The Afghanistan Engineering Support Program assembled this deliverable. It is an approved, official USAID document. Budget information contained herein is for illustrative purposes. All policy, personal, financial, and procurement sensitive information has been removed. Additional information on the report can be obtained from Firouz Rooyani, Tetra Tech Sr. VP International Operations, (703) 387-2151.

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ENGINEERING SUPPORT PROGRAM

WO-LT-0077 PRT Technical Engineering Support
Gardez to Khost Road, Afghanistan
Construction of Bridge #09
Design Analysis – 30% Design Submittal

November 8, 2013

This publication was produced for review by the United States Agency for International Development. It was prepared by Tetra Tech, Inc.

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Design Analysis

Introduction: The Design Analysis provides documentation of the basis for the design on the project. It is intended to describe the project requirements, identify governing codes and criteria being utilized, explain proposed design solutions and document other situations which affect the design. Engineering calculations are also included where appropriate.

The Design Analysis is organized by content and technical design discipline as follows:

Section 1 - Hydraulics

Section 2 - Geotechnical

Section 3 - Civil

Section 4 - Structural

Section 5 - Bill of Quantities

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Section 1
Hydraulics

(To be provided at next Design Submittal)

Section 2
Geotechnical

(To be provided at next Design Submittal)

Section 3
Civil

Design Analysis

Discipline:	Civil	**Date:**	November 8, 2013

Design Submittal: 30% Design Submittal
Site Location: Bridge #09
Prepared By: Tetra Tech

I. General Summary:

The existing Bridge #09, located along the Gardez to Khost Road in Afghanistan, consists of a two-span concrete deck / concrete grider bridge, supported on stone masonry abutments and piers. The existing bridge has numerous structural problems, including the collapse of one of the two spans. In addition, based on preliminary hydraulic modeling performed by Others and anecdotal evidence, the existing bridge elevation is not sufficient to meet the hydraulic demands of the crossing. Complete bridge replacement is proposed.

The objective is to design a new bridge crossing to replace the existing bridge crossing. The proposed bridge superstructure and substructure shall be constructed out of reinforced concrete. Approach roadway work will be required to transition from the existing roadway to the bridge. Riprap will be used to protect the substructure and approaches, as required for scour protection.

The preliminary bridge design was performed without survey of existing topography, without complete hydraulic information and without geotechnical design parameters. A site survey, complete hydraulic analysis and geotechnical investigation shall be performed during the next phase of design.

II. Basis of Design

- The roadway approaches consist of asphaltic concrete pavement travel lanes and bituminous sealed shoulders. The roadway typical section is comprised of two 3.5 meter lanes with 1.0 meter shoulders with normal crown at the bridge and super elevated sections at the horizontal curves. There will be a transition to the bridge section which includes two 3.5m lanes with 0.55m shoulders and 1.2m sidewalks on each side.

- Horizontal and vertical alignments were designed for approximately 50 kph (30 mph) to match the existing roadway.

- Embankments adjacent to the river will be protected with rip rap stone.

- Stone masonry walls are provided along the proposed roadway approaches to assist in guiding vehicles to the bridge crossing. The design of the stone masonry walls is not intended to be for crash attenuation.

- The project also includes extension of an existing culvert. Detailed information of this work will be provided after site survey is performed.

III. Material Properties

- Approach roadway surface: Asphaltic concrete pavement to be obtained and manufactured locally.
- Approach roadway fill: Select fill intended to be obtained locally.
- Stone masonry walls and Rip Rap: Stones intended to be obtained locally.
- Compaction of soil materials for roadway base courses and embankments shall be 95% maximum dry density as per ASTM D1557.

IV. Code References

- US Army Corps of Engineers Afghanistan Engineer District AED Design Requirements: Vertical Curve Design and Superelevation Road Design March 2009
- AASHTO "LRFD Bridge Design Specifications" 6th Edition, 2012.

Section 4
Structural

Design Analysis

Discipline:	Structural	**Date:**	November 8, 2013

Design Submittal: 30% Design Submittal
Site Location: Bridge #09
Prepared By: Tetra Tech

I. General Summary:

The existing Bridge #09, located along the Gardez to Khost Road in Afghanistan, consists of a two-span concrete deck / concrete grider bridge, supported on stone masonry abutments and piers. The existing bridge has numerous structural problems, including the collapse of one of the two spans. In addition, based on preliminary hydraulic modeling performed (by Others) provided by USAID and on anecdotal evidence, the existing bridge elevation is not sufficient to meet the hydraulic demands of the crossing. Complete bridge replacement is proposed.

The objective is to design a new bridge crossing to replace the existing bridge crossing. The proposed bridge superstructure and substructure shall be constructed out of reinforced concrete. Approach roadway work will be required to transition from the existing roadway to the bridge. Riprap will be used to protect the substructure and approaches, as required for scour protection.

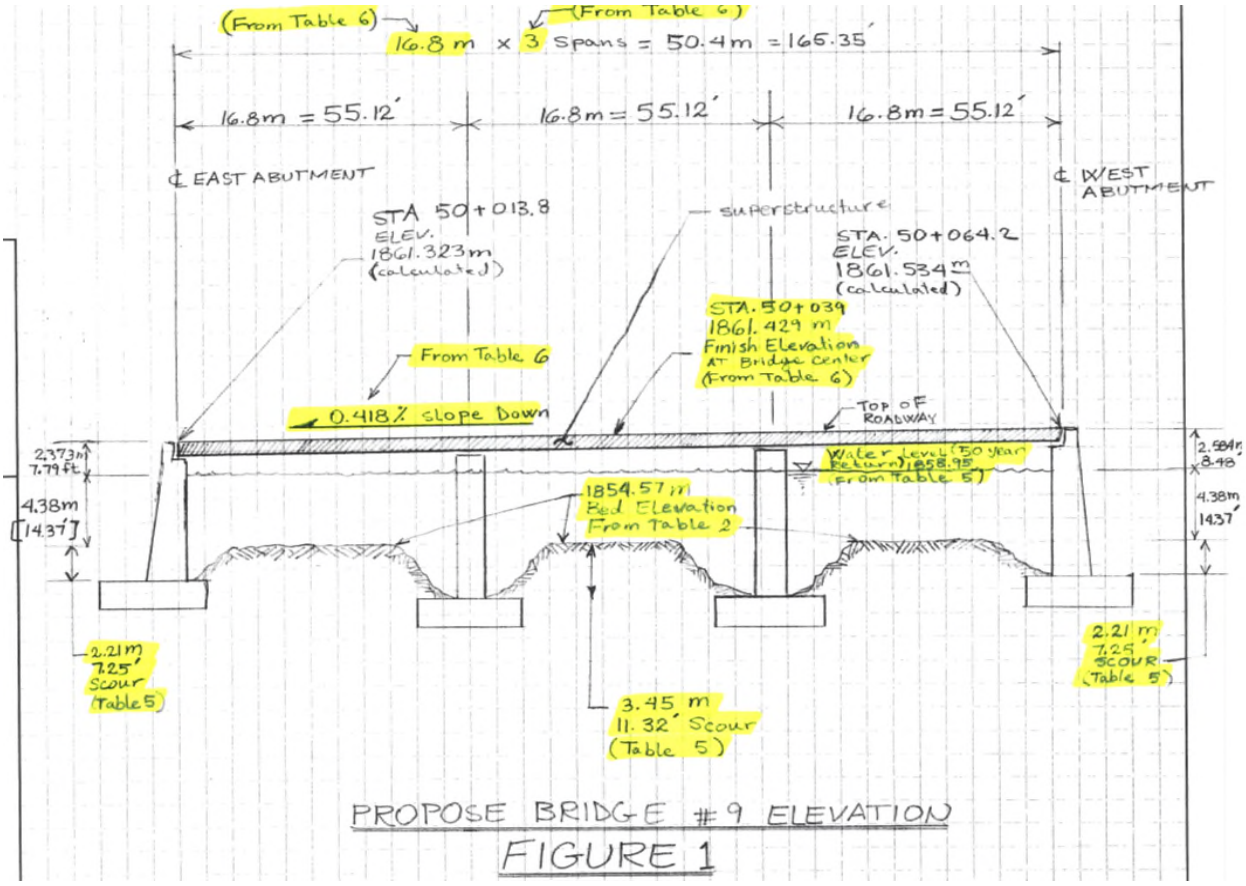
The preliminary bridge design was performed without survey of existing topography, without complete hydraulic information and without geotechnical information specific to the bridge site. A site survey, complete hydraulic analysis and geotechnical investigation of the bridge site shall be performed during the next phase of design.

II. Detailed Analysis:

The proposed bridge elevation shown in Figure 1 was developed based on information and bridge requirements provided in the preliminary hydraulic report referenced above. The information highlighted on Figure 1 is from the preliminary hydraulic report and its sources are sited on the Figure. The piers and abutments were sized to insure their footings are below the scour line.

In addition to the preliminary hydrology report referenced above, USAID also provided profile and plans for Gardez-Khost Rehabilitation Project (by Others). Bridge profile shown on sheet GK-PP-072 of the reference drawings indicates a river bed elevation of approximately 1857.5m which is about 2.93m higher than that indicated in the hydraulic report. For the purpose of this preliminary design, the lower bed elevation (1854.57m) provided in the hydraulic report is used.

In addition of the drawings and hydraulic report referenced above, USAID also provided a geotechnical report for Gardez to Khost Road Rehabilitation/Reconstruction Project (also by Others). The geotechnical parameters in this report are not complete and are not specific to this Bridge #09 site. These geotechnical design parameters are used for the purpose of this preliminary design. A geotechnical investigation of bridge #9 site will be performed during the next phase of design.



The proposed three-span reinforced concrete bridge is comprised of 16.8 meter simple spans, with a total bridge length of 50.4 meters. The superstructure (girder, slab and barriers) and the substructure (abutments and piers) shall be reinforced concrete. The roadway and sidewalks widths on the bridge match those of adjacent Bridge #10 on the same road. As such, the roadway is 4.05m wide in each direction of travel and has two 1.2 m wide sidewalks on each side of the roadway. The bridge is designed for an AASHTO LRFD HL-93 vehicle.

The substructure construction will potentially require dewatering and support-of-excavation in order to construct the proposed foundation.

If a crane is available during the superstructure construction, the beams can be precast offsite or on the approaches and placed using a crane. Using precast beams would accelerate the superstructure construction considerably. Since the reinforced concrete superstructure is heavy, deep girders are required to carry the load. The proposed bridge seat elevation has been set 0.49m above the 50-year flood elevation in order to accommodate top of roadway elevation provided in the preliminary Hydrology report furnished by USAID. For related approach roadway work and limits of work, see the Civil section.

The superstructure, abutments, and piers have been designed to resist all applied loads as described in AASHTO “LRFD Bridge Design Specifications” 6th Edition, 2012. See the “Basis of Design” for design load information.

III. Basis of Design

- Dead Load: Selfweight of superstructure and substructure components
- Live Load: AASHTO LRFD LH-93 Vehicle
- Longitudinal Force: 5% of Live Load
- Seismic Load: Ss = 0.67g
  S1 = 0.26g
  SPC B
  PGA = 0.29g
- Hydraulic: Watershed Area = 237.87 square kilometers.
  Design Flood Event = 50-yr
  Design Discharge = 534.7 m^3/s
  Design Velocity = 3.13 m/s
  Design Groundwater Elevation = 1858.95m
  Scour Depth at Piers = 3.45m
  Scour Depth at Abutments = 2.21m
- Load combinations are based on AASHTO "LRFD Bridge Design Specifications" 6th Edition, 2012.

IV. Material Properties

Concrete Properties:
- Concrete mix shall be ASTM C-150 Type 1 or Type 2 Portland Cement.
- f'c = 27.5 MPa (4000 psi)
- Reinforcement: fy = 4218 kg/cm^2 (60 ksi)

Soil properties (assumed, to be verified during Final Design):
- Weight of Soil 18.1 kN/m^3 (115 pcf)
- Allowable Soil Bearing Pressure (Average Net Pressure)
  - Abutments = 4.07 kg/cm^2 (8.35 ksf)
  - Piers = 4.07 kg/cm^2 (8.35 ksf)
- Friction Angle = 30 degrees
- Coefficient of Friction for Sliding = 0.50
- Ko = 0.5
- Ka = 0.409
- Kp = 2.44
- Compaction shall be 95% maximum dry density as per ASTM D 1557.
- The Contractor shall verify that the actual subsurface conditions meet the assumed geotechnical design parameters.

V. Code References

- AASHTO "LRFD Bridge Design Specifications" 6th Edition, 2012

VI. List of Attachments:

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Calculations

PRELIMINARY DESIGN CALCULATIONS
BRIDGE #09
GARDEZ TO KHOST ROAD - PHASE - IV

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** FOR PRELIMINARY DESIGN ONLY **

SUPERSTRUCTURE ANALYSIS

CONSPAN MODEL, ANALYSIS & RESULTS

** FOR PRELIMINARY DESIGN ONLY **

PROJECT DATA

Project:	Khost Bridge No 9
Designer:	alh
Date:	Oct/28/2013
Checked By:	
Date Checked:	
User job number:	Projects\1298\127-1298-12001-LT0077\SupportDocs\Calcs\Structural\Conspan
State:	Khost, Afghanistan, State Job #:
State Specification:	None
Design Code:	AASHTO LRFD - [6th Edition, 2012]
Units:	US
Span Type:	Simple Span
Flared Girder:	No
File Name:	\\INES011FS1\Projects\1298\127-1298-12001-LT0077 \SupportDocs\Calcs\Structural\Conspan\KHOST_BRIDGE_9.csl

GEOMETRY DATA

BRIDGE LAYOUT

Overall Width (ft)	35.920
Left curb (ft)	4.670
Right curb (ft)	4.670
Curb-to-curb width (ft)	26.580
Number of spans	1
Number of lanes	2
Lane width (ft)	12.000
Eff Deck thick (in)	8.860
Sacrificial thick (in)	0.000
Haunch thickness (in)	0.000
Haunch width (in)	23.640
Bridge c/s,MI(Ixx) (in4)	5349779.00

SPAN DATA

Precast length,	ft =	55.120
Bearing-to-bearing,	ft =	54.120
Release span,	ft =	55.120

BEAM DATA

No	ID	Loc-prev ft	Area in2	MI(Ixx) in4	Height in	Yb in	B-topg in	B-trib ft
1	600x1500(2x5)	2.790	1395.7	405420.0	59.04	29.52	23.64	5.825
2	600x1500(2x5)	6.070	1395.7	405420.0	59.04	29.52	23.64	6.070
3	600x1500(2x5)	6.070	1395.7	405420.0	59.04	29.52	23.64	6.070
4	600x1500(2x5)	6.070	1395.7	405420.0	59.04	29.52	23.64	6.070
5	600x1500(2x5)	6.070	1395.7	405420.0	59.04	29.52	23.64	6.070
6	600x1500(2x5)	6.070	1395.7	405420.0	59.04	29.52	23.64	5.815

MATERIAL DATA - Project Level

As defined in Material Tab. For beam level properties look at Beam Specific output.

CONCRETE PROPERTIES

	Precast Release	Precast Final	C.I.P
f'c (ksi)	1.000	4.000	4.000
Wc (pcf)	150.000	150.000	150.000
Ec (ksi)	1917.130	3834.250	3600.000
K1	1.000	1.000	1.000
Thermal coeff.(1/°F)	0.00000600		

STRAND AND REBAR PROPERTIES

PRESTRESSED STEEL:

DUMMY, Low relaxation strands
Straight Pattern
Strand Diameter = 0.100 in
Tensile Strength(fpu) = 270.0 ksi
Use transformed strand and rebar: No

REINFORCING STEEL:
Tension/Shear steel: fy = 60.0 ksi Es = 29000 ksi

LOADS DATA

Loads generated using Permanent Load Wizard: NO
DEAD LOADS ON PRECAST - NONE

DIAPHRAGM LOADS - using Wizard

Span	Magnitude (plf)	Location (ft)	Skew (deg)
1	1000.000	0.000	0.000
1	1000.000	27.060	0.000
1	1000.000	54.120	0.000

Span	Beam	Load (kips)	Location (ft)
1	1	2.050	0.000
1	1	2.050	27.060
1	1	2.050	54.120
1	2	4.100	0.000
1	2	4.100	27.060
1	2	4.100	54.120
1	3	4.100	0.000
1	3	4.100	27.060
1	3	4.100	54.120
1	4	4.100	0.000
1	4	4.100	27.060
1	4	4.100	54.120
1	5	4.100	0.000
1	5	4.100	27.060
1	5	4.100	54.120
1	6	2.050	0.000
1	6	2.050	27.060
1	6	2.050	54.120

DEAD LOADS ON COMPOSITE
UNITS: (Point: kips, Location: ft, Line: klf, Trapez: klf, Area: ksf, Width: ft)

Span	DC/DW	Type	Mag.1	Loc.1/Width	Mag.2	Loc.2	Description
1	DC	Line	0.510	0.000	0.510	54.120	Left Barrier Weight
1	DC	Line	0.530	0.000	0.530	54.120	Left Sidewalk Weight
1	DC	Line	0.530	0.000	0.530	54.120	Right Sidewalk Weight
1	DC	Line	0.510	0.000	0.510	54.120	Right Barrier Weight
1	DW	Area	0.030	26.570	-	-	Future Wearing Surface

TEMPERATURE LOADS

Temperature Loads (Degrees Fahrenheit)

Load Name	Uniform Rise	Uniform Fall	Gradient Rise Top	Gradient Rise Bottom	Gradient Fall Top	Gradient Fall Bottom
Temp(Khost)	17.4	52.6				

LIVE LOADS

Live load deflection: included.

ID	Type
Design Lane	Design Lane
Design Tandem	Design Tandem
Design Truck	Design Truck

Pedestrian Load

295.50 plf

LRFD Article 3.6.1.6 requires 0.075 ksf applied to all sidewalks greater than 2.0 ft.

LIVE LOADS USED

LIVE LOAD LIBRARY: Default.cs3

1 ID: Design Lane

Description:	Design Lane as in AASHTO-LRFD
Type:	Design Lane

Lane Load:	Intensity = 0.64 klf,	Width = 10.00 ft

2 ID: Design Tandem

Description:	Design Tandem as in AASHTO-LRFD
Type:	Design Tandem

First Axle Magnitude = 25.00 k,	Wheel Spacing = 6.00 ft,	Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	25.00	4.00	4.00	0.00

3 ID: Design Truck

Description:	Design Truck as in AASHTO-LRFD
Type:	Design Truck

First Axle Magnitude = 8.00 k,	Wheel Spacing = 6.00 ft,	Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	14.00	2.00

4 ID: Fatigue Truck

Description:	Fatigue Truck as in AASHTO-LRFD
Type:	Fatigue Truck

First Axle Magnitude = 8.00 k,	Wheel Spacing = 6.00 ft,	Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	30.00	0.00

RATING LOADS

Design Live Load Type,	Weight (tons),	Wheel Spacing(ft)
Design Tandem	25.00	6.00
Design Truck	36.00	6.00
Fatigue Truck	36.00	6.00
HL93 Design Load	-	-

Legal Live Load Type,	Weight (tons),	Wheel Spacing(ft)
3S2 Legal Load	36.00	6.00
3-3 Legal Load	40.00	6.00
3 Legal Load	25.00	6.00

Permit Live Load Type,	Weight (tons),	Wheel Spacing(ft)
PT110	110.00	6.00

RATING LOADS DETAILS
Design Rating Loads:

1 ID: Design Tandem

Description:	Design Tandem as in AASHTO-LRFD
Type:	Design Tandem

First Axle Magnitude = 25.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	25.00	4.00	4.00	0.00

2 ID: Design Truck

Description:	Design Truck as in AASHTO-LRFD
Type:	Design Truck

First Axle Magnitude = 8.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	14.00	2.00

3 ID: Fatigue Truck

Description:	Fatigue Truck as in AASHTO-LRFD
Type:	Design Truck

First Axle Magnitude = 8.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	30.00	0.00

4 ID: Fatigue Truck

Description:	Fatigue Truck as in AASHTO-LRFD
Type:	Fatigue Truck

First Axle Magnitude = 8.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	30.00	0.00

Legal Rating Loads:

1 ID: 3S2 Legal Load

Description:	3S2 Truck as in Manual for Condition Evaluation of Bridges 1994
Type:	Legal Truck

First Axle Magnitude = 10.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	15.50	11.00	11.00	0.00
2	15.50	4.00	4.00	0.00
3	15.50	22.00	22.00	0.00
4	15.50	4.00	4.00	0.00

2 ID: 3-3 Legal Load

Description:	3-3 Truck as in Manual for Condition Evaluation of Bridges 1994
Type:	Legal Truck

First Axle Magnitude = 12.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	12.00	15.00	15.00	0.00
2	12.00	4.00	4.00	0.00
3	16.00	15.00	15.00	0.00
4	14.00	16.00	16.00	0.00
5	14.00	4.00	4.00	0.00

3 ID: 3 Legal Load

Description:	3 Truck as in Manual for Condition Evaluation of Bridges 1994
Type:	Legal Truck

First Axle Magnitude = 16.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	17.00	15.00	15.00	0.00
2	17.00	4.00	4.00	0.00

4 ID: Fatigue Truck

Description:	Fatigue Truck as in AASHTO-LRFD
Type:	Fatigue Truck

First Axle Magnitude = 8.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	30.00	0.00

Permit Rating Loads:

1 ID: PT110

Description:	Permit Vehicle 110 Tons
Type:	Permit Vehicle

Uniform Load	Intensity, klf	Location, ft	Length, ft
Preceding	0.00	0.00	0.00
Trailing	0.00	0.00	0.00

First Axle Magnitude = 10.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	18.00	9.00	9.00	0.00
2	18.00	4.00	4.00	0.00
3	23.00	4.00	4.00	0.00
4	23.00	4.00	4.00	0.00
5	23.00	4.00	4.00	0.00
6	21.00	10.00	10.00	0.00
7	21.00	4.00	4.00	0.00
8	21.00	4.00	4.00	0.00
9	21.00	4.00	4.00	0.00
10	21.00	4.00	4.00	0.00

2 ID: Fatigue Truck

Description:	Fatigue Truck as in AASHTO-LRFD
Type:	Fatigue Truck

First Axle Magnitude = 8.00 k, Wheel Spacing = 6.00 ft, Truck Width = 10.00 ft

#	Magnitude, k	Max Spacing, ft	Min Spacing, ft	Increment, ft
1	32.00	14.00	14.00	0.00
2	32.00	30.00	30.00	0.00

ANALYSIS DATA

ANALYSIS PARAMETERS DATA

Truck impact:	1.330
Lane impact:	1.000
Strength II impact:	1.330
Fatigue impact:	1.150

DISTRIBUTION FACTORS (Art. 4.6.2.2):

Include sacrificial deck thick in ts:	NO
Is Span Post-tensioned:	NO
ADTT (Average Daily Truck Traffic) :	5000
Percent of the specified force effect :	1.00
Apply reduction of Moment for skew:	YES

NOTE: Beam specific dead and live load DFs are printed in beam level reports.

