

BRIDGE LOAD RATING REPORT

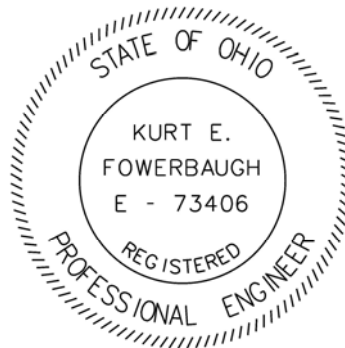
FOR PROPOSED BRIDGE PROJECT No.: 77332 / 85531

BRIDGE NO.: **CUY-90-1627**

SFN: **1809687**

BRIDGE LOAD RATING REPORT

Bridge Description	East 14th Street On-Ramp to I-90 WB (I-90 WB over East 9th Street) Single span prestressed concrete bulb-tee beams with composite reinforced concrete deck supported by MSE wall with stub abutments on piles.			
Work Details	New bridge on new alignment			
Spans (C/C Bearings)	138'-0 7/8" c/c bearing (Maximum span length measured along B4 - B10)			
Bridge Plan Information	Design build submittal to ODOT District 12			
Material Strengths	f'c = 4.5 ksi, f _{ps} = 11.0 ksi, Fy(reinforcing steel) = 60 ksi			
Live Load Distribution	LL Distribution Factor for Interior girders @ 8'-9 3/4" c/c, (AASHTO LRFD, 4th Edition - 2007 Article 4.6.2.2.2b)	n/a		
	LL Distribution Factor for Exterior girder (AASHTO LRFD 4th Edition - 2007 Article 4.6.2.2)	0.831		
Rating Method	Load and Resistance Factor			
Rating Software	VIRTIS			
Special Assumptions				
Structure Rating Summary		Rating	Member	Location
	HL-93 Inventory RF	1.08	Exterior (Beam B1)	96.3% (shear)
	HL-93 Operating RF	1.39	Exterior (Beam B1)	96.3% (shear)
	Ohio Legal Loads (%)	210%	Exterior (Beam B1)	96.3% (shear)
	2F1 (Operating RF)	3.57	Exterior (Beam B1)	96.3% (shear)
	3F1 (Operating RF)	3.12	Exterior (Beam B1)	96.3% (shear)
	4F1 (Operating RF)	2.70	Exterior (Beam B1)	96.3% (shear)
5C1 (Operating RF)	2.11	Exterior (Beam B1)	96.3% (shear)	
Rated by (Name, signature, PE #)	Kurt Fowerbaugh, P.E.	73406		
Company	Shrewsbury & Associates, LLC 7321 Shadeland Station, Suite 160 Indianapolis, IN 46256 Phone: (317) 841-4799 Fax: (317) 841-4790			
Date	Jan 10, 2012			

BRIDGE LOAD RATING REPORT

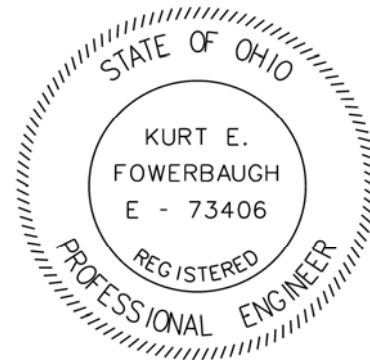
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Material Strengths	f'c = 4.5 ksi, f _{ps} = 11.0 ksi, Fy(reinforcing steel) = 60 ksi			
Live Load Distribution	LL Distribution Factor for Interior girders @ 8'-9 3/4" c/c, (AASHTO LRFD, 4th Edition - 2007 Article 4.6.2.2.2b)	0.714		
	LL Distribution Factor for Exterior girder (AASHTO LRFD 4th Edition - 2007 Article 4.6.2.2)	n/a		
Rating Method	Load and Resistance Factor			
Rating Software	VIRTIS			
Special Assumptions				
Structure Rating Summary		Rating	Member	Location
	HL-93 Inventory RF	1.03	Interior (Beam B5)	96.2% (shear)
	HL-93 Operating RF	1.33	Interior (Beam B5)	96.2% (shear)
	Ohio Legal Loads (%)	200%	Interior (Beam B5)	96.2% (shear)
	2F1 (Operating RF)	3.40	Interior (Beam B5)	96.2% (shear)
	3F1 (Operating RF)	2.97	Interior (Beam B5)	96.2% (shear)
	4F1 (Operating RF)	2.57	Interior (Beam B5)	96.2% (shear)
Rated by (Name, signature, PE #)	Kurt Fowerbaugh, P.E.	73406		
Company	Shrewsbury & Associates, LLC 7321 Shadeland Station, Suite 160 Indianapolis, IN 46256 Phone: (317) 841-4799 Fax: (317) 841-4790			
Date	January 10, 2012			

CUY-20-1627
 BL-6
 LRFR Load Ratings

Analysis Results - PSC Bulb Tee #1

Report Type: Rating Results Summary | Lane/Impact Loading Type: As Requested | Display Format: Multiple rating levels per row

Live Load	Live Load Type	Rating Method	Inventory Load Rating (Ton)	Operating Load Rating (Ton)	Legal Load Rating (Ton)	Permit Load Rating (Ton)	Inventory Rating Factor	Operating Rating Factor	Legal Rating Factor	Permit Rating Factor	Inventory Location (ft)	Inventory Location Span-(%)	Operating Location (ft)	Operating Location Span-(%)	Legal Location (ft)	Permit Location (ft)	Inventory Limit State	Operating Limit State	Legal Limit State	Permit Limit State	Impact	Lane
HS 20-44	Lane	LRFR	74.28	96.29			2.063	2.675			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
2F1	Lane	LRFR	41.27	53.49			2.751	3.566			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
3F1	Lane	LRFR	63.27	82.02			2.751	3.566			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
4F1	Lane	LRFR	74.28	96.29			2.751	3.566			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
5C1	Lane	LRFR	110.04	142.65			2.751	3.566			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HS 25-44	Lane	LRFR	92.85	120.36			2.063	2.675			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HS 20-44	Axle Load	LRFR	57.23	74.18			1.590	2.061			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
2F1	Axle Load	LRFR	54.58	70.75			3.639	4.717			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
3F1	Axle Load	LRFR	55.35	71.74			2.406	3.119			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
4F1	Axle Load	LRFR	56.22	72.87			2.082	2.699			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
5C1	Axle Load	LRFR	65.07	84.35			1.627	2.109			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HS 25-44	Axle Load	LRFR	57.23	74.18			1.272	1.649			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	38.71	50.18			1.075	1.394			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	47.14	61.10			1.309	1.697			132.92	1 - (96.3)	132.92	1 - (96.3)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested

AASHTO LRFR Engine Version 6.3.0.3001

Analysis Results - PSC Bulb Tee #5

Report Type: Rating Results Summary | Lane/Impact Loading Type: As Requested | Display Format: Multiple rating levels per row

Live Load	Live Load Type	Rating Method	Inventory Load Rating (Ton)	Operating Load Rating (Ton)	Legal Load Rating (Ton)	Permit Load Rating (Ton)	Inventory Rating Factor	Operating Rating Factor	Legal Rating Factor	Permit Rating Factor	Inventory Location (ft)	Inventory Location Span-(%)	Operating Location (ft)	Operating Location Span-(%)	Legal Location (ft)	Permit Location (ft)	Inventory Limit State	Operating Limit State	Legal Limit State	Permit Limit State	Impact	Lane
HS 20-44	Lane	LRFR	70.84	91.83			1.968	2.551			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
2F1	Lane	LRFR	39.36	51.02			2.624	3.401			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
3F1	Lane	LRFR	60.34	78.22			2.624	3.401			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
4F1	Lane	LRFR	70.84	91.83			2.624	3.401			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
5C1	Lane	LRFR	104.95	136.04			2.624	3.401			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HS 25-44	Lane	LRFR	88.55	114.79			1.968	2.551			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HS 20-44	Axle Load	LRFR	54.56	70.73			1.516	1.965			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
2F1	Axle Load	LRFR	52.03	67.45			3.469	4.497			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
3F1	Axle Load	LRFR	52.77	68.40			2.294	2.974			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
4F1	Axle Load	LRFR	53.60	69.48			1.985	2.573			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
5C1	Axle Load	LRFR	62.04	80.42			1.551	2.011			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HS 25-44	Axle Load	LRFR	54.56	70.73			1.212	1.572			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HL-93 (US)	Truck + Lane	LRFR	36.91	47.85			1.025	1.329			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested
HL-93 (US)	Tandem + Lane	LRFR	44.95	58.27			1.249	1.619			132.85	1 - (96.2)	132.85	1 - (96.2)			STRENGTH-I Concrete Shear	STRENGTH-I Concrete Shear			As Requested	As Requested

AASHTO LRFR Engine Version 6.3.0.3001

PSCBulbTee1 LRFD Dist Factor

 ** Note that this file contains the distribution factors **
 ** computed by the Opis wizard based on the bridge description **
 ** in Opis on the date and time below. These computed values **
 ** may not match those shown in Opis if the user has changed **
 ** the Opis bridge description after these distribution **
 ** factors were computed. **

Bridge: E 14th St Ramp to I90WB
 Bridge ID: CUY-90-1627 NBI Structure ID: BL-6
 BID: 25

Superstructure Def: 10 Beam System
 Member: PSC BT1
 Member Alternative: PSC Bulb Tee #1

Date: 01/10/2012 Time: 11:59:19 AM

AASHTO LRFD Bridge Design Specifications, Fourth Edition - 2007

Moment Distribution Factor Schedule

Start Distance (ft)	End Distance (ft)	Single Lane DF (Lanes)	Multi Lane DF (Lanes)
0.00	138.07	0.831(L)	0.728(A)*

Shear Distribution Factor Schedule

Start Distance (ft)	End Distance (ft)	Single Lane DF (Lanes)	Multi Lane DF (Lanes)
0.00	13.81	0.855(L)	0.742(A)*
13.81	124.27	0.831(L)	0.721(A)*
124.27	138.07	0.855(L)	0.742(A)*

Deflection Distribution Factor Schedule

Start Distance (ft)	End Distance (ft)	Single Lane DF (Lanes)	Multi Lane DF (Lanes)
0.00	138.07	0.120(A)	0.390(A)

Reaction Distribution Factor Schedule

Support Deflect DF (Lanes)	Moment DF (Lanes)	Single Lane Shear DF (Lanes)	Deflect DF (Lanes)	Moment DF (Lanes)	Multi Lane Shear DF (Lanes)
1	0.831 (L)	0.855 (L)	0.120 (A)	0.728(A)*	0.742(A)*

PSCBulbTee1 LRFD Dist Factor
 2
 0.390 (A) 0.831 (L) 0.855 (L) 0.120 (A) 0.728(A)* 0.742(A)*

Legend:

- (A) = AASHTO Equations
- (L) = AASHTO Lever Rule in AASHTO Tables
- (LO) = Lever Rule Override
- (R) = Rigid Deck Distribution
- * = Single Lane DF governs and will be used in the multi lane analysis

=====
 == Detailed Calculations ==
 =====

=====
 Lever Rule Distribution
 (Article 4.6.2.2)
 =====

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 1

Truck	Truck Left Wheel (ft)	Truck Right Wheel (ft)
1	3.50	9.50

Lever Rule Reaction, R = 0.692

Lever DF = MPF * R = 1.20 * 0.692 = 0.831 Lanes

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 2

Truck	Truck Left Wheel (ft)	Truck Right Wheel (ft)
1	3.50	9.50
2	15.50	21.50

Lever Rule Reaction, R = 0.692

Lever DF = MPF * R = 1.20 * 0.692 = 0.831 Lanes

PSCBul bTee1 LRFD Dist Factor

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 3

Truck	Left Wheel (ft)	Right Wheel (ft)
1	3.50	9.50
2	15.50	21.50
3	27.50	33.50

1	3.50	9.50	
2	15.50	21.50	**Does not contribute to load**
3	27.50	33.50	**Does not contribute to load**

Lever Rule Reaction, R = 0.692

Lever DF = MPF * R = 1.20 * 0.692 = 0.831 Lanes

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 4

Truck	Left Wheel (ft)	Right Wheel (ft)
1	3.50	9.50
2	15.50	21.50
3	27.50	33.50
4	39.50	45.50

1	3.50	9.50	
2	15.50	21.50	**Does not contribute to load**
3	27.50	33.50	**Does not contribute to load**
4	39.50	45.50	**Does not contribute to load**

Lever Rule Reaction, R = 0.692

Lever DF = MPF * R = 1.20 * 0.692 = 0.831 Lanes

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 5

Truck	Left Wheel (ft)	Right Wheel (ft)
1	3.50	9.50
2	15.50	21.50
3	27.50	33.50
4	39.50	45.50
5	51.50	57.50

1	3.50	9.50	
2	15.50	21.50	**Does not contribute to load**
3	27.50	33.50	**Does not contribute to load**
4	39.50	45.50	**Does not contribute to load**
5	51.50	57.50	**Does not contribute to load**

Lever Rule Reaction, R = 0.692

Lever DF = MPF * R = 1.20 * 0.692 = 0.831 Lanes

PSCBul bTee1 LRFD Dist Factor

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 6

Truck	Left Wheel (ft)	Right Wheel (ft)
1	3.50	9.50
2	15.50	21.50
3	27.50	33.50
4	39.50	45.50
5	51.50	57.50
6	63.50	69.50

1	3.50	9.50	
2	15.50	21.50	**Does not contribute to load**
3	27.50	33.50	**Does not contribute to load**
4	39.50	45.50	**Does not contribute to load**
5	51.50	57.50	**Does not contribute to load**
6	63.50	69.50	**Does not contribute to load**

Lever Rule Reaction, R = 0.692

Lever DF = MPF * R = 1.20 * 0.692 = 0.831 Lanes

Rigid Deck Distribution (Article 4.6.2.2d)

Distance from left edge of deck to CG of girder pattern = 43.12 (ft)

Distance from Pattern CG to Each Girder

Girder	X (ft)
1	-39.32
2	-30.55
3	-21.78
4	-13.34
5	-4.53
6	4.28
7	13.09
8	21.91
9	30.72
10	39.53

