_{cf} = 1.2 \quad (5.10.8.2.1b)$$

Reinforcement Confinement Factor

$$\lambda_{rc} := 0.4 \quad (C5.10.8.2.1c)$$

Total Development Length

$$l_{d5} := \lambda_{cf} \cdot \lambda_{rc} \cdot l_{d5} = 1.6971 \text{ ft}$$

Splice Length for Class B Splice

$$l_{splice5} := \text{ceil} \left(1.3 \cdot \frac{l_{d5}}{in} \right) \cdot in = 27 \text{ in} \quad (5.10.8.4.3a)$$

I.3 Leveling Pad Design

Plain Elastomeric Pad Design - Method A

(LRFD 14.7.6)

Elastomer Properties

Hardness

$$HD := 60$$

(CDOT BDM 14.5.7)

Shear Modulus

$$G := 0.130 \cdot \text{ksi}$$

Minimum Value for HD= 60
(LRFD Table 14.7.6.2-1)

Pad & Abutment Dimensions

Distance from CL Brg to FF Abut

$$d_{ff} := 1.50 \text{ ft}$$

Length (along CL girder)

$$L := 10 \text{ in}$$

Width (perp to CL girder)

$$W := 2 \text{ ft} + 1 \text{ in}$$

Elastomeric Pad Thickness

$$h_{ri} := 0.75 \cdot \text{in}$$

External Layer Thickness

$$h_{re} := 0 \cdot \text{in}$$

Shape Factor

$$S := \frac{L \cdot W}{2 \cdot h_{ri} \cdot (L + W)} = 4.762$$

(LRFD Eq. 14.7.5.1-1)

Compression Stress Check

(LRFD 14.7.6.3.2)

This check is only done for dead loads and through the deck pour per CDOT BDM 14.5.7

Dead Load

$$R_{DL} := 72.0 \text{ kip}$$

(From Service I Bearing
Loads for all DLs, Gir L)

Dead Load Stress

$$\sigma_s := \frac{R_{DL}}{L \cdot W} = 0.288 \text{ ksi}$$

Compressive Stress Limit

$$\sigma_{s\_limit} := \min(1.00 \cdot G \cdot S, 0.80 \cdot \text{ksi}) = 0.619 \text{ ksi}$$

(LRFD Eq. 14.7.6.3.2-1&2)

$$\left\| \begin{array}{l} \text{if } \sigma_s \leq \sigma_{s\_limit} \\ \quad \left\| \begin{array}{l} \text{"OK"} \\ \text{else} \\ \text{"NG"} \end{array} \right\| \end{array} \right\| = \text{"OK"}$$

Compression Deflection Check

Compressive DL Strain

$$\varepsilon_{DL} := \frac{\sigma_s}{4.8 \cdot G \cdot S^2} = 0.02$$

(LRFD Eq. C14.7.5.3.6-1)

Compressive Deflection

$$\Delta_{DL} := \varepsilon_{DL} \cdot h_{ri} = 0.015 \text{ in}$$

(LRFD Eq. 14.7.5.3.6-2)

Compressive Deflection Limit

$$\Delta_{limit} := 0.09 \cdot h_{ri} = 0.068 \text{ in}$$

(LRFD 14.7.6.3.3)

$$\left\| \begin{array}{l} \text{if } \Delta_{DL} \leq \Delta_{limit} \\ \quad \left\| \begin{array}{l} \text{"OK"} \\ \text{else} \\ \text{"NG"} \end{array} \right\| \end{array} \right\| = \text{"OK"}$$

Stability Check

(LRFD 14.7.6.3.6)

$$\left\| \begin{array}{l} \text{if } h_{ri} \leq \min\left(\frac{L}{3}, \frac{W}{3}\right) \\ \quad \left\| \begin{array}{l} \text{"OK"} \\ \text{else} \\ \text{"NG"} \end{array} \right\| \end{array} \right\| = \text{"OK"}$$

Rotation Check

Construction Tolerance

$$\theta_{ct} := 0.005$$

(LRFD 14.4.2.1)

Max Slope Between Supports

$$s_{max} := \frac{5787.27 - 5785.51}{76.49} = 0.023$$

(Girder G Span 2 controls)

Rotation Due to Slope

$$\theta_{sl} := \text{atan}(s_{max}) = 0.023$$

Rotation Due to Defl & Camber

$$\theta_{dc} := \text{atan}\left(\frac{3.330 - 1.1}{0.5 \cdot 76.49 \cdot 12}\right) = 0.005$$

Total Rotation

$$\theta_{tot} := \theta_{dc} - \theta_{ct} - \theta_{sl} = -0.023$$

Maximum Allowable Rotation

$$\theta_a := -\text{atan}\left(\frac{h_r - \Delta_{DL}}{d_{ff}}\right) = -0.041$$

$$\left\| \begin{array}{l} \text{if } \theta_a \leq \theta_{tot} \\ \quad \left\| \begin{array}{l} \text{"OK"} \\ \text{else} \\ \quad \text{"NG"} \end{array} \right\| \end{array} \right\| = \text{"OK"}$$