LOAD FACTORS: (Table 3.4.1-1 & 3.4.1-2)

	Live	DC(max)	DC(min)	DW(max)	DW(min)	TU(max)	TU(min)	TG/TML(max)	TG/TML(min)
Service I:	1.00	1.00	-	1.00	-	1.20	1.00	0.50	0.50
Service III:	0.80	1.00	-	1.00	-	-	1.00	-	0.50
Strength I:	1.75	1.25	0.90	1.50	0.65	-	0.50	-	0.00
Strength II:	1.35	1.25	0.90	1.50	0.65	-	0.50	-	0.00
Fatigue I:	1.50	-	-	-	-	-	-	-	-

Note: For TU, TG/TML, the Max. load factor is used for deflections and the Min. load factor for forces.
Permit Vehicle Side by Side with Design Loads (Art. 4.6.2.2.5): No

Ductility Factor:	1.00
Redundancy Factor:	1.00
Importance Factor:	1.00

SHEAR/MOMENT ENVELOPE (&REACTIONS)

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 1, SERVICE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	46.8	79.4	148.0	197.0	226.4	236.2
Haunch (Max)	V	17.5	17.5	15.6	14.2	10.7	7.1	3.6	0.0
Diaphragm :	M	0.0	0.0	2.9	5.1	10.8	16.4	22.1	27.7
(Max)	V	3.1	3.1	1.9	1.0	1.0	1.0	1.0	1.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	193.0	324.8	591.4	763.2	862.9	878.6
	V	63.3	63.3	58.6	55.0	46.4	37.8	27.6	8.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	63.3	63.3	58.6	55.0	46.7	38.7	30.9	23.5
	M	0.0	0.0	195.4	324.8	568.5	718.2	771.6	736.9
Pedestrian:	M+	0.0	0.0	3.6	6.1	11.3	15.0	17.3	18.0
	V	1.3	1.3	1.2	1.1	0.8	0.5	0.3	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.3	1.3	1.2	1.1	0.8	0.6	0.5	0.3
	M	-0.0	-0.0	3.6	6.1	10.6	10.0	9.8	9.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	386.5	653.3	1205.0	1582.0	1807.1	1868.4
	V	137.5	137.5	124.2	113.9	90.8	67.8	43.1	9.9
Total :	M-	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	137.5	137.5	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	137.5	137.5	124.2	113.9	91.2	68.8	46.6	24.9
	M	0.0	0.0	389.1	653.3	1181.4	1532.0	1708.3	1718.4

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	226.4	197.0	148.0	79.4	46.8	0.0	0.0
Haunch (Max)	V	3.6	7.1	10.7	14.2	15.6	17.5	17.5
Diaphragm :	M	22.1	16.4	10.8	5.1	2.9	0.0	0.0
(Max)	V	1.0	1.0	1.0	1.0	1.9	3.1	3.1
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	862.9	763.2	591.4	324.8	193.0	0.0	0.0
	V	27.6	37.8	46.4	55.0	58.6	63.3	63.3
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	30.9	38.7	46.7	55.0	58.6	63.3	63.3
	M	771.6	718.2	568.5	324.8	195.4	0.0	0.0
Pedestrian:	M+	17.3	15.0	11.3	6.1	3.6	0.0	0.0
	V	0.3	0.5	0.8	1.1	1.2	1.3	1.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.6	1.3	1.3
Pedestrian:	Vmx	0.5	0.6	0.9	1.1	1.2	1.3	1.3
	M	11.0	11.1	9.5	5.7	3.5	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1807.1	1582.0	1205.0	653.3	386.5	0.0	0.0
	V	43.1	67.8	90.8	113.9	124.2	137.5	137.5
Total :	M-	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	137.5	137.5
Total :	Vmx	46.6	68.8	91.2	113.9	124.2	137.5	137.5
	M	1709.5	1533.1	1180.3	653.0	388.9	0.0	0.0

REACTIONS (kips), SERVICE I

Load Type	Left Support	Right Support
Self Wt.	39.3	39.3
Deck+Haunch	17.5	17.5
Diaphragm	3.1	3.1
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	56.3	56.3
DL-Comp.(DW)	21.6	21.6
Live	76.9	76.9
Pedestrian	8.0	8.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 2, SERVICE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	193.0	324.8	591.4	763.2	862.9	878.6
	V	78.6	78.6	72.7	68.2	57.5	46.9	34.3	11.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	78.6	78.6	72.7	68.2	57.9	48.0	38.4	29.2
	M	0.0	0.0	195.4	324.8	568.5	718.2	771.6	736.9
Pedestrian:	M+	0.0	0.0	3.6	6.1	11.3	15.0	17.3	18.0
	V	1.3	1.3	1.2	1.1	0.8	0.5	0.3	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.3	1.3	1.2	1.1	0.8	0.6	0.5	0.3
	M	-0.0	-0.0	3.6	6.1	10.6	10.0	9.8	9.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	391.4	661.8	1222.1	1606.8	1838.7	1906.1
	V	156.6	156.6	140.9	128.8	103.5	78.2	50.9	13.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	156.6	156.6	140.9	128.8	103.9	79.4	55.3	31.6
	M	0.0	0.0	393.9	661.8	1198.4	1556.7	1739.9	1756.0

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	862.9	763.2	591.4	324.8	193.0	0.0	0.0
	V	34.3	46.9	57.5	68.2	72.7	78.6	78.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	38.4	48.0	57.9	68.2	72.7	78.6	78.6
	M	771.6	718.2	568.5	324.8	195.4	0.0	0.0
Pedestrian:	M+	17.3	15.0	11.3	6.1	3.6	0.0	0.0
	V	0.3	0.5	0.8	1.1	1.2	1.3	1.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.6	1.3	1.3
Pedestrian:	Vmx	0.5	0.6	0.9	1.1	1.2	1.3	1.3
	M	11.0	11.1	9.5	5.7	3.5	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1838.7	1606.8	1222.1	661.8	391.4	0.0	0.0
	V	50.9	78.2	103.5	128.8	140.9	156.6	156.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	55.3	79.4	103.9	128.8	140.9	156.6	156.6
	M	1741.2	1557.8	1197.4	661.4	393.8	0.0	0.0

REACTIONS (kips), SERVICE I

Load Type	Left Support	Right Support
Self Wt.	39.3	39.3
Deck+Haunch	18.2	18.2
Diaphragm	6.2	6.2
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	56.3	56.3
DL-Comp.(DW)	21.6	21.6
Live	76.9	76.9
Pedestrian	8.0	8.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 3, SERVICE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	193.0	324.8	591.4	763.2	862.9	878.6
	V	78.6	78.6	72.7	68.2	57.5	46.9	34.3	11.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	78.6	78.6	72.7	68.2	57.9	48.0	38.4	29.2
	M	0.0	0.0	195.4	324.8	568.5	718.2	771.6	736.9
Pedestrian:	M+	0.0	0.0	3.6	6.1	11.3	15.0	17.3	18.0
	V	1.3	1.3	1.2	1.1	0.8	0.5	0.3	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.3	1.3	1.2	1.1	0.8	0.6	0.5	0.3
	M	-0.0	-0.0	3.6	6.1	10.6	10.0	9.8	9.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	391.4	661.8	1222.1	1606.8	1838.7	1906.1
	V	156.6	156.6	140.9	128.8	103.5	78.2	50.9	13.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	156.6	156.6	140.9	128.8	103.9	79.4	55.3	31.6
	M	0.0	0.0	393.9	661.8	1198.4	1556.7	1739.9	1756.0

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	862.9	763.2	591.4	324.8	193.0	0.0	0.0
	V	34.3	46.9	57.5	68.2	72.7	78.6	78.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	38.4	48.0	57.9	68.2	72.7	78.6	78.6
	M	771.6	718.2	568.5	324.8	195.4	0.0	0.0
Pedestrian:	M+	17.3	15.0	11.3	6.1	3.6	0.0	0.0
	V	0.3	0.5	0.8	1.1	1.2	1.3	1.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.6	1.3	1.3
Pedestrian:	Vmx	0.5	0.6	0.9	1.1	1.2	1.3	1.3
	M	11.0	11.1	9.5	5.7	3.5	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1838.7	1606.8	1222.1	661.8	391.4	0.0	0.0
	V	50.9	78.2	103.5	128.8	140.9	156.6	156.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	55.3	79.4	103.9	128.8	140.9	156.6	156.6
	M	1741.2	1557.8	1197.4	661.4	393.8	0.0	0.0

REACTIONS (kips), SERVICE I

Load Type	Left Support	Right Support
Self Wt.	39.3	39.3
Deck+Haunch	18.2	18.2
Diaphragm	6.2	6.2
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	56.3	56.3
DL-Comp.(DW)	21.6	21.6
Live	76.9	76.9
Pedestrian	8.0	8.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 4, SERVICE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	193.0	324.8	591.4	763.2	862.9	878.6
	V	78.6	78.6	72.7	68.2	57.5	46.9	34.3	11.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	78.6	78.6	72.7	68.2	57.9	48.0	38.4	29.2
	M	0.0	0.0	195.4	324.8	568.5	718.2	771.6	736.9
Pedestrian:	M+	0.0	0.0	3.6	6.1	11.3	15.0	17.3	18.0
	V	1.3	1.3	1.2	1.1	0.8	0.5	0.3	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.3	1.3	1.2	1.1	0.8	0.6	0.5	0.3
	M	-0.0	-0.0	3.6	6.1	10.6	10.0	9.8	9.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	391.4	661.8	1222.1	1606.8	1838.7	1906.1
	V	156.6	156.6	140.9	128.8	103.5	78.2	50.9	13.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	156.6	156.6	140.9	128.8	103.9	79.4	55.3	31.6
	M	0.0	0.0	393.9	661.8	1198.4	1556.7	1739.9	1756.0

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	862.9	763.2	591.4	324.8	193.0	0.0	0.0
	V	34.3	46.9	57.5	68.2	72.7	78.6	78.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	38.4	48.0	57.9	68.2	72.7	78.6	78.6
	M	771.6	718.2	568.5	324.8	195.4	0.0	0.0
Pedestrian:	M+	17.3	15.0	11.3	6.1	3.6	0.0	0.0
	V	0.3	0.5	0.8	1.1	1.2	1.3	1.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.6	1.3	1.3
Pedestrian:	Vmx	0.5	0.6	0.9	1.1	1.2	1.3	1.3
	M	11.0	11.1	9.5	5.7	3.5	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1838.7	1606.8	1222.1	661.8	391.4	0.0	0.0
	V	50.9	78.2	103.5	128.8	140.9	156.6	156.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	55.3	79.4	103.9	128.8	140.9	156.6	156.6
	M	1741.2	1557.8	1197.4	661.4	393.8	0.0	0.0

REACTIONS (kips), SERVICE I

Load Type	Left Support	Right Support
Self Wt.	39.3	39.3
Deck+Haunch	18.2	18.2
Diaphragm	6.2	6.2
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	56.3	56.3
DL-Comp.(DW)	21.6	21.6
Live	76.9	76.9
Pedestrian	8.0	8.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 5, SERVICE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	193.0	324.8	591.4	763.2	862.9	878.6
	V	78.6	78.6	72.7	68.2	57.5	46.9	34.3	11.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	78.6	78.6	72.7	68.2	57.9	48.0	38.4	29.2
	M	0.0	0.0	195.4	324.8	568.5	718.2	771.6	736.9
Pedestrian:	M+	0.0	0.0	3.6	6.1	11.3	15.0	17.3	18.0
	V	1.3	1.3	1.2	1.1	0.8	0.5	0.3	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.3	1.3	1.2	1.1	0.8	0.6	0.5	0.3
	M	-0.0	-0.0	3.6	6.1	10.6	10.0	9.8	9.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	391.4	661.8	1222.1	1606.8	1838.7	1906.1
	V	156.6	156.6	140.9	128.8	103.5	78.2	50.9	13.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	156.6	156.6	140.9	128.8	103.9	79.4	55.3	31.6
	M	0.0	0.0	393.9	661.8	1198.4	1556.7	1739.9	1756.0

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	862.9	763.2	591.4	324.8	193.0	0.0	0.0
	V	34.3	46.9	57.5	68.2	72.7	78.6	78.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	38.4	48.0	57.9	68.2	72.7	78.6	78.6
	M	771.6	718.2	568.5	324.8	195.4	0.0	0.0
Pedestrian:	M+	17.3	15.0	11.3	6.1	3.6	0.0	0.0
	V	0.3	0.5	0.8	1.1	1.2	1.3	1.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.6	1.3	1.3
Pedestrian:	Vmx	0.5	0.6	0.9	1.1	1.2	1.3	1.3
	M	11.0	11.1	9.5	5.7	3.5	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1838.7	1606.8	1222.1	661.8	391.4	0.0	0.0
	V	50.9	78.2	103.5	128.8	140.9	156.6	156.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	55.3	79.4	103.9	128.8	140.9	156.6	156.6
	M	1741.2	1557.8	1197.4	661.4	393.8	0.0	0.0

REACTIONS (kips), SERVICE I

Load Type	Left Support	Right Support
Self Wt.	39.3	39.3
Deck+Haunch	18.2	18.2
Diaphragm	6.2	6.2
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	56.3	56.3
DL-Comp.(DW)	21.6	21.6
Live	76.9	76.9
Pedestrian	8.0	8.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 6, SERVICE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	46.7	79.3	147.7	196.7	226.0	235.8
Haunch (Max)	V	17.4	17.4	15.6	14.2	10.6	7.1	3.5	0.0
Diaphragm :	M	0.0	0.0	2.9	5.1	10.8	16.4	22.1	27.7
(Max)	V	3.1	3.1	1.9	1.0	1.0	1.0	1.0	1.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	193.0	324.8	591.4	763.2	862.9	878.6
	V	63.3	63.3	58.6	55.0	46.4	37.8	27.6	8.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	63.3	63.3	58.6	55.0	46.7	38.7	30.9	23.5
	M	0.0	0.0	195.4	324.8	568.5	718.2	771.6	736.9
Pedestrian:	M+	0.0	0.0	3.6	6.1	11.3	15.0	17.3	18.0
	V	1.3	1.3	1.2	1.1	0.8	0.5	0.3	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.3	1.3	1.2	1.1	0.8	0.6	0.5	0.3
	M	-0.0	-0.0	3.6	6.1	10.6	10.0	9.8	9.7
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	386.5	653.2	1204.8	1581.7	1806.7	1868.0
	V	137.5	137.5	124.2	113.9	90.8	67.7	43.1	9.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	137.5	137.5	124.2	113.9	91.2	68.8	46.6	24.9
	M	0.0	0.0	389.0	653.2	1181.2	1531.6	1707.9	1718.0

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	226.0	196.7	147.7	79.3	46.7	0.0	0.0
Haunch (Max)	V	3.5	7.1	10.6	14.2	15.6	17.4	17.4
Diaphragm :	M	22.1	16.4	10.8	5.1	2.9	0.0	0.0
(Max)	V	1.0	1.0	1.0	1.0	1.9	3.1	3.1
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	862.9	763.2	591.4	324.8	193.0	0.0	0.0
	V	27.6	37.8	46.4	55.0	58.6	63.3	63.3
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	30.9	38.7	46.7	55.0	58.6	63.3	63.3
	M	771.6	718.2	568.5	324.8	195.4	0.0	0.0
Pedestrian:	M+	17.3	15.0	11.3	6.1	3.6	0.0	0.0
	V	0.3	0.5	0.8	1.1	1.2	1.3	1.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.6	1.3	1.3
Pedestrian:	Vmx	0.5	0.6	0.9	1.1	1.2	1.3	1.3
	M	11.0	11.1	9.5	5.7	3.5	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1806.7	1581.7	1204.8	653.2	386.5	0.0	0.0
	V	43.1	67.7	90.8	113.9	124.2	137.5	137.5
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	46.6	68.8	91.2	113.9	124.2	137.5	137.5
	M	1709.2	1532.7	1180.1	652.8	388.8	0.0	0.0

REACTIONS (kips), SERVICE I

Load Type	Left Support	Right Support
Self Wt.	39.3	39.3
Deck+Haunch	17.4	17.4
Diaphragm	3.1	3.1
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	56.3	56.3
DL-Comp.(DW)	21.6	21.6
Live	76.9	76.9
Pedestrian	8.0	8.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 1, SERVICE III
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	46.8	79.4	148.0	197.0	226.4	236.2
Haunch (Max)	V	17.5	17.5	15.6	14.2	10.7	7.1	3.6	0.0
Diaphragm :	M	0.0	0.0	2.9	5.1	10.8	16.4	22.1	27.7
(Max)	V	3.1	3.1	1.9	1.0	1.0	1.0	1.0	1.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	154.4	259.8	473.2	610.6	690.3	702.9
	V	50.7	50.7	46.9	44.0	37.1	30.2	22.1	7.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	50.7	50.7	46.9	44.0	37.4	31.0	24.8	18.8
	M	0.0	0.0	156.3	259.8	454.8	574.5	617.3	589.5
Pedestrian:	M+	0.0	0.0	2.9	4.8	9.0	12.0	13.8	14.4
	V	1.1	1.1	1.0	0.9	0.7	0.4	0.2	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.1	1.1	1.0	0.9	0.7	0.5	0.4	0.2
	M	-0.0	-0.0	2.9	4.8	8.5	8.0	7.8	7.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	347.2	587.2	1084.5	1426.4	1631.1	1689.1
	V	124.6	124.6	112.2	102.7	81.4	60.1	37.5	8.2
Total :	M-	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	124.6	124.6	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	124.6	124.6	112.2	102.7	81.7	60.9	40.4	20.1
	M	0.0	0.0	349.2	587.2	1065.6	1386.3	1552.0	1569.1

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	226.4	197.0	148.0	79.4	46.8	0.0	0.0
Haunch (Max)	V	3.6	7.1	10.7	14.2	15.6	17.5	17.5
Diaphragm :	M	22.1	16.4	10.8	5.1	2.9	0.0	0.0
(Max)	V	1.0	1.0	1.0	1.0	1.9	3.1	3.1
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	690.3	610.6	473.2	259.8	154.4	0.0	0.0
	V	22.1	30.2	37.1	44.0	46.9	50.7	50.7
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	24.8	31.0	37.4	44.0	46.9	50.7	50.7
	M	617.3	574.5	454.8	259.8	156.3	0.0	0.0
Pedestrian:	M+	13.8	12.0	9.0	4.8	2.9	0.0	0.0
	V	0.2	0.4	0.7	0.9	1.0	1.1	1.1
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.5	1.1	1.1
Pedestrian:	Vmx	0.4	0.5	0.7	0.9	1.0	1.1	1.1
	M	8.8	8.9	7.6	4.6	2.8	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1631.1	1426.4	1084.5	587.2	347.2	0.0	0.0
	V	37.5	60.1	81.4	102.7	112.2	124.6	124.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	124.6	124.6
Total :	Vmx	40.4	60.9	81.7	102.7	112.2	124.6	124.6
	M	1553.0	1387.2	1064.7	586.9	349.1	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 2, SERVICE III
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	154.4	259.8	473.2	610.6	690.3	702.9
	V	62.9	62.9	58.2	54.6	46.0	37.5	27.4	8.8
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	62.9	62.9	58.2	54.6	46.4	38.4	30.7	23.4
	M	0.0	0.0	156.3	259.8	454.8	574.5	617.3	589.5
Pedestrian:	M+	0.0	0.0	2.9	4.8	9.0	12.0	13.8	14.4
	V	1.1	1.1	1.0	0.9	0.7	0.4	0.2	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.1	1.1	1.0	0.9	0.7	0.5	0.4	0.2
	M	-0.0	-0.0	2.9	4.8	8.5	8.0	7.8	7.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	352.1	595.6	1101.5	1451.1	1662.7	1726.7
	V	140.6	140.6	126.1	114.9	91.8	68.7	44.0	10.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	140.6	140.6	126.1	114.9	92.2	69.7	47.5	25.7
	M	0.0	0.0	354.1	595.6	1082.6	1411.1	1583.6	1606.7

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	690.3	610.6	473.2	259.8	154.4	0.0	0.0
	V	27.4	37.5	46.0	54.6	58.2	62.9	62.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	30.7	38.4	46.4	54.6	58.2	62.9	62.9
	M	617.3	574.5	454.8	259.8	156.3	0.0	0.0
Pedestrian:	M+	13.8	12.0	9.0	4.8	2.9	0.0	0.0
	V	0.2	0.4	0.7	0.9	1.0	1.1	1.1
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.5	1.1	1.1
Pedestrian:	Vmx	0.4	0.5	0.7	0.9	1.0	1.1	1.1
	M	8.8	8.9	7.6	4.6	2.8	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1662.7	1451.1	1101.5	595.6	352.1	0.0	0.0
	V	44.0	68.7	91.8	114.9	126.1	140.6	140.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	47.5	69.7	92.2	114.9	126.1	140.6	140.6
	M	1584.6	1411.9	1081.7	595.3	354.0	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 3, SERVICE III
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	154.4	259.8	473.2	610.6	690.3	702.9
	V	62.9	62.9	58.2	54.6	46.0	37.5	27.4	8.8
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	62.9	62.9	58.2	54.6	46.4	38.4	30.7	23.4
	M	0.0	0.0	156.3	259.8	454.8	574.5	617.3	589.5
Pedestrian:	M+	0.0	0.0	2.9	4.8	9.0	12.0	13.8	14.4
	V	1.1	1.1	1.0	0.9	0.7	0.4	0.2	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.1	1.1	1.0	0.9	0.7	0.5	0.4	0.2
	M	-0.0	-0.0	2.9	4.8	8.5	8.0	7.8	7.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	352.1	595.6	1101.5	1451.1	1662.7	1726.7
	V	140.6	140.6	126.1	114.9	91.8	68.7	44.0	10.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	140.6	140.6	126.1	114.9	92.2	69.7	47.5	25.7
	M	0.0	0.0	354.1	595.6	1082.6	1411.1	1583.6	1606.7

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	690.3	610.6	473.2	259.8	154.4	0.0	0.0
	V	27.4	37.5	46.0	54.6	58.2	62.9	62.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	30.7	38.4	46.4	54.6	58.2	62.9	62.9
	M	617.3	574.5	454.8	259.8	156.3	0.0	0.0
Pedestrian:	M+	13.8	12.0	9.0	4.8	2.9	0.0	0.0
	V	0.2	0.4	0.7	0.9	1.0	1.1	1.1
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.5	1.1	1.1
Pedestrian:	Vmx	0.4	0.5	0.7	0.9	1.0	1.1	1.1
	M	8.8	8.9	7.6	4.6	2.8	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1662.7	1451.1	1101.5	595.6	352.1	0.0	0.0
	V	44.0	68.7	91.8	114.9	126.1	140.6	140.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	47.5	69.7	92.2	114.9	126.1	140.6	140.6
	M	1584.6	1411.9	1081.7	595.3	354.0	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 4, SERVICE III
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	154.4	259.8	473.2	610.6	690.3	702.9
	V	62.9	62.9	58.2	54.6	46.0	37.5	27.4	8.8
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	62.9	62.9	58.2	54.6	46.4	38.4	30.7	23.4
	M	0.0	0.0	156.3	259.8	454.8	574.5	617.3	589.5
Pedestrian:	M+	0.0	0.0	2.9	4.8	9.0	12.0	13.8	14.4
	V	1.1	1.1	1.0	0.9	0.7	0.4	0.2	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.1	1.1	1.0	0.9	0.7	0.5	0.4	0.2
	M	-0.0	-0.0	2.9	4.8	8.5	8.0	7.8	7.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	352.1	595.6	1101.5	1451.1	1662.7	1726.7
	V	140.6	140.6	126.1	114.9	91.8	68.7	44.0	10.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	140.6	140.6	126.1	114.9	92.2	69.7	47.5	25.7
	M	0.0	0.0	354.1	595.6	1082.6	1411.1	1583.6	1606.7

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	690.3	610.6	473.2	259.8	154.4	0.0	0.0
	V	27.4	37.5	46.0	54.6	58.2	62.9	62.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	30.7	38.4	46.4	54.6	58.2	62.9	62.9
	M	617.3	574.5	454.8	259.8	156.3	0.0	0.0
Pedestrian:	M+	13.8	12.0	9.0	4.8	2.9	0.0	0.0
	V	0.2	0.4	0.7	0.9	1.0	1.1	1.1
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.5	1.1	1.1
Pedestrian:	Vmx	0.4	0.5	0.7	0.9	1.0	1.1	1.1
	M	8.8	8.9	7.6	4.6	2.8	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1662.7	1451.1	1101.5	595.6	352.1	0.0	0.0
	V	44.0	68.7	91.8	114.9	126.1	140.6	140.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	47.5	69.7	92.2	114.9	126.1	140.6	140.6
	M	1584.6	1411.9	1081.7	595.3	354.0	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 5, SERVICE III
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	154.4	259.8	473.2	610.6	690.3	702.9
	V	62.9	62.9	58.2	54.6	46.0	37.5	27.4	8.8
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	62.9	62.9	58.2	54.6	46.4	38.4	30.7	23.4
	M	0.0	0.0	156.3	259.8	454.8	574.5	617.3	589.5
Pedestrian:	M+	0.0	0.0	2.9	4.8	9.0	12.0	13.8	14.4
	V	1.1	1.1	1.0	0.9	0.7	0.4	0.2	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.1	1.1	1.0	0.9	0.7	0.5	0.4	0.2
	M	-0.0	-0.0	2.9	4.8	8.5	8.0	7.8	7.7
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	352.1	595.6	1101.5	1451.1	1662.7	1726.7
	V	140.6	140.6	126.1	114.9	91.8	68.7	44.0	10.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	140.6	140.6	126.1	114.9	92.2	69.7	47.5	25.7
	M	0.0	0.0	354.1	595.6	1082.6	1411.1	1583.6	1606.7

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	690.3	610.6	473.2	259.8	154.4	0.0	0.0
	V	27.4	37.5	46.0	54.6	58.2	62.9	62.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	30.7	38.4	46.4	54.6	58.2	62.9	62.9
	M	617.3	574.5	454.8	259.8	156.3	0.0	0.0
Pedestrian:	M+	13.8	12.0	9.0	4.8	2.9	0.0	0.0
	V	0.2	0.4	0.7	0.9	1.0	1.1	1.1
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.5	1.1	1.1
Pedestrian:	Vmx	0.4	0.5	0.7	0.9	1.0	1.1	1.1
	M	8.8	8.9	7.6	4.6	2.8	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1662.7	1451.1	1101.5	595.6	352.1	0.0	0.0
	V	44.0	68.7	91.8	114.9	126.1	140.6	140.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	47.5	69.7	92.2	114.9	126.1	140.6	140.6
	M	1584.6	1411.9	1081.7	595.3	354.0	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 6, SERVICE III
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	46.7	79.3	147.7	196.7	226.0	235.8
Haunch (Max)	V	17.4	17.4	15.6	14.2	10.6	7.1	3.5	0.0
Diaphragm :	M	0.0	0.0	2.9	5.1	10.8	16.4	22.1	27.7
(Max)	V	3.1	3.1	1.9	1.0	1.0	1.0	1.0	1.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
LL + I :	M+	0.0	0.0	154.4	259.8	473.2	610.6	690.3	702.9
	V	50.7	50.7	46.9	44.0	37.1	30.2	22.1	7.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	50.7	50.7	46.9	44.0	37.4	31.0	24.8	18.8
	M	0.0	0.0	156.3	259.8	454.8	574.5	617.3	589.5
Pedestrian:	M+	0.0	0.0	2.9	4.8	9.0	12.0	13.8	14.4
	V	1.1	1.1	1.0	0.9	0.7	0.4	0.2	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.1	1.1	1.0	0.9	0.7	0.5	0.4	0.2
	M	-0.0	-0.0	2.9	4.8	8.5	8.0	7.8	7.7
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	347.2	587.0	1084.2	1426.0	1630.7	1688.7
	V	124.6	124.6	112.2	102.7	81.4	60.1	37.5	8.2
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	124.6	124.6	112.2	102.7	81.7	60.9	40.4	20.1
	M	0.0	0.0	349.2	587.0	1065.3	1386.0	1551.6	1568.6