Compute Rigid Deck Distribution Factors

Input:

NL = 1
 Nb = 10
 Xext = -39.32 (ft)
 SUM(x^2) = 6328.57 (ft^2)

Lane	Ecc. from Pattern CG (ft)
1	-36.62

R = $\frac{NL + Xext \cdot \text{SUM}(e)}{Nb \cdot \text{SUM}(x^2)}$ = 0.328 Lanes

Rigid DF = MPF * R = 1.20 * 0.328 = 0.393 Lanes

PSCBul bTee1 LRFD Dist Factor

Compute Rigid Deck Distribution Factors

 Input:
 NL = 2
 Nb = 10
 Xext = -39.32 (ft)
 SUM(x^2) = 6328.57 (ft^2)

Lane	Ecc. from Pattern CG (ft)
1	-36.62
2	-24.62

$$R = \frac{NL}{Nb} + \frac{Xext \cdot \text{SUM}(e)}{\text{SUM}(x^2)} = 0.581 \text{ Lanes}$$

Rigid DF = MPF * R = 1.00 * 0.581 = 0.581 Lanes

Compute Rigid Deck Distribution Factors

 Input:
 NL = 3
 Nb = 10
 Xext = -39.32 (ft)
 SUM(x^2) = 6328.57 (ft^2)

Lane	Ecc. from Pattern CG (ft)
1	-36.62
2	-24.62
3	-12.62

$$R = \frac{NL}{Nb} + \frac{Xext \cdot \text{SUM}(e)}{\text{SUM}(x^2)} = 0.759 \text{ Lanes}$$

Rigid DF = MPF * R = 0.85 * 0.759 = 0.645 Lanes

Compute Rigid Deck Distribution Factors

 Input:
 NL = 4
 Nb = 10
 Xext = -39.32 (ft)
 SUM(x^2) = 6328.57 (ft^2)

Lane	Ecc. from Pattern CG (ft)
1	-36.62
2	-24.62
3	-12.62
4	-0.62

PSCBul bTee1 LRFD Dist Factor

$$R = \frac{NL}{Nb} + \frac{Xext \cdot \text{SUM}(e)}{\text{SUM}(x^2)} = 0.863 \text{ Lanes}$$

Rigid DF = MPF * R = 0.65 * 0.863 = 0.561 Lanes

Compute Rigid Deck Distribution Factors

 Input:
 NL = 5
 Nb = 10
 Xext = -39.32 (ft)
 SUM(x^2) = 6328.57 (ft^2)

Lane	Ecc. from Pattern CG (ft)
1	-36.62
2	-24.62
3	-12.62
4	-0.62
5	11.38

$$R = \frac{NL}{Nb} + \frac{Xext \cdot \text{SUM}(e)}{\text{SUM}(x^2)} = 0.892 \text{ Lanes}$$

Rigid DF = MPF * R = 0.65 * 0.892 = 0.580 Lanes

Compute Rigid Deck Distribution Factors

 Input:
 NL = 6
 Nb = 10
 Xext = -39.32 (ft)
 SUM(x^2) = 6328.57 (ft^2)

Lane	Ecc. from Pattern CG (ft)
1	-36.62
2	-24.62
3	-12.62
4	-0.62
5	11.38
6	23.38

$$R = \frac{NL}{Nb} + \frac{Xext \cdot \text{SUM}(e)}{\text{SUM}(x^2)} = 0.847 \text{ Lanes}$$

Rigid DF = MPF * R = 0.65 * 0.847 = 0.551 Lanes

=====
 Moment Distribution Factors
 =====

Region 1 PSCBulbTee1 LRFD Dist Factor

 Start Distance: 0.00(ft)
 End Distance: 138.07(ft)
 Moment Type: Positive
 Properties at: 69.04(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

 Properties at: 67.05(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)
 Kg = n(I + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

 Distribution of Live Loads Per Lane for Moment in Interior Beams
 (Article 4.6.2.2.2b Interior Beams with Concrete Decks)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED
 Kg = 3059651.33(in^4) 10,000 <= Kg <= 7,000,000: PASSED

 Compute Moment Distribution Factors

 Input:
 S = 8.77(ft)
 ts = 7.50(in)
 L = 138.07(ft)
 Kg = 3059651.33(in^4)
 Theta = -12.76(Deg)

One Design Lane Loaded:
 DF = 0.06 + (S/14.0)^0.4 * (S/L)^0.3 * (Kg/(12.0L(ts^3)))^0.1 = 0.480 Lanes

Two or More Design Lanes Loaded:
 DF = 0.075 + (S/9.5)^0.6 * (S/L)^0.2 * (Kg/(12.0L(ts^3)))^0.1 = 0.712 Lanes

PSCBulbTee1 LRFD Dist Factor

 *** Exterior Beam DF ***

 Distribution of Live Loads Per Lane for Moment in Exterior Longitudinal Beams
 (Article 4.6.2.2.2d Exterior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

 Compute Moment Distribution Factors

Input:
 Adjacent interior beam Multi Lane DF = 0.712 Lanes
 de = 2.30(ft)

e = 0.77 + de/9.1 = 1.023

One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.728 Lanes

 Reduction of Load Distribution Factors for Moment
 in Longitudinal Beams on Skewed Supports
 (Article 4.6.2.2.2e Skewed Bridges)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 30 <= Theta <= 60: FAILED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

***** WARNING! *****
 One or more range of applicability checks failed.
 The skew correction factor will be set to 1.00.

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.831 * 1.000 = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.728 * 1.000 = 0.728 Lanes

PSCBulbTee1 LRFDDist Factor

Support 1

Start Distance: 0.00(ft)
 End Distance: 0.00(ft)
 Properties at: 0.00(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

Properties at: 1.99(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)
 Kg = n(I + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

Distribution of Live Loads Per Lane for Moment in Interior Beams
 (Article 4.6.2.2.2b Interior Beams with Concrete Decks)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED
 Kg = 3059651.33(in^4) 10,000 <= Kg <= 7,000,000: PASSED

Compute Moment Distribution Factors

Input:
 S = 8.77(ft)
 ts = 7.50(in)
 L = 138.07(ft)
 Kg = 3059651.33(in^4)
 Theta = -12.76(Deg)

One Design Lane Loaded:
 DF = 0.06 + (S/14.0)^0.4 * (S/L)^0.3 * (Kg/(12.0L(ts^3)))^0.1 = 0.480 Lanes

Two or More Design Lanes Loaded:
 DF = 0.075 + (S/9.5)^0.6 * (S/L)^0.2 * (Kg/(12.0L(ts^3)))^0.1 = 0.712 Lanes
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PSCBulbTee1 LRFDDist Factor

 *** Exterior Beam DF ***

Distribution of Live Loads Per Lane for Moment in Exterior Longitudinal Beams
 (Article 4.6.2.2.2d Exterior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

Compute Moment Distribution Factors

Input:
 Adjacent interior beam Multi Lane DF = 0.712 Lanes
 de = 2.30(ft)
 e = 0.77 + de/9.1 = 1.023

One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.728 Lanes

Reduction of Load Distribution Factors for Moment
 in Longitudinal Beams on Skewed Supports
 (Article 4.6.2.2.2e Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 30 <= Theta <= 60: FAILED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

***** WARNING! *****
 One or more range of applicability checks failed.
 The skew correction factor will be set to 1.00.

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.831 * 1.000 = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.728 * 1.000 = 0.728 Lanes
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PSCBul bTee1 LRF D i s t F a c t o r

 Support 2

Start Distance: 138.07(ft)
 End Distance: 138.07(ft)
 Properties at: 138.07(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

Properties at: 136.09(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)
 Kg = n(I + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

 Distribution of Live Loads Per Lane for Moment in Interior Beams
 (Article 4.6.2.2.2b Interior Beams with Concrete Decks)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED
 Kg = 3059651.33(in^4) 10,000 <= Kg <= 7,000,000: PASSED

 Compute Moment Distribution Factors

 Input:
 S = 8.77(ft)
 ts = 7.50(in)
 L = 138.07(ft)
 Kg = 3059651.33(in^4)
 Theta = -12.76(Deg)

One Design Lane Loaded:
 DF = 0.06 + (S/14.0)^0.4 * (S/L)^0.3 * (Kg/(12.0L(ts^3)))^0.1 = 0.480 Lanes

Two or More Design Lanes Loaded:

PSCBul bTee1 LRF D i s t F a c t o r

DF = 0.075 + (S/9.5)^0.6 * (S/L)^0.2 * (Kg/(12.0L(ts^3)))^0.1 = 0.712 Lanes

 *** Exterior Beam DF ***

 Distribution of Live Loads Per Lane for Moment in Exterior Longitudinal Beams
 (Article 4.6.2.2.2d Exterior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

 Compute Moment Distribution Factors

 Input:
 Adjacent interior beam Multi Lane DF = 0.712 Lanes
 de = 2.30(ft)

e = 0.77 + de/9.1 = 1.023

One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.728 Lanes

 Reduction of Load Distribution Factors for Moment
 in Longitudinal Beams on Skewed Supports
 (Article 4.6.2.2.2e Skewed Bridges)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 30 <= Theta <= 60: FAILED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

***** WARNING! *****

One or more range of applicability checks failed.
 The skew correction factor will be set to 1.00.

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.831 * 1.000 = 0.831 Lanes

Two or More Design Lanes Loaded:

PSCBul bTee1 LRF D i s t Factor
 DF = Factor * Skew Correction Factor = 0.728 * 1.000 = 0.728 Lanes

=====
 Shear Distribution Factors
 =====

 Region 1

Start Distance: 0.00(ft)
 End Distance: 13.81(ft)
 Properties at: 6.90(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

 Properties at: 4.92(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)
 Kg = n(I + Aeg²) (4.6.2.2.1-1)
 Kg = 3059651.33(in⁴)

Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

 Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Compute Shear Distribution Factors

 Input:
 S = 8.77(ft)
 One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.711 Lanes

 Two or More Design Lanes Loaded:

PSCBul bTee1 LRF D i s t Factor
 DF = 0.2 + (S/12.0) - (S/35.0)².0 = 0.868 Lanes

 *** Exterior Beam DF ***

 Distribution of Live Load Per Lane for Shear in Exterior Beams
 (Article 4.6.2.2.3b Exterior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

 Compute Shear Distribution Factors

 Input:
 Adjacent interior beam Multi Lane DF = 0.868 Lanes
 de = 2.30(ft)
 e = 0.6 + de/10 = 0.830

 One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

 Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.721 Lanes

 Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

 Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

 Compute Skew Correction Factor

 Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.3(in⁴)
 ts = 7.50(in)

PSCBul bTee1 LRFD Dist Factor
 Correction Factor = $1.0 + 0.2 * (12.0 * L * (ts^3) / Kg)^{0.3} * \tan(\Theta) = 1.029$
 One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = $0.831 * 1.029 = 0.855$ Lanes
 Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = $0.721 * 1.029 = 0.742$ Lanes

 Region 2

 Start Distance: 13.81(ft)
 End Distance: 124.27(ft)
 Properties at: 69.04(ft) (measured along PSC BT1)
 Theta: 0.00(Deg)

 *** Adjacent Interior Beam DF ***

 Properties at: 67.05(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)
 Kg = $n(I + Aeg^2) (4.6.2.2.1-1)$
 Kg = 3059651.33(in⁴)

Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

 Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

 Input:
 S = 8.77(ft)

One Design Lane Loaded:

PSCBul bTee1 LRFD Dist Factor
 DF = $0.36 + (S/25.0) = 0.711$ Lanes
 Two or More Design Lanes Loaded:
 DF = $0.2 + (S/12.0) - (S/35.0)^{2.0} = 0.868$ Lanes

 *** Exterior Beam DF ***

 Distribution of Live Load Per Lane for Shear in Exterior Beams
 (Article 4.6.2.2.3b Exterior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

Compute Shear Distribution Factors

 Input:
 Adjacent interior beam Multi Lane DF = 0.868 Lanes
 de = 2.30(ft)

e = $0.6 + de/10 = 0.830$

One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.721 Lanes

 Region 3

Start Distance: 124.27(ft)
 End Distance: 138.07(ft)
 Properties at: 131.17(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

 Properties at: 129.18(ft) (measured along PSC BT2)

 Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)

PSCBulbTee1 LRF D Dist Factor
 $K_g = n(I + A_{eg}^2) / (4.6.2.2.1-1)$
 $K_g = 3059651.33(in^4)$

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

Input:
 S = 8.77(ft)
 One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.711 Lanes

Two or More Design Lanes Loaded:
 DF = 0.2 + (S/12.0) - (S/35.0)^2.0 = 0.868 Lanes

 *** Exterior Beam DF ***

Distribution of Live Load Per Lane for Shear in Exterior Beams
 (Article 4.6.2.2.3b Exterior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

Compute Shear Distribution Factors

Input:
 Adjacent interior beam Multi Lane DF = 0.868 Lanes
 de = 2.30(ft)

e = 0.6 + de/10 = 0.830

One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

PSCBulbTee1 LRF D Dist Factor
 Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.721 Lanes

Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

Compute Skew Correction Factor

Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.3(in^4)
 ts = 7.50(in)
 Correction Factor = 1.0 + 0.2 * (12.0*L*(ts^3)/Kg)^0.3 * tan(Theta) = 1.029

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.831 * 1.029 = 0.855 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.721 * 1.029 = 0.742 Lanes

Support 1

Start Distance: 0.00(ft)
 End Distance: 0.00(ft)
 Properties at: 0.00(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

 Properties at: 1.99(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

Input:
 n = 1.56
 I = 540257.89(in^4)

PSCBul bTee1 LRF D Dist Factor
 A = 955.60(in^2)
 eg = 38.55(in)
 Kg = n(l + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

Input:
 S = 8.77(ft)

One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.711 Lanes

Two or More Design Lanes Loaded:
 DF = 0.2 + (S/12.0) - (S/35.0)^2.0 = 0.868 Lanes

 *** Exterior Beam DF ***

Distribution of Live Load Per Lane for Shear in Exterior Beams
 (Article 4.6.2.2.3b Exterior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