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	226.0	196.7	147.7	79.3	46.7	0.0	0.0
Haunch (Max)	V	3.5	7.1	10.6	14.2	15.6	17.4	17.4
Diaphragm :	M	22.1	16.4	10.8	5.1	2.9	0.0	0.0
(Max)	V	1.0	1.0	1.0	1.0	1.9	3.1	3.1
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
LL + I :	M+	690.3	610.6	473.2	259.8	154.4	0.0	0.0
	V	22.1	30.2	37.1	44.0	46.9	50.7	50.7
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	24.8	31.0	37.4	44.0	46.9	50.7	50.7
	M	617.3	574.5	454.8	259.8	156.3	0.0	0.0
Pedestrian:	M+	13.8	12.0	9.0	4.8	2.9	0.0	0.0
	V	0.2	0.4	0.7	0.9	1.0	1.1	1.1
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.5	1.1	1.1
Pedestrian:	Vmx	0.4	0.5	0.7	0.9	1.0	1.1	1.1
	M	8.8	8.9	7.6	4.6	2.8	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1630.7	1426.0	1084.2	587.0	347.2	0.0	0.0
	V	37.5	60.1	81.4	102.7	112.2	124.6	124.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	40.4	60.9	81.7	102.7	112.2	124.6	124.6
	M	1552.6	1386.9	1064.5	586.7	349.0	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 1, STRENGTH I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	58.5	99.2	185.0	246.2	283.0	295.2
Haunch (Max)	V	21.8	21.8	19.5	17.8	13.3	8.9	4.4	0.0
Deck + :	M	0.0	0.0	42.1	71.5	133.2	177.3	203.8	212.6
Haunch (Min)	V	15.7	15.7	14.1	12.8	9.6	6.4	3.2	0.0
Diaphragm :	M	0.0	0.0	3.6	6.4	13.5	20.5	27.6	34.7
(Max)	V	3.8	3.8	2.4	1.3	1.3	1.3	1.3	1.3
Diaphragm :	M	0.0	0.0	2.6	4.6	9.7	14.8	19.9	25.0
(Min)	V	2.8	2.8	1.7	0.9	0.9	0.9	0.9	0.9
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	337.7	568.4	1035.0	1335.6	1510.0	1537.5
	V	110.9	110.9	102.6	96.2	81.1	66.1	48.3	15.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	110.9	110.9	102.6	96.2	81.7	67.7	54.2	41.2
	M	0.0	0.0	342.0	568.4	995.0	1256.8	1350.2	1289.6
Pedestrian:	M+	0.0	0.0	6.3	10.6	19.8	26.3	30.2	31.6
	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	2.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	2.3	2.3	2.1	1.9	1.5	1.1	0.8	0.5
	M	-0.0	-0.0	6.4	10.6	18.5	17.6	17.1	16.9
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	583.9	986.2	1815.3	2376.8	2710.6	2796.0
	V	205.1	205.1	186.0	171.2	137.7	104.2	68.0	16.9
Total :	M-	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	177.9	177.9	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	205.1	205.1	186.0	171.2	138.3	106.0	74.2	43.0
	M	0.0	0.0	588.3	986.2	1774.0	2289.2	2537.7	2533.4

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	283.0	246.2	185.0	99.2	58.5	0.0	0.0
Haunch (Max)	V	4.4	8.9	13.3	17.8	19.5	21.8	21.8
Deck + :	M	203.8	177.3	133.2	71.5	42.1	0.0	0.0
Haunch (Min)	V	3.2	6.4	9.6	12.8	14.1	15.7	15.7
Diaphragm :	M	27.6	20.5	13.5	6.4	3.6	0.0	0.0
(Max)	V	1.3	1.3	1.3	1.3	2.4	3.8	3.8
Diaphragm :	M	19.9	14.8	9.7	4.6	2.6	0.0	0.0
(Min)	V	0.9	0.9	0.9	0.9	1.7	2.8	2.8
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1510.0	1335.6	1035.0	568.4	337.7	0.0	0.0
	V	48.3	66.1	81.1	96.2	102.6	110.9	110.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	54.2	67.7	81.7	96.2	102.6	110.9	110.9
	M	1350.2	1256.8	995.0	568.4	342.0	0.0	0.0
Pedestrian:	M+	30.2	26.3	19.8	10.6	6.3	0.0	0.0
	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	1.0	2.3	2.3
Pedestrian:	Vmx	0.8	1.1	1.5	1.9	2.1	2.3	2.3
	M	19.3	19.5	16.6	10.0	6.1	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2710.6	2376.8	1815.3	986.2	583.9	0.0	0.0
	V	68.0	104.2	137.7	171.2	186.0	205.1	205.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	177.9	177.9
Total :	Vmx	74.2	106.0	138.3	171.2	186.0	205.1	205.1
	M	2539.9	2291.1	1772.1	985.6	588.0	0.0	0.0

REACTIONS (kips), STRENGTH I

Load Type	Left Support	Right Support
Self Wt.	49.2	49.2
Deck+Haunch	21.8	21.8
Diaphragm	3.8	3.8
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	70.4	70.4
DL-Comp.(DW)	32.4	32.4
Live	134.6	134.6
Pedestrian	14.0	14.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 2, STRENGTH I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	337.7	568.4	1035.0	1335.6	1510.0	1537.5
	V	137.6	137.6	127.3	119.3	100.7	82.0	60.0	19.3
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	137.6	137.6	127.3	119.3	101.4	84.1	67.2	51.1
	M	0.0	0.0	342.0	568.4	995.0	1256.8	1350.2	1289.6
Pedestrian:	M+	0.0	0.0	6.3	10.6	19.8	26.3	30.2	31.6
	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	2.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	2.3	2.3	2.1	1.9	1.5	1.1	0.8	0.5
	M	-0.0	-0.0	6.4	10.6	18.5	17.6	17.1	16.9
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	590.0	996.8	1836.6	2407.7	2750.1	2843.0
	V	236.6	236.6	213.9	196.4	159.1	121.8	81.1	21.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	236.6	236.6	213.9	196.4	159.8	124.0	88.7	54.2
	M	0.0	0.0	594.4	996.8	1795.2	2320.1	2577.2	2580.5

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1510.0	1335.6	1035.0	568.4	337.7	0.0	0.0
	V	60.0	82.0	100.7	119.3	127.3	137.6	137.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	67.2	84.1	101.4	119.3	127.3	137.6	137.6
	M	1350.2	1256.8	995.0	568.4	342.0	0.0	0.0
Pedestrian:	M+	30.2	26.3	19.8	10.6	6.3	0.0	0.0
	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	1.0	2.3	2.3
Pedestrian:	Vmx	0.8	1.1	1.5	1.9	2.1	2.3	2.3
	M	19.3	19.5	16.6	10.0	6.1	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2750.1	2407.7	1836.6	996.8	590.0	0.0	0.0
	V	81.1	121.8	159.1	196.4	213.9	236.6	236.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	88.7	124.0	159.9	196.4	213.9	236.6	236.6
	M	2579.4	2322.0	1793.3	996.2	594.1	0.0	0.0

REACTIONS (kips), STRENGTH I

Load Type	Left Support	Right Support
Self Wt.	49.2	49.2
Deck+Haunch	22.7	22.7
Diaphragm	7.7	7.7
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	70.4	70.4
DL-Comp.(DW)	32.4	32.4
Live	134.6	134.6
Pedestrian	14.0	14.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 3, STRENGTH I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	337.7	568.4	1035.0	1335.6	1510.0	1537.5
	V	137.6	137.6	127.3	119.3	100.7	82.0	60.0	19.3
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	137.6	137.6	127.3	119.3	101.4	84.1	67.2	51.1
	M	0.0	0.0	342.0	568.4	995.0	1256.8	1350.2	1289.6
Pedestrian:	M+	0.0	0.0	6.3	10.6	19.8	26.3	30.2	31.6
	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	2.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	2.3	2.3	2.1	1.9	1.5	1.1	0.8	0.5
	M	-0.0	-0.0	6.4	10.6	18.5	17.6	17.1	16.9
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	590.0	996.8	1836.6	2407.7	2750.1	2843.0
	V	236.6	236.6	213.9	196.4	159.1	121.8	81.1	21.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	236.6	236.6	213.9	196.4	159.8	124.0	88.7	54.2
	M	0.0	0.0	594.4	996.8	1795.2	2320.1	2577.2	2580.5

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1510.0	1335.6	1035.0	568.4	337.7	0.0	0.0
	V	60.0	82.0	100.7	119.3	127.3	137.6	137.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	67.2	84.1	101.4	119.3	127.3	137.6	137.6
	M	1350.2	1256.8	995.0	568.4	342.0	0.0	0.0
Pedestrian:	M+	30.2	26.3	19.8	10.6	6.3	0.0	0.0
	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	1.0	2.3	2.3
Pedestrian:	Vmx	0.8	1.1	1.5	1.9	2.1	2.3	2.3
	M	19.3	19.5	16.6	10.0	6.1	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2750.1	2407.7	1836.6	996.8	590.0	0.0	0.0
	V	81.1	121.8	159.1	196.4	213.9	236.6	236.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	88.7	124.0	159.9	196.4	213.9	236.6	236.6
	M	2579.4	2322.0	1793.3	996.2	594.1	0.0	0.0

REACTIONS (kips), STRENGTH I

Load Type	Left Support	Right Support
Self Wt.	49.2	49.2
Deck+Haunch	22.7	22.7
Diaphragm	7.7	7.7
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	70.4	70.4
DL-Comp.(DW)	32.4	32.4
Live	134.6	134.6
Pedestrian	14.0	14.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 4, STRENGTH I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	337.7	568.4	1035.0	1335.6	1510.0	1537.5
	V	137.6	137.6	127.3	119.3	100.7	82.0	60.0	19.3
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	137.6	137.6	127.3	119.3	101.4	84.1	67.2	51.1
	M	0.0	0.0	342.0	568.4	995.0	1256.8	1350.2	1289.6
Pedestrian:	M+	0.0	0.0	6.3	10.6	19.8	26.3	30.2	31.6
	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	2.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	2.3	2.3	2.1	1.9	1.5	1.1	0.8	0.5
	M	-0.0	-0.0	6.4	10.6	18.5	17.6	17.1	16.9
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	590.0	996.8	1836.6	2407.7	2750.1	2843.0
	V	236.6	236.6	213.9	196.4	159.1	121.8	81.1	21.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	236.6	236.6	213.9	196.4	159.8	124.0	88.7	54.2
	M	0.0	0.0	594.4	996.8	1795.2	2320.1	2577.2	2580.5

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1510.0	1335.6	1035.0	568.4	337.7	0.0	0.0
	V	60.0	82.0	100.7	119.3	127.3	137.6	137.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	67.2	84.1	101.4	119.3	127.3	137.6	137.6
	M	1350.2	1256.8	995.0	568.4	342.0	0.0	0.0
Pedestrian:	M+	30.2	26.3	19.8	10.6	6.3	0.0	0.0
	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	1.0	2.3	2.3
Pedestrian:	Vmx	0.8	1.1	1.5	1.9	2.1	2.3	2.3
	M	19.3	19.5	16.6	10.0	6.1	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2750.1	2407.7	1836.6	996.8	590.0	0.0	0.0
	V	81.1	121.8	159.1	196.4	213.9	236.6	236.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	88.7	124.0	159.9	196.4	213.9	236.6	236.6
	M	2579.4	2322.0	1793.3	996.2	594.1	0.0	0.0

REACTIONS (kips), STRENGTH I

Load Type	Left Support	Right Support
Self Wt.	49.2	49.2
Deck+Haunch	22.7	22.7
Diaphragm	7.7	7.7
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	70.4	70.4
DL-Comp.(DW)	32.4	32.4
Live	134.6	134.6
Pedestrian	14.0	14.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 5, STRENGTH I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	337.7	568.4	1035.0	1335.6	1510.0	1537.5
	V	137.6	137.6	127.3	119.3	100.7	82.0	60.0	19.3
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	137.6	137.6	127.3	119.3	101.4	84.1	67.2	51.1
	M	0.0	0.0	342.0	568.4	995.0	1256.8	1350.2	1289.6
Pedestrian:	M+	0.0	0.0	6.3	10.6	19.8	26.3	30.2	31.6
	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	2.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	2.3	2.3	2.1	1.9	1.5	1.1	0.8	0.5
	M	-0.0	-0.0	6.4	10.6	18.5	17.6	17.1	16.9
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	590.0	996.8	1836.6	2407.7	2750.1	2843.0
	V	236.6	236.6	213.9	196.4	159.1	121.8	81.1	21.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	236.6	236.6	213.9	196.4	159.8	124.0	88.7	54.2
	M	0.0	0.0	594.4	996.8	1795.2	2320.1	2577.2	2580.5

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1510.0	1335.6	1035.0	568.4	337.7	0.0	0.0
	V	60.0	82.0	100.7	119.3	127.3	137.6	137.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	67.2	84.1	101.4	119.3	127.3	137.6	137.6
	M	1350.2	1256.8	995.0	568.4	342.0	0.0	0.0
Pedestrian:	M+	30.2	26.3	19.8	10.6	6.3	0.0	0.0
	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	1.0	2.3	2.3
Pedestrian:	Vmx	0.8	1.1	1.5	1.9	2.1	2.3	2.3
	M	19.3	19.5	16.6	10.0	6.1	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2750.1	2407.7	1836.6	996.8	590.0	0.0	0.0
	V	81.1	121.8	159.1	196.4	213.9	236.6	236.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	88.7	124.0	159.9	196.4	213.9	236.6	236.6
	M	2579.4	2322.0	1793.3	996.2	594.1	0.0	0.0

REACTIONS (kips), STRENGTH I

Load Type	Left Support	Right Support
Self Wt.	49.2	49.2
Deck+Haunch	22.7	22.7
Diaphragm	7.7	7.7
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	70.4	70.4
DL-Comp.(DW)	32.4	32.4
Live	134.6	134.6
Pedestrian	14.0	14.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 6, STRENGTH I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	58.4	99.1	184.7	245.8	282.5	294.7
Haunch (Max)	V	21.8	21.8	19.5	17.7	13.3	8.9	4.4	0.0
Deck + :	M	0.0	0.0	42.1	71.3	133.0	177.0	203.4	212.2
Haunch (Min)	V	15.7	15.7	14.0	12.8	9.6	6.4	3.2	0.0
Diaphragm :	M	0.0	0.0	3.6	6.4	13.5	20.5	27.6	34.7
(Max)	V	3.8	3.8	2.4	1.3	1.3	1.3	1.3	1.3
Diaphragm :	M	0.0	0.0	2.6	4.6	9.7	14.8	19.9	25.0
(Min)	V	2.8	2.8	1.7	0.9	0.9	0.9	0.9	0.9
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	337.7	568.4	1035.0	1335.6	1510.0	1537.5
	V	110.9	110.9	102.6	96.2	81.1	66.1	48.3	15.6
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	110.9	110.9	102.6	96.2	81.7	67.7	54.2	41.2
	M	0.0	0.0	342.0	568.4	995.0	1256.8	1350.2	1289.6
Pedestrian:	M+	0.0	0.0	6.3	10.6	19.8	26.3	30.2	31.6
	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	2.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	2.3	2.3	2.1	1.9	1.5	1.1	0.8	0.5
	M	-0.0	-0.0	6.4	10.6	18.5	17.6	17.1	16.9
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	583.8	986.0	1815.0	2376.4	2710.1	2795.4
	V	205.1	205.1	185.9	171.1	137.7	104.2	68.0	16.9
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	205.1	205.1	185.9	171.1	138.3	106.0	74.2	43.0
	M	0.0	0.0	588.2	986.0	1773.6	2288.8	2537.2	2532.9

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	282.5	245.8	184.7	99.1	58.4	0.0	0.0
Haunch (Max)	V	4.4	8.9	13.3	17.7	19.5	21.8	21.8
Deck + :	M	203.4	177.0	133.0	71.3	42.1	0.0	0.0
Haunch (Min)	V	3.2	6.4	9.6	12.8	14.0	15.7	15.7
Diaphragm :	M	27.6	20.5	13.5	6.4	3.6	0.0	0.0
(Max)	V	1.3	1.3	1.3	1.3	2.4	3.8	3.8
Diaphragm :	M	19.9	14.8	9.7	4.6	2.6	0.0	0.0
(Min)	V	0.9	0.9	0.9	0.9	1.7	2.8	2.8
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1510.0	1335.6	1035.0	568.4	337.7	0.0	0.0
	V	48.3	66.1	81.1	96.2	102.6	110.9	110.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	54.2	67.7	81.7	96.2	102.6	110.9	110.9
	M	1350.2	1256.8	995.0	568.4	342.0	0.0	0.0
Pedestrian:	M+	30.2	26.3	19.8	10.6	6.3	0.0	0.0
	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	1.0	2.3	2.3
Pedestrian:	Vmx	0.8	1.1	1.5	1.9	2.1	2.3	2.3
	M	19.3	19.5	16.6	10.0	6.1	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2710.1	2376.4	1815.0	986.0	583.8	0.0	0.0
	V	68.0	104.2	137.7	171.1	185.9	205.1	205.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	74.2	106.0	138.3	171.1	185.9	205.1	205.1
	M	2539.4	2290.7	1771.7	985.4	587.9	0.0	0.0

REACTIONS (kips), STRENGTH I

Load Type	Left Support	Right Support
Self Wt.	49.2	49.2
Deck+Haunch	21.8	21.8
Diaphragm	3.8	3.8
DL-Prec.(DC)	0.0	0.0
DL-Prec.(DW)	0.0	0.0
DL-Comp.(DC)	70.4	70.4
DL-Comp.(DW)	32.4	32.4
Live	134.6	134.6
Pedestrian	14.0	14.0

Upward reactions are positive.
Live Load reactions are per lane with no distribution factor and no impact.
Reactions are not multiplied by Load Modifiers (ductility, redundancy and operational importance).
Non-composite load types are per beam.
Composite and Pedestrian load types are per total bridge width.

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 1, STRENGTH II
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	58.5	99.2	185.0	246.2	283.0	295.2
Haunch (Max)	V	21.8	21.8	19.5	17.8	13.3	8.9	4.4	0.0
Deck + :	M	0.0	0.0	42.1	71.5	133.2	177.3	203.8	212.6
Haunch (Min)	V	15.7	15.7	14.1	12.8	9.6	6.4	3.2	0.0
Diaphragm :	M	0.0	0.0	3.6	6.4	13.5	20.5	27.6	34.7
(Max)	V	3.8	3.8	2.4	1.3	1.3	1.3	1.3	1.3
Diaphragm :	M	0.0	0.0	2.6	4.6	9.7	14.8	19.9	25.0
(Min)	V	2.8	2.8	1.7	0.9	0.9	0.9	0.9	0.9
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	260.5	438.5	798.5	1030.3	1164.9	1186.1
	V	85.5	85.5	79.1	74.2	62.6	51.0	37.3	12.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	85.5	85.5	79.1	74.2	63.0	52.3	41.8	31.8
	M	0.0	0.0	263.8	438.5	767.5	969.5	1041.6	994.8
Pedestrian:	M+	0.0	0.0	4.8	8.2	15.3	20.3	23.3	24.3
	V	1.8	1.8	1.6	1.5	1.1	0.7	0.4	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.8	1.8	1.6	1.5	1.1	0.8	0.6	0.4
	M	-0.0	-0.0	4.9	8.2	14.3	13.5	13.2	13.1
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	505.3	853.8	1574.2	2065.5	2358.5	2437.3
	V	179.3	179.3	162.0	148.7	118.8	88.9	56.9	13.3
Total :	M-	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	152.0	152.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	179.3	179.3	162.0	148.7	119.3	90.3	61.6	33.5
	M	0.0	0.0	508.6	853.8	1542.3	1997.9	2225.2	2234.8

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	283.0	246.2	185.0	99.2	58.5	0.0	0.0
Haunch (Max)	V	4.4	8.9	13.3	17.8	19.5	21.8	21.8
Deck + :	M	203.8	177.3	133.2	71.5	42.1	0.0	0.0
Haunch (Min)	V	3.2	6.4	9.6	12.8	14.1	15.7	15.7
Diaphragm :	M	27.6	20.5	13.5	6.4	3.6	0.0	0.0
(Max)	V	1.3	1.3	1.3	1.3	2.4	3.8	3.8
Diaphragm :	M	19.9	14.8	9.7	4.6	2.6	0.0	0.0
(Min)	V	0.9	0.9	0.9	0.9	1.7	2.8	2.8
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1164.9	1030.3	798.5	438.5	260.5	0.0	0.0
	V	37.3	51.0	62.6	74.2	79.1	85.5	85.5
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	41.8	52.3	63.0	74.2	79.1	85.5	85.5
	M	1041.6	969.5	767.5	438.5	263.8	0.0	0.0
Pedestrian:	M+	23.3	20.3	15.3	8.2	4.8	0.0	0.0
	V	0.4	0.7	1.1	1.5	1.6	1.8	1.8
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.8	1.8	1.8
Pedestrian:	Vmx	0.6	0.9	1.2	1.5	1.6	1.8	1.8
	M	14.9	15.0	12.8	7.7	4.7	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2358.5	2065.5	1574.2	853.8	505.3	0.0	0.0
	V	56.9	88.9	118.8	148.7	162.0	179.3	179.3
Total :	M-	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	152.0	152.0
Total :	Vmx	61.6	90.3	119.3	148.7	162.0	179.3	179.3
	M	2226.8	1999.4	1540.8	853.3	508.4	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 2, STRENGTH II
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	260.5	438.5	798.5	1030.3	1164.9	1186.1
	V	106.1	106.1	98.2	92.1	77.7	63.3	46.2	14.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	106.1	106.1	98.2	92.1	78.2	64.8	51.8	39.4
	M	0.0	0.0	263.8	438.5	767.5	969.5	1041.6	994.8
Pedestrian:	M+	0.0	0.0	4.8	8.2	15.3	20.3	23.3	24.3
	V	1.8	1.8	1.6	1.5	1.1	0.7	0.4	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.8	1.8	1.6	1.5	1.1	0.8	0.6	0.4
	M	-0.0	-0.0	4.9	8.2	14.3	13.5	13.2	13.1
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	511.3	864.4	1595.5	2096.4	2398.1	2484.4
	V	204.6	204.6	184.3	168.6	135.7	102.8	67.3	17.5
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	204.6	204.6	184.3	168.6	136.3	104.5	73.2	42.4
	M	0.0	0.0	514.7	864.4	1563.6	2028.8	2264.7	2281.9

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1164.9	1030.3	798.5	438.5	260.5	0.0	0.0
	V	46.2	63.3	77.7	92.1	98.2	106.1	106.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	51.8	64.8	78.2	92.1	98.2	106.1	106.1
	M	1041.6	969.5	767.5	438.5	263.8	0.0	0.0
Pedestrian:	M+	23.3	20.3	15.3	8.2	4.8	0.0	0.0
	V	0.4	0.7	1.1	1.5	1.6	1.8	1.8
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.8	1.8	1.8
Pedestrian:	Vmx	0.6	0.9	1.2	1.5	1.6	1.8	1.8
	M	14.9	15.0	12.8	7.7	4.7	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2398.1	2096.4	1595.5	864.4	511.3	0.0	0.0
	V	67.3	102.8	135.7	168.6	184.3	204.6	204.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	73.2	104.5	136.3	168.6	184.3	204.6	204.6
	M	2266.4	2030.3	1562.1	863.9	514.5	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 3, STRENGTH II
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	260.5	438.5	798.5	1030.3	1164.9	1186.1
	V	106.1	106.1	98.2	92.1	77.7	63.3	46.2	14.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	106.1	106.1	98.2	92.1	78.2	64.8	51.8	39.4
	M	0.0	0.0	263.8	438.5	767.5	969.5	1041.6	994.8
Pedestrian:	M+	0.0	0.0	4.8	8.2	15.3	20.3	23.3	24.3
	V	1.8	1.8	1.6	1.5	1.1	0.7	0.4	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.8	1.8	1.6	1.5	1.1	0.8	0.6	0.4
	M	-0.0	-0.0	4.9	8.2	14.3	13.5	13.2	13.1
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	511.3	864.4	1595.5	2096.4	2398.1	2484.4
	V	204.6	204.6	184.3	168.6	135.7	102.8	67.3	17.5
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	204.6	204.6	184.3	168.6	136.3	104.5	73.2	42.4
	M	0.0	0.0	514.7	864.4	1563.6	2028.8	2264.7	2281.9

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1164.9	1030.3	798.5	438.5	260.5	0.0	0.0
	V	46.2	63.3	77.7	92.1	98.2	106.1	106.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	51.8	64.8	78.2	92.1	98.2	106.1	106.1
	M	1041.6	969.5	767.5	438.5	263.8	0.0	0.0
Pedestrian:	M+	23.3	20.3	15.3	8.2	4.8	0.0	0.0
	V	0.4	0.7	1.1	1.5	1.6	1.8	1.8
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.8	1.8	1.8
Pedestrian:	Vmx	0.6	0.9	1.2	1.5	1.6	1.8	1.8
	M	14.9	15.0	12.8	7.7	4.7	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2398.1	2096.4	1595.5	864.4	511.3	0.0	0.0
	V	67.3	102.8	135.7	168.6	184.3	204.6	204.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	73.2	104.5	136.3	168.6	184.3	204.6	204.6
	M	2266.4	2030.3	1562.1	863.9	514.5	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 4, STRENGTH II
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	260.5	438.5	798.5	1030.3	1164.9	1186.1
	V	106.1	106.1	98.2	92.1	77.7	63.3	46.2	14.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	106.1	106.1	98.2	92.1	78.2	64.8	51.8	39.4
	M	0.0	0.0	263.8	438.5	767.5	969.5	1041.6	994.8
Pedestrian:	M+	0.0	0.0	4.8	8.2	15.3	20.3	23.3	24.3
	V	1.8	1.8	1.6	1.5	1.1	0.7	0.4	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.8	1.8	1.6	1.5	1.1	0.8	0.6	0.4
	M	-0.0	-0.0	4.9	8.2	14.3	13.5	13.2	13.1
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	511.3	864.4	1595.5	2096.4	2398.1	2484.4
	V	204.6	204.6	184.3	168.6	135.7	102.8	67.3	17.5
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	204.6	204.6	184.3	168.6	136.3	104.5	73.2	42.4
	M	0.0	0.0	514.7	864.4	1563.6	2028.8	2264.7	2281.9

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1164.9	1030.3	798.5	438.5	260.5	0.0	0.0
	V	46.2	63.3	77.7	92.1	98.2	106.1	106.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	51.8	64.8	78.2	92.1	98.2	106.1	106.1
	M	1041.6	969.5	767.5	438.5	263.8	0.0	0.0
Pedestrian:	M+	23.3	20.3	15.3	8.2	4.8	0.0	0.0
	V	0.4	0.7	1.1	1.5	1.6	1.8	1.8
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.8	1.8	1.8
Pedestrian:	Vmx	0.6	0.9	1.2	1.5	1.6	1.8	1.8
	M	14.9	15.0	12.8	7.7	4.7	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2398.1	2096.4	1595.5	864.4	511.3	0.0	0.0
	V	67.3	102.8	135.7	168.6	184.3	204.6	204.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	73.2	104.5	136.3	168.6	184.3	204.6	204.6
	M	2266.4	2030.3	1562.1	863.9	514.5	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 5, STRENGTH II
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	61.0	103.4	192.8	256.6	294.9	307.7
Haunch (Max)	V	22.7	22.7	20.4	18.5	13.9	9.3	4.6	0.0
Deck + :	M	0.0	0.0	43.9	74.5	138.8	184.7	212.3	221.5
Haunch (Min)	V	16.4	16.4	14.7	13.3	10.0	6.7	3.3	0.0
Diaphragm :	M	0.0	0.0	7.2	12.8	27.0	41.1	55.2	69.3
(Max)	V	7.7	7.7	4.8	2.6	2.6	2.6	2.6	2.6
Diaphragm :	M	0.0	0.0	5.2	9.2	19.4	29.6	39.8	49.9
(Min)	V	5.5	5.5	3.5	1.8	1.8	1.8	1.8	1.8
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	260.5	438.5	798.5	1030.3	1164.9	1186.1
	V	106.1	106.1	98.2	92.1	77.7	63.3	46.2	14.9
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	106.1	106.1	98.2	92.1	78.2	64.8	51.8	39.4
	M	0.0	0.0	263.8	438.5	767.5	969.5	1041.6	994.8
Pedestrian:	M+	0.0	0.0	4.8	8.2	15.3	20.3	23.3	24.3
	V	1.8	1.8	1.6	1.5	1.1	0.7	0.4	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.8	1.8	1.6	1.5	1.1	0.8	0.6	0.4
	M	-0.0	-0.0	4.9	8.2	14.3	13.5	13.2	13.1
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	511.3	864.4	1595.5	2096.4	2398.1	2484.4
	V	204.6	204.6	184.3	168.6	135.7	102.8	67.3	17.5
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	204.6	204.6	184.3	168.6	136.3	104.5	73.2	42.4
	M	0.0	0.0	514.7	864.4	1563.6	2028.8	2264.7	2281.9

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	294.9	256.6	192.8	103.4	61.0	0.0	0.0
Haunch (Max)	V	4.6	9.3	13.9	18.5	20.4	22.7	22.7
Deck + :	M	212.3	184.7	138.8	74.5	43.9	0.0	0.0
Haunch (Min)	V	3.3	6.7	10.0	13.3	14.7	16.4	16.4
Diaphragm :	M	55.2	41.1	27.0	12.8	7.2	0.0	0.0
(Max)	V	2.6	2.6	2.6	2.6	4.8	7.7	7.7
Diaphragm :	M	39.8	29.6	19.4	9.2	5.2	0.0	0.0
(Min)	V	1.8	1.8	1.8	1.8	3.5	5.5	5.5
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1164.9	1030.3	798.5	438.5	260.5	0.0	0.0
	V	46.2	63.3	77.7	92.1	98.2	106.1	106.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	51.8	64.8	78.2	92.1	98.2	106.1	106.1
	M	1041.6	969.5	767.5	438.5	263.8	0.0	0.0
Pedestrian:	M+	23.3	20.3	15.3	8.2	4.8	0.0	0.0
	V	0.4	0.7	1.1	1.5	1.6	1.8	1.8
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.8	1.8	1.8
Pedestrian:	Vmx	0.6	0.9	1.2	1.5	1.6	1.8	1.8
	M	14.9	15.0	12.8	7.7	4.7	-0.0	-0.0
Temperature:	(Rise) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2398.1	2096.4	1595.5	864.4	511.3	0.0	0.0
	V	67.3	102.8	135.7	168.6	184.3	204.6	204.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	73.2	104.5	136.3	168.6	184.3	204.6	204.6
	M	2266.4	2030.3	1562.1	863.9	514.5	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 6, STRENGTH II
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	131.9	223.6	416.9	554.9	637.8	665.4
(Max)	V	49.2	49.2	44.0	40.1	30.1	20.0	10.0	0.0
Self wt. :	M	0.0	0.0	94.9	161.0	300.2	399.6	459.2	479.1
(Min)	V	35.4	35.4	31.7	28.8	21.6	14.4	7.2	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	58.4	99.1	184.7	245.8	282.5	294.7
Haunch (Max)	V	21.8	21.8	19.5	17.7	13.3	8.9	4.4	0.0
Deck + :	M	0.0	0.0	42.1	71.3	133.0	177.0	203.4	212.2
Haunch (Min)	V	15.7	15.7	14.0	12.8	9.6	6.4	3.2	0.0
Diaphragm :	M	0.0	0.0	3.6	6.4	13.5	20.5	27.6	34.7
(Max)	V	3.8	3.8	2.4	1.3	1.3	1.3	1.3	1.3
Diaphragm :	M	0.0	0.0	2.6	4.6	9.7	14.8	19.9	25.0
(Min)	V	2.8	2.8	1.7	0.9	0.9	0.9	0.9	0.9
DL-Comp :	M	0.0	0.0	31.4	53.3	99.4	132.3	152.1	158.7
DC(Max)	V	11.7	11.7	10.5	9.6	7.2	4.8	2.4	0.0
DL-Comp :	M	0.0	0.0	22.6	38.4	71.6	95.3	109.5	114.2
DC(Min)	V	8.4	8.4	7.6	6.9	5.2	3.4	1.7	0.0
DL-Comp :	M	0.0	0.0	14.5	24.5	45.7	60.9	69.9	73.0
DW(Max)	V	5.4	5.4	4.8	4.4	3.3	2.2	1.1	0.0
DL-Comp :	M	0.0	0.0	6.3	10.6	19.8	26.4	30.3	31.6
DW(Min)	V	2.3	2.3	2.1	1.9	1.4	1.0	0.5	0.0
LL + I :	M+	0.0	0.0	260.5	438.5	798.5	1030.3	1164.9	1186.1
	V	85.5	85.5	79.1	74.2	62.6	51.0	37.3	12.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	85.5	85.5	79.1	74.2	63.0	52.3	41.8	31.8
	M	0.0	0.0	263.8	438.5	767.5	969.5	1041.6	994.8
Pedestrian:	M+	0.0	0.0	4.8	8.2	15.3	20.3	23.3	24.3
	V	1.8	1.8	1.6	1.5	1.1	0.7	0.4	0.0
Pedestrian:	M-	-0.0	-0.0	-0.0	0.0	0.0	0.0	0.0	0.0
	V	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	1.8	1.8	1.6	1.5	1.1	0.8	0.6	0.4
	M	-0.0	-0.0	4.9	8.2	14.3	13.5	13.2	13.1
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	505.2	853.7	1573.9	2065.1	2358.1	2436.8
	V	179.2	179.2	162.0	148.7	118.8	88.9	56.9	13.3
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	179.2	179.2	162.0	148.7	119.3	90.3	61.6	33.5
	M	0.0	0.0	508.5	853.7	1542.0	1997.5	2224.7	2234.3

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	637.8	554.9	416.9	223.6	131.9	0.0	0.0
(Max)	V	10.0	20.0	30.1	40.1	44.0	49.2	49.2
Self wt. :	M	459.2	399.6	300.2	161.0	94.9	0.0	0.0
(Min)	V	7.2	14.4	21.6	28.8	31.7	35.4	35.4
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	282.5	245.8	184.7	99.1	58.4	0.0	0.0
Haunch (Max)	V	4.4	8.9	13.3	17.7	19.5	21.8	21.8
Deck + :	M	203.4	177.0	133.0	71.3	42.1	0.0	0.0
Haunch (Min)	V	3.2	6.4	9.6	12.8	14.0	15.7	15.7
Diaphragm :	M	27.6	20.5	13.5	6.4	3.6	0.0	0.0
(Max)	V	1.3	1.3	1.3	1.3	2.4	3.8	3.8
Diaphragm :	M	19.9	14.8	9.7	4.6	2.6	0.0	0.0
(Min)	V	0.9	0.9	0.9	0.9	1.7	2.8	2.8
DL-Comp :	M	152.1	132.3	99.4	53.3	31.4	0.0	0.0
DC(Max)	V	2.4	4.8	7.2	9.6	10.5	11.7	11.7
DL-Comp :	M	109.5	95.3	71.6	38.4	22.6	0.0	0.0
DC(Min)	V	1.7	3.4	5.2	6.9	7.6	8.4	8.4
DL-Comp :	M	69.9	60.9	45.7	24.5	14.5	0.0	0.0
DW(Max)	V	1.1	2.2	3.3	4.4	4.8	5.4	5.4
DL-Comp :	M	30.3	26.4	19.8	10.6	6.3	0.0	0.0
DW(Min)	V	0.5	1.0	1.4	1.9	2.1	2.3	2.3
LL + I :	M+	1164.9	1030.3	798.5	438.5	260.5	0.0	0.0
	V	37.3	51.0	62.6	74.2	79.1	85.5	85.5
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	41.8	52.3	63.0	74.2	79.1	85.5	85.5
	M	1041.6	969.5	767.5	438.5	263.8	0.0	0.0
Pedestrian:	M+	23.3	20.3	15.3	8.2	4.8	0.0	0.0
	V	0.4	0.7	1.1	1.5	1.6	1.8	1.8
Pedestrian:	M-	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0
	V	0.0	0.0	0.0	0.0	0.8	1.8	1.8
Pedestrian:	Vmx	0.6	0.9	1.2	1.5	1.6	1.8	1.8
	M	14.9	15.0	12.8	7.7	4.7	-0.0	-0.0
Temperature:	(Rise) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temperature:	(Fall) M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	2358.1	2065.1	1573.9	853.7	505.1	0.0	0.0
	V	56.9	88.9	118.8	148.7	162.0	179.2	179.2
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	61.6	90.3	119.3	148.7	162.0	179.2	179.2
	M	2226.4	1999.0	1540.5	853.2	508.3	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 1, FATIGUE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	46.8	79.4	148.0	197.0	226.4	236.2
Haunch (Max)	V	17.5	17.5	15.6	14.2	10.7	7.1	3.6	0.0
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	0.0	0.0	2.9	5.1	10.8	16.4	22.1	27.7
(Max)	V	3.1	3.1	1.9	1.0	1.0	1.0	1.0	1.0
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	0.0	0.0	130.6	216.4	374.8	475.3	513.0	516.4
	V	50.8	50.8	46.5	43.2	35.6	28.5	20.8	19.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	50.8	50.8	46.5	43.2	35.6	28.8	23.3	19.1
	M	0.0	0.0	130.6	216.4	374.8	461.9	503.0	516.4
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	320.6	538.8	977.1	1279.1	1440.0	1488.2
	V	123.7	123.7	110.9	101.0	79.3	57.9	36.0	20.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	123.7	123.7	110.9	101.0	79.3	58.3	38.6	20.1
	M	0.0	0.0	320.6	538.8	977.1	1265.7	1429.9	1488.2

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	226.4	197.0	148.0	79.4	46.8	0.0	0.0
Haunch (Max)	V	3.6	7.1	10.7	14.2	15.6	17.5	17.5
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	22.1	16.4	10.8	5.1	2.9	0.0	0.0
(Max)	V	1.0	1.0	1.0	1.0	1.9	3.1	3.1
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	513.0	475.3	374.8	216.3	130.6	0.0	0.0
	V	20.8	28.5	35.6	43.2	46.5	50.8	50.8
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	23.3	28.8	35.6	43.2	46.5	50.8	50.8
	M	503.0	461.9	374.8	216.3	130.6	0.0	0.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1440.0	1279.1	977.1	538.8	320.6	0.0	0.0
	V	36.0	57.9	79.3	101.0	110.9	123.7	123.7
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	38.6	58.3	79.3	101.0	110.9	123.7	123.7
	M	1429.9	1265.7	977.1	538.8	320.6	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 2, FATIGUE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	0.0	0.0	123.4	204.4	354.1	449.1	484.8	488.0
	V	56.0	56.0	51.3	47.6	39.3	31.4	22.9	21.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	56.0	56.0	51.3	47.6	39.3	31.7	25.7	21.0
	M	0.0	0.0	123.4	204.4	354.1	436.4	475.2	488.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	318.2	535.4	973.5	1277.6	1443.3	1497.4
	V	132.7	132.7	118.2	107.1	84.4	62.1	39.3	23.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	132.7	132.7	118.2	107.1	84.4	62.5	42.1	23.1
	M	0.0	0.0	318.2	535.4	973.5	1264.9	1433.8	1497.4

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	484.8	449.1	354.1	204.4	123.4	0.0	0.0
	V	22.9	31.4	39.3	47.6	51.3	56.0	56.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	25.7	31.7	39.3	47.6	51.3	56.0	56.0
	M	475.2	436.4	354.1	204.4	123.4	0.0	0.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1443.3	1277.6	973.5	535.4	318.2	0.0	0.0
	V	39.3	62.1	84.4	107.1	118.2	132.7	132.7
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	42.1	62.5	84.4	107.1	118.2	132.7	132.7
	M	1433.8	1264.9	973.5	535.4	318.2	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 3, FATIGUE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	0.0	0.0	123.4	204.4	354.1	449.1	484.8	488.0
	V	56.0	56.0	51.3	47.6	39.3	31.4	22.9	21.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	56.0	56.0	51.3	47.6	39.3	31.7	25.7	21.0
	M	0.0	0.0	123.4	204.4	354.1	436.4	475.2	488.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	318.2	535.4	973.5	1277.6	1443.3	1497.4
	V	132.7	132.7	118.2	107.1	84.4	62.1	39.3	23.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	132.7	132.7	118.2	107.1	84.4	62.5	42.1	23.1
	M	0.0	0.0	318.2	535.4	973.5	1264.9	1433.8	1497.4

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	484.8	449.1	354.1	204.4	123.4	0.0	0.0
	V	22.9	31.4	39.3	47.6	51.3	56.0	56.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	25.7	31.7	39.3	47.6	51.3	56.0	56.0
	M	475.2	436.4	354.1	204.4	123.4	0.0	0.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1443.3	1277.6	973.5	535.4	318.2	0.0	0.0
	V	39.3	62.1	84.4	107.1	118.2	132.7	132.7
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	42.1	62.5	84.4	107.1	118.2	132.7	132.7
	M	1433.8	1264.9	973.5	535.4	318.2	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 4, FATIGUE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	0.0	0.0	123.4	204.4	354.1	449.1	484.8	488.0
	V	56.0	56.0	51.3	47.6	39.3	31.4	22.9	21.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	56.0	56.0	51.3	47.6	39.3	31.7	25.7	21.0
	M	0.0	0.0	123.4	204.4	354.1	436.4	475.2	488.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	318.2	535.4	973.5	1277.6	1443.3	1497.4
	V	132.7	132.7	118.2	107.1	84.4	62.1	39.3	23.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	132.7	132.7	118.2	107.1	84.4	62.5	42.1	23.1
	M	0.0	0.0	318.2	535.4	973.5	1264.9	1433.8	1497.4

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	484.8	449.1	354.1	204.4	123.4	0.0	0.0
	V	22.9	31.4	39.3	47.6	51.3	56.0	56.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	25.7	31.7	39.3	47.6	51.3	56.0	56.0
	M	475.2	436.4	354.1	204.4	123.4	0.0	0.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1443.3	1277.6	973.5	535.4	318.2	0.0	0.0
	V	39.3	62.1	84.4	107.1	118.2	132.7	132.7
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	42.1	62.5	84.4	107.1	118.2	132.7	132.7
	M	1433.8	1264.9	973.5	535.4	318.2	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 5, FATIGUE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	48.8	82.7	154.2	205.3	235.9	246.1
Haunch (Max)	V	18.2	18.2	16.3	14.8	11.1	7.4	3.7	0.0
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	0.0	0.0	5.8	10.3	21.6	32.9	44.2	55.5
(Max)	V	6.2	6.2	3.8	2.1	2.1	2.1	2.1	2.1
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	0.0	0.0	123.4	204.4	354.1	449.1	484.8	488.0
	V	56.0	56.0	51.3	47.6	39.3	31.4	22.9	21.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	56.0	56.0	51.3	47.6	39.3	31.7	25.7	21.0
	M	0.0	0.0	123.4	204.4	354.1	436.4	475.2	488.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	318.2	535.4	973.5	1277.6	1443.3	1497.4
	V	132.7	132.7	118.2	107.1	84.4	62.1	39.3	23.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	132.7	132.7	118.2	107.1	84.4	62.5	42.1	23.1
	M	0.0	0.0	318.2	535.4	973.5	1264.9	1433.8	1497.4

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	235.9	205.3	154.2	82.7	48.8	0.0	0.0
Haunch (Max)	V	3.7	7.4	11.1	14.8	16.3	18.2	18.2
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	44.2	32.9	21.6	10.3	5.8	0.0	0.0
(Max)	V	2.1	2.1	2.1	2.1	3.8	6.2	6.2
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	484.8	449.1	354.1	204.4	123.4	0.0	0.0
	V	22.9	31.4	39.3	47.6	51.3	56.0	56.0
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	25.7	31.7	39.3	47.6	51.3	56.0	56.0
	M	475.2	436.4	354.1	204.4	123.4	0.0	0.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1443.3	1277.6	973.5	535.4	318.2	0.0	0.0
	V	39.3	62.1	84.4	107.1	118.2	132.7	132.7
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	42.1	62.5	84.4	107.1	118.2	132.7	132.7
	M	1433.8	1264.9	973.5	535.4	318.2	0.0	0.0

SHEAR AND MOMENT ENVELOPE : Span : 1, Beam : 6, FATIGUE I
Shears: kips, Moments: kft

		Bearing	Trans	H/2	0.10L	0.20L	0.30L	0.40L	Midspan
Location,	ft	0.00	0.00	2.83	5.01	10.52	16.04	21.55	27.06
Self wt. :	M	0.0	0.0	105.5	178.9	333.5	443.9	510.2	532.3
(Max)	V	39.3	39.3	35.2	32.1	24.0	16.0	8.0	0.0
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	0.0	0.0	46.7	79.3	147.7	196.7	226.0	235.8
Haunch (Max)	V	17.4	17.4	15.6	14.2	10.6	7.1	3.5	0.0
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	0.0	0.0	2.9	5.1	10.8	16.4	22.1	27.7
(Max)	V	3.1	3.1	1.9	1.0	1.0	1.0	1.0	1.0
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	25.2	42.7	79.5	105.9	121.7	126.9
DC(Max)	V	9.4	9.4	8.4	7.6	5.7	3.8	1.9	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	0.0	0.0	9.6	16.3	30.5	40.6	46.6	48.6
DW(Max)	V	3.6	3.6	3.2	2.9	2.2	1.5	0.7	0.0
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	0.0	0.0	130.6	216.4	374.8	475.3	513.0	516.4
	V	50.8	50.8	46.5	43.2	35.6	28.5	20.8	19.1
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	50.8	50.8	46.5	43.2	35.6	28.8	23.3	19.1
	M	0.0	0.0	130.6	216.4	374.8	461.9	503.0	516.4
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	0.0	0.0	320.5	538.7	976.8	1278.7	1439.6	1487.8
	V	123.6	123.6	110.9	101.0	79.3	57.9	36.0	20.1
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	123.6	123.6	110.9	101.0	79.3	58.2	38.6	20.1
	M	0.0	0.0	320.5	538.7	976.8	1265.3	1429.5	1487.8

		0.60L	0.70L	0.80L	0.90L	H/2	Trans	Bearing
Location,	ft	32.57	38.08	43.60	49.11	51.29	54.12	54.12
Self wt. :	M	510.2	443.9	333.5	178.9	105.5	0.0	0.0
(Max)	V	8.0	16.0	24.0	32.1	35.2	39.3	39.3
Self wt. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Max)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Prec. :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deck + :	M	226.0	196.7	147.7	79.3	46.7	0.0	0.0
Haunch (Max)	V	3.5	7.1	10.6	14.2	15.6	17.4	17.4
Deck + :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haunch (Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diaphragm :	M	22.1	16.4	10.8	5.1	2.9	0.0	0.0
(Max)	V	1.0	1.0	1.0	1.0	1.9	3.1	3.1
Diaphragm :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	121.7	105.9	79.5	42.7	25.2	0.0	0.0
DC(Max)	V	1.9	3.8	5.7	7.6	8.4	9.4	9.4
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DC(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DL-Comp :	M	46.6	40.6	30.5	16.3	9.6	0.0	0.0
DW(Max)	V	0.7	1.5	2.2	2.9	3.2	3.6	3.6
DL-Comp :	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DW(Min)	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	M+	513.0	475.3	374.8	216.3	130.6	0.0	0.0
	V	20.8	28.5	35.6	43.2	46.5	50.8	50.8
LL + I :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LL + I :	Vmx	23.3	28.8	35.6	43.2	46.5	50.8	50.8
	M	503.0	461.9	374.8	216.3	130.6	0.0	0.0
Pedestrian:	M+	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian:	Vmx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	M+	1439.6	1278.7	976.8	538.7	320.5	0.0	0.0
	V	36.0	57.9	79.3	101.0	110.9	123.6	123.6
Total :	M-	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	V	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total :	Vmx	38.6	58.2	79.3	101.0	110.9	123.6	123.6
	M	1429.5	1265.3	976.8	538.7	320.5	0.0	0.0

ULTIMATE MOMENT

ULTIMATE - Span : 1, Beam : 1, STRENGTH I
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer 0.0	0.00 65.9	0.007	265.7	3.8	3.2	3411.4	0.057T	0.90	-	-	-	-
H/2 583.9	2.83 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1342.4	776.6	2.54	-
0.1L 986.2	5.01 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1274.6	1274.6	2.68	-
0.2L 1815.3	10.52 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1131.3	1131.3	3.02	-
0.3L 2376.8	16.04 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1027.9	1027.9	3.32	-
0.4L 2710.6	21.55 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	964.5	964.5	3.54	-
0.5L 2796.0	27.06 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	940.9	940.9	3.63	-
0.6L 2710.6	32.57 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	964.5	964.5	3.54	-
0.7L 2376.8	38.08 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1027.9	1027.9	3.32	-
0.8L 1815.3	43.60 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1131.3	1131.3	3.02	-
0.9L 986.2	49.11 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1274.6	1274.6	2.68	-
H/2 583.9	51.29 65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1342.4	776.6	2.54	-
Transfer 0.0	54.12 65.9	0.007	265.7	3.8	3.2	3411.4	0.057T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 2, STRENGTH I
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.7	2.53	-
0.1L	5.01											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
0.2L	10.52											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2843.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
H/2	51.29											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.6	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 3, STRENGTH I
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.7	2.53	-
0.1L	5.01											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
0.2L	10.52											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2843.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
H/2	51.29											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.6	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 4, STRENGTH I
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.7	2.53	-
0.1L	5.01											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
0.2L	10.52											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2843.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
H/2	51.29											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.6	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 5, STRENGTH I
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.7	2.53	-
0.1L	5.01											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
0.2L	10.52											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2843.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2750.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2407.7	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1836.6	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
996.8	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1277.7	2.68	-
H/2	51.29											
590.0	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	784.6	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 6, STRENGTH I
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.7	3.8	3.2	3411.2	0.057T	0.90	-	-	-	-
H/2	2.83											
583.8	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1342.0	776.4	2.54	-
0.1L	5.01											
986.0	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1274.3	1274.3	2.68	-
0.2L	10.52											
1815.0	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1131.2	1131.2	3.02	-
0.3L	16.04											
2376.4	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1028.0	1028.0	3.32	-
0.4L	21.55											
2710.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	964.6	964.6	3.54	-
0.5L	27.06											
2795.4	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	941.2	941.2	3.63	-
0.6L	32.57											
2710.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	964.6	964.6	3.54	-
0.7L	38.08											
2376.4	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1028.0	1028.0	3.32	-
0.8L	43.60											
1815.0	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1131.2	1131.2	3.02	-
0.9L	49.11											
986.0	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1274.3	1274.3	2.68	-
H/2	51.29											
583.8	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1342.0	776.4	2.54	-
Transfer	54.12											
0.0	65.9	0.007	265.7	3.8	3.2	3411.2	0.057T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 1, STRENGTH II
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.7	3.8	3.2	3411.4	0.057T	0.90	-	-	-	-
H/2	2.83											
505.3	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1342.4	672.0	2.54	-
0.1L	5.01											
853.8	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1274.6	1135.6	2.68	-
0.2L	10.52											
1574.2	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1131.3	1131.3	3.02	-
0.3L	16.04											
2065.5	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1027.9	1027.9	3.32	-
0.4L	21.55											
2358.5	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	964.5	964.5	3.54	-
0.5L	27.06											
2437.3	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	940.9	940.9	3.63	-
0.6L	32.57											
2358.5	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	964.5	964.5	3.54	-
0.7L	38.08											
2065.5	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1027.9	1027.9	3.32	-
0.8L	43.60											
1574.2	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1131.3	1131.3	3.02	-
0.9L	49.11											
853.8	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1274.6	1135.6	2.68	-
H/2	51.29											
505.3	65.9	0.010	265.7	3.8	3.2	3415.3	0.057T	0.90	1342.4	672.0	2.54	-
Transfer	54.12											
0.0	65.9	0.007	265.7	3.8	3.2	3411.4	0.057T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 2, STRENGTH II
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
0.1L	5.01											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
0.2L	10.52											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2484.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
H/2	51.29											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 3, STRENGTH II
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
0.1L	5.01											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
0.2L	10.52											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2484.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
H/2	51.29											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 4, STRENGTH II
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
0.1L	5.01											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
0.2L	10.52											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2484.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
H/2	51.29											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 5, STRENGTH II
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-
H/2	2.83											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
0.1L	5.01											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
0.2L	10.52											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.3L	16.04											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.4L	21.55											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.5L	27.06											
2484.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	918.1	918.1	3.72	-
0.6L	32.57											
2398.1	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	946.0	946.0	3.61	-
0.7L	38.08											
2096.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1015.2	1015.2	3.37	-
0.8L	43.60											
1595.5	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1125.8	1125.8	3.04	-
0.9L	49.11											
864.4	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1277.7	1149.7	2.68	-
H/2	51.29											
511.3	65.9	0.010	265.9	3.6	3.1	3419.0	0.055T	0.90	1349.3	680.1	2.53	-
Transfer	54.12											
0.0	65.9	0.007	265.9	3.6	3.1	3415.1	0.055T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