Compute Shear Distribution Factors

Input:
 Adjacent interior beam Multi Lane DF = 0.868 Lanes
 de = 2.30(ft)

e = 0.6 + de/10 = 0.830

PSCBul bTee1 LRF D Dist Factor
 One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes
 Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.721 Lanes

Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

Compute Skew Correction Factor

Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.3(in^4)
 ts = 7.50(in)

Correction Factor = 1.0 + 0.2 * (12.0*L*(ts^3)/Kg)^0.3 * tan(Theta) = 1.029

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.831 * 1.029 = 0.855 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.721 * 1.029 = 0.742 Lanes

Support 2

Start Distance: 138.07(ft)
 End Distance: 138.07(ft)
 Properties at: 138.07(ft) (measured along PSC BT1)
 Theta: -12.76(Deg)

 *** Adjacent Interior Beam DF ***

 Properties at: 136.09(ft) (measured along PSC BT2)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

PSCBulbTee1 LRFD Dist Factor

Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)
 Kg = n(I + Aeg²) (4.6.2.2.1-1)
 Kg = 3059651.33(in⁴)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

Input:
 S = 8.77(ft)
 One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.711 Lanes

Two or More Design Lanes Loaded:
 DF = 0.2 + (S/12.0) - (S/35.0)² = 0.868 Lanes

 *** Exterior Beam DF ***

Distribution of Live Load Per Lane for Shear in Exterior Beams
 (Article 4.6.2.2.3b Exterior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 de = 2.30(ft) -1.0 <= de <= 5.5: PASSED

Compute Shear Distribution Factors

Input:
 Adjacent interior beam Multi Lane DF = 0.868 Lanes
 de = 2.30(ft)

PSCBulbTee1 LRFD Dist Factor

e = 0.6 + de/10 = 0.830

One Design Lane Loaded:
 Lever Rule DF = 0.831 Lanes

Two or More Design Lanes Loaded:
 DF = e * g(interior) = 0.721 Lanes

Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.77(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

Compute Skew Correction Factor

Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.3(in⁴)
 ts = 7.50(in)
 Correction Factor = 1.0 + 0.2 * (12.0*L*(ts³)/Kg)^{0.3} * tan(Theta) = 1.029

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.831 * 1.029 = 0.855 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.721 * 1.029 = 0.742 Lanes

Deflection Distribution Factors

Region 1
 Start Distance: 0.00(ft)
 End Distance: 138.07(ft)

Compute Deflection Distribution Factors
 (Article 2.5.2.6.2)

PSCBul bTee1 LRFD Dist Factor

Input:
Number lanes = 6 1 Lane MPF = 1.20
Number beams = 10 2 Lane MPF = 1.00
 3 Lane MPF = 0.85
 >3 Lane MPF = 0.65

One Design Lane Loaded:
DF = 1.0/Number beams * MPF = 1.0/10 * 1.20 = 0.120 Lanes

Two or More Design Lanes Loaded:
DF = Number lanes/Number beams * MPF = 6/10 * 0.65 = 0.390 Lanes

Support 1

Start Distance: 0.00(ft)
End Distance: 0.00(ft)

Compute Deflection Distribution Factors
(Article 2.5.2.6.2)

Input:
Number lanes = 6 1 Lane MPF = 1.20
Number beams = 10 2 Lane MPF = 1.00
 3 Lane MPF = 0.85
 >3 Lane MPF = 0.65

One Design Lane Loaded:
DF = 1.0/Number beams * MPF = 1.0/10 * 1.20 = 0.120 Lanes

Two or More Design Lanes Loaded:
DF = Number lanes/Number beams * MPF = 6/10 * 0.65 = 0.390 Lanes

Support 2

Start Distance: 138.07(ft)
End Distance: 138.07(ft)

Compute Deflection Distribution Factors
(Article 2.5.2.6.2)

Input:
Number lanes = 6 1 Lane MPF = 1.20
Number beams = 10 2 Lane MPF = 1.00
 3 Lane MPF = 0.85
 >3 Lane MPF = 0.65

One Design Lane Loaded:
DF = 1.0/Number beams * MPF = 1.0/10 * 1.20 = 0.120 Lanes

Two or More Design Lanes Loaded:
DF = Number lanes/Number beams * MPF = 6/10 * 0.65 = 0.390 Lanes

PSCBulbTee5 LRFD Dist Factor

 ** Note that this file contains the distribution factors **
 ** computed by the Opis wizard based on the bridge description **
 ** in Opis on the date and time below. These computed values **
 ** may not match those shown in Opis if the user has changed **
 ** the Opis bridge description after these distribution **
 ** factors were computed. **

Bridge: E 14th St Ramp to I90WB
 Bridge ID: CUY-90-1627 NBI Structure ID: BL-6
 BID: 25

Superstructure Def: 10 Beam System
 Member: PSC BT5
 Member Alternative: PSC Bulb Tee #5

Date: 01/10/2012 Time: 11:58:31 AM

AASHTO LRFD Bridge Design Specifications, Fourth Edition - 2007

Moment Distribution Factor Schedule

Start Distance (ft)	End Distance (ft)	Single Lane DF (Lanes)	Multi Lane DF (Lanes)
0.00	138.07	0.482(A)	0.714(A)

Shear Distribution Factor Schedule

Start Distance (ft)	End Distance (ft)	Single Lane DF (Lanes)	Multi Lane DF (Lanes)
0.00	13.81	0.733(A)	0.896(A)
13.81	124.27	0.712(A)	0.871(A)
124.27	138.07	0.733(A)	0.896(A)

Deflection Distribution Factor Schedule

Start Distance (ft)	End Distance (ft)	Single Lane DF (Lanes)	Multi Lane DF (Lanes)
0.00	138.07	0.120(A)	0.390(A)

Reaction Distribution Factor Schedule

Support Deflect DF (Lanes)	Moment DF (Lanes)	Single Lane Shear DF (Lanes)	Deflect DF (Lanes)	Moment DF (Lanes)	Multi Lane Shear DF (Lanes)
1	0.482 (A)	0.733 (A)	0.120 (A)	0.714 (A)	0.896 (A)

PSCBulbTee5 LRFD Dist Factor
 2
 0.390 (A) 0.482 (A) 0.733 (A) 0.120 (A) 0.714 (A) 0.896 (A)

Legend:

- (A) = AASHTO Equations
- (L) = AASHTO Lever Rule in AASHTO Tables
- (LO) = Lever Rule Override
- (R) = Rigid Deck Distribution
- * = Single Lane DF governs and will be used in the multi lane analysis

=====
 == Detailed Calculations ==
 =====

=====
 Lever Rule Distribution
 (Article 4.6.2.2)
 =====

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 1

Truck	Truck Wheel Left Wheel (ft)	Truck Wheel Right Wheel (ft)
1	38.59	44.59

Lever Rule Reaction, R = 0.660

Lever DF = MPF * R = 1.20 * 0.660 = 0.791 Lanes

Compute Lever Rule Deck Distribution Factors

Number Lanes Loaded = 2

Truck	Truck Wheel Left Wheel (ft)	Truck Wheel Right Wheel (ft)
1	38.59	44.59
2	28.59	34.59

Lever Rule Reaction, R = 0.933

Lever DF = MPF * R = 1.00 * 0.933 = 0.933 Lanes

PSCBulbTee5 LRFDDist Factor

=====
 Moment Distribution Factors
 =====

 Region 1

Start Distance: 0.00(ft)
 End Distance: 138.07(ft)
 Moment Type: Positive
 Properties at: 69.04(ft)
 Theta: -12.76(Deg)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)

Kg = n(I + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

 Distribution of Live Loads Per Lane for Moment in Interior Beams
 (Article 4.6.2.2.2b Interior Beams with Concrete Decks)

Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED
 Kg = 3059651.33(in^4) 10,000 <= Kg <= 7,000,000: PASSED

 Compute Moment Distribution Factors

Input:
 S = 8.81(ft)
 ts = 7.50(in)
 L = 138.07(ft)
 Kg = 3059651.33(in^4)
 Theta = -12.76(Deg)

One Design Lane Loaded:
 DF = 0.06 + (S/14.0)^0.4 * (S/L)^0.3 * (Kg/(12.0L(ts^3)))^0.1 = 0.482 Lanes

PSCBulbTee5 LRFDDist Factor

Two or More Design Lanes Loaded:
 DF = 0.075 + (S/9.5)^0.6 * (S/L)^0.2 * (Kg/(12.0L(ts^3)))^0.1 = 0.714 Lanes

 Reduction of Load Distribution Factors for Moment
 in Longitudinal Beams on Skewed Supports
 (Article 4.6.2.2.2e Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 30 <= Theta <= 60: FAILED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

***** WARNING! *****
 One or more range of applicability checks failed.
 The skew correction factor will be set to 1.00.

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.482 * 1.000 = 0.482 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.714 * 1.000 = 0.714 Lanes

 Support 1

Start Distance: 0.00(ft)
 End Distance: 0.00(ft)
 Properties at: 0.00(ft)
 Theta: -12.76(Deg)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)

Kg = n(I + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

 Distribution of Live Loads Per Lane for Moment in Interior Beams
 (Article 4.6.2.2.2b Interior Beams with Concrete Decks)

Cross section type: Type K from Table 4.6.2.2.1-1)

PSCBulbTee5 LRF D Dist Factor

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED
 Kg = 3059651.33(in^4) 10,000 <= Kg <= 7,000,000: PASSED

Compute Moment Distribution Factors

Input:
 S = 8.81(ft)
 ts = 7.50(in)
 L = 138.07(ft)
 Kg = 3059651.3(in^4)
 Theta = -12.76(Deg)

One Design Lane Loaded:
 $DF = 0.06 + (S/14.0)^{0.4} * (S/L)^{0.3} * (Kg/(12.0L(ts^3)))^{0.1} = 0.482$ Lanes

Two or More Design Lanes Loaded:
 $DF = 0.075 + (S/9.5)^{0.6} * (S/L)^{0.2} * (Kg/(12.0L(ts^3)))^{0.1} = 0.714$ Lanes

Reduction of Load Distribution Factors for Moment in Longitudinal Beams on Skewed Supports (Article 4.6.2.2.2e Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 30 <= Theta <= 60: FAILED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

***** WARNING! *****
 One or more range of applicability checks failed.
 The skew correction factor will be set to 1.00.

One Design Lane Loaded:
 $DF = \text{Factor} * \text{Skew Correction Factor} = 0.482 * 1.000 = 0.482$ Lanes

Two or More Design Lanes Loaded:
 $DF = \text{Factor} * \text{Skew Correction Factor} = 0.714 * 1.000 = 0.714$ Lanes

Support 2

PSCBulbTee5 LRF D Dist Factor

Start Distance: 138.07(ft)
 End Distance: 138.07(ft)
 Properties at: 138.07(ft)
 Theta: -12.76(Deg)

Longitudinal Stiffness Parameter, Kg, Calculation (Article 4.6.2.2 Beam-Slab Bridges)

Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)

$Kg = n(I + Aeg^2) (4.6.2.2.1-1)$
 $Kg = 3059651.33(in^4)$

Distribution of Live Loads Per Lane for Moment in Interior Beams (Article 4.6.2.2.2b Interior Beams with Concrete Decks)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED
 Kg = 3059651.33(in^4) 10,000 <= Kg <= 7,000,000: PASSED

Compute Moment Distribution Factors

Input:
 S = 8.81(ft)
 ts = 7.50(in)
 L = 138.07(ft)
 Kg = 3059651.3(in^4)
 Theta = -12.76(Deg)

One Design Lane Loaded:
 $DF = 0.06 + (S/14.0)^{0.4} * (S/L)^{0.3} * (Kg/(12.0L(ts^3)))^{0.1} = 0.482$ Lanes

Two or More Design Lanes Loaded:
 $DF = 0.075 + (S/9.5)^{0.6} * (S/L)^{0.2} * (Kg/(12.0L(ts^3)))^{0.1} = 0.714$ Lanes

Reduction of Load Distribution Factors for Moment in Longitudinal Beams on Skewed Supports (Article 4.6.2.2.2e Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

PSCBulbTee5 LRFD Dist Factor

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 30 <= Theta <= 60: FAILED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

***** WARNING! *****
 One or more range of applicability checks failed.
 The skew correction factor will be set to 1.00.

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.482 * 1.000 = 0.482 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.714 * 1.000 = 0.714 Lanes

=====
 Shear Distribution Factors
 =====

 Region 1

Start Distance: 0.00(ft)
 End Distance: 13.81(ft)
 Properties at: 6.90(ft)
 Theta: -12.76(Deg)

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

Input:
 n = 1.56
 I = 540257.89(in^4)
 A = 955.60(in^2)
 eg = 38.55(in)

Kg = n(I + Aeg^2) (4.6.2.2.1-1)
 Kg = 3059651.33(in^4)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

PSCBulbTee5 LRFD Dist Factor

 Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

Input:
 S = 8.81(ft)

One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.712 Lanes

Two or More Design Lanes Loaded:
 DF = 0.2 + (S/12.0) - (S/35.0)^2.0 = 0.871 Lanes

 Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

Compute Skew Correction Factor

Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.3(in^4)
 ts = 7.50(in)

Correction Factor = 1.0 + 0.2 * (12.0*L*(ts^3)/Kg)^0.3 * tan(Theta) = 1.029

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.712 * 1.029 = 0.733 Lanes

Two or More Design Lanes Loaded:
 DF = Factor * Skew Correction Factor = 0.871 * 1.029 = 0.896 Lanes

 Region 2

Start Distance: 13.81(ft)
 End Distance: 124.27(ft)
 Properties at: 69.04(ft)
 Theta: 0.00(Deg)

PSCBul bTee5 LRFD Dist Factor

Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)
 Kg = n(I + Aeg²) (4.6.2.2.1-1)
 Kg = 3059651.33(in⁴)

Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

 Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

 Input:
 S = 8.81(ft)
 One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.712 Lanes
 Two or More Design Lanes Loaded:
 DF = 0.2 + (S/12.0) - (S/35.0)^{2.0} = 0.871 Lanes

 Region 3

 Start Distance: 124.27(ft)
 End Distance: 138.07(ft)
 Properties at: 131.17(ft)
 Theta: -12.76(Deg)

 Longitudinal Stiffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)