ULTIMATE - Span : 1, Beam : 6, STRENGTH II
(Mr-prvd computed by AASHTO equations, Art. 5.7.3.2/5.7.3.3)

Location (ft) Mu k.ft	dp in	Aps in2	fps ksi	c in	a in	Mr-prvd k.ft	c/dt	Phi	Mcr k.ft	min Mr k.ft	Crkg Ratio	Mu-p/r Ratio
Transfer	0.00											
0.0	65.9	0.007	265.7	3.8	3.2	3411.2	0.057T	0.90	-	-	-	-
H/2	2.83											
505.2	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1342.0	671.9	2.54	-
0.1L	5.01											
853.7	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1274.3	1135.4	2.68	-
0.2L	10.52											
1573.9	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1131.2	1131.2	3.02	-
0.3L	16.04											
2065.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1028.0	1028.0	3.32	-
0.4L	21.55											
2358.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	964.6	964.6	3.54	-
0.5L	27.06											
2436.8	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	941.2	941.2	3.63	-
0.6L	32.57											
2358.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	964.6	964.6	3.54	-
0.7L	38.08											
2065.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1028.0	1028.0	3.32	-
0.8L	43.60											
1573.9	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1131.2	1131.2	3.02	-
0.9L	49.11											
853.7	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1274.3	1135.4	2.68	-
H/2	51.29											
505.1	65.9	0.010	265.7	3.8	3.2	3415.2	0.057T	0.90	1342.0	671.8	2.54	-
Transfer	54.12											
0.0	65.9	0.007	265.7	3.8	3.2	3411.2	0.057T	0.90	-	-	-	-

Legend: C = Compression-Controlled (c/dt > 0.600)
I = In-Transition (0.60 >= c/dt > 0.375)
T = Tension-Controlled (c/dt <= 0.375)
Note : fr used for calculating Mcr is computed using AASHTO method (Art.5.4.2.6.)
Consider Bottom Tension Steel Contribution : YES

	Transfer	H/2	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	H/2	Transfer
Location(ft)	0.00	2.83	5.01	10.52	16.04	21.55	27.06	32.57	38.08	43.60	49.11	51.29	54.12
ds (in)	0.00	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42	61.42
As (in2)	0.00	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64	12.64
min Fy (ksi)	0.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
As * Fy (kips)	0.00	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40	758.40

DESIGN SUMMARY

Span: 1, Beam: 1, Exterior beam

Beam type:		
	Non-Voided Rectangular,	600x1500(2x5)
Precast Length,	ft	55.12
Release Length,	ft	55.12
Strand Pattern:	Straight	
Strand:	DUMMY	
Strand Es,	ksi:	28000.0
No. of strands:	1	
	Draped:	0
	Straight:	1
Concrete Strength:		
	f'ci:	1.0 ksi
	f'c:	4.0 ksi
	f'ct:	4.0 ksi
Initial losses:	4.19 %	
Final losses:	9.87 %	

Specification	Allowable	Computed	Location	Status
Release Stresses (ksi) (Art. 5.9.4.1)				
Precast Bot (compression)	0.600	-0.000	Depress	OK
Precast Top w/ no reinf. (tension)	-0.095	0.015	Trans	
Precast Top w/ reinf. (tension)	-0.240			
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3415.31	2795.95	Midspan	OK
Strength II (Art. 3.4.1, 5.7.2.9.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3415.31	2437.31	Midspan	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed		Status
Max. Debond per Row	50.00 %	0.00 %		OK
Max. Debond Total	50.00 %	0.00 %		OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Allow	Final 1 Comp	Loc.	Allow	Final 2 Comp	Loc.	Allow	Final 3 Comp	Loc.
Service I Limit State - Compressive	Stresses	Only							
Precast Top	2.400	0.978	Midspan	1.800	0.740	Midspan			
Precast Bot	2.400	0.005	Bearing	1.800	0.005	Bearing			
Service III Limit State - Tensile	Stresses	Only							
Precast Top	-0.380	-0.002	Bearing						
Precast Bot	-0.380	-1.170*	Midspan						
Fatigue I Limit State - Compressive	Stresses	Only							
Precast Top							1.600	0.507	Midspan
Precast Bot							1.600	0.002	Bearing

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 27.06 ft

	Release	Mult	Erection	Mult	Final
Prestress	0.004	1.80	0.007	2.20	0.008
Self Wt.	-0.388	1.85	-0.719	2.40	-0.932
Deck + Haunch			-0.080	2.30	-0.184
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			-0.008	3.00	-0.023
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.020	3.00	-0.059
DL-Comp. (DW)			-0.008	3.00	-0.023
Temperature			-0.000	3.00	-0.000
Live Load					-0.104
Pedestrian Load					-0.000
Total	-0.385		-0.827		-1.318

Positive values indicate upward deflection.

Span: 1, Beam: 2, Interior beam

Beam type:		
	Non-Voided Rectangular,	600x1500(2x5)
Precast Length,	ft	55.12
Release Length,	ft	55.12
Strand Pattern:	Straight	
Strand:	DUMMY	
Strand Es,	ksi:	28000.0
No. of strands:	1	
	Draped:	0
	Straight:	1
Concrete Strength:		
	f'ci:	1.0 ksi
	f'c:	4.0 ksi
	f'ct:	4.0 ksi
Initial losses:	4.19 %	
Final losses:	9.77 %	

Specification	Allowable	Computed	Location	Status
Release Stresses (ksi) (Art. 5.9.4.1)				
Precast Bot (compression)	0.600	-0.000	Depress	OK
Precast Top w/ no reinf. (tension)	-0.095	0.015	Trans	
Precast Top w/ reinf. (tension)	-0.240			
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2843.04	Midspan	OK
Strength II (Art. 3.4.1, 5.7.2.9.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2484.40	Midspan	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed		Status
Max. Debond per Row	50.00 %	0.00 %		OK
Max. Debond Total	50.00 %	0.00 %		OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Allow	Final 1 Comp	Loc.	Allow	Final 2 Comp	Loc.	Allow	Final 3 Comp	Loc.
Service I Limit State - Compressive	Stresses	Only							
Precast Top	2.400	1.002	Midspan	1.800	0.771	Midspan			
Precast Bot	2.400	0.005	Bearing	1.800	0.005	Bearing			
Service III Limit State - Tensile	Stresses	Only							
Precast Top	-0.380	-0.002	Bearing						
Precast Bot	-0.380	-1.199*	Midspan						
Fatigue I Limit State - Compressive	Stresses	Only							
Precast Top							1.600	0.511	Midspan
Precast Bot							1.600	0.002	Bearing

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 27.06 ft

	Release	Mult	Erection	Mult	Final
Prestress	0.004	1.80	0.007	2.20	0.008
Self Wt.	-0.388	1.85	-0.719	2.40	-0.932
Deck + Haunch			-0.083	2.30	-0.192
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			-0.015	3.00	-0.045
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.019	3.00	-0.058
DL-Comp. (DW)			-0.007	3.00	-0.022
Temperature			0.000	3.00	0.000
Live Load					-0.103
Pedestrian Load					-0.000
Total	-0.385		-0.837		-1.345

Positive values indicate upward deflection.

Span: 1, Beam: 3, Interior beam

Beam type:		
	Non-Voided Rectangular,	600x1500(2x5)
Precast Length,	ft	55.12
Release Length,	ft	55.12
Strand Pattern:	Straight	
Strand:	DUMMY	
Strand Es,	ksi:	28000.0
No. of strands:	1	
	Draped:	0
	Straight:	1
Concrete Strength:		
	f'ci:	1.0 ksi
	f'c:	4.0 ksi
	f'ct:	4.0 ksi
Initial losses:	4.19 %	
Final losses:	9.77 %	

Specification	Allowable	Computed	Location	Status
Release Stresses (ksi) (Art. 5.9.4.1)				
Precast Bot (compression)	0.600	-0.000	Depress	OK
Precast Top w/ no reinf. (tension)	-0.095	0.015	Trans	
Precast Top w/ reinf. (tension)	-0.240			
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2843.04	Midspan	OK
Strength II (Art. 3.4.1, 5.7.2.9.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2484.40	Midspan	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed		Status
Max. Debond per Row	50.00 %	0.00 %		OK
Max. Debond Total	50.00 %	0.00 %		OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Allow	Final 1 Comp	Loc.	Allow	Final 2 Comp	Loc.	Allow	Final 3 Comp	Loc.
Service I Limit State - Compressive	Stresses	Only							
Precast Top	2.400	1.002	Midspan	1.800	0.771	Midspan			
Precast Bot	2.400	0.005	Bearing	1.800	0.005	Bearing			
Service III Limit State - Tensile	Stresses	Only							
Precast Top	-0.380	-0.002	Bearing						
Precast Bot	-0.380	-1.199*	Midspan						
Fatigue I Limit State - Compressive	Stresses	Only							
Precast Top							1.600	0.511	Midspan
Precast Bot							1.600	0.002	Bearing

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 27.06 ft

	Release	Mult	Erection	Mult	Final
Prestress	0.004	1.80	0.007	2.20	0.008
Self Wt.	-0.388	1.85	-0.719	2.40	-0.932
Deck + Haunch			-0.083	2.30	-0.192
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			-0.015	3.00	-0.045
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.019	3.00	-0.058
DL-Comp. (DW)			-0.007	3.00	-0.022
Temperature			0.000	3.00	0.000
Live Load					-0.103
Pedestrian Load					-0.000
Total	-0.385		-0.837		-1.345

Positive values indicate upward deflection.

Span: 1, Beam: 4, Interior beam

Beam type:		
	Non-Voided Rectangular,	600x1500(2x5)
Precast Length,	ft	55.12
Release Length,	ft	55.12
Strand Pattern:	Straight	
Strand:	DUMMY	
Strand Es,	ksi:	28000.0
No. of strands:	1	
	Draped:	0
	Straight:	1
Concrete Strength:		
	f'ci:	1.0 ksi
	f'c:	4.0 ksi
	f'ct:	4.0 ksi
Initial losses:	4.19 %	
Final losses:	9.77 %	

Specification	Allowable	Computed	Location	Status
Release Stresses (ksi) (Art. 5.9.4.1)				
Precast Bot (compression)	0.600	-0.000	Depress	OK
Precast Top w/ no reinf. (tension)	-0.095	0.015	Trans	
Precast Top w/ reinf. (tension)	-0.240			
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2843.04	Midspan	OK
Strength II (Art. 3.4.1, 5.7.2.9.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2484.40	Midspan	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed		Status
Max. Debond per Row	50.00 %	0.00 %		OK
Max. Debond Total	50.00 %	0.00 %		OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Allow	Final 1 Comp	Loc.	Allow	Final 2 Comp	Loc.	Allow	Final 3 Comp	Loc.
Service I Limit State - Compressive	Stresses	Only							
Precast Top	2.400	1.002	Midspan	1.800	0.771	Midspan			
Precast Bot	2.400	0.005	Bearing	1.800	0.005	Bearing			
Service III Limit State - Tensile	Stresses	Only							
Precast Top	-0.380	-0.002	Bearing						
Precast Bot	-0.380	-1.199*	Midspan						
Fatigue I Limit State - Compressive	Stresses	Only							
Precast Top							1.600	0.511	Midspan
Precast Bot							1.600	0.002	Bearing

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 27.06 ft

	Release	Mult	Erection	Mult	Final
Prestress	0.004	1.80	0.007	2.20	0.008
Self Wt.	-0.388	1.85	-0.719	2.40	-0.932
Deck + Haunch			-0.083	2.30	-0.192
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			-0.015	3.00	-0.045
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.019	3.00	-0.058
DL-Comp. (DW)			-0.007	3.00	-0.022
Temperature			0.000	3.00	0.000
Live Load					-0.103
Pedestrian Load					-0.000
Total	-0.385		-0.837		-1.345

Positive values indicate upward deflection.

Span: 1, Beam: 5, Interior beam

Beam type:		
	Non-Voided Rectangular,	600x1500(2x5)
Precast Length,	ft	55.12
Release Length,	ft	55.12
Strand Pattern:	Straight	
Strand:	DUMMY	
Strand Es,	ksi:	28000.0
No. of strands:	1	
	Draped:	0
	Straight:	1
Concrete Strength:		
	f'ci:	1.0 ksi
	f'c:	4.0 ksi
	f'ct:	4.0 ksi
Initial losses:	4.19 %	
Final losses:	9.77 %	

Specification	Allowable	Computed	Location	Status
Release Stresses (ksi) (Art. 5.9.4.1)				
Precast Bot (compression)	0.600	-0.000	Depress	OK
Precast Top w/ no reinf. (tension)	-0.095	0.015	Trans	
Precast Top w/ reinf. (tension)	-0.240			
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2843.04	Midspan	OK
Strength II (Art. 3.4.1, 5.7.2.9.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3419.01	2484.40	Midspan	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed		Status
Max. Debond per Row	50.00 %	0.00 %		OK
Max. Debond Total	50.00 %	0.00 %		OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Allow	Final 1 Comp	Loc.	Allow	Final 2 Comp	Loc.	Allow	Final 3 Comp	Loc.
Service I Limit State - Compressive	Stresses	Only							
Precast Top	2.400	1.002	Midspan	1.800	0.771	Midspan			
Precast Bot	2.400	0.005	Bearing	1.800	0.005	Bearing			
Service III Limit State - Tensile	Stresses	Only							
Precast Top	-0.380	-0.002	Bearing						
Precast Bot	-0.380	-1.199*	Midspan						
Fatigue I Limit State - Compressive	Stresses	Only							
Precast Top							1.600	0.511	Midspan
Precast Bot							1.600	0.002	Bearing

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 27.06 ft

	Release	Mult	Erection	Mult	Final
Prestress	0.004	1.80	0.007	2.20	0.008
Self Wt.	-0.388	1.85	-0.719	2.40	-0.932
Deck + Haunch			-0.083	2.30	-0.192
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			-0.015	3.00	-0.045
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.019	3.00	-0.058
DL-Comp. (DW)			-0.007	3.00	-0.022
Temperature			0.000	3.00	0.000
Live Load					-0.103
Pedestrian Load					-0.000
Total	-0.385		-0.837		-1.345

Positive values indicate upward deflection.

Span: 1, Beam: 6, Exterior beam

Beam type:		
	Non-Voided Rectangular,	600x1500(2x5)
Precast Length,	ft	55.12
Release Length,	ft	55.12
Strand Pattern:	Straight	
Strand:	DUMMY	
Strand Es,	ksi:	28000.0
No. of strands:	1	
	Draped:	0
	Straight:	1
Concrete Strength:		
	f'ci:	1.0 ksi
	f'c:	4.0 ksi
	f'ct:	4.0 ksi
Initial losses:	4.19 %	
Final losses:	9.87 %	

Specification	Allowable	Computed	Location	Status
Release Stresses (ksi) (Art. 5.9.4.1)				
Precast Bot (compression)	0.600	-0.000	Depress	OK
Precast Top w/ no reinf. (tension)	-0.095	0.015	Trans	
Precast Top w/ reinf. (tension)	-0.240			
Strength I (Art. 3.4.1, 5.7.3.1.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3415.15	2795.45	Midspan	OK
Strength II (Art. 3.4.1, 5.7.2.9.1)	Provided	Required	Location	Status
Ult. Moment (k.ft)	3415.15	2436.80	Midspan	OK
Debonding Limits (Art. 5.11.4.3)	Allowable	Computed		Status
Max. Debond per Row	50.00 %	0.00 %		OK
Max. Debond Total	50.00 %	0.00 %		OK

Positive Moment Envelope Stresses (ksi) (Art. 3.4.1 and 5.9.4.2)

Specification	Allow	Final 1 Comp	Loc.	Allow	Final 2 Comp	Loc.	Allow	Final 3 Comp	Loc.
Service I Limit State - Compressive	Stresses	Only							
Precast Top	2.400	0.978	Midspan	1.800	0.740	Midspan			
Precast Bot	2.400	0.005	Bearing	1.800	0.005	Bearing			
Service III Limit State - Tensile	Stresses	Only							
Precast Top	-0.380	-0.002	Bearing						
Precast Bot	-0.380	-1.170*	Midspan						
Fatigue I Limit State - Compressive	Stresses	Only							
Precast Top							1.600	0.507	Midspan
Precast Bot							1.600	0.002	Bearing

CAMBER / DEFLECTION: (PCI Design Handbook - 4th Ed.- Table 4.6.2)
0.5 x L = 27.06 ft

	Release	Mult	Erection	Mult	Final
Prestress	0.004	1.80	0.007	2.20	0.008
Self Wt.	-0.388	1.85	-0.719	2.40	-0.932
Deck + Haunch			-0.080	2.30	-0.184
DL-Prec. (DC)			0.000	3.00	0.000
Diaphragm			-0.008	3.00	-0.023
DL-Prec. (DW)			0.000	3.00	0.000
DL-Comp. (DC)			-0.020	3.00	-0.059
DL-Comp. (DW)			-0.008	3.00	-0.023
Temperature			0.000	3.00	0.000
Live Load					-0.104
Pedestrian Load					-0.000
Total	-0.385		-0.827		-1.317

Positive values indicate upward deflection.

DECK SLAB DESIGN INPUT/OUTPUT

Design Methodology: Empirical Method (LRFD 9.7.2)
Interior Region of Deck, ft = 24.28
Effective Length, ft = 4.10

Required/provided area in deck:

	Required	Provided	
Longitudinal Steel – top layer, in2/ft	0.18	0.62	OK
Longitudinal Steel – bottom layer, in2/ft	0.27	0.62	OK
Longitudinal Steel – Max. Spacing, in	18.00	6.00	OK
Longitudinal Steel – Min Grade Steel, ksi	60.00	60.00	OK
Transverse Steel – top layer, in2/ft	0.18	0.40	OK
Transverse Steel – bottom layer, in2/ft	0.27	0.40	OK
Transverse Steel – Max. Spacing, in	18.00	6.00	OK
Transverse Steel – Min Grade Steel, ksi	60.00	60.00	OK

Longitudinal Steel provided:

Size	fy (ksi)	Spacing (in)	Dist. From Top (in)	End Cover (in)
US#5[M16]	60.0	6.00	2.50	2.00
US#5[M16]	60.0	6.00	6.80	2.00

Transverse Steel provided:

Size	fy (ksi)	Spacing (in)	Dist. From Top (in)	End Cover (in)
US#4[M13]	60.0	6.00	2.00	2.00
US#4[M13]	60.0	6.00	6.80	2.00

Verification of Design Conditions:

1. Diaphragms at line of support?	NO		(Calculated)
2. Concrete Girders?	YES		
3. CIP and water cured deck?	YES		
4. Uniform Depth?	YES		
5. 6 < Eff Length to Depth Ratio < 18?	NO	5.55	(Calculated)
6. Eff Length < 13.5 ft?	YES	4.10	(Calculated)
7. Core Depth > 4.0 in?	YES	4.93	(Calculated)
8. Slab Thickness > 7.0 in?	YES	8.86	(Calculated)
9. Min. Overhang to depth ratio > 5?	NO	3.77	(Calculated)
10. Min. concrete strength > 4 ksi?	YES	4.00	(Calculated)
11. Deck composite?	YES		

Warning! Empirical Method cannot be used in this case, since all design conditions have not been satisfied.

Note: No State specific criteria have been applied for deck design.
Note: Continuous barrier not provided.

SUPERSTRUCTURE ANAYLSIS

BACKUP INFORMATION FOR SUPERSTRUCTURE DESIGN

* GEOMETRY & PERMANENT LOADS

*TEMPERATURE LOADS

*LIVE LOAD DISTRIBUTION FACTORS

** FOR PRELIMINARY DESIGN ONLY **

GEOMETRY AND CONSPAN INPUT

Length =	50400	mm	165.31	ft					
Spans =	3		3						
Span Length =	16800	mm	55.10	ft					
Width =	10950	mm	35.92	ft					
Barrier =	225	mm	0.74	ft					
Sidewalk =	1200	mm	3.94	ft					
Barrier + Sidewalk =	1425	mm	4.67	ft					
Roadway =	8100	mm	26.57	ft					
No of Lanes	2	mm	0.01	ft					
Lane Width =	3657.6	mm	12.00	ft					
Shoulder =	392.4	mm	1.29	ft					
No of Beams =	6		6			Ixc =	1620034	in^4	bd^3/3
b =	600	mm	1.97	ft	23.62 in	cg =	29.52	in	d/2
d =	1500	mm	4.92	ft	59.04 in	eg =	33.948	in	d/2 + ts/2
						A =	1394.289	in^2	b*d
Spacing =	1850	mm	6.07	ft	72.82 in				
Distance for Beam to Beam =	9250	mm	30.34	ft	364.08 in				
Overhang, OH =	850	mm	2.79	ft	33.46 in				
Clear Overhang, OH_cl =	550	mm	1.80	ft	21.65 in				
Clear Spacing bw Beams =	1250	mm	4.10	ft					
Wearing Surface Thickness =	54	mm	0.18	ft	2.13 in				
Deck Thickness, ts =	225	mm	0.74	ft	8.86 in				
Barrier Height =	1400	mm	4.59	ft	55.10 in				
Sidewalk Height =	275	mm	0.90	ft	10.82 in				

PERMANENT LOADS	L ft	W ft	H ft	Volume cf	Unit Weight lbs/cf	Load klf	Load ksf
LEFT BARRIER	1.00	0.74	4.59	3.39	150	0.51	
LEFT SIDEWALK	1.00	3.94	0.90	3.55	150	0.53	
WEARING SURFACE	1.00	26.57	0.18	4.71	165	0.78	
WEARING SURFACE	55.12	26.57	0.18	259.38	165		0.03
RIGHT SIDEWALK	1.00	3.94	0.90	3.55	150	0.53	
RIGHT BARRIER	1.00	0.74	4.59	3.39	150	0.51	

CONSPAN INPUT

TEMPERATURE LOAD (AASHTO 3.12)

AASHTO Table 3.12.2.1-1

Climate	Concrete (˚F) Range		T_Design (˚F) Tmin	T_Design (˚F) Tmax
Cold	10	80	10	80
Moderate	0	80	0	80

* Use moderate for areas that typically have < 14 days/yr with a T < 32

Khost Temperatue

	Avg (˚F)	Max (˚F)
High	76.1	115
Low	50.4	13.3
Daily Mean	62.6	

*Ref: Wikepedia

Use

Tmin =	10	˚F
Tmax =	80	˚F

$T_{_RISE}$ = Tmax - Daily Mean =	17.4	˚F
$T_{_FALL}$ = Daily Mean - Tmin =	52.6	˚F

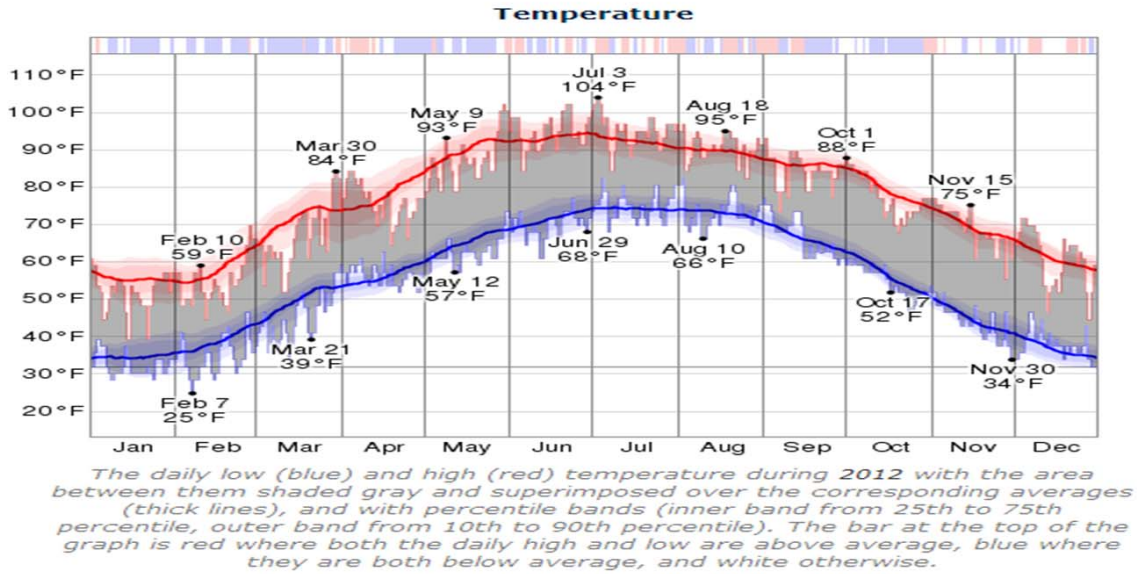
INPUT FOR CONSPAN

Climate data for Khost, Afghanistan

Climate data for Khost, Afghanistan

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F	71.80	80.40	90.10	98.60	104.40	115.50	106.70	100.00	104.00	91.80	84.20	71.60	**115.50**
Average high °F	54.9	56.8	66.4	77.2	86.5	95.7	92.5	90.1	86.9	79.5	68.2	58.6	**76.1**
Daily mean °F	40.6	44.6	54	63.5	72.7	82.4	81.3	79.5	73.9	64.2	51.8	43.5	**62.6**
Average low °F	30.4	34	42.4	50.7	57.7	67.6	70.3	70.2	61.7	50.5	38.5	32	**50.4**
Record low °F	16.7	13.3	26.1	33.8	41.7	49.1	55.9	58.3	45	32	21	22.1	**13.3**
Precipitation mm (inches)	1.02	2.11	2.433	2.567	1.567	0.85	2.988	2.441	1.201	0.303	0.457	0.823	**18.76**
Avg. precipitation days (≥ 1.0 mm)	4.1	5.8	9.2	9.1	5.7	2.5	7.9	7	3.6	2.2	2.2	3.1	**62.4**
% humidity	60	62	62	59	50	46	63	68	62	56	56	59	**58.6**
Mean monthly sunshine hours	198.4	183.6	207.7	234	291.4	285	251.1	248	270	251.1	243	176.7	**2,840**

Source #1: NOAA (1972-1983) [2]
Source #2: (sunshine and precipitation days)[3]
http://en.wikipedia.org/wiki/Khost



http://weatherspark.com/history/31368/2012/Khost-Afghanistan

LIVE LOAD DISTRIBUTION FACTORS

Live Load Distribution Factors (DF)

Action	Location	AASHTO Table	Lanes Loaded	Distribution Factors (mg = DF)		Range of Applicability
Moment	Interior	4.6.2.2.2b-1	One Design lane	DFm_si	$+\left(\frac{S}{14}\right)^{0.4} * \left(\frac{S}{L}\right)^{0.3} * \left(\frac{Kg}{12 * L * ts^3}\right)^{0.1}$	
			Multiple Design lane	DFm_mi	$+\left(\frac{S}{9.5}\right)^{0.6} * \left(\frac{S}{L}\right)^{0.2} * \left(\frac{Kg}{12 * L * ts^3}\right)^{0.1}$	
	Exterior	4.6.2.2.2d-1	One Design lane	DFm_se	Use Lever Rule DFm_se = Rxn * Multiple Presence Factor	
			Multiple Design lane	DFm_me	DFm_me = e * (DFm_mi) $e = 0.77 + (d_e/9.1) \geq 1.0$ de is (+) if girder is inside of the barrier, otherwise (-)	
Shear	Interior	4.6.2.2.3a-1	One Design lane	DFv_si	$0.36 + \left(\frac{S}{25.0}\right)$	
			Multiple Design lane	DFv_mi	$0.20 + \left(\frac{S}{12}\right) - \left(\frac{S}{35.0}\right)^2$	
	Exterior	4.6.2.2.3b-1	One Design lane	DFv_se	Use Lever Rule DFv_se = Rxn * Multiple Presence Factor	
			Multiple Design lane	DFv_me	DFv_me = e * (DFv_mi) $e = 0.60 + d_e/10.0$ de is (+) if girder is inside of the barrier, otherwise (-)	

	min	max
S (ft) =	3.5	16
ts (in) =	4.5	12
L (ft) =	20	240
Nb =	4	≥
Kg =	10000	7000000

	min	max
S (ft) =	3.5	16
ts (in) =	4.5	12
L (ft) =	20	240
Nb =	4	≥
Kg =	10000	7000000

Chart is applicable tor:

Concrete Deck, Filled Grid, Partially Filled Grid, or Unfilled Grid Deck Composite with Reinforced Concrete Slab on Steel or Concrete Beams; Concrete T-Beams, T and Double T-Sections.

LIVE LOAD DISTRIBUTION FACTORS - GEOMETRY

Length =	50400	mm	165.31	ft			
Spans =	3		3				
Span Length =	16800	mm	55.10	ft			
Width =	10950	mm	35.92	ft			
Barrier =	225	mm	0.74	ft			
Sidewalk =	1200	mm	3.94	ft			
Barrier + Sidewalk =	1425	mm	4.67	ft			
Roadway =	8100	mm	26.57	ft			
No of Lanes	2	mm	0.01	ft			
Lane Width =	3657.6	mm	12.00	ft			
Shoulder =	392.4	mm	1.29	ft			
No of Beams =	6		6				
b =	600	mm	1.97	ft	23.62	in	
d =	1500	mm	4.92	ft	59.04	in	
				Ixc =	1620034	in^4	bd^3/3
				cg =	29.52	in	d/2
				eg =	33.948	in	d/2 + ts/2
				A =	1394.289	in^2	b*d
Spacing =	1850	mm	6.07	ft	72.82	in	
Distance for Beam to Beam =	9250	mm	30.34	ft	364.08	in	
Overhang, OH =	850	mm	2.79	ft	33.46	in	
Clear Overhang, OH_cl =	550	mm	1.80	ft	21.65	in	
Clear Spacing bw Beams =	1250	mm	4.10	ft			
Deck Thickness, ts =	225	mm	0.74	ft	8.86	in	
Barrier Height =	1400	mm	4.59	ft	55.10	in	
Sidewalk Height =	275	mm	0.90	ft	10.82	in	

LIVE LOAD DISTRIBUTION FACTORS - MOMENT IN INTERIOR BEAMS

Distribution of Live Loads for Moment in Interior Beams

Table 4.6.2.2.2b-1—Distribution of Live Loads for Moment in Interior Beams

Type of Superstructure	Applicable Cross-Section from Table 4.6.2.2.1-1	Distribution Factors	Range of Applicability
Wood Deck on Wood or Steel Beams	a, 1	See Table 4.6.2.2.2a-1	
Concrete Deck on Wood Beams	1	One Design Lane Loaded: $S/12.0$ Two or More Design Lanes Loaded: $S/10.0$	$S \le 6.0$
Concrete Deck, Filled Grid, Partially Filled Grid, or Unfilled Grid Deck Composite with Reinforced Concrete Slab on Steel or Concrete Beams; Concrete T-Beams, T- and Double T-Sections	a, e, k and also i, j if sufficiently connected to act as a unit	One Design Lane Loaded: $0.06+\left(\frac{S}{14}\right)^{0.4}\left(\frac{S}{L}\right)^{0.3}\left(\frac{K_g}{12.0Lt_s^3}\right)^{0.1}$ Two or More Design Lanes Loaded: $0.075+\left(\frac{S}{9.5}\right)^{0.6}\left(\frac{S}{L}\right)^{0.2}\left(\frac{K_g}{12.0\,Lt_s^3}\right)^{0.1}$	$3.5 \le S \le 16.0$ $4.5 \le t_s \le 12.0$ $20 \le L \le 240$ $N_b \ge 4$ $10{,}000 \le K_g \le 7{,}000{,}000$
		use lesser of the values obtained from the equation above with $N_b = 3$ or the lever rule	$N_b = 3$

DFm_	Distribution factors for Moment
si	single lane, interior girders
mi	multiple lane, interior girders

				Req'd Range min	Req'd Range max	
Beam Spacing,	S =	6.07	ft	S = 3.5	16	OK
Thickness of Deck,	ts =	8.86	in	ts = 4.5	12	OK
Bridge Length,	L =	55.10	ft	L = 20	240	OK
Number of Beams,	Nb =	6.00		Nb = 4	≥	OK
	Kg =	3,226,905	in^4	Kg = 10,000	7,000,000	OK

Modular Ratio, n =	1	ksi	Eb / Ed
Eb =	3000	ksi	Beam Material --> Concrete
Ed =	3000	ksi	Deck Material --> Concrete
Ixc =	1620034.01	in^4	bd^3/3
eg =	33.9	in	d/2 + ts/2
A =	1394.3	in^2	b*d
d =	59.0	in	

Moment Single Lane Interior Beam DF -->	DFm_si=	0.583
Moment Multiple Lane Interior Beam DF -->	DFm_mi=	0.759

LIVE LOAD DISTRIBUTION FACTORS - MOMENT IN EXTERIOR BEAMS

Distribution of Live Loads for Moment in Exterior Beams

Table 4.6.2.2.2d-1—Distribution of Live Loads for Moment in Exterior Longitudinal Beams

Type of Superstructure	Applicable Cross-Section from Table 4.6.2.2.1-1	One Design Lane Loaded	Two or More Design Lanes Loaded	Range of Applicability
Wood Deck on Wood or Steel Beams	a, l	Lever Rule	Lever Rule	N/A
Concrete Deck on Wood Beams	l	Lever Rule	Lever Rule	N/A
Concrete Deck, Filled Grid, Partially Filled Grid, or Unfilled Grid Deck Composite with Reinforced Concrete Slab on Steel or Concrete Beams; Concrete T-Beams, T- and Double T-Sections	a, e, k and also i, j if sufficiently connected to act as a unit	Lever Rule	$g = e\,g_{interior}$ $e = 0.77 + \frac{d_e}{9.1}$	$-1.0 \le d_e \le 5.5$
			use lesser of the values obtained from the equation above with $N_b = 3$ or the lever rule	$N_b = 3$

DFm_	Distribution factors for Moment
se	single lane, exterior girders
me	multiple lane, exterior girders

One Design Lane Loaded

Lever Rule --> Rxn * Spacing = P/2*L1 + P/2*L2

Barrier + 2' from Barrier, Axle 1 =	2.74	ft	Hinge to Axle 1, L1 =	6.12
Axle 1 + 6' = Axle 2 =	8.74		Hinge to Axle 2, L2 =	0.12
CI of First Beam, Rxn 1 =	2.79	ft		
CI of Second Beam, Hinge =	8.86	ft		

P/2*L1 = P*	3.06	
P/2*L2 = P*	0.06	
P/2*L1 + P/2*L2 = P*	3.12	
Rxn = P*	0.514	
Multiple Presence Factor, m =	1.2	<-- (1 Lane)

Moment Single Lane Exterior Beam DF --> DFm_se= 0.617 =Rxn*m

Two or More Design Lanes Loaded

Barrier Width =	0.74	ft		
CI of Beam to Edge of Deck, OH =	2.79	ft		
de =	2.05	ft		
e =	1.00		Use, e =	1
Moment Multiple Lane Exterior Beam DF --> DFm_me=	0.759			

LIVE LOAD DISTRIBUTION FACTORS - SHEAR IN INTERIOR BEAMS

Distribution of Live Loads for Shear in Interior Beams

Table 4.6.2.2.3a-1—Distribution of Live Load for Shear in Interior Beams

Type of Superstructure	Applicable Cross-Section from Table 4.6.2.2.1-1	One Design Lane Loaded	Two or More Design Lanes Loaded	Range of Applicability
Wood Deck on Wood or Steel Beams	a, 1	See Table 4.6.2.2.2a-1		
Concrete Deck on Wood Beams	1	Lever Rule	Lever Rule	N/A
Concrete Deck, Filled Grid, Partially Filled Grid, or Unfilled Grid Deck Composite with Reinforced Concrete Slab on Steel or Concrete Beams; Concrete T-Beams, T-and Double T-Sections	a, e, k and also i, j if sufficiently connected to act as a unit	$0.36+\frac{S}{25.0}$	$0.2+\frac{S}{12}-\left(\frac{S}{35}\right)^{2.0}$	$3.5 \le S \le 16.0$ $20 \le L \le 240$ $4.5 \le t_s \le 12.0$ $N_b \ge 4$
		Lever Rule	Lever Rule	$N_b = 3$

DFv_	Distribution factors for Shear
si	single lane, interior girders
mi	multiple lane, interior girders

Shear Single Lane Interior Beam DF -->	DFv_si=	0.680
Shear Multiple Lane Interior Beam DF -->	DFv_mi=	0.814

LIVE LOAD DISTRIBUTION FACTORS - SHEAR IN EXTERIOR BEAMS

Distribution of Live Loads for Shear in Exterior Beams

Table 4.6.2.2.3b-1—Distribution of Live Load for Shear in Exterior Beams

Type of Superstructure	Applicable Cross-Section from Table 4.6.2.2.1-1	One Design Lane Loaded	Two or More Design Lanes Loaded	Range of Applicability
Wood Deck on Wood or Steel Beams	a, l	Lever Rule	Lever Rule	N/A
Concrete Deck on Wood Beams	l	Lever Rule	Lever Rule	N/A
Concrete Deck, Filled Grid, Partially Filled Grid, or Unfilled Grid Deck Composite with Reinforced Concrete Slab on Steel or Concrete Beams; Concrete T-Beams, T- and Double T-Beams	a, e, k and also i, j if sufficiently connected to act as a unit	Lever Rule	$g = e\,g_{interior}$ $e = 0.6 + \frac{d_e}{10}$	$-1.0 \le d_e \le 5.5$
			Lever Rule	$N_b = 3$

DFv_	Distribution factors for Shear
se	single lane, exterior girders
me	multiple lane, exterior girders

One Design Lane Loaded

Lever Rule --> Rxn * Spacing = P/2*L1 + P/2*L2

Barrier + 2' from Barrier, Axle 1 =	2.74	ft	Hinge to Axle 1, L1 =	6.12
Axle 1 + 6' = Axle 2 =	8.74		Hinge to Axle 2, L2 =	0.12
Cl of First Beam, Rxn 1 =	2.79	ft		
Cl of Second Beam, Hinge =	8.86	ft		

P/2*L1 = P*	3.06	
P/2*L2 = P*	0.06	
P/2*L1 + P/2*L2 = P*	3.12	
Rxn = P*	0.514	
Multiple Presence Factor, m =	1.2	<-- (1 Lane)

Shear Single Lane Exterior Beam DF --> DFv_se= 0.617 =Rxn*m

Two or More Design Lanes Loaded

Barrier Width =	0.74	ft		
Cl of Beam to Edge of Deck, OH =	2.79	ft		
de =	2.05	ft		
e =	0.81		Use, e =	0.81
Shear Multiple Lane Exterior Beam DF --> DFv_me=	0.656		= e * DFv_mi	

LIVE LOAD DISTRIBUTION FACTORS - SUMMARY

Summary Distribution of Live Loads for Moment in Exterior Beams

Distribution For:	Loaded Lanes	Distribution Factors		
		Interior	Exterior	Governs
Moment	Multiple	0.759	0.759	0.759
	Single	0.583	0.617	0.617
Shear	Multiple	0.814	0.656	0.814
	Single	0.680	0.617	0.680

SUBSTRUCTURE ANALYSIS

** FOR PRELIMINARY DESIGN ONLY **

SUBSTRUCTURE ANALYSIS

ABUTMENT DESIGN

* SUPERSTRUCTURE DEAD LOADS ON ABUTMENT
* SUPERSTRUCTURE LIVE LOADS ON ABUTMENT
* ABUTMENT STABILITY DESIGN

** FOR PRELIMINARY DESIGN ONLY **

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

References: AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012

Notes: This spreadsheet computes the loads on an abutment, considering the spans left or right of the abutment is simply supported.

SUPERSTRUCTURE DEAD LOAD

Abutment Length = 35.92 ft

Length =	50400	mm	165.31	ft
Spans =	3		3	
Span Length =	16800	mm	55.10	ft

Width =	10950	mm	35.92	ft
Barrier =	225	mm	0.74	ft
Sidewalk =	1200	mm	3.94	ft
Barrier + Sidewalk =	1425	mm	4.67	ft
Roadway =	8100	mm	26.57	ft
No of Lanes	2	mm	0.01	ft
Lane Width =	3657.6	mm	12.00	ft
Shoulder =	392.4	mm	1.29	ft

No of Beams =	6		6			
b =	600	mm	1.97	ft	23.62	in
d =	1500	mm	4.92	ft	59.04	in
Spacing =	1850	mm	6.07	ft	72.82	in
Distance from Ext Beam to Ext Beam =	9250	mm	30.34	ft	364.08	in
Overhang, OH =	850	mm	2.79	ft	33.46	in
Clear Overhang, OH_cl =	550	mm	1.80	ft	21.65	in
Clear Spacing bw Beams =	1250	mm	4.10	ft	49.20	
Deck Thickness, ts =	225	mm	0.74	ft	8.86	in
Barrier Height =	1400	mm	4.59	ft	55.10	in
Sidewalk Height =	275	mm	0.90	ft	10.82	in

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE DEAD LOAD

CAT		Width ft	Height ft	Length ft	Volume cf	Unit Weight lbs/cf	Weight Kips	Qty #	Total Kips	DC Kips	DW Kips
DC	Beams / Girders	1.97	4.92	55.10	533.55	150	80.03	6	480.19	480.19	
DC	Sidewalks	3.94	0.90	55.10	195.40	150	29.31	2	58.62	58.62	
DC	Safety Curbs	0.00	0.00	0.00	0.00	150	0.00	0	0.00	0.00	
DC	Barriers	0.74	4.59	55.10	187.17	150	28.07	2	56.15	56.15	
DW	Wearing Surface	26.57	0.18	55.10	263.54	165	43.48	1	43.48		43.48
DC	End Diaphragms	4.10	4.92	2.46	49.62	150	7.44	10	74.43	74.43	
DC	Intermediate Diaphragms	4.10	4.92	0.98	19.77	150	2.97	5	14.83	14.83	
DW	Utilities				0.00	0	0.00	0	0.00		0.00
DW	Stay-In-Place Forms	0.00	0.00	0.00	0.00	0	0.00	0	0.00		0.00
DC	Deck	35.92	0.74	55.10	1460.59	150	219.09	1	219.09	219.09	
					0.00		0.00		0.00		
					0.00		0.00		0.00		
					0.00		0.00		0.00		
									946.80	903.31	43.48
										946.80	

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE DEAD LOAD

		DC (kips)	DW (Kips)	DL (kips)		
DC	Beams / Girders	480.19				
DC	Sidewalks	58.62				
DC	Safety Curbs	0.00	0.00			
DC	Barriers	56.15				
DW	Wearing Surface		43.48			
DC	End Diaphragms	74.43				
DC	Intermediate Diaphragms	14.83				
DW	Utilities		0.00			
DW	Stay-In-Place Forms		0.00			
DC	Deck	219.09				
		DC	DW	DL		
Total Superstructure Dead Load		903.31	43.48	946.80	kips	
Total Dead Load / Abutment		451.66	21.74	473.40	kips / Abutment	
Length of Abutment		35.92	35.92	35.92	Abutment Length	
Total (DL / Linear Foot of Abutment)		12.58	0.61	13.18		
Total (DL / Linear Foot of Pier)		25.15	1.21	26.36		
Abutment Design						
Design For: Abutment Loading		12.58	0.61	13.18	kips/LF of Abutment	<-- Superstructure Dead Load (Input Tab)

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

References: AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012

Notes: This spreadsheet computes the loads on an abutment, considering the spans left or right of the abutment is simply supported.

SUPERSTRUCTURE LOADING ON ABUTMENT - VERTICAL FORCES (CONT.)

Live Load, LL

Type of Truck: HL	93	
Roadway Width =	26.57	ft
Lane Width =	12	ft
Roadway / Lane Width =	2.21	
Use --> No of Lanes =	2	
Multiple Presence Factor, m =	1	

Table 3.6.1.1.2-1—Multiple Presence Factors, *m*

Number of Loaded Lanes	Multiple Presence Factors, *m*
1	1.20
2	1.00
3	0.85
>3	0.65

Truck Loading:

Section 3.6.1.2.2

	Left/Right Span		
Span Length, L =	55.10	ft	
Dynamic Load Allowance, (IM) =	1.33		Section 3.6.2.1
Number of Lanes =	2		
Multiple Presence Factor, m =	1.00		Section 3.6.1.1.2
Vmax =	59.1	kips / Lane	<-- T3.3.1.2 Shear & End Reactions
Vmax =	118.20	kips	<- Vmax * m * # of lanes
Reaction, LL V =	118.20	kips	
Reaction, (LL+IM) V =	157.2	kips	<-- IM * V
Total Reaction, Truck (LL) =	118.2	kips	
Total Reaction, Truck (LL+IM) =	157.2	kips	

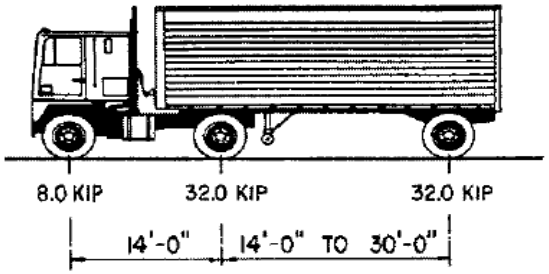


Figure 3.6.1.2.2-1

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - VERTICAL FORCES (CONT.)

Tandem Loading: Section 3.6.1.2.3

	Left/Right Span		
L =	55.10	ft	
Dynamic Load Allowance, (IM) =	1.33		Section 3.6.2.1
Number of Lanes =	2		
Multiple Presence Factor, m =	1.00		Section 3.6.1.1.2
P1 =	25	kips	
P2 =	25	kips	
Axle Spacing =	4	ft	
Vmax =	48.19	kips/ Lane	
Vmax =	96.37	Kips	<- Vmax * m * # of lanes
Reaction, LL V =	96.37	kips	
Reaction, (LL+IM) V =	128.17	kips	<-- IM * V
Total Reaction, Tandem (LL) =	96.4	kips	
Total Reaction, Tandem (LL+IM) =	128.2	kips	

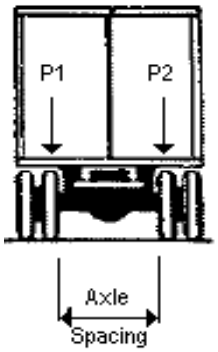
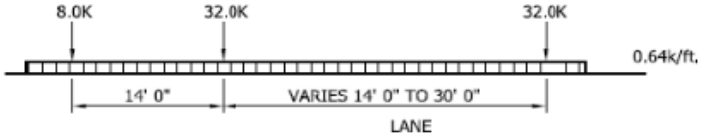


Figure 3.6.1.2.2-1

Live Load, LL (cont.)

Lane Loading: Section 3.6.1.2.4

	Left/Right Span		
L =	55.10	ft	
Number of Lanes =	2		
Multiple Presence Factor, m =	1.00		Section 3.6.1.1.2
Lane Load =	0.64	klf	
Vmax =	17.63	kips/ Lane	
Vmax =	35.27	Kips	<- Vmax * m * # of lanes
Reaction, Lane Load (LL) =	35.3	kips	
Total Reaction, Lane Load (LL) =	35.3	kips	



BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - VERTICAL FORCES (CONT.)

Pedestrian Live Load

Pedestrian Live Load, PL =	0.075	ksf	<--- per AASHTO 3.6.1.6 for Sidewalks with a Width >= 2.0 ft
Width of Sidewalk =	3.95	ft	
PL =	0.296	klf	
Length of Sidewalk =	55.10	ft	
PL =	16.32	kips	--> PL / Abutment = 8.16 kips

Bridge Width = 35.92 ft

--> PL / LF of Abutment = 0.23 klf

Live Loads

	LL	IM	LL + IM
Truck	59.10	1.33	78.60
Tandem	48.19	1.33	64.09
Lane	17.63	1	17.63
Truck + Lane	76.73		96.24
Tandem + lane	65.82		81.72
Max	76.73		96.24

Max =	96.24	kips
No of Lanes =	2.00	
m =	1.00	
LL+I =	192.47	kips
Abutment Length =	35.92	ft
LL+ I =	5.36	klf
LL + I + PL =	5.59	klf

<-- INPUT LOAD

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - LATERAL FORCES

Braking Force, BR — Section 3.6.4

Notes: Dynamic Load Allowance increase not required. AASHTO3.6.2.1
Braking Force ONLY applies to fixed bearings
Braking Force includes multiple presence factor

Type of Bearing: Fixed

25% Axle Weight of Design Truck =	25%	18.00	kips	Design Truck Axle Weight =	72
25% Axle Weight of Design Tandem =	25%	12.50	kips	Design Tandem Axle Weight =	50
5% (Axle Weight of Design Truck + Lane Load) =	5%	4.48	kips	Design Truck + Lane Axle Weight =	89.63
5% (Axle Weight of Design Tandem Load + Lane Load) =	5%	2.53	kips	Design Tandem + Lane Axle Weight =	50.64

Braking Force on Abutment (BR) =	18	kips	<---- 25% Axle Weight of Design Truck	
Number of Lanes =	2			
Multiple Presence Factor, m =	1			
BR =	1.00	klf	<--- BR / Abutment Length	<-- Input Load

Location of Load Application = *0.00* *ft above Bridge Seat*

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

* FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - LATERAL FORCES - EQ

Total Superstructure Dead Load =	13.18	kips			
Coefficient of Friction =	0.3				
Coefficient of Friction =	0.15		<-- Use %	50%	per MassDOT 3.4.4.4 -5
DL * u =	1.98	kips			
Abutment Length =	35.92	ft			
EQ =	0.06	klf	<--- INPUT LOAD		

COEFFICIENT OF FRICTION

The following friction coefficients shall be considered in calculating the sliding friction forces :

Concrete to Soil / Rock	0.30
Concrete to Steel	0.45
Steel to Steel	0.30
Steel to Teflon Plate	0.10
Brick Masonry on moist clay	0.33
Brick Masonry on dry clay	0.50
Brick Masonry on sand	0.40
Brick Masonry on gravel	0.60
Brick Masonry to Brick	0.70
Brick Masonry on rock	0.75
Granite on Granite	0.60
Limestone on Limestone	0.75
Cement Blocks on Cement Blocks	0.65
Cement concrete on dry clay	0.40
Cement concrete on wet clay	0.20
Cement concrete on wet sand	0.40
Cement concrete on dry sand	0.50 - 0.60
Cement concrete on dry gravel	0.50 - 0.60
Cement concrete on dry rock	0.60 - 0.70
Cement concrete on wet rock	0.50
Brick on Brick	0.65
Wood on Wood	0.48

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

TABLE OF MAXIMUM MOMENTS, SHEARS, AND REACTIONS— SIMPLE SPANS, ONE LANE

Spans in feet; moments in thousands of foot-pounds; shears and reactions in thousands of pounds.