PSCBul bTee5 LRFD Dist Factor

eg = 38.55(in)
 Kg = n(I + Aeg²) (4.6.2.2.1-1)
 Kg = 3059651.33(in⁴)

Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

 Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

 Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

 Input:
 S = 8.81(ft)
 One Design Lane Loaded:
 DF = 0.36 + (S/25.0) = 0.712 Lanes
 Two or More Design Lanes Loaded:
 DF = 0.2 + (S/12.0) - (S/35.0)^{2.0} = 0.871 Lanes

 Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

 Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

 Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

Compute Skew Correction Factor

 Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.33(in⁴)
 ts = 7.50(in)

PSCBul bTee5 LRFD Di st Factor

Correcti on Factor = $1.0 + 0.2 * (12.0 * L * (ts^3) / Kg)^{0.3} * \tan(\Theta) = 1.029$

One Design Lane Loaded:

DF = Factor * Skew Correction Factor = $0.712 * 1.029 = 0.733$ Lanes

Two or More Design Lanes Loaded:

DF = Factor * Skew Correction Factor = $0.871 * 1.029 = 0.896$ Lanes

 Support 1

Start Distance: 0.00(ft)
 End Distance: 0.00(ft)
 Properties at: 0.00(ft)
 Theta: -12.76(Deg)

Longi tudinal Sti ffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)

$Kg = n(I + Aeg^2)$ (4.6.2.2.1-1)
 $Kg = 3059651.33(in^4)$

 Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

 Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

 Compute Shear Di stribution Factors

Input:
 S = 8.81(ft)

One Design Lane Loaded:
 DF = $0.36 + (S/25.0) = 0.712$ Lanes

Two or More Design Lanes Loaded:
 DF = $0.2 + (S/12.0) - (S/35.0)^{2.0} = 0.871$ Lanes

PSCBul bTee5 LRFD Di st Factor

 Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

 Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

 Compute Skew Correction Factor

Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.33(in⁴)
 ts = 7.50(in)

Correcti on Factor = $1.0 + 0.2 * (12.0 * L * (ts^3) / Kg)^{0.3} * \tan(\Theta) = 1.029$

One Design Lane Loaded:

DF = Factor * Skew Correction Factor = $0.712 * 1.029 = 0.733$ Lanes

Two or More Design Lanes Loaded:

DF = Factor * Skew Correction Factor = $0.871 * 1.029 = 0.896$ Lanes

 Support 2

Start Distance: 138.07(ft)
 End Distance: 138.07(ft)
 Properties at: 138.07(ft)
 Theta: -12.76(Deg)

Longi tudinal Sti ffness Parameter, Kg, Calculation
 (Article 4.6.2.2 Beam-Slab Bridges)

 Input:
 n = 1.56
 I = 540257.89(in⁴)
 A = 955.60(in²)
 eg = 38.55(in)

$Kg = n(I + Aeg^2)$ (4.6.2.2.1-1)
 $Kg = 3059651.33(in^4)$

PSCBul bTee5 LRFD Dist Factor

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 ts = 7.50(in) 4.5 <= ts <= 12.0: PASSED
 Nb = 10 Nb >= 4: PASSED

Distribution of Live Load Per Lane for Shear in Interior Beams
 (Article 4.6.2.2.3a Interior Beams)

Cross section type: Type K from Table 4.6.2.2.1-1)

Compute Shear Distribution Factors

Input:
 S = 8.81(ft)

One Design Lane Loaded:
 DF = $0.36 + (S/25.0) = 0.712$ Lanes

Two or More Design Lanes Loaded:
 DF = $0.2 + (S/12.0) - (S/35.0)^2.0 = 0.871$ Lanes

Correction Factors for Load Distribution Factors
 for Support Shear of the Obtuse Corner
 (Article 4.6.2.2.3c Skewed Bridges)

Cross section type: Type K from Table 4.6.2.2.1-1)

Check Range of Applicability

Cross section type: Type K from Table 4.6.2.2.1-1)

Input:
 Theta = -12.76(Deg) 0 <= Theta <= 60: PASSED
 S = 8.81(ft) 3.5 <= S <= 16.0: PASSED
 L = 138.07(ft) 20 <= L <= 240: PASSED
 Nb = 10 Nb >= 4: PASSED

Compute Skew Correction Factor

Input:
 Theta = -12.76(Deg)
 L = 138.07(ft)
 Kg = 3059651.3(in^4)
 ts = 7.50(in)

Correction Factor = $1.0 + 0.2 * (12.0 * L * (ts^3) / Kg)^{0.3} * \tan(\text{Theta}) = 1.029$

One Design Lane Loaded:
 DF = Factor * Skew Correction Factor = 0.712 * 1.029 = 0.733 Lanes

PSCBul bTee5 LRFD Dist Factor

Two or More Design Lanes Loaded:

DF = Factor * Skew Correction Factor = 0.871 * 1.029 = 0.896 Lanes

Deflection Distribution Factors

Region 1

Start Distance: 0.00(ft)
 End Distance: 138.07(ft)

Compute Deflection Distribution Factors
 (Article 2.5.2.6.2)

Input:
 Number lanes = 6 1 Lane MPF = 1.20
 Number beams = 10 2 Lane MPF = 1.00
 3 Lane MPF = 0.85
 >3 Lane MPF = 0.65

One Design Lane Loaded:
 DF = $1.0 / \text{Number beams} * \text{MPF} = 1.0 / 10 * 1.20 = 0.120$ Lanes

Two or More Design Lanes Loaded:
 DF = $\text{Number lanes} / \text{Number beams} * \text{MPF} = 6 / 10 * 0.65 = 0.390$ Lanes

Support 1

Start Distance: 0.00(ft)
 End Distance: 0.00(ft)

Compute Deflection Distribution Factors
 (Article 2.5.2.6.2)

Input:
 Number lanes = 6 1 Lane MPF = 1.20
 Number beams = 10 2 Lane MPF = 1.00
 3 Lane MPF = 0.85
 >3 Lane MPF = 0.65

One Design Lane Loaded:
 DF = $1.0 / \text{Number beams} * \text{MPF} = 1.0 / 10 * 1.20 = 0.120$ Lanes

Two or More Design Lanes Loaded:
 DF = $\text{Number lanes} / \text{Number beams} * \text{MPF} = 6 / 10 * 0.65 = 0.390$ Lanes

Support 2

Start Distance: 138.07(ft)
 End Distance: 138.07(ft)

PSCBul bTee5 LRFD Dist Factor

Compute Deflection Distribution Factors
(Article 2.5.2.6.2)

Input:
Number lanes = 6 1 Lane MPF = 1.20
Number beams = 10 2 Lane MPF = 1.00
 3 Lane MPF = 0.85
 >3 Lane MPF = 0.65

One Design Lane Loaded:
DF = 1.0/Number beams * MPF = 1.0/10 * 1.20 = 0.120 Lanes

Two or More Design Lanes Loaded:
DF = Number Lanes/Number beams * MPF = 6/10 * 0.65 = 0.390 Lanes

Username: virtis
 Date: Thursday, January 12, 2012 19:43:07

Bridge ID CUY-90-1627 LRFR E 14th St Ramp to I90WB

NBI Structure ID (8): BL-6 LRFR
 Description: Single Span Prestressed Concrete Bulb-Tee Bridge
 Rated by: Jennifer L. Hart, PE (Shrewsberry)
 Reviewed by: Kurt E. Fowerbaugh, PE (Shrewsberry)

Superstructure Definition 10 Beam System

Definition

Units: US Customary
 Number of spans: 1
 Number of girders: 10

Length
 Span (ft)
 1 138.0730

Frame Structure Simplified Definition:
 Support Frame Connection

1
 2
 Girder Spacing Display Type: Perpendicular
 Average Humidity: 70.000 (%)

Analysis

Default Library Factors

Factor Override

Analysis Module

Analysis Method: ASD

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module:

Analysis Module Component:

Properties:

Default rating method: LFD

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Structure Framing Plan Details

Layout

Skew
 Support (Degrees)
 1 -12.7550
 2 -12.7550

Girder Spacing Orientation: Perpendicular

Girder Bay	Girder Spacing	
	Start (ft)	End (ft)
1	8.7700	8.7700
2	8.7700	8.7700
3	8.4375	8.4375
4	8.8125	8.8125
5	8.8125	8.8125
6	8.8125	8.8125
7	8.8125	8.8125
8	8.8125	8.8125
9	8.8125	8.8125

Diaphragms

Girder Bay 1

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.56	33.57	34.52	2	0.2503
35.56	33.57	0.00	1	0.2503
138.07	138.07	0.00	1	

Girder Bay 2

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.56	33.57	34.52	2	0.2503
35.56	33.57	0.00	1	0.2503
138.07	138.07	0.00	1	

Girder Bay 3

Distance	Distance	Diaphragm	Number of	Diaphragm
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Left Girder (ft)	Right Girder (ft)	Spacing (ft)	Spaces	Weight (kip)
0.00	0.00	0.00	1	
35.48	33.57	0.00	1	0.2503
35.48	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Girder Bay 4

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.57	33.57	0.00	1	0.2503
35.57	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Girder Bay 5

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.57	33.57	0.00	1	0.2503
35.57	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Girder Bay 6

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.57	33.57	0.00	1	0.2503
35.57	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Girder Bay 7

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.57	33.57	0.00	1	0.2503
35.57	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Girder Bay 8

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	
35.57	33.57	0.00	1	0.2503
35.57	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Girder Bay 9

Distance Left Girder (ft)	Distance Right Girder (ft)	Diaphragm Spacing (ft)	Number of Spaces	Diaphragm Weight (kip)
0.00	0.00	0.00	1	

35.57	33.57	0.00	1	0.2503
35.57	33.57	34.52	2	0.2503
138.07	138.07	0.00	1	

Structure Typical Section

Deck

Left start width:	42.96 (ft)
Left end width:	42.96 (ft)
Right start width:	42.96 (ft)
Right end width:	42.96 (ft)
Left start overhang:	3.80 (ft)
Left end overhang:	3.80 (ft)

Deck (Cont'd)

Deck concrete:	QSC2 - 4500psi
Total deck thickness:	8.5000 (in)
Deck crack control parameter:	(kip/in)
Sustained modular ratio factor:	3.000

Parapet

Name	Load Case	Measure To	Measured From	Distance At Start	Distance At End	Front Face Orientation
3'-6" Par...	DC2	Front	Left Ed...	1.50	1.50	Right
4'-9" Par...	DC2	Front	Right E...	1.50	1.50	Left

Lane Position

Offset Left Start:	-41.46 (ft)
Offset Left End:	-41.46 (ft)
Offset Right Start:	41.46 (ft)
Offset Right End:	41.46 (ft)

Wearing Surface

Wearing surface material:

Description:	
Wearing surface thickness:	(in)
Wearing surface density:	(pcf)
Load case:	DW

Load Case Description

Load Case Name	Description	Stage	Type	Time (Days)
DC2	DC acting on long-ter...		Composite (long te...	D,DC
DW	DW acting on long-ter...		Composite (long te...	D,DW
SIP Forms	Weight due to stay-in...		Non-composite (Sta...	D,DC

Superstructure Loads

DL Distribution

Stage 1 Dead Load Distribution: Tributary Area
 Stage 2 Dead Load Distribution: Uniformly to All Girders

Stiffener Definitions

Stress Limits

Name: **PSC Properties**
 Description: PSC Properties
 Concrete material: PSC 11.0 ksi
 Initial allowable tension (LFD): 0.200 (ksi)
 Initial allowable compression (LFD): 4.500 (ksi)
 Final allowable slab compression (LFD): (ksi)
 Final allowable tension (LFD): 0.630 (ksi)
 Final allowable DL compression (LFD): 4.400 (ksi)
 Final allowable compression (LFD): 6.600 (ksi)
 Final allowable compression (LL + 1/2(Pe+DL)) (LFD): 4.400 (ksi)
 Initial allowable tension (LRFD): 0.200 (ksi)
 Initial allowable compression (LRFD): 4.500 (ksi)
 Final allowable slab compression (LRFD): (ksi)
 Final allowable tension (LRFD): 0.630 (ksi)
 Final allowable DL compression (LRFD): 4.950 (ksi)
 Final allowable compression (LRFD): 6.600 (ksi)
 Final allowable compression (LL + 1/2(Pe+DL)) (LRFD): 4.400 (ksi)

Prestress Properties

Name: **PS Properties**
General Prestress Data
 Prestressing Strand: 0.6" (7W-270) LR
 Loss Method: AASHTO Refined
 Jacking stress ratio: 0.750
 Transfer stress ratio:
 Transfer time: 24.0 (Hours)
 AASHTO - Dead load percent: 0.0 (%)
Loss Data - PCI
 PCI - Maturity coefficient:
 PCI - Ultimate creep loss: (ksi)
 PCI - Ultimate shrinkage loss: (ksi)
 PCI - Additional time 1: (Days)
 PCI - Additional time 2: (Days)
 PCI - Additional time 3: (Days)
 PCI - Additional time 4: (Days)
 PCI - Additional time 5: (Days)
 PCI - Additional time 6: (Days)
 PCI - Additional time 7: (Days)
 PCI - Additional time 8: (Days)
 PCI - Additional time 9: (Days)
 PCI - Additional time 10: (Days)
Loss Data - Lump-sum
 Lump-sum - Composite loss: (ksi)
 Lump-sum - Continuous loss: (ksi)
 Lump-sum - Final loss: (ksi)

Shear Reinforcement Definitions - Vertical

Name: **401**
 Vertical Reinforcement: Grade 60 EC
 Vertical Rebar: 4

Number of legs (Vertical): 2.00
 Inclination angle alpha (Vertical): 90.0 (Degrees)
 No horizontal shear reinforcement definitions.