These values are subject to specification reduction for loading of multiple lanes.

Impact not included.

Span	Moment	End shear and end reaction (a)	Span	Moment	End shear and end reaction (a)
1	8.0(b)	32.0(b)	42	485.3(b)	56.0(b)
2	16.0(b)	32.0(b)	44	520.9(b)	56.7(b)
3	24.0(b)	32.0(b)	46	556.5(b)	57.3(b)
4	32.0(b)	32.0(b)	48	592.1(b)	58.0(b)
5	40.0(b)	32.0(b)	50	627.9(b)	58.5(b)
6	48.0(b)	32.0(b)	52	663.6(b)	59.1(b)
7	56.0(b)	32.0(b)	54	699.3(b)	59.6(b)
8	64.0(b)	32.0(b)	56	735.1(b)	60.0(b)
9	72.0(b)	32.0(b)	58	770.8(b)	60.4(b)
10	80.0(b)	32.0(b)	60	806.5(b)	60.8(b)
11	88.0(b)	32.0(b)	62	842.4(b)	61.2(b)
12	96.0(b)	32.0(b)	64	878.1(b)	61.5(b)
13	104.0(b)	32.0(b)	66	914.0(b)	61.9(b)
14	112.0(b)	32.0(b)	68	949.7(b)	62.1(b)
15	120.0(b)	34.1(b)	70	985.6(b)	62.4(b)
16	128.0(b)	36.0(b)	75	1,075.1(b)	63.1(b)
17	136.0(b)	37.7(b)	80	1,164.9(b)	63.6(b)
18	144.0(b)	39.1(b)	85	1,254.7(b)	64.1(b)
19	152.0(b)	40.4(b)	90	1,344.4(b)	64.5(b)
20	160.0(b)	41.6(b)	95	1,434.1(b)	64.9(b)
21	168.0(b)	42.7(b)	100	1,524.0(b)	65.3(b)
22	176.0(b)	43.6(b)	110	1,703.6(b)	65.9(b)
23	184.0(b)	44.5(b)	120	1,883.3(b)	66.4(b)
24	192.7(b)	45.3(b)	130	2,063.1(b)	67.6
25	207.4(b)	46.1(b)	140	2,242.8(b)	70.8
26	222.2(b)	46.8(b)	150	2,475.1	74.0
27	237.0(b)	47.4(b)	160	2,768.0	77.2
28	252.0(b)	48.0(b)	170	3,077.1	80.4
29	267.0(b)	48.8(b)	180	3,402.1	83.6
30	282.1(b)	49.6(b)	190	3,743.1	86.8
31	297.3(b)	50.3(b)	200	4,100.0	90.0
32	312.5(b)	51.0(b)	220	4,862.0	96.4
33	327.8(b)	51.6(b)	240	5,688.0	102.8
34	343.5(b)	52.2(b)	260	6,578.0	109.2
35	361.2(b)	52.8(b)	280	7,532.0	115.6
36	378.9(b)	53.3(b)	300	8,550.0	122.0
37	396.6(b)	53.8(b)			
38	414.3(b)	54.3(b)			
39	432.1(b)	54.8(b)			
40	449.8(b)	55.2(b)			

AASHTO Standard Specifications for Highway Bridges - 17th edition 2002

Loading -- HS 20-44 (MS18)

Table 3.3.1.1

Maximum Unfactored HL-93 Live Load Moments, Shears, and Reactions

Simple Spans, One Lane, w/o Dynamic Load Allowance

	MOMENTS					SHEARS & END REACTIONS			
SPAN	TRUCK	TANDEM	LANE	TOTAL	SPAN PT.	TRUCK	TANDEM	LANE	TOTAL
FT	KIP-FT	KIP-FT	KIP-FT	KIP-FT	%	KIP	KIP	KIP	KIP
1	8.0	6.3	0.1	8.1	0.50	32.0	25.0	0.3	32.3
2	16.0	12.5	0.3	16.3	0.50	32.0	25.0	0.6	32.6
3	24.0	18.8	0.7	24.7	0.50	32.0	25.0	1.0	33.0
4	32.0	25.0	1.3	33.3	0.50	32.0	25.0	1.3	33.3
5	40.0	31.3	2.0	42.0	0.50	32.0	30.0	1.6	33.6
6	48.0	37.5	2.9	50.9	0.50	32.0	33.3	1.9	35.3
7	56.0	43.8	3.9	59.9	0.50	32.0	35.7	2.2	38.0
8	64.0	50.0	5.1	69.1	0.50	32.0	37.5	2.6	40.1
9	72.0	62.5	6.5	78.5	0.50	32.0	38.9	2.9	41.8
10	80.0	75.0	8.0	88.0	0.50	32.0	40.0	3.2	43.2
11	84.5	92.0	9.3	101.3	0.40	32.0	40.9	3.5	44.4
12	92.2	104.0	11.1	115.1	0.40	32.0	41.7	3.8	45.5
13	103.0	115.9	13.4	129.3	0.45	32.0	42.3	4.2	46.5
14	110.9	128.3	15.5	143.8	0.45	32.0	42.9	4.5	47.3
15	118.8	140.6	17.8	158.4	0.45	34.1	43.3	4.8	48.1
16	126.7	153.0	20.3	173.3	0.45	36.0	43.8	5.1	48.9
17	134.6	165.4	22.9	188.3	0.45	37.6	44.1	5.4	49.6
18	142.6	177.8	25.7	203.4	0.45	39.1	44.4	5.8	50.2
19	150.5	190.1	28.6	218.7	0.45	40.4	44.7	6.1	50.8
20	158.4	202.5	31.7	234.2	0.45	41.6	45.0	6.4	51.4
21	166.3	214.9	34.9	249.8	0.45	42.7	45.2	6.7	52.0
22	174.2	227.3	38.3	265.6	0.45	43.6	45.5	7.0	52.5
23	182.2	239.6	41.9	281.5	0.45	44.5	45.7	7.4	53.0
24	190.1	252.0	45.6	297.6	0.45	45.3	45.8	7.7	53.5
25	198.0	264.4	49.5	313.9	0.45	46.1	46.0	8.0	54.1
26	210.2	276.8	53.5	330.3	0.45	46.8	46.2	8.3	55.1
27	226.1	289.1	57.7	346.9	0.45	47.4	46.3	8.6	56.0
28	241.9	301.5	62.1	363.6	0.45	48.0	46.4	9.0	57.0
29	257.8	313.9	66.6	380.5	0.45	48.8	46.6	9.3	58.1
30	273.6	326.3	71.3	397.5	0.45	49.6	46.7	9.6	59.2
31	289.4	338.6	76.1	414.7	0.45	50.3	46.8	9.9	60.2
32	307.0	351.0	81.1	432.1	0.45	51.0	46.9	10.2	61.2
33	324.9	363.4	86.2	449.6	0.45	51.6	47.0	10.6	62.2
34	332.0	375.0	92.5	467.5	0.50	52.2	47.1	10.9	63.1
35	350.0	387.5	98.0	485.5	0.50	52.8	47.1	11.2	64.0
36	368.0	400.0	103.7	503.7	0.50	53.3	47.2	11.5	64.9
37	386.0	412.5	109.5	522.0	0.50	53.8	47.3	11.8	65.7
38	404.0	425.0	115.5	540.5	0.50	54.3	47.4	12.2	66.5
39	422.0	437.5	121.7	559.2	0.50	54.8	47.4	12.5	67.2
40	440.0	450.0	128.0	578.0	0.50	55.2	47.5	12.8	68.0

Project Number: 1298\127-1298-12001-LT0077
Description: Khost Bridge No. 9
Structure: Abutment Design

Designed By: alh
Checked By:
Date: 11/8/2013

Table 3.3.1.2

Maximum Unfactored HL-93 Live Load Moments, Shears, and Reactions

Simple Spans, One Lane, w/o Dynamic Load Allowance

	MOMENTS					SHEARS & END REACTIONS			
SPAN FT	TRUCK KIP-FT	TANDEM KIP-FT	LANE KIP-FT	TOTAL KIP-FT	SPAN PT. %	TRUCK KIP	TANDEM KIP	LANE KIP	TOTAL KIP
42	485.2	474.8	139.7	624.9	0.45	56.0	47.6	13.4	69.4
44	520.9	499.5	153.3	674.2	0.45	56.7	47.7	14.1	70.8
46	556.5	524.3	167.6	724.1	0.45	57.4	47.8	14.7	72.1
48	592.2	549.0	182.5	774.6	0.45	58.0	47.9	15.4	73.4
50	627.8	573.8	198.0	825.8	0.45	58.6	48.0	16.0	74.6
52	663.4	598.5	214.2	877.6	0.45	59.1	48.1	16.6	75.7
54	699.1	623.3	230.9	930.0	0.45	59.6	48.1	17.3	76.8
56	734.7	648.0	248.4	983.1	0.45	60.0	48.2	17.9	77.9
58	770.4	672.8	266.4	1036.8	0.45	60.4	48.3	18.6	79.0
60	806.0	697.5	285.1	1091.1	0.45	60.8	48.3	19.2	80.0
62	841.6	722.3	304.4	1146.1	0.45	61.2	48.4	19.8	81.0
64	877.3	747.0	324.4	1201.7	0.45	61.5	48.4	20.5	82.0
66	912.9	771.8	345.0	1257.9	0.45	61.8	48.5	21.1	82.9
68	948.6	796.5	366.2	1314.8	0.45	62.1	48.5	21.8	83.9
70	984.2	821.3	388.1	1372.3	0.45	62.4	48.6	22.4	84.8
75	1070.0	887.5	450.0	1520.0	0.50	63.0	48.7	24.0	87.0
80	1160.0	950.0	512.0	1672.0	0.50	63.6	48.8	25.6	89.2
85	1250.0	1012.5	578.0	1828.0	0.50	64.1	48.8	27.2	91.3
90	1340.0	1075.0	648.0	1988.0	0.50	64.5	48.9	28.8	93.3
95	1430.0	1137.5	722.0	2152.0	0.50	64.9	48.9	30.4	95.3
100	1520.0	1200.0	800.0	2320.0	0.50	65.3	49.0	32.0	97.3
110	1700.0	1325.0	968.0	2668.0	0.50	65.9	49.1	35.2	101.1
120	1880.0	1450.0	1152.0	3032.0	0.50	66.4	49.2	38.4	104.8
130	2060.0	1575.0	1352.0	3412.0	0.50	66.8	49.2	41.6	108.4
140	2240.0	1700.0	1568.0	3808.0	0.50	67.2	49.3	44.8	112.0
150	2420.0	1825.0	1800.0	4220.0	0.50	67.5	49.3	48.0	115.5
160	2600.0	1950.0	2048.0	4648.0	0.50	67.8	49.4	51.2	119.0
170	2780.0	2075.0	2312.0	5092.0	0.50	68.0	49.4	54.4	122.4
180	2960.0	2200.0	2592.0	5552.0	0.50	68.3	49.4	57.6	125.9
190	3140.0	2325.0	2888.0	6028.0	0.50	68.5	49.5	60.8	129.3
200	3320.0	2450.0	3200.0	6520.0	0.50	68.6	49.5	64.0	132.6

http://www.dot.nd.gov/manuals/bridge/lrfd-bridge-design/Section03A.pdf

CANTILEVER ABUTMENT DESIGN -INPUT

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012	AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011
ACI 318-08 Building Code Requirements for Structural Concrete, 2005	
2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions	

General Notes: **This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).**

Changes made for Wall/ Pier option | Job Specific Notes

Project Notes: For the Preliminary Design: Design was based on the West Abutment

General Design Parameters

Input Section : 1.0

GEOMETRY INFORMATION INPUT:

PROPOSED TOP OF ROADWAY ELEV:			6105.83	ft	1861.53	m
PROPOSED TOP OF BACKWALL ELEV:			6101.96		1860.35	m
PROPOSED BRIDGE SEAT ELEV:	H_Backwall = 2.30	ft	6099.66	ft	1859.65	m
PROPOSED TOP OF FOOTING ELEV:	H_Footing = 3.28	ft	6079.00	ft	1853.35	m
PROPOSED BOT. OF FOOTING ELEV:			6075.72	ft	1852.35	m
ELEVATION OF HIGH WATER:		FOR NO WATER = 0.00	6097.36		1858.95	m
PROPOSED BRIDGE SEAT WIDTH:			3.28	ft	1.00	m
PROPOSED BACKWALL WIDTH:			1.31	ft	0.40	m
ABUTMENT/WALL DESIGN LENGTH:	1.00	Ft Actual Length=	35.92	ft	10.95	m
FOOTING LENGTH:			44.12	ft	13.45	m

DW CALCULATION INPUT:

WEARING SURFACE DEPTH:	2.13 IN	x 1. Layers	0.18	ft	<-- ---	0.05	m
ROADWAY WIDTH:			26.57	ft		8.10	m
BRIDGE SPAN:	Total Length = 165.312	<-- 3 Spans @	55.10	ft		16.80	m
NUMBER OF GIRDERS:			6				

MATERIAL PROPERTIES:

CUBIC WEIGHT CONCRETE:	150.00	pcf
COMP. STRENGTH OF CONC. = F'c:	4.00	ksi
MAXIMUM SIZE OF COARSE AGGREGATE	1.50	in
TENSILE STRENGTH OF REBAR = Fy:	60.00	ksi
CUBIC WEIGHT OF HOT MIX ASPHALT (HMA):	165.00	pcf

GEOTECHNICAL INFORMATION:

BEARING RESISTANCE (CAPACITY):	8.35	ksf	<-- Per Geotech Report
FACTORED BEARING RESISTANCE, qr :	8.35	ksf	<-- Assumed
WEIGHT OF SOIL BACKFILL:	115.00	Lbs/CF	<-- Assumed
WALL ON ROCK?	N	(Y OR N)	
WALL ON PILES?	N	(Y OR N)	
GRAVITY WALL?	N	(Y OR N)	
BETA: SLOPE OF BACKFILL:	0.00	DEG	<-- Assumed
THETA: BATTER ANGLE BACKWALL:	76.55	DEG	AASHTO Table 3.11.5.3-1
PHI: FRICTION ANGLE OF BACKFILL:	30.00	DEG	<-- Assumed
DELTA: ANGLE BACKWALL FRICTION:	20.00	DEG	<-- Assumed δ=2/3 (ϕ)

Fill-in for Abutment / Pier Design
Khost Bridge No.10

CANTILEVER ABUTMENT DESIGN	Y
GRAVITY ABUTMENT DESIGN	N
CANTILEVER WALL DESIGN	N
GRAVITY WALL DESIGN	N
PIER DESIGN	N

CANTILEVER ABUTMENT DESIGN -INPUT

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

General Loading Parameters

Input Section : 2.0

LIVE LOAD INFORMATION:

APPROACH SLAB:	Y	(Y OR N)
ROADWAY WITHIN H/2 OF TOP OF WALL:	Y	(Y OR N)
Live Load Surcharge to be Considered?:	Y	
SURCHARGE HEIGHT:	2.00	ft REF: Table 3.11.6.4-1
Construction Surcharge, q:	250.00	psf REF: C3.4.2.1

SEISMIC LOAD INFORMATION:

WALL RESTRAINED HORZ. MOVMT.(Y/N):	N	(Y OR N)
SEISMIC ACCELERATION COEFF. A:	0.290	REF: FIG.3.10.2.1-2, AASHTO
SEISMIC CATEGORY:	D	**<---Assumed based on Location & AASHTO Seimic Design Guide**

RAILING CLASS: S3-TL4 (CT) (PER MASSDOT LRFD BRIDGE MANUAL PART 1) 3.3.2.2 **<--- N/A**

Horizontal Railing Design Load	0.00	kips
Horizontal Railing Impact Length	0.00	ft
Wall Height+Rail Height	0.00	ft
Distributed Horizontal Railing Design Load @ top of wall	0.00	klf
Distributed Horizontal Railing Design Load @ bottom of wall	0.00	klf/wall height
Railing Dead Load	0.00	
Additional Moment From Railing Impact	0.00	<--- **Note:** The added moment from top of railing to bottom of railing is distributed along bottom of footing*

SURCHARGE HEIGHT (Per ASSHTO 3.11.6.4 Live Load Surchage)

ABUTMENTS ----> Table 3.11.6.4-1

Table 3.11.6.4-1 - Equivalent Height of Soil for Vehicular Loading on Abutments Perpindicular to Traffic

Abutment Height (ft)	h_{eq} (ft)
5	4
10	3
>20	2

Surcharge Height = 2.00 ft

RETAINING WALLS -- --> Table 3.11.6.4-2

See Table 3.11.6.4-2 for Equivalent Height of Soil for Vechicular Loading on Retaining Walls Parallel to Traffic.

Retaining Wall Height (ft)	heq (ft) Distance from wall backface to edge of traffic	
	0.0 ft	≥ 1.0 ft
5	5	2
10	3.5	2
>20	2	2

Distance from wall backface to edge of traffic = 0.0 ft

Surcharge Height = 2.00 ft

Note: See 3.11.6.5 for Possible Reduction of Surcharge

CANTILEVER ABUTMENT DESIGN -INPUT

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Superstructure Loading Parameters

Input Section : 3.0

ADDITIONAL LOADS ON STRUCTURE

(load is per linear foot of structure (Abutment/ Pier/ Wall) NOT the Footing, arm from front edge of bridge seat)

LOADS		LOAD (klf)	ARM (feet)			
(DC+DW), SUPERSTRUCT. DEAD LOAD:	DL	13.18	1.72	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
DC (Structural Components & nonstructural attachments)	DC	12.58	1.72	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
DW (Wearing Surface & Utilities)	DW	0.61	1.72	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
(LL+IM+PL), LIVE LOAD, IMPACT AND PED LL:	LL+IM+PL	5.59	1.72	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
WS, WIND LOAD ON STRUCTURE:	WS	0.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
WL, WIND LOAD ON LIVE LOAD:	WL	0.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
BR, BREAKING LOAD :	BR	1.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
TU, THERMAL FORCE:	TU	0.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
EQ, SEISMIC LOAD ON SUPERSTRUCTURE:	EQ	0.06	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
CT, VEHICLE COLLISION LOAD	CT	0.00	0.00	Distance above top pf wall equal to the height of rail	Include =	Y

Note: Per AASHTO 11.5.1, abutments and retaining walls should be designed for EH, WA, LS, DS, DC, TU, EQ. Therefore, including wind and breaking forces is conservative. Say OK

CANTILEVER ABUTMENT DESIGN -INPUT

*** FOR PRELIMINARY DESIGN ONLY**

General Information

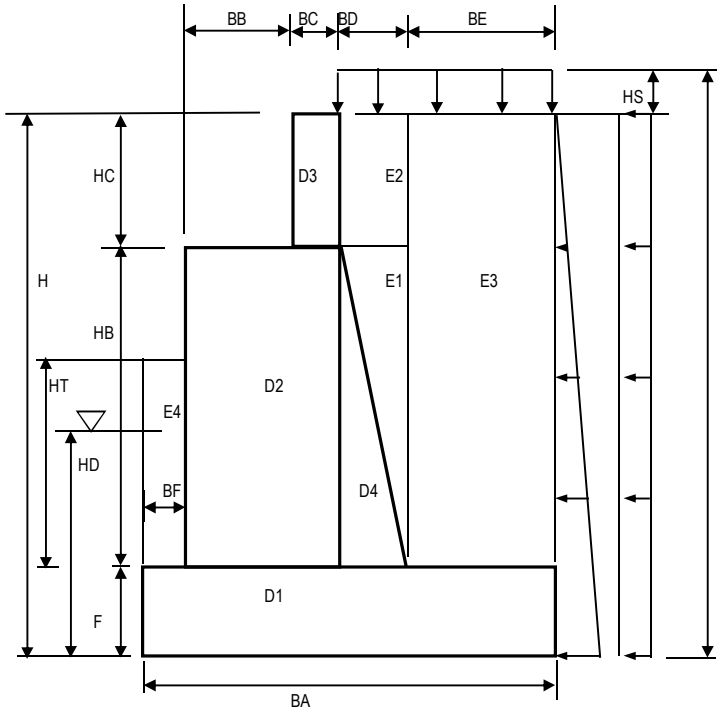
Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Abutment Geometry

Input Section : 4.0

CALCULATION OF WALL AND BACKFILL GEOMETRY:

		Prelim Size	User Adjust	Final Size (ft)	Approx Size (mm)
HEIGHT OF ABUTMENT / WALL, H:	H =	26.240	0.00	26.24	7900
HEIGHT OF FOOTING, F:	F =	3.280	0.00	3.28	1000
HEIGHT OF STEM, HB:	HB =	20.660	0.00	20.66	6200
HEIGHT OF BACKWALL, HC:	HC =	2.300	0.00	2.30	700
HEIGHT OF HIGH WATER, HD:	HD =	21.636	0.00	21.64	6500
HEIGHT OF SURCHARGE, HS:	HS =	2.000	0.00	2.00	600
WIDTH OF FOOTING, BA:	BA =	22.960	0.00	22.96	6900
WIDTH OF BRIDGE SEAT, BB:	BB =	3.280	0.00	3.28	1000
WIDTH OF BACKWALL, BC:	BC =	1.310	0.00	1.31	400
WIDTH OF BATTER OF STEM, BD:	BD =	5.250	0.00	5.25	1600
WIDTH OF FOOTING HEEL, BE:	BE =	9.184	0.00	9.18	2800
WIDTH OF FOOTING TOE, BF:	BF =	3.936	0.00	3.94	1200
HEIGHT OF SOIL OVER TOE, HT:	HT =	3.810	6.50	10.31	3100
HEIGHT OF SOIL OVER HEEL, HH:	HH =	22.960	0.00	22.96	6900
HEIGHT OF SOIL AT BACKFACE FACE (HEEL), HS1	Hss1 =			26.24	7900
HEIGHT OF SOIL AT FRONT FACE FACE (TOE), HS2	Hss2 =			13.59	4100



OVERALL QUANTITIES:

WEIGHT OF CONCRETE WALL/L.F.:	34.108	Kips per l.f.
CONCRETE QUANTITY / L.F.:	8.422	C.Y. per l.f.

SUMMARY OF QUANTITIES:

STEEL / L.F. =	304.101	LBS/L.F.
CONC. / L.F =	8.422	C.Y./L.F.

Geometry Check: Check Width: **ok**
Check Height: **ok**

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

- AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012
- ACI 318-08 Building Code Requirements for Structural Concrete, 2005
- 2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions
- AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011

Notes:

This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).

Changes made for Wall/ Pier option **Job Specific Notes**

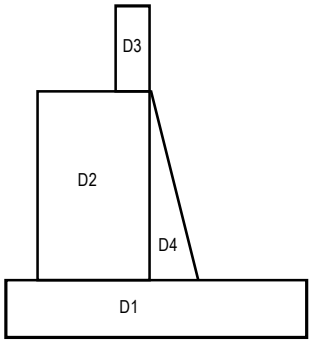
Calculate Dead Loads

Primary Loads Section : 1.0

Superstructure Loads: Vertical: Horizontal:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	Superstructure	12.58	5.66	71.15			
DW	Superstructure	0.61	5.66	3.43			

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.