Member PSC BT1

Link with: None
 Description:
 Existing: PSC Bulb Tee #1 -
 Current: PSC Bulb Tee #1 -
 Number of Spans: 1

Span	Span Length
Number	(ft)
1	138.073000

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

<u>General</u>				
Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #1

Description:
 Description:
 Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary

Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFDF
 Analysis Module: AASHTO LRFDF
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Inventory Operating

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

D i s t r i b u t i o n F a c t o r (Wheels)

Lanes	Shear	Shear at Supports	Moment	Deflection
Loaded				
1 Lane	1.385	1.385	1.385	0.200
Multi-Lane	1.385	1.385	1.385	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.831	0.831
0.00	13.81	Shear	0.855	0.855
13.81	110.46	Shear	0.831	0.831
124.27	13.81	Shear	0.855	0.855
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
					Projection
	Projection	Creep			

1 Modified AASH... PSC 11.0 ksi PS Properties (in) (in)
 10.000... TRUE 10.000...

Continuous Support Details

Support Number Support Distance on Left, SL (in) Support Distance on Right, SR (in)

1

2

Stress Limit Ranges

Stress Limit Span Start Distance (ft) Length (ft)
 PSC Properties 1 0.000 139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span No.	Material Bar	Left Support		Right Support	
		Distance Bar	Bar Count	Distance Bar	Bar Count

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1	Left	1	1	Harp			0.0000
	Right						0.0000
1	Left	1	2	Harp			0.0000
	Right						0.0000
1	Left	1	3	Harp			0.0000
	Right						0.0000
1	Left	1	4	Harp			0.0000
	Right						0.0000

1	Left	1	5	Harp			0.0000
	Right						0.0000
1	Left	1	6	Harp			0.0000
	Right						0.0000
1	Left	1	7	Harp			0.0000
	Right						0.0000
1	Left	1	8	Harp			0.0000
	Right						0.0000
1	Left	1	9	Harp			0.0000
	Right						0.0000
1	Left	1	10	Harp			0.0000
	Right						0.0000
1	Left	1	11	Harp			0.0000
	Right						0.0000
1	Left	2	1	Harp			0.0000
	Right						0.0000
1	Left	2	2	Harp			0.0000
	Right						0.0000
1	Left	2	3	Harp			0.0000
	Right						0.0000
1	Left	2	4	Harp			0.0000
	Right						0.0000
1	Left	20	1	Harp			62.88
	Right	20	1				62.88
1	Left	20	2	Harp			62.88
	Right	20	2				62.88
1	Left	20	3	Harp			62.88
	Right	20	3				62.88
1	Left	20	4	Harp			0.0000
	Right						0.0000
1	Left	20	5	Harp			0.0000
	Right						0.0000
1	Left	20	6	Harp			0.0000
	Right						0.0000
1	Left	20	7	Harp			0.0000
	Right						0.0000
1	Left	20	8	Harp			0.0000
	Right						0.0000
1	Left	20	9	Harp			0.0000
	Right						0.0000
1	Left	20	10	Harp			0.0000
	Right						0.0000
1	Left	20	11	Harp			0.0000

1	Right	2	11	Harped	0.0000	
	Left				0.0000	
1	Right	3	1	Harped	0.0000	
	Left				0.0000	
1	Right	3	2	Harped	0.0000	
	Left				0.0000	
1	Right	3	3	Harped	0.0000	
	Left				0.0000	
1	Right	3	4	Harped	0.0000	
	Left				0.0000	
1	Right	3	5	Harped	0.0000	
	Left	21	1		62.88	
	Right	21	1		62.88	
1	Right	3	6	Harped	0.0000	
	Left	21	2		62.88	
	Right	21	2		62.88	
1	Right	3	7	Harped	0.0000	
	Left	21	3		62.88	
	Right	21	3		62.88	
1	Right	3	8	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	3	9	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	3	10	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	3	11	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	4	1	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	4	2	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	4	3	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	4	4	Harped	0.0000	
	Left				0.0000	
	Right				0.0000	
1	Right	4	5	Harped	0.0000	

	Left	22	1		62.88	0.0000
	Right	22	1		62.88	0.0000
1	Right	4	6	Harped		
	Left	22	2		62.88	0.0000
	Right	22	2		62.88	0.0000
1	Right	4	7	Harped		
	Left	22	3		62.88	0.0000
	Right	22	3		62.88	0.0000
1	Right	4	8	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	4	9	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	4	10	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	4	11	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	5	1	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	5	2	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	5	3	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	5	4	Harped		
	Left	23	1		62.88	0.0000
	Right	23	1		62.88	0.0000
1	Right	5	5	Harped		
	Left	23	2		62.88	0.0000
	Right	23	2		62.88	0.0000
1	Right	5	6	Harped		
	Left	23	3		62.88	0.0000
	Right	23	3		62.88	0.0000
1	Right	5	7	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	5	8	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	5	9	Harped		
	Left				0.0000	
	Right				0.0000	
1	Right	6	1	Harped		
	Left				0.0000	
	Right				0.0000	

1	6	2	Harped		
Left	24	1		62.88	0.0000
Right	24	1		62.88	0.0000
1	6	3	Harped		
Left	24	2		62.88	0.0000
Right	24	2		62.88	0.0000
1	6	4	Harped		
Left	24	3		62.88	0.0000
Right	24	3		62.88	0.0000
1	6	5	Harped		
Left					0.0000
Right					0.0000

Deck Profile

Deck Concrete

Material (LRFD)	Distance n (ft)	Length (ft)	Total Thickness (in)	Structural Thickness (in)	Effective Width (Std) (in)	Effective Width (in)
QSC2 - 4500ps...	0.00	138.07		7.5000	98.2440	98.2440
	7.50...					

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Z3 (in)	Z4 (in)	Y1 (in)	Y2 (in)	Y3 (in)
0.00	138.07	0.0000	0.0000	0.0000	0.0000	2.0000	0.0000	0.0000
	0.0000							

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT2

Link with: None

Description:

Existing: PSC Bulb Tee #2 -
 Current: PSC Bulb Tee #2 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #2

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)
 Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Inventory Operating

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC

Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

D i s t r i b u t i o n F a c t o r (Wheels)

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.253	1.316	1.253	0.200
Multi-Lane	1.595	1.860	1.595	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.480	0.712
0.00	13.81	Shear	0.731	0.893
13.81	110.46	Shear	0.711	0.868
124.27	13.81	Shear	0.731	0.893
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
				(in)	(in)
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties	10.000...	

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type:	Intentionally Roughened
Interface width:	(in)
Deck cohesion factor:	0.280 (ksi)
Deck friction factor:	1.000

Continuity Diaphragm

Span No.	Material Bar	Left Support		Right Support	
		Distance Bar	Bar Count	Material	Distance Bar Count

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			
	Left						0.0000
	Right						0.0000
1		1	2	Harped			
	Left						0.0000
	Right						0.0000
1		1	3	Harped			
	Left						0.0000
	Right						0.0000
1		1	4	Harped			
	Left						0.0000
	Right						0.0000
1		1	5	Harped			
	Left						0.0000
	Right						0.0000
1		1	6	Harped			
	Left						0.0000
	Right						0.0000

	Left							0.0000
	Right							0.0000
1		1	7	Harped				
	Left							0.0000
	Right							0.0000
1		1	8	Harped				
	Left							0.0000
	Right							0.0000
1		1	9	Harped				
	Left							0.0000
	Right							0.0000
1		1	10	Harped				
	Left							0.0000
	Right							0.0000
1		1	11	Harped				
	Left							0.0000
	Right							0.0000
1		2	1	Harped				
	Left							0.0000
	Right							0.0000
1		2	2	Harped				
	Left							0.0000
	Right							0.0000
1		2	3	Harped				
	Left							0.0000
	Right							0.0000
1		2	4	Harped				
	Left							0.0000
	Right							0.0000
1		2	5	Harped				
	Left	20	1				62.88	0.0000
	Right	20	1				62.88	0.0000
1		2	6	Harped				
	Left	20	2				62.88	0.0000
	Right	20	2				62.88	0.0000
1		2	7	Harped				
	Left	20	3				62.88	0.0000
	Right	20	3				62.88	0.0000
1		2	8	Harped				
	Left							0.0000
	Right							0.0000
1		2	9	Harped				
	Left							0.0000
	Right							0.0000
1		2	10	Harped				
	Left							0.0000
	Right							0.0000
1		2	11	Harped				
	Left							0.0000
	Right							0.0000

1		3	1	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	2	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	3	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	4	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	5	Harped			
	Left	21	1		62.88	0.0000	
	Right	21	1		62.88	0.0000	
1		3	6	Harped			
	Left	21	2		62.88	0.0000	
	Right	21	2		62.88	0.0000	
1		3	7	Harped			
	Left	21	3		62.88	0.0000	
	Right	21	3		62.88	0.0000	
1		3	8	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	9	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	10	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	11	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	1	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	2	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	3	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	4	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	5	Harped			
	Left	22	1		62.88	0.0000	
	Right	22	1		62.88	0.0000	
1		4	6	Harped			
	Left	22	2		62.88	0.0000	

1	Right	22	2		62.88	0.0000	
		4	7	Harped			
1	Left	22	3		62.88	0.0000	
	Right	22	3		62.88	0.0000	
1		4	8	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	9	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	10	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	11	Harped			
	Left				0.0000		
	Right				0.0000		
1		5	1	Harped			
	Left				0.0000		
	Right				0.0000		
1		5	2	Harped			
	Left				0.0000		
	Right				0.0000		
1		5	3	Harped			
	Left				0.0000		
	Right				0.0000		
1		5	4	Harped			
	Left	23	1		62.88	0.0000	
	Right	23	1		62.88	0.0000	
1		5	5	Harped			
	Left	23	2		62.88	0.0000	
	Right	23	2		62.88	0.0000	
1		5	6	Harped			
	Left	23	3		62.88	0.0000	
	Right	23	3		62.88	0.0000	
1		5	7	Harped			
	Left				0.0000		
	Right				0.0000		
1		5	8	Harped			
	Left				0.0000		
	Right				0.0000		
1		5	9	Harped			
	Left				0.0000		
	Right				0.0000		
1		6	1	Harped			
	Left				0.0000		
	Right				0.0000		
1		6	2	Harped			
	Left	24	1		62.88	0.0000	
	Right	24	1		62.88	0.0000	
1		6	3	Harped			

	Left	24	2		62.88	0.0000
	Right	24	2		62.88	0.0000
1		6	4	Harped		
	Left	24	3		62.88	0.0000
	Right	24	3		62.88	0.0000
1		6	5	Harped		
	Left					0.0000
	Right					0.0000

Deck Profile

Deck Concrete

Material (LRFD)	Distance n	Length	Total Thickness	Structural Thickness	Effective Width (Std)	Effective Width
	(ft)	(ft)	(in)	(in)	(in)	(in)
QSC2 - 4500ps...	0.00	138.07		7.5000	105.2400	105.2400
	7.50...					

Haunch Profile

Distance	Length	Z1	Z2	Y1	Y3
(ft)	(ft)	(in)	(in)	(in)	(in)
0.00	138.07	0.0000	0.0000	2.0000	0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		(in)	
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT3

Link with: None
 Description:

Existing: PSC Bulb Tee #3 -
 Current: PSC Bulb Tee #3 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support Frame Connection

1
2

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #3

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast I

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: (kip/ft)

Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Inventory Operating

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor
 Type:

Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)
 All other limit states: 33.0 (%)

Live Load Distribution

Standard

Distribution Factor (Wheels)				
Lanes	Shear	Supports	Moment	Deflection
Loaded				
1 Lane	1.229	1.316	1.229	0.200
Multi-Lane	1.564	1.842	1.564	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.475	0.702
0.00	13.81	Shear	0.725	0.881
13.81	110.46	Shear	0.704	0.857
124.27	13.81	Shear	0.725	0.881
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties		(in) (in) 10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		

2

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type:	Intentionally Roughened
Interface width:	(in)
Deck cohesion factor:	0.280 (ksi)
Deck friction factor:	1.000

Continuity Diaphragm

Span	Material Bar	Left Support		Right Support	
		Distance Bar	Bar Count	Material	Distance Count

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			
	Left						0.0000
	Right						0.0000
1		1	2	Harped			
	Left						0.0000
	Right						0.0000
1		1	3	Harped			
	Left						0.0000
	Right						0.0000
1		1	4	Harped			
	Left						0.0000
	Right						0.0000
1		1	5	Harped			
	Left						0.0000
	Right						0.0000
1		1	6	Harped			
	Left						0.0000
	Right						0.0000
1		1	7	Harped			
	Left						0.0000
	Right						0.0000
1		1	8	Harped			
	Left						0.0000
	Right						0.0000

	Left						0.0000
	Right						0.0000
1		1	9	Harped			
	Left						0.0000
	Right						0.0000
1		1	10	Harped			
	Left						0.0000
	Right						0.0000
1		1	11	Harped			
	Left						0.0000
	Right						0.0000
1		2	1	Harped			
	Left						0.0000
	Right						0.0000
1		2	2	Harped			
	Left						0.0000
	Right						0.0000
1		2	3	Harped			
	Left						0.0000
	Right						0.0000
1		2	4	Harped			
	Left						0.0000
	Right						0.0000
1		2	5	Harped			
	Left	20	1			62.88	0.0000
	Right	20	1			62.88	0.0000
1		2	6	Harped			
	Left	20	2			62.88	0.0000
	Right	20	2			62.88	0.0000
1		2	7	Harped			
	Left	20	3			62.88	0.0000
	Right	20	3			62.88	0.0000
1		2	8	Harped			
	Left						0.0000
	Right						0.0000
1		2	9	Harped			
	Left						0.0000
	Right						0.0000
1		2	10	Harped			
	Left						0.0000
	Right						0.0000
1		2	11	Harped			
	Left						0.0000
	Right						0.0000
1		3	1	Harped			
	Left						0.0000
	Right						0.0000
1		3	2	Harped			
	Left						0.0000
	Right						0.0000

1		3	3	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	4	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	5	Harped			
	Left	21	1		62.88	0.0000	
	Right	21	1		62.88	0.0000	
1		3	6	Harped			
	Left	21	2		62.88	0.0000	
	Right	21	2		62.88	0.0000	
1		3	7	Harped			
	Left	21	3		62.88	0.0000	
	Right	21	3		62.88	0.0000	
1		3	8	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	9	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	10	Harped			
	Left				0.0000		
	Right				0.0000		
1		3	11	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	1	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	2	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	3	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	4	Harped			
	Left				0.0000		
	Right				0.0000		
1		4	5	Harped			
	Left	22	1		62.88	0.0000	
	Right	22	1		62.88	0.0000	
1		4	6	Harped			
	Left	22	2		62.88	0.0000	
	Right	22	2		62.88	0.0000	
1		4	7	Harped			
	Left	22	3		62.88	0.0000	
	Right	22	3		62.88	0.0000	
1		4	8	Harped			
	Left				0.0000		

1	Right	4	9	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		4	10	Harped			
	Left						0.0000
	Right						0.0000
1		4	11	Harped			
	Left						0.0000
	Right						0.0000
1		5	1	Harped			
	Left						0.0000
	Right						0.0000
1		5	2	Harped			
	Left						0.0000
	Right						0.0000
1		5	3	Harped			
	Left						0.0000
	Right						0.0000
1		5	4	Harped			
	Left	23	1		62.88	0.0000	
	Right	23	1		62.88	0.0000	
1		5	5	Harped			
	Left	23	2		62.88	0.0000	
	Right	23	2		62.88	0.0000	
1		5	6	Harped			
	Left	23	3		62.88	0.0000	
	Right	23	3		62.88	0.0000	
1		5	7	Harped			
	Left						0.0000
	Right						0.0000
1		5	8	Harped			
	Left						0.0000
	Right						0.0000
1		5	9	Harped			
	Left						0.0000
	Right						0.0000
1		6	1	Harped			
	Left						0.0000
	Right						0.0000
1		6	2	Harped			
	Left	24	1		62.88	0.0000	
	Right	24	1		62.88	0.0000	
1		6	3	Harped			
	Left	24	2		62.88	0.0000	
	Right	24	2		62.88	0.0000	
1		6	4	Harped			
	Left	24	3		62.88	0.0000	
	Right	24	3		62.88	0.0000	
1		6	5	Harped			

Left 0.0000
 Right 0.0000

Deck Profile

Deck Concrete

Material (LRFD)	Distance n (ft)	Length (ft)	Total Thickness (in)	Structural Thickness (in)	Effective Width (Std) (in)	Effective Width (in)
QSC2 - 4500ps...	0.00	138.07		7.5000	103.2450	103.2450
	7.50...					

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Y1 (in)	Y3 (in)
0.00	138.07	0.0000	0.0000	2.0000	0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
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Member PSC BT4

Link with: None
 Description:

Existing: PSC Bulb Tee #4 -
 Current: PSC Bulb Tee #4 -
 Number of Spans: 1

Span Number	Span Length (ft)
-------------	------------------

1 138.073000

Support Frame Connection

1
2

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #4

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD

Analysis Module Component:
 Properties:

Analysis Method: LRF
 Analysis Module: AASHTO LRF
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRF
 LRF shear computation method: General Procedure

Factors

Factor Override

LRF:

LFD:

ASD Factors

Inventory Operating

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRF Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes	Shear	Supports	Moment	Deflection
Loaded				
1 Lane	1.232	1.319	1.232	0.200
Multi-Lane	1.568	1.845	1.568	0.900

LRF

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.476	0.703
0.00	13.81	Shear	0.725	0.883
13.81	110.46	Shear	0.705	0.858
124.27	13.81	Shear	0.725	0.883
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties		(in) (in) 10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span No.	Material Bar	Left Support		Right Support	
		Distance Bar	Bar Count	Distance Bar	Bar Count

Prestressing Force Information

Strand Lavout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			
	Left						0.0000
	Right						0.0000
1		1	2	Harped			
	Left						0.0000
	Right						0.0000
1		1	3	Harped			
	Left						0.0000
	Right						0.0000
1		1	4	Harped			
	Left						0.0000
	Right						0.0000
1		1	5	Harped			
	Left						0.0000
	Right						0.0000
1		1	6	Harped			
	Left						0.0000
	Right						0.0000
1		1	7	Harped			
	Left						0.0000
	Right						0.0000
1		1	8	Harped			
	Left						0.0000
	Right						0.0000
1		1	9	Harped			
	Left						0.0000
	Right						0.0000
1		1	10	Harped			
	Left						0.0000
	Right						0.0000

	Left						0.0000
	Right						0.0000
1		1	11	Harped			
	Left						0.0000
	Right						0.0000
1		2	1	Harped			
	Left						0.0000
	Right						0.0000
1		2	2	Harped			
	Left						0.0000
	Right						0.0000
1		2	3	Harped			
	Left						0.0000
	Right						0.0000
1		2	4	Harped			
	Left						0.0000
	Right						0.0000
1		2	5	Harped			
	Left	20	1		62.88		0.0000
	Right	20	1		62.88		0.0000
1		2	6	Harped			
	Left	20	2		62.88		0.0000
	Right	20	2		62.88		0.0000
1		2	7	Harped			
	Left	20	3		62.88		0.0000
	Right	20	3		62.88		0.0000
1		2	8	Harped			
	Left						0.0000
	Right						0.0000
1		2	9	Harped			
	Left						0.0000
	Right						0.0000
1		2	10	Harped			
	Left						0.0000
	Right						0.0000
1		2	11	Harped			
	Left						0.0000
	Right						0.0000
1		3	1	Harped			
	Left						0.0000
	Right						0.0000
1		3	2	Harped			
	Left						0.0000
	Right						0.0000
1		3	3	Harped			
	Left						0.0000
	Right						0.0000
1		3	4	Harped			
	Left						0.0000
	Right						0.0000

Deck Concrete

Material (LRFD)	Distance n (ft)	Length (ft)	Total Thickness (in)	Structural Thickness (in)	Effective Width (Std) (in)	Effective Width (in)
QSC2 - 4500ps...	0.00	138.07		7.5000	103.5000	103.5000
	7.50...					

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Y1 (in)	Y3 (in)
0.00	138.07	0.0000	0.0000	2.0000	0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT5

Link with: None
 Description:

Existing: PSC Bulb Tee #5 -
 Current: PSC Bulb Tee #5 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #5

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:

Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Inventory Operating

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

D i s t r i b u t i o n F a c t o r (Wheels)

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.259	1.319	1.259	0.200
Multi-Lane	1.602	1.865	1.602	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.482	0.714
0.00	13.81	Shear	0.733	0.896
13.81	110.46	Shear	0.712	0.871
124.27	13.81	Shear	0.733	0.896
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties		(in) (in) 10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance	Count	Size
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Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1	Left	1	1	Harped			0.0000
1	Right	1	2	Harped			0.0000
1	Left	1	3	Harped			0.0000
1	Right	1	4	Harped			0.0000
1	Left	1	5	Harped			0.0000
1	Right	1	6	Harped			0.0000
1	Left	1	7	Harped			0.0000
1	Right	1	8	Harped			0.0000
1	Left	1	9	Harped			0.0000
1	Right	1	10	Harped			0.0000
1	Left	1	11	Harped			0.0000
1	Right	2	1	Harped			0.0000

1	Left	2	2	Harped			0.0000
1	Right	2	3	Harped			0.0000
1	Left	2	4	Harped			0.0000
1	Right	2	5	Harped			0.0000
1	Left	20	1		62.88		0.0000
1	Right	20	1	Harped	62.88		0.0000
1	Left	20	2		62.88		0.0000
1	Right	20	2	Harped	62.88		0.0000
1	Left	20	3		62.88		0.0000
1	Right	20	3	Harped	62.88		0.0000
1	Left	2	8				0.0000
1	Right	2	9	Harped			0.0000
1	Left	2	10				0.0000
1	Right	2	11	Harped			0.0000
1	Left	3	1				0.0000
1	Right	3	1	Harped			0.0000
1	Left	3	2				0.0000
1	Right	3	2	Harped			0.0000
1	Left	3	3				0.0000
1	Right	3	3	Harped			0.0000
1	Left	3	4				0.0000
1	Right	3	4	Harped			0.0000
1	Left	3	5				0.0000
1	Right	3	5	Harped			0.0000
1	Left	21	1		62.88		0.0000
1	Right	21	1	Harped	62.88		0.0000
1	Left	3	6				0.0000
1	Right	3	6	Harped			0.0000
1	Left	21	2		62.88		0.0000
1	Right	21	2	Harped	62.88		0.0000

1		3	7	Harped			
	Left	21	3		62.88	0.0000	
	Right	21	3		62.88	0.0000	
1		3	8	Harped			
	Left					0.0000	
	Right					0.0000	
1		3	9	Harped			
	Left					0.0000	
	Right					0.0000	
1		3	10	Harped			
	Left					0.0000	
	Right					0.0000	
1		3	11	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	1	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	2	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	3	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	4	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	5	Harped			
	Left	22	1		62.88	0.0000	
	Right	22	1		62.88	0.0000	
1		4	6	Harped			
	Left	22	2		62.88	0.0000	
	Right	22	2		62.88	0.0000	
1		4	7	Harped			
	Left	22	3		62.88	0.0000	
	Right	22	3		62.88	0.0000	
1		4	8	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	9	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	10	Harped			
	Left					0.0000	
	Right					0.0000	
1		4	11	Harped			
	Left					0.0000	
	Right					0.0000	
1		5	1	Harped			
	Left					0.0000	

				Right					0.0000
1		5	2	Harped					
	Left								0.0000
	Right								0.0000
1		5	3	Harped					
	Left								0.0000
	Right								0.0000
1		5	4	Harped					
	Left	23	1		62.88	0.0000			
	Right	23	1		62.88	0.0000			
1		5	5	Harped					
	Left	23	2		62.88	0.0000			
	Right	23	2		62.88	0.0000			
1		5	6	Harped					
	Left	23	3		62.88	0.0000			
	Right	23	3		62.88	0.0000			
1		5	7	Harped					
	Left					0.0000			
	Right					0.0000			
1		5	8	Harped					
	Left					0.0000			
	Right					0.0000			
1		5	9	Harped					
	Left					0.0000			
	Right					0.0000			
1		6	1	Harped					
	Left					0.0000			
	Right					0.0000			
1		6	2	Harped					
	Left	24	1		62.88	0.0000			
	Right	24	1		62.88	0.0000			
1		6	3	Harped					
	Left	24	2		62.88	0.0000			
	Right	24	2		62.88	0.0000			
1		6	4	Harped					
	Left	24	3		62.88	0.0000			
	Right	24	3		62.88	0.0000			
1		6	5	Harped					
	Left					0.0000			
	Right					0.0000			

Deck Profile
Deck Concrete

Material (LRFD)	Distance (ft)	Length (ft)	Total Thickness (in)	Structural Thickness (in)	Effective Width (Std) (in)	Effective Width (in)
QSC2 - 4500ps...	0.00	138.07		7.5000	105.7500	105.7500

7.50...

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Y1 (in)	Y3 (in)
0.00	138.07	0.0000	0.0000	2.0000	0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT6

Link with: None
 Description:

Existing: PSC Bulb Tee #6 -
 Current: PSC Bulb Tee #6 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support	Horizontal	Vertical	Rotational	Load Case Name
---------	------------	----------	------------	----------------

Number	(in)	(in)	(Radians)
1			
2			

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #6

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:

Properties:

Default rating method: LRF
 LFRD shear computation method: General Procedure

Factors

Factor Override

LFRD:

LFD:

ASD Factors

Inventory Operating

Structural steel

Concrete

PS Concrete Comp.

PS Concrete Tens.

PS Moment Cap.

Reinforcement

Bearing Stiffener

Stirrup

Timber

NA

Default Materials

Deck concrete: QSC2 - 4500psi

Deck reinforcement: Grade 60 EC

Beam concrete: PSC 11.0 ksi

Beam reinforcement: Grade 60 EC

Stirrup reinforcement: Grade 60 EC

Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type:

Standard - AASHTO

LFRD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.259	1.319	1.259	0.200
Multi-Lane	1.602	1.865	1.602	0.900

LFRD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.482	0.714
0.00	13.81	Shear	0.733	0.896

13.81	110.46	Shear	0.712	0.871
124.27	13.81	Shear	0.733	0.896
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties	(in)	(in) 10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span	Material Bar	Left Support Distance Bar	Bar	Bar	Right Support Material	Distance

No. Count Size Count Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			
	Left						0.0000
	Right						0.0000
1		1	2	Harped			
	Left						0.0000
	Right						0.0000
1		1	3	Harped			
	Left						0.0000
	Right						0.0000
1		1	4	Harped			
	Left						0.0000
	Right						0.0000
1		1	5	Harped			
	Left						0.0000
	Right						0.0000
1		1	6	Harped			
	Left						0.0000
	Right						0.0000
1		1	7	Harped			
	Left						0.0000
	Right						0.0000
1		1	8	Harped			
	Left						0.0000
	Right						0.0000
1		1	9	Harped			
	Left						0.0000
	Right						0.0000
1		1	10	Harped			
	Left						0.0000
	Right						0.0000
1		1	11	Harped			
	Left						0.0000
	Right						0.0000
1		2	1	Harped			
	Left						0.0000
	Right						0.0000
1		2	2	Harped			
	Left						0.0000
	Right						0.0000

1		2	3	Harped			
	Left						0.0000
	Right						0.0000
1		2	4	Harped			
	Left						0.0000
	Right						0.0000
1		2	5	Harped			
	Left	20	1		62.88		0.0000
	Right	20	1		62.88		0.0000
1		2	6	Harped			
	Left	20	2		62.88		0.0000
	Right	20	2		62.88		0.0000
1		2	7	Harped			
	Left	20	3		62.88		0.0000
	Right	20	3		62.88		0.0000
1		2	8	Harped			
	Left						0.0000
	Right						0.0000
1		2	9	Harped			
	Left						0.0000
	Right						0.0000
1		2	10	Harped			
	Left						0.0000
	Right						0.0000
1		2	11	Harped			
	Left						0.0000
	Right						0.0000
1		3	1	Harped			
	Left						0.0000
	Right						0.0000
1		3	2	Harped			
	Left						0.0000
	Right						0.0000
1		3	3	Harped			
	Left						0.0000
	Right						0.0000
1		3	4	Harped			
	Left						0.0000
	Right						0.0000
1		3	5	Harped			
	Left	21	1		62.88		0.0000
	Right	21	1		62.88		0.0000
1		3	6	Harped			
	Left	21	2		62.88		0.0000
	Right	21	2		62.88		0.0000
1		3	7	Harped			
	Left	21	3		62.88		0.0000
	Right	21	3		62.88		0.0000
1		3	8	Harped			
	Left						0.0000

1	Right	3	9	Harped	0.0000	
	Left				0.0000	
1	Right	3	10	Harped	0.0000	
	Left				0.0000	
1	Right	3	11	Harped	0.0000	
	Left				0.0000	
1	Right	4	1	Harped	0.0000	
	Left				0.0000	
1	Right	4	2	Harped	0.0000	
	Left				0.0000	
1	Right	4	3	Harped	0.0000	
	Left				0.0000	
1	Right	4	4	Harped	0.0000	
	Left				0.0000	
1	Right	4	5	Harped	0.0000	62.88
	Left	22	1		0.0000	62.88
1	Right	4	6	Harped	0.0000	
	Left	22	2		0.0000	62.88
1	Right	4	7	Harped	0.0000	62.88
	Left	22	3		0.0000	62.88
1	Right	4	8	Harped	0.0000	62.88
	Left				0.0000	
1	Right	4	9	Harped	0.0000	
	Left				0.0000	
1	Right	4	10	Harped	0.0000	
	Left				0.0000	
1	Right	4	11	Harped	0.0000	
	Left				0.0000	
1	Right	5	1	Harped	0.0000	
	Left				0.0000	
1	Right	5	2	Harped	0.0000	
	Left				0.0000	
1	Right	5	3	Harped	0.0000	

	Left					0.0000
	Right					0.0000
1	Right	5	4	Harped		
	Left	23	1		62.88	0.0000
	Right	23	1		62.88	0.0000
1	Right	5	5	Harped		
	Left	23	2		62.88	0.0000
	Right	23	2		62.88	0.0000
1	Right	5	6	Harped		
	Left	23	3		62.88	0.0000
	Right	23	3		62.88	0.0000
1	Right	5	7	Harped		
	Left					0.0000
	Right					0.0000
1	Right	5	8	Harped		
	Left					0.0000
	Right					0.0000
1	Right	5	9	Harped		
	Left					0.0000
	Right					0.0000
1	Right	6	1	Harped		
	Left					0.0000
	Right					0.0000
1	Right	6	2	Harped		
	Left	24	1		62.88	0.0000
	Right	24	1		62.88	0.0000
1	Right	6	3	Harped		
	Left	24	2		62.88	0.0000
	Right	24	2		62.88	0.0000
1	Right	6	4	Harped		
	Left	24	3		62.88	0.0000
	Right	24	3		62.88	0.0000
1	Right	6	5	Harped		
	Left					0.0000
	Right					0.0000

Deck Profile
Deck Concrete

Material (LRFD)	Distance n	Length	Total Thickness	Structural Thickness	Effective Width (Std)	Effective Width
QSC2 - 4500ps...	0.00	138.07	(in)	(in)	(in)	(in)
	7.50...			7.5000	105.7500	105.7500

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Y1 (in)	Y3 (in)

0.00 138.07 0.0000 0.0000 2.0000 0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT7

Link with: None
 Description:

Existing: PSC Bulb Tee #7 -
 Current: PSC Bulb Tee #7 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support Frame Connection
 1
 2

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #7

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete:	QSC2 - 4500psi
Deck reinforcement:	Grade 60 EC
Beam concrete:	PSC 11.0 ksi
Beam reinforcement:	Grade 60 EC
Stirrup reinforcement:	Grade 60 EC
Prestressing strand:	0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

Lanes Loaded	Distribution Factor (Wheels)			
	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.259	1.319	1.259	0.200
Multi-Lane	1.602	1.865	1.602	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.482	0.714
0.00	13.81	Shear	0.733	0.896
13.81	110.46	Shear	0.712	0.871
124.27	13.81	Shear	0.733	0.896
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties	10.000...	(in) (in)

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type:	Intentionally Roughened
Interface width:	(in)
Deck cohesion factor:	0.280 (ksi)
Deck friction factor:	1.000

Continuity Diaphragm

Span	Material Bar	Left Support	Bar	Bar	Right Support
		Distance Bar			Material
No.		Count	Size	Count	Size

Prestress Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	2	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	3	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	4	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	5	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	6	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	7	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	8	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	9	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	10	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		1	11	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	1	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	2	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	3	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	4	Harped			0.0000
	Left						0.0000

	Right						0.0000
1		2	5	Harped			0.0000
	Left	20	1		62.88		0.0000
	Right	20	1		62.88		0.0000
1		2	6	Harped			0.0000
	Left	20	2		62.88		0.0000
	Right	20	2		62.88		0.0000
1		2	7	Harped			0.0000
	Left	20	3		62.88		0.0000
	Right	20	3		62.88		0.0000
1		2	8	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	9	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	10	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		2	11	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	1	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	2	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	3	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	4	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	5	Harped			0.0000
	Left	21	1		62.88		0.0000
	Right	21	1		62.88		0.0000
1		3	6	Harped			0.0000
	Left	21	2		62.88		0.0000
	Right	21	2		62.88		0.0000
1		3	7	Harped			0.0000
	Left	21	3		62.88		0.0000
	Right	21	3		62.88		0.0000
1		3	8	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	9	Harped			0.0000
	Left						0.0000
	Right						0.0000
1		3	10	Harped			0.0000

	Left				0.0000	
	Right				0.0000	
1	Left	3	11	Harped		
	Right				0.0000	
1	Left	4	1	Harped		
	Right				0.0000	
1	Left	4	2	Harped		
	Right				0.0000	
1	Left	4	3	Harped		
	Right				0.0000	
1	Left	4	4	Harped		
	Right				0.0000	
1	Left	4	5	Harped		
	Right	22	1		62.88	0.0000
1	Left	4	6	Harped		
	Right	22	1		62.88	0.0000
1	Left	22	2		62.88	0.0000
	Right	22	2		62.88	0.0000
1	Left	4	7	Harped		
	Right	22	3		62.88	0.0000
1	Left	4	8	Harped		
	Right				0.0000	
1	Left	4	9	Harped		
	Right				0.0000	
1	Left	4	10	Harped		
	Right				0.0000	
1	Left	4	11	Harped		
	Right				0.0000	
1	Left	5	1	Harped		
	Right				0.0000	
1	Left	5	2	Harped		
	Right				0.0000	
1	Left	5	3	Harped		
	Right				0.0000	
1	Left	5	4	Harped		
	Right	23	1		62.88	0.0000
	Right	23	1		62.88	0.0000

1	Left	5	5	Harped		
	Right	23	2		62.88	0.0000
1	Left	5	6	Harped		
	Right	23	3		62.88	0.0000
1	Left	5	7	Harped		
	Right				0.0000	
1	Left	5	8	Harped		
	Right				0.0000	
1	Left	5	9	Harped		
	Right				0.0000	
1	Left	6	1	Harped		
	Right				0.0000	
1	Left	6	2	Harped		
	Right	24	1		62.88	0.0000
1	Left	6	3	Harped		
	Right	24	1		62.88	0.0000
1	Left	6	4	Harped		
	Right	24	2		62.88	0.0000
1	Left	6	5	Harped		
	Right	24	3		62.88	0.0000
1	Left	6	6	Harped		
	Right				0.0000	

Deck Profile
Deck Concrete

Material	Distance	Length	Total Thickness	Structural Thickness	Effective Width (Std)	Effective Width
(LRFD)	n		(in)	(in)	(in)	(in)
QSC2 - 4500ps...	0.00	138.07		7.5000	105.7500	105.7500
	7.50...					

Haunch Profile

Distance	Length	Z1	Z2	Y1	Y3
(ft)	(ft)	(in)	(in)	(in)	(in)
0.00	138.07	0.0000	0.0000	2.0000	0.0000

Shear Reinforcement Ranges - Vertical

Shear	Span	Start	Number	Spacing	Extends into
-------	------	-------	--------	---------	--------------

Reinforcement	No	Distance (ft)	Spaces	Spaces (in)	Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT8

Link with: None
 Description:

Existing: PSC Bulb Tee #8 -
 Current: PSC Bulb Tee #8 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #8

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)
 Analysis Module
 Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 StIRRUP
 Timber

Inventory Operating

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 StIRRUP reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes	Shear	Shear at Supports	Moment	Deflection
Loaded				
1 Lane	1.259	1.319	1.259	0.200
Multi-Lane	1.602	1.865	1.602	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.482	0.714
0.00	13.81	Shear	0.733	0.896
13.81	110.46	Shear	0.712	0.871
124.27	13.81	Shear	0.733	0.896
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)
 Analysis time: (Years)
 Composite time: (Days)
 Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties		(in) (in) 10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span	Material	Left Support Distance	Bar	Bar	Right Support Material	Distance
No.			Count	Size		Count Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
------	------	---------	----------	--------------	---------------	-----------------	----------------

				(ft)	(in)	(in)
1		1	1	Harped		
	Left					0.0000
	Right					0.0000
1		1	2	Harped		
	Left					0.0000
	Right					0.0000
1		1	3	Harped		
	Left					0.0000
	Right					0.0000
1		1	4	Harped		
	Left					0.0000
	Right					0.0000
1		1	5	Harped		
	Left					0.0000
	Right					0.0000
1		1	6	Harped		
	Left					0.0000
	Right					0.0000
1		1	7	Harped		
	Left					0.0000
	Right					0.0000
1		1	8	Harped		
	Left					0.0000
	Right					0.0000
1		1	9	Harped		
	Left					0.0000
	Right					0.0000
1		1	10	Harped		
	Left					0.0000
	Right					0.0000
1		1	11	Harped		
	Left					0.0000
	Right					0.0000
1		2	1	Harped		
	Left					0.0000
	Right					0.0000
1		2	2	Harped		
	Left					0.0000
	Right					0.0000
1		2	3	Harped		
	Left					0.0000
	Right					0.0000
1		2	4	Harped		
	Left					0.0000
	Right					0.0000
1		2	5	Harped		
	Left	20	1		62.88	0.0000
	Right	20	1		62.88	0.0000
1		2	6	Harped		

	Left	20	2		62.88	0.0000
	Right	20	2		62.88	0.0000
1		2	7	Harped		
	Left	20	3		62.88	0.0000
	Right	20	3		62.88	0.0000
1		2	8	Harped		
	Left					0.0000
	Right					0.0000
1		2	9	Harped		
	Left					0.0000
	Right					0.0000
1		2	10	Harped		
	Left					0.0000
	Right					0.0000
1		2	11	Harped		
	Left					0.0000
	Right					0.0000
1		3	1	Harped		
	Left					0.0000
	Right					0.0000
1		3	2	Harped		
	Left					0.0000
	Right					0.0000
1		3	3	Harped		
	Left					0.0000
	Right					0.0000
1		3	4	Harped		
	Left					0.0000
	Right					0.0000
1		3	5	Harped		
	Left	21	1		62.88	0.0000
	Right	21	1		62.88	0.0000
1		3	6	Harped		
	Left	21	2		62.88	0.0000
	Right	21	2		62.88	0.0000
1		3	7	Harped		
	Left	21	3		62.88	0.0000
	Right	21	3		62.88	0.0000
1		3	8	Harped		
	Left					0.0000
	Right					0.0000
1		3	9	Harped		
	Left					0.0000
	Right					0.0000
1		3	10	Harped		
	Left					0.0000
	Right					0.0000
1		3	11	Harped		
	Left					0.0000
	Right					0.0000

1		4	1	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	2	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	3	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	4	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	5	Harped		
	Left	22	1		62.88	0.0000
	Right	22	1		62.88	0.0000
1		4	6	Harped		
	Left	22	2		62.88	0.0000
	Right	22	2		62.88	0.0000
1		4	7	Harped		
	Left	22	3		62.88	0.0000
	Right	22	3		62.88	0.0000
1		4	8	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	9	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	10	Harped		
	Left				0.0000	
	Right				0.0000	
1		4	11	Harped		
	Left				0.0000	
	Right				0.0000	
1		5	1	Harped		
	Left				0.0000	
	Right				0.0000	
1		5	2	Harped		
	Left				0.0000	
	Right				0.0000	
1		5	3	Harped		
	Left				0.0000	
	Right				0.0000	
1		5	4	Harped		
	Left	23	1		62.88	0.0000
	Right	23	1		62.88	0.0000
1		5	5	Harped		
	Left	23	2		62.88	0.0000
	Right	23	2		62.88	0.0000
1		5	6	Harped		
	Left	23	3		62.88	0.0000

1	Right	23	3		62.88	0.0000
		5	7	Harped		
	Left				0.0000	
	Right				0.0000	
1		5	8	Harped		
	Left				0.0000	
	Right				0.0000	
1		5	9	Harped		
	Left				0.0000	
	Right				0.0000	
1		6	1	Harped		
	Left				0.0000	
	Right				0.0000	
1		6	2	Harped		
	Left	24	1		62.88	0.0000
	Right	24	1		62.88	0.0000
1		6	3	Harped		
	Left	24	2		62.88	0.0000
	Right	24	2		62.88	0.0000
1		6	4	Harped		
	Left	24	3		62.88	0.0000
	Right	24	3		62.88	0.0000
1		6	5	Harped		
	Left				0.0000	
	Right				0.0000	

Deck Profile
Deck Concrete

Material (LRFD)	Distance n	Length	Total Thickness	Structural Thickness	Effective Width (Std)	Effective Width
QSC2 - 4500ps...	(ft) 0.00	(ft) 138.07	(in) 7.5000	(in) 7.5000	(in) 105.7500	(in) 105.7500
	7.50...					

Haunch Profile

Distance	Length	Z1	Z2	Y1	Y3
(ft) 0.00	(ft) 138.07	(in) 0.0000	(in) 0.0000	(in) 2.0000	(in) 0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
401	1	(ft) 0.00	1	(in) 3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE

401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
---------------------	---------	----------------	---------------	---------	------------------

Member PSC BT9

Link with: None
 Description:

Existing: PSC Bulb Tee #9 -
 Current: PSC Bulb Tee #9 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support Frame Connection
 1
 2

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				

2

Member Alternative PSC Bulb Tee #9

Description:

Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)

Analysis Module

Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:

Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRFD
 Analysis Module: AASHTO LRFD
 Analysis Module Component:
 Properties:

Analysis Method: LFRF
 Analysis Module: AASHTO LFRF
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LFRF
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Inventory Operating

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.

PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor
 Type: Standard - AASHTO
 LRFD Dynamic Load Allowance
 Fatigue and fracture limit states: 15.0 (%)
 All other limit states: 33.0 (%)

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes	Shear at	Supports	Moment	Deflection
Loaded	Shear			
1 Lane	1.259	1.319	1.259	0.200
Multi-Lane	1.602	1.865	1.602	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.482	0.714
0.00	13.81	Shear	0.733	0.896
13.81	110.46	Shear	0.712	0.871
124.27	13.81	Shear	0.733	0.896
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:
 Deck drying time: (Days)
 Consider deck differential shrinkage loads:
 Beam Curing method:
 Curing time: (Days)
 Service life: 75.00 (Years)
 Analysis time: (Years)
 Composite time: (Days)
 Continuous time: (Days)

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material	Prestress Properties	Left	Right
	Projection	Creep			Projection
1	Modified AASH... 10.000...	PSC 11.0 ksi TRUE	PS Properties		(in) (in) 10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span	Material	Bar	Left Support Distance	Bar	Count	Size	Right Support Material	Bar	Count	Size
No.										

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			
	Left						0.0000
	Right						0.0000
1		1	2	Harped			

	Left				0.0000	
	Right				0.0000	
1	Left	1	3	Harped		
	Right				0.0000	
1	Left	1	4	Harped		
	Right				0.0000	
1	Left	1	5	Harped		
	Right				0.0000	
1	Left	1	6	Harped		
	Right				0.0000	
1	Left	1	7	Harped		
	Right				0.0000	
1	Left	1	8	Harped		
	Right				0.0000	
1	Left	1	9	Harped		
	Right				0.0000	
1	Left	1	10	Harped		
	Right				0.0000	
1	Left	1	11	Harped		
	Right				0.0000	
1	Left	2	1	Harped		
	Right				0.0000	
1	Left	2	2	Harped		
	Right				0.0000	
1	Left	2	3	Harped		
	Right				0.0000	
1	Left	2	4	Harped		
	Right				0.0000	
1	Left	2	5	Harped		
	Right	20	1		62.88	
	Right	20	1		62.88	
1	Left	2	6	Harped		
	Right	20	2		62.88	
	Right	20	2		62.88	
1	Left	2	7	Harped		
	Right	20	3		62.88	
	Right	20	3		62.88	

1	Left	2	8	Harped		
	Right				0.0000	
1	Left	2	9	Harped		
	Right				0.0000	
1	Left	2	10	Harped		
	Right				0.0000	
1	Left	2	11	Harped		
	Right				0.0000	
1	Left	3	1	Harped		
	Right				0.0000	
1	Left	3	2	Harped		
	Right				0.0000	
1	Left	3	3	Harped		
	Right				0.0000	
1	Left	3	4	Harped		
	Right				0.0000	
1	Left	3	5	Harped		
	Right	21	1		62.88	0.0000
	Right	21	1		62.88	0.0000
1	Left	3	6	Harped		
	Right	21	2		62.88	0.0000
	Right	21	2		62.88	0.0000
1	Left	3	7	Harped		
	Right	21	3		62.88	0.0000
	Right	21	3		62.88	0.0000
1	Left	3	8	Harped		
	Right				0.0000	
1	Left	3	9	Harped		
	Right				0.0000	
1	Left	3	10	Harped		
	Right				0.0000	
1	Left	3	11	Harped		
	Right				0.0000	
1	Left	4	1	Harped		
	Right				0.0000	
1	Left	4	2	Harped		
	Left				0.0000	

1	Right	4	3	Harped		0.0000
	Left					0.0000
	Right					0.0000
1	Left	4	4	Harped		
	Right					0.0000
	Left					0.0000
1	Right	4	5	Harped		
	Left	22	1		62.88	0.0000
	Right	22	1		62.88	0.0000
1	Left	4	6	Harped		
	Right					0.0000
	Left	22	2		62.88	0.0000
	Right	22	2		62.88	0.0000
1	Left	4	7	Harped		
	Right					0.0000
	Left	22	3		62.88	0.0000
	Right	22	3		62.88	0.0000
1	Left	4	8	Harped		
	Right					0.0000
	Left					0.0000
1	Right	4	9	Harped		
	Left					0.0000
	Right					0.0000
1	Left	4	10	Harped		
	Right					0.0000
	Left					0.0000
1	Right	4	11	Harped		
	Left					0.0000
	Right					0.0000
1	Left	5	1	Harped		
	Right					0.0000
	Left					0.0000
1	Right	5	2	Harped		
	Left					0.0000
	Right					0.0000
1	Left	5	3	Harped		
	Right					0.0000
	Left					0.0000
1	Right	5	4	Harped		
	Left	23	1		62.88	0.0000
	Right	23	1		62.88	0.0000
1	Left	5	5	Harped		
	Right					0.0000
	Left	23	2		62.88	0.0000
	Right	23	2		62.88	0.0000
1	Left	5	6	Harped		
	Right					0.0000
	Left	23	3		62.88	0.0000
	Right	23	3		62.88	0.0000
1	Left	5	7	Harped		
	Right					0.0000
	Left					0.0000
1	Right	5	8	Harped		

	Left					0.0000
	Right					0.0000
1	Left	5	9	Harped		
	Right					0.0000
	Left					0.0000
1	Right	6	1	Harped		
	Left					0.0000
	Right					0.0000
1	Left	6	2	Harped		
	Right					0.0000
	Left	24	1		62.88	0.0000
	Right	24	1		62.88	0.0000
1	Left	6	3	Harped		
	Right					0.0000
	Left	24	2		62.88	0.0000
	Right	24	2		62.88	0.0000
1	Left	6	4	Harped		
	Right					0.0000
	Left	24	3		62.88	0.0000
	Right	24	3		62.88	0.0000
1	Left	6	5	Harped		
	Right					0.0000
	Left					0.0000
	Right					0.0000

Deck Profile
Deck Concrete

Material (LRFD)	Distance (ft)	Length (ft)	Total Thickness (in)	Structural Thickness (in)	Effective Width (Std) (in)	Effective Width (in)
QSC2 - 4500ps...	0.00	138.07		7.5000	105.7500	105.7500
	7.50...					

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Y1 (in)	Y3 (in)
0.00	138.07	0.0000	0.0000	2.0000	0.0000

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE

401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
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Member PSC BT10

Link with: None
 Description:

Existing: PSC Bulb Tee #10 -
 Current: PSC Bulb Tee #10 -
 Number of Spans: 1

Span Number	Span Length (ft)
1	138.073000

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative PSC Bulb Tee #10

Description:
 Description

Material Type: Prestressed Concrete
 Girder Type: PS Precast I
 Member units: US Customary
 Girder property input method: Schedule based
 Additional Self Load: (kip/ft)
 Additional Self Load %: (%)
 Analysis Module
 Analysis Method: ASD
 Analysis Module: AASHTO ASD
 Analysis Module Component:
 Properties:

Analysis Method: LFD
 Analysis Module: AASHTO LFD
 Analysis Module Component:
 Properties:

Analysis Method: LRF
 Analysis Module: AASHTO LRF
 Analysis Module Component:
 Properties:

Analysis Method: LRFR
 Analysis Module: AASHTO LRFR
 Analysis Module Component:
 Properties:

Analysis Method: Distribution Factors
 Analysis Module: Virtis Dist Fact
 Analysis Module Component:
 Properties:

Default rating method: LRFR
 LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

Structural steel
 Concrete
 PS Concrete Comp.
 PS Concrete Tens.
 PS Moment Cap.
 Reinforcement
 Bearing Stiffener
 Stirrup
 Timber

Inventory Operating

NA

Default Materials

Deck concrete: QSC2 - 4500psi
 Deck reinforcement: Grade 60 EC
 Beam concrete: PSC 11.0 ksi
 Beam reinforcement: Grade 60 EC
 Stirrup reinforcement: Grade 60 EC
 Prestressing strand: 0.6" (7W-270) LR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 (%)

All other limit states: 33.0 (%)

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes	Shear	Shear at Supports	Moment	Deflection
Loaded				
1 Lane	1.268	1.268	1.268	0.200
Multi-Lane	1.268	1.268	1.268	0.900

LRFD

Distance (ft)	Length (ft)	Type	1 Lane	Multi-Lane
0.00	138.07	Moment	0.761	0.761
0.00	13.81	Shear	0.783	0.783
13.81	110.46	Shear	0.761	0.761
124.27	13.81	Shear	0.783	0.783
0.00	138.07	Deflectio...	0.120	0.390

Shrinkage/Time

Deck curing method:

Deck drying time: (Days)

Consider deck differential shrinkage loads:

Beam Curing method:

Curing time: (Days)

Service life: 75.00 (Years)

Analysis time: (Years)

Composite time: (Days)

Continuous time: (Days)

Beam Details

Span Details

Span Prestress Shape Concrete Material Prestress Properties Left Right

Use	n	Projection	Creep	PS Properties	Projection (in) (in)
1	Modified AASH...	10.000...	PSC 11.0 ksi TRUE		10.000...

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PSC Properties	1	0.000	139.74

Slab Interface

Deck interface type: Intentionally Roughened
 Interface width: (in)
 Deck cohesion factor: 0.280 (ksi)
 Deck friction factor: 1.000

Continuity Diaphragm

Span	Material Bar	Left Support		Right Support	
		Distance Bar	Bar Count	Bar Count	Distance
No.					

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Harped			
	Left						0.0000
	Right						0.0000
1		1	2	Harped			
	Left						0.0000
	Right						0.0000
1		1	3	Harped			
	Left						0.0000
	Right						0.0000

1		1	4	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	5	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	6	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	7	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	8	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	9	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	10	Harped						
	Left				0.0000					
	Right				0.0000					
1		1	11	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	1	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	2	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	3	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	4	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	5	Harped						
	Left	20	1		0.0000	62.88				
	Right	20	1		0.0000	62.88				
1		2	6	Harped						
	Left	20	2		0.0000	62.88				
	Right	20	2		0.0000	62.88				
1		2	7	Harped						
	Left	20	3		0.0000	62.88				
	Right	20	3		0.0000	62.88				
1		2	8	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	9	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	10	Harped						
	Left				0.0000					
	Right				0.0000					
1		2	11	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	1	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	2	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	3	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	4	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	5	Harped						
	Left	21	1		0.0000	62.88				
	Right	21	1		0.0000	62.88				
1		3	6	Harped						
	Left	21	2		0.0000	62.88				
	Right	21	2		0.0000	62.88				
1		3	7	Harped						
	Left	21	3		0.0000	62.88				
	Right	21	3		0.0000	62.88				
1		3	8	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	9	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	10	Harped						
	Left				0.0000					
	Right				0.0000					
1		3	11	Harped						
	Left				0.0000					
	Right				0.0000					
1		4	1	Harped						
	Left				0.0000					
	Right				0.0000					
1		4	2	Harped						
	Left				0.0000					
	Right				0.0000					
1		4	3	Harped						
	Left				0.0000					
	Right				0.0000					
1		4	4	Harped						
	Left				0.0000					
	Right				0.0000					

	Left				0.0000
	Right				0.0000
1	Left	4	5	Harped	
	Right	22	1		62.88
	Right	22	1		62.88
1	Left	4	6	Harped	
	Right	22	2		62.88
	Right	22	2		62.88
1	Left	4	7	Harped	
	Right	22	3		62.88
	Right	22	3		62.88
1	Left	4	8	Harped	
	Right				0.0000
	Right				0.0000
1	Left	4	9	Harped	
	Right				0.0000
	Right				0.0000
1	Left	4	10	Harped	
	Right				0.0000
	Right				0.0000
1	Left	4	11	Harped	
	Right				0.0000
	Right				0.0000
1	Left	5	1	Harped	
	Right				0.0000
	Right				0.0000
1	Left	5	2	Harped	
	Right				0.0000
	Right				0.0000
1	Left	5	3	Harped	
	Right				0.0000
	Right				0.0000
1	Left	5	4	Harped	
	Right	23	1		62.88
	Right	23	1		62.88
1	Left	5	5	Harped	
	Right	23	2		62.88
	Right	23	2		62.88
1	Left	5	6	Harped	
	Right	23	3		62.88
	Right	23	3		62.88
1	Left	5	7	Harped	
	Right				0.0000
	Right				0.0000
1	Left	5	8	Harped	
	Right				0.0000
	Right				0.0000
1	Left	5	9	Harped	
	Right				0.0000
	Right				0.0000

1	Left	6	1	Harped					
	Right								0.0000
	Right								0.0000
1	Left	6	2	Harped					
	Right	24	1		62.88				0.0000
	Right	24	1		62.88				0.0000
1	Left	6	3	Harped					
	Right	24	2		62.88				0.0000
	Right	24	2		62.88				0.0000
1	Left	6	4	Harped					
	Right	24	3		62.88				0.0000
	Right	24	3		62.88				0.0000
1	Left	6	5	Harped					
	Right								0.0000
	Right								0.0000

Deck Profile

Deck Concrete

Material (LRFD)	Distance (ft)	Length (ft)	Total Thickness (in)	Structural Thickness (in)	Effective Width (Std) (in)	Effective Width (in)
QSC2 - 4500ps...	0.00	138.07	7.5000	7.5000	92.1450	92.1450
	7.50...					

Haunch Profile

Distance (ft)	Length (ft)	Z1 (in)	Z2 (in)	Z3 (in)	Z4 (in)	Y1 (in)	Y2 (in)	Y3 (in)
0.00	138.07	0.0000	0.0000	0.0000	0.0000	2.0000	0.0000	0.0000
	0.0000							

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
401	1	0.00	1	3.0000	TRUE
401	1	0.25	9	3.0000	TRUE
401	1	2.50	1	6.0000	TRUE
401	1	3.00	1	6.0000	TRUE
401	1	3.50	1	21.0000	TRUE
401	1	5.25	74	20.9443	TRUE
401	1	134.41	1	21.0000	TRUE
401	1	136.16	1	6.0000	TRUE
401	1	136.66	1	6.0000	TRUE
401	1	137.16	9	3.0000	TRUE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
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