Substructure Loads: Vertical: Horizontal:

AREA #		Volume (CF)	γ_{conc} (pcf)	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	D1	75.31	150.00	11.30	11.48	129.68			
	D2	94.83	150.00	14.22	6.23	88.63			
	D3	3.01	150.00	0.45	7.87	3.56			
	D4	54.23	150.00	8.13	10.28	83.59			
	Subtotal Concrete			**34.11**		**305.47**			

Total Dead Load: Vertical: Horizontal:

AREA #	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
TOTAL DC (Super + Sub)	**46.68**		**376.62**			
TOTAL DW (Super)	**0.61**		**3.43**			
TOTAL DC (Substr. Only - Construction)	**34.11**		**305.47**			

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Earth Loads

Primary Loads Section : 2.0

Compute Horizontal Earth Pressure, EH:

Coulomb's Active Earth Pressure: (per MHD 3.1.5 and AASHTO 3.11.5.3)

PHI, $\phi f'$ =	30.00	Degrees,	Rad =	0.52
DELTA, δ =	20.00	Degrees,	Rad =	0.35
BETA, β =	0.00	Degrees,	Rad =	0.00
THETA, θ =	76.55	Degrees,	Rad =	1.34
Γ (per AASHTO Eq. 3.11.5.3-2)=	2.85			
Ka (per AASHTO Eq. 3.11.5.3-1)=	**0.409**			

Earth Pressure Coefficient to be Used for Design per MassDOT

MassDOT Bridge Manual Section 3.1.5 Earth Pressure Computations

All Walls on Rock	ko	0.500	
All Walls on Piles	ko	0.500	
Cantilever Walls < than 16' in Height	0.5*(Ko + Ka)	0.455	
Cantilever Walls > than 16' in Height	Ka	0.409	<-- USE
Gravity wall supported on Spread Footing	Ka	0.409	

At-Rest Earth Pressure Coeff:

Ko = **0.500**

Earth Pressure Coefficient to be Used for Design per MHD:

Per MHD 3.1.5, design of walls on rock or piles shall use Ko. Cantilever walls less than 16.00' shall use 0.5*(Ko+Ka).
Cantilever walls greater than or equal to 16.00' in height or any spread footing-supported gravity wall shall use Ka.
Active pressure coefficients shall be estimated using Coulomb Theory.

WALL ON LEDGE:	N	(Y OR N)
WALL ON PILES:	N	(Y OR N)
Wall Height:	26.24	ft
Earth pressure Type:	Ka	
Ke =	**0.409**	**<===== Governs.**

Earth Pressure Coefficients to be Used for Design per Geotechnical Report:

Ko =	0.00	
Ka =	0.00	
Ke (geotech) =	**0.000**	**<=== Does not govern.**

Compute Lateral Earth Pressure:

Application of lateral earth pressure shall be per AASHTO Figure C3.11.5.3-1. This shows a different application for Gravity and Cantilever (semi-gravity) walls.
Note that the reduction in lateral earth pressures due to the water table is not included in this section. It is included in the WA (Bouyancy) section of this design.

Cantilever (semi-gravity) Walls:

Load inclination from horizontal, min = $\phi/3$ =	10.00	degrees
Load inclination from horizontal, max = ϕ*2/3 =	20.00	degrees
GAMMA =	115.00	pcf
H = Soil Height at Back face, Hss1	26.24	Feet
Lateral Earth Load, Pa = 1/2*Ke*γ*H^2 =	16.19	kips
Arm for Horiz Load above BOF = H/3 =	8.75	ft
Arm for Vert Load from Toe = F =	22.96	ft

Consider minimum inclination for Sliding, Overturning and Bearing Pressure:

Vertical Component, Pav = Pa*sin(ϕ/3) =	2.81	klf
Horizontal Component, Pah = Pa*cos(ϕ/3) =	15.95	klf

Consider maximum inclination for Footing Heel Reinforcement:

Vertical Component, Pav = Pa*sin(ϕ*2/3) =	5.54	klf
Horizontal Component, Pah = Pa*cos(ϕ*2/3) =	15.22	klf

← ← THIS SECTION IS FOR CANTILEVER OR SEMI-GRAVITY WALLS ONLY ← ←

Gravity Walls:

Load inclination from horizontal = $\delta + (90-\theta)$ =	33.45	degrees
GAMMA =	115.00	pcf
H =	26.24	Feet
Lateral Earth Load, Pa = 1/2*Ke*γ*H^2 =	16.19	kips
Arm for Horiz Load above BOF = H/3 =	8.75	ft
Arm for Vert Load from Toe=(BF+BB+BC+BD*2/3) =	12.03	ft

Consider for Sliding, Overturning, Bearing Pressure and Footing Reinforcement:

Vertical Component, Pav = Pa*sin(δ+(90−θ)) =	8.93	klf
Horizontal Component, Pah = Pa*cos(δ+(90−θ)) =	13.51	klf
Is the wall a Gravity Wall?	N	

← ← N/A ---> THIS SECTION IS FOR GRAVITY WALLS ONLY ← ←

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Earth Loads Continued..

Primary Loads Section : 2.1

Include Passive Earth Pressure	Y
Pp Factor	1

∅ = Soil Friction Angle	30.00	degrees	
δ = Wall Interface Friction	20.00	degrees = 2/3 * ∅ --> 11.6.5.5	
Kp = Passive Earth Pressure Coefficient	3.20	Fig A11.4-2	<-- For the preliminary design it was assumed kp = kpe (see below for kpe back-up)
γ = Unit Weight of Soil	115.00	pcf	
H = Hss2= Height of Soil at Front Face	13.59	ft	
Lateral EQ Load, Pp = 1/2*γ*Kp*H^2=	33.98	klf ---> Equation A11.4-4	
Arm for Horiz Load above BOF = H/3 =	4.53	ft (AASHTO pg 11-112)	

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Earth Loads Continued..

Primary Loads Section : 2.2

Horizontal Earth Pressure, EH:

AREA #	Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EH: Pa	2.81	22.96	64.56	15.95	8.75	139.49
EH: Pp			0.00	-33.98	4.53	-153.94
EH (For all cases except heel reinforcement):	2.81	22.96	64.56	-18.03	13.28	-239.44
EH: Pa	5.54	22.96	127.17	15.22	8.75	133.10
EH: Pp			0.00			0.00
EH (For Heel Reinforcement):	5.54	22.96	127.17	15.22	8.75	133.10

<=== Note, Based on AASHTO Figure C11.5.6-1, both the vertical and horizontal components of EH should be included here because they carry the same load factor.

Vertical Earth Pressure, EV:

AREA #		Volume (CF)	γ_{SOIL} (plf)	Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EV	E1	54.23	115.00	6.24	12.03	75.00			
	E2	12.08	115.00	1.39	11.15	15.48			
	E3	210.86	115.00	24.25	18.37	445.41			
	E4	40.58	115.00	4.67	1.97	9.18			
TOTAL EV				**36.54**		**545.09**			

Note, **per AASHTO 11.6.1.2**, the weight of the soil over the battered portion of the stem or over the base of a footing may be considered as part of the effective weight of the abutment. This is consistant with design.

Earth Surcharge, ES: (This applies for construction case only)

q =	250.00	psf
Uniform Load on Wall, p=Ke*q =	0.102	ksf
Wall Height, H =	26.24	Feet
Heel Length, BE =	9.18	Feet
Footing Width, BA =	22.96	Feet
Wall Length Considered =	1.00	ft

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
ES	P_{con}(h) = p*H*Length =				2.68	13.12	35.20
	P_{con}(v) = q*BE*Length =	3.61	15.74	56.81			
TOTAL ES		**3.61**		**56.81**	**2.68**		**35.20**

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

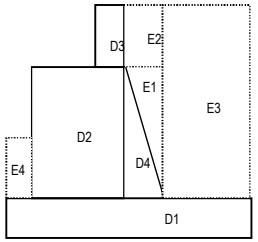
*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Live Loads

Primary Loads Section : 3.0



Superstructure Loads:

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
LL+IM+PL	Superstructure	5.59	5.66	31.61			
BR	Superstructure				1.002	23.94	24.00

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

Live Load Surcharge Loads: LS

Per AASHTO 3.11.6.4, a live load surcharge shall be applied where vehicular load is expected to act on the surface of the backfill within a distance equal to one-half the wall height behind the back face of the wall.
If the surcharge is for highway, the intensity of the load shall be consistent with provisions of Article 3.6.1.2. See Tables 3.11.6.4-1 and 3.11.6.4-2 for equivalent heights.

Compute Horizontal Live Load Surcharge: (To be used for bearing pressure and sliding load cases):

Ke =	0.409	
Unit Weight of Soil, γ =	115.000	pcf
Surcharge Height, heq =	2.00	Feet
LS(h) =(Ke)(γ)(heq)*H =	2.47	kips
Moment arm = H/2 =	13.12	kips

Compute Vertical Live Load Surcharge: (To be used for bearing pressure cases only):

LS(v) =(γ)(heq)(BD+BE) =	3.32	kips
Moment arm = Ba-(BD+BE)/2 =	15.74	kips

Compute Vertical Live Load Surcharge: (To be used for heel reinf cases only):

LS(v) =(γ)(heq)(BE) =	2.11	kips
Moment arm (to back of batter) = BE/2 =	4.59	kips

Live Load Surcharge, LS: Summary

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
LS	LS(v)	3.32	15.74	52.26			
	LS(h)				2.47	13.12	32.39

Total Live Load Load:

AREA #	Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
TOTAL LL+IM+PED+BR+LS	8.91		83.87	3.47		56.38
TOTAL LL+IM+PED+BR+LS (Sliding Only)	5.59		31.61	3.47		56.38
TOTAL LS (Heel Reinf Only)	2.11	4.59	9.70			

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Buoyancy Forces

Primary Loads Section : 4.0

HEIGHT OF STEM AT HIGH WATER:	18.36	
HEIGHT OF FOOTING AT HIGH WATER:	3.28	
WIDTH OF FOOTING, BA	22.96	
SOIL WEIGHT - WATER WEIGHT	52.60	pcf
UPWARD BOUYANT FORCE	-62.40	pcf

Horizontal Force = B(h) = (γ-(γ-62.4))*Ka)H^2/2, acts at HD/3:

Bouyant Load, WA: Vertical: Horizontal:

AREA #		VOLUME (CF)	GAMMA (#/CF)	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
WA	B1 (Ftg)	75.31	-62.40	-4.70	11.48	-53.95			
	B2 (Stem)	180.62	-62.40	-11.27	6.23	-70.23			
	B3 (Soil over Ftg)	240.83	-62.40	-15.03	18.37	-276.03			
	STATIC						5.97	7.21	43.08
	SEISMIC						11.97	7.21	86.36
TOTAL WA (Static)				**-31.00**		**-400.21**	**5.97**		**43.08**
TOTAL WA (Seismic)				**-31.00**		**-400.21**	**11.97**		**86.36**

Calculate Wind Loads

Primary Loads Section : 5.0

Superstructure Loads: Vertical: Horizontal:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
WS	**Superstructure**				**0.00**	**23.94**	**0.00**
WL	**Superstructure**				**0.00**	**23.94**	**0.00**

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

Calculate Temperature Loads

Primary Loads Section : 6.0

Superstructure Loads: Vertical: Horizontal:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
TU	**Superstructure**				**0.00**	**23.94**	**0.00**

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Seismic Forces

Primary Loads Section : 7.0

Per the latest MassDOT Bridge Design Manual: 3.4.5.1 For wingwalls and free standing retaining walls classified as SDC A or B a seismic analysis is not required. For walls classified as SDC C or D, the dynamic soil forces shall be used.

Superstructure Loads:

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EQ	**Superstructure**				**0.055**	**23.94**	**1.32**

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

Substructure Loads:

(Ref: AASHTO 4th Ed., A11.1.1.1 for Mononobe-Okabe Analysis.)

GAMMA = unit weight of soil =	115.00	Lbs/CF		
H = height of soil face =	26.24	Feet		
PHI = angle of internal friction of soil =	30.00	Degrees =	0.52	Radians
DELTA = angle of friction between soil & abut =	20.00	Degrees =	0.35	Radians
i = backfill slope angle =	0.00	Degrees =	0.00	Radians
BETA = slope of wall to the vertical	0.00	Degrees =	0.00	Radians
A =	0.29			
kh = horizontal acceleration coefficient	0.435			
kv = vertical acceleration coefficient	0.000			
THETA = arc tan (kh/(1-Kv) =	23.51	Degrees =	0.41	Radians
Kae (per AASHTO Eq. A11.1.1.1-2) =	**0.820**	**<===== Governs.**		

Consider Cohesion? N ------> kh = a * 0.5, Wall is NOT Restrained from Horizontal Movement

Earth Pressure Coefficients to be Used for Design per Geotechnical Report:

Kae (geotech) = **0.000** **<=== Does not govern.**

N/A
NOT GIVEN IN GEOTECH REPORT

Load inclination from horizontal = δ =	20.00	degrees
Lateral EQ Load, Eae = 1/2*γ*Kae*H^2*(1-kv) =	32.46	klf
Arm for Horiz Load above BOF = H/3 =	8.75	ft (AASHTO pg 11-112)
Arm for Vert Load from Toe = BA =	22.96	ft

Consider for Sliding, Overturning, Bearing Pressure and Footing Reinforcement:

Vertical Component, Eav = Eae*sin(δ) =	11.10	klf	Include EQ In Design = Y
Horizontal Component, Eah = Eae*cos(δ) =	30.50	klf	EQ Factor = 1

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Seismic Forces

Primary Loads Section : 7.1

Include Seismic Passive Earth Pressure	Y	
Epe Factor	1	
kh = horizontal acceleration coefficient	0.435	
ϕ = Soil Friction Angle	30.00	degrees
δ = Wall Interface Friction	20.00	degrees = 2/3 * ϕ --> 11.6.5.5
Kpe = Seismic Passive Earth Pressure Coefficient	3.20	Fig A11.4-2
γ = Unit Weight of Soil	115.00	pcf
Hff = Height of Soil at Front Face	13.59	ft
Lateral EQ Load, Epe = 1/2*γ*Kpe*H^2=	33.98	klf ---> Equation A11.4-4
Arm for Horiz Load above BOF = Hff/3 =	4.53	ft (AASHTO pg 11-112)

SECTION 11: WALLS, ABUTMENTS, AND PIERS 11-117

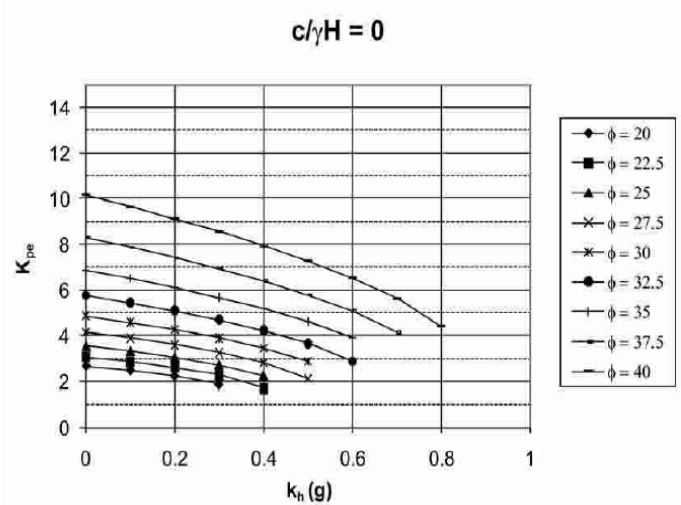


Figure A11.4-2—Seismic Passive Earth Pressure Coefficient Based on Log Spiral Procedure for $c/\gamma H$ = 0 and 0.05 (c = soil cohesion, γ = soil unit weight, and H = height or depth of wall over which the passive resistance acts)

Note: $k_h = A_s = k_{h0}$ for wall heights greater than 20 ft.

CANTILEVER ABUTMENT DESIGN - PRIMARY LOADS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Seismic Forces Continued..

Primary Loads Section : 7.2

WALL INERTIA EFFECTS

Per **AASHTO DIV 1A 6.4.3**, seismic design should take into account forces arising from seismically inducd lateral earth pressures (as computed above), additional forces arising from wall inertia and the transfer of seismic forces from the bridge deck through bearing supports which do not slide freely.

The following table computes the inertia forces due to the weight of the concrete and backfill.

kh = 0.435

AREA #		DL (Kips)	DL*kh (Kips)	ARM (Feet)	MOM (Ft x K)
DL Wall	D1	11.30	4.91	1.64	8.06
	D2	14.22	6.19	13.61	84.21
	D3	0.45	0.20	25.09	4.93
	D4	8.13	3.54	10.17	35.98
	Subtotal	**34.11**	**14.84**	**8.98**	**133.18**
DL Backfill	E1	6.24	2.71	17.05	46.27
	E2	1.39	0.60	25.09	15.16
	E3	24.25	10.55	14.76	155.70
	E4	4.67	2.03	8.44	17.12
	Subtotal	**36.54**	**15.90**	**14.74**	**234.24**
TOTAL		**70.65**	**30.73**	**11.96**	**367.42**

Total Seismic Loads, EQ:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EQ	EQ Superstructure =				0.055	23.94	1.318
	Eae(v)	11.10	22.96	254.90			
	Eae(h)				30.50	8.75	266.79
	Epe				-33.98	4.53	-153.94
	Fwi(h)				30.73	11.96	367.42
TOTAL EQ		**11.10**		**254.90**	**27.31**		**481.59**

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

- AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012
- ACI 318-08 Building Code Requirements for Structural Concrete, 2005
- 2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions
- AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011

Notes:

This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).

Job Specific Notes

Summary of Primary Loads

Load Combinations : 1.0

INCLUDE SEISMIC = Y

Load		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)	Notes	LRFD Load Combination Load Case
Dead Load	$DC_{SUB+SUPER}$	46.68	0.00	376.62	0.00	0.00	0.00	Super + Sub	
	DW	0.61	0.00	3.43	0.00	0.00	0.00	Super Only	
	DC_{SUB}	34.11	0.00	305.47	0.00	0.00	0.00	Sub Only - Construction	LC1 only
Earth Load	EH	2.81	22.96	64.56	-18.03	13.28	-239.44	All cases except Heel	Used in all load cases
	EH	5.54	22.96	127.17	15.22	8.75	133.10	For Heel Reinforcement	Not used in any load case
	EV	36.54	0.00	545.09	0.00	0.00	0.00		
Earth Load Surcharge	ES	3.61	0.00	56.81	2.68	0.00	35.20		
Live Load Surcharge	LS(v)	3.32	15.74	52.26	0.00	0.00	0.00		
	LS(h)	0.00	0.00	0.00	2.47	13.12	32.39		
Live Load	LL+IM+PED+BR+LS	8.91	0.00	83.87	3.47	0.00	56.38		
	LL+IM+PED+BR+LS	5.59	0.00	31.61	3.47	0.00	56.38	No LS for Sliding LC	LC4, LC8 & LC10
	LS	2.11	4.59	9.70	0.00	0.00	0.00		
Bouyant Load	WA	-31.00	0.00	-400.21	5.97	0.00	43.08	Static	
	WA	-31.00	0.00	-400.21	11.97	0.00	86.36	Seismic	LC9 &LC10
Wind Load	WS	0.00	0.00	0.00	0.00	23.94	0.00		
	WL	0.00	0.00	0.00	0.00	23.94	0.00		
Temperature Load	TU	0.00	0.00	0.00	0.00	23.94	0.00		
Seismic Load	EQ	11.10	0.00	254.90	27.31	0.00	481.59		
Vehicle Collision Load	CT	0.00	0.00	0.00	0.00	0.00	0.00	Stem Wall	LC11 & LC12
	CT	0.00	0.00	0.00	0.00	0.00	0.00	Stability	

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Limit States and Load Factors

Load Combinations : 2.0

Service Limit State

Per AASHTO 10.5.2, foundation design at the service limit state shall include settlements, horizontal movements, overall stability (of earth slopes) and scour at the design flood.
* These items are part of the geotechnical scope and are therefore NOT included in this design.

Strength Limit States

Per AASHTO 10.5.3, foundation design at the strength limit strength shall include structural resistance, scour, nominal bearing resistance, overturning or excessive loss of contact, sliding and constructability.
* These items, except scour, are addressed in this design.

Extreme Events Limit States

Per AASHTO 10.5.4, foundation shall be designed for extreme events such as a seismic event and vehicle collision.
* These items are addressed in this design.

Since these factors are 1.0, they have not yet been incorporated into the design template.

Computation of the Load Modification Factor, h_i:

		Extreme	Strength
h_D Ductility Factor, (AASHTO 1.3.3):		1.00	1.00
h_R Redundancy Factor, (AASHTO 1.3.4):		1.00	1.00
h_I Operational Importance Factor, (AASHTO 1.3.5):		1.00	1.00
h_i (for loads for which γ_i(max) is appropriate) (AASHTO Eq 1.3.2.1-2):	$h_i = h_D h_R h_I \geq 0.95$	1.00	1.00
h_i (for loads for which γ_i(min) is appropriate) (AASHTO Eq 1.3.2.1-3):	$h_i = 1 / h_D h_R h_I \leq 1.00$	1.00	1.00

h_D Ductility Factor (for all other limit states h_D = 1.00)

$h_D \geq$	1.05	for nonductile components and connections.
$h_D =$	1.00	for conventional designs and details complying with the specifications.
$h_D \geq$	0.95	for components and connections for which additional ductility-enhancing me

h_R Redundancy Factor (for all other limit states h_R = 1.00)

$h_R \geq$	1.05	for nonredundant members
$h_R =$	1.00	for conventional levels of redundancy
$h_R \geq$	0.95	for exceptinal levels of redundancy

h_I Operational Importance Factor

$h_I \geq$	1.05	for a bridge of operational importance
$h_I =$	1.00	for typical bridges
$h_I \geq$	0.95	for relatively less important bridges

Load Factors for Permanent Loads (per AASHTO Table 3.4.1-2), g_p:

	Maximum	Minimum
DC (Dead Load, General):	1.25	0.90
DW (Wearing Surface & Utilities):	1.50	0.65
EH (Horiz Earth):	1.43	0.90
ES (Horiz Earth):	1.50	0.75
EV (Vertical Earth, Retaining Structure):	1.35	1.00

<-- An average of Active and At-rest Coefficients used based on MHD's earth pressure design guidelines.

Live Load Factor During a Seismic Event, g_{EQ}:

	Maximum	Minimum
g_{EQ} (AASHTO 3.4.1):	0.50	0.00

<--- Seismic Included

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations & Notes

Load Combinations : 3.0

NOTES:

1. Load Combination Strength II does not need to be checked since it applies to special design vehicles.
2. Load Combination Strength III does not need to be checked during construction since WS is not a significant load.
3. Load Combination Strength IV does not need to be checked since it applies to bridges with very high dead load to live load ratios.
4. Load Combination Strength V does not need to be checked during construction since WS and WL are not significant loads.
5. Extreme Event load combinations do not need to be checked during construction.
6. Extreme Event II load combinations does not need to be checked for abutments.
7. Service limit state load combinations do not need to be checked for abutment stability / reinforcement.
8. Fatigue limit state load combinations do not need to be checked for abutment stability / reinforcement.
9. All remaining load cases shall be checked using load factors which would provide max effect for either bearing or sliding / eccentricity similar to AASHTO Figures C11.5.5-1 and C11.5.5.2.
10. Bouyancy has been included in sliding load combinations. A load factor of 0.0 has been used for bearing pressure load combinations since it is conservative to ignore sliding for these computations.

Strength	LC1	LC1 - STRENGTH I CONSTRUCTION (Before Bridge Construction): gp max*(DCsub)+gp max*(EH)+gp max*(EV)+γp max*(ES)
Strength	LC2	LC2 - STRENGTH I CONSTRUCTION (Before Bridge LL): gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+γp max*(ES)
Bearing	LC3	LC3 - STRENGTH I BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)
Sliding	LC4	LC4 - STRENGTH I SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)
Bearing	LC5	LC5 - STRENGTH III BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)
Sliding	LC6	LC6 - STRENGTH III SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)
Bearing	LC7	LC7 - STRENGTH V BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)
Sliding	LC8	LC8 - STRENGTH V SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)
Extreme Bearing	LC9	LC9 - EXTREME EVENT I BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+gEQ MAX*(LL+IM+PL+BR+LS)+1.0*(EQ)
Extreme Sliding	LC10	LC10 - EXTREME EVENT I SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+gEQ MIN*(LL+IM+PL+BR+LS)+1.0*(WA)+1.0*(EQ)
Extreme Bearing	LC11	LC11 - EXTREME EVENT II BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+0.50*(LL+IM+PL+BR+LS)+1.0*(CT)
Extreme Sliding	LC12	LC12 - EXTREME EVENT II SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+0.50*(LL+IM+PL+BR+LS)+1.0*(WA)+1.0*(CT)

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

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Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations

Load Combinations : 3.1

↓ N/A, Valid for Pile Design Only ↓

NA (for Bottom row of piles) From Pile Design =	0
Bottom Row to Edge of Toe =	0

LC1 - STRENGTH I CONSTRUCTION (Before Bridge Construction): $g_{p\,max}$*(DCsub)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+$\gamma_{p\,max}$*(ES)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC_{SUB}	1.25	42.63		381.83	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.35	49.33		735.87	0.00		0.00
ES	1.50	5.41		85.21	4.02		52.81
SUM		**101.39**		**1294.91**	**-21.67**		**-288.40**

↓ N/A, Valid for Pile Design Only ↓

Distance of Pile Group N.A. From Footing Toe (See Pile Design Spreadsheet): 0.00 ft

Distance of Vertical Force (V) From The Footing Toe	Offset of Pile Group N.A. From Original Location of V	Equivalent Moment Due to Offset of Pile Group N.A. From Original Location of V	**Mom. to Be Used On Pile Group = O.T. Mom. - Equivalent Mom.**	**Vertical Force to Be Used On Pile Group**	**Horizontal Force to Be Used On Pile Group**
12.77 ft	12.77 ft	1294.9 k.ft	**-1583.3 k.ft**	**101.4 kip**	**-21.7 kip**

LC2 - STRENGTH I CONSTRUCTION (Before Bridge LL): $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+$\gamma_{p\,max}$*(ES)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	58.35		470.77	0.00		0.00
DW	1.5	0.91		5.14	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.35	49.33		735.87	0.00		0.00
ES	1.50	5.41		85.21	4.02		52.81
SUM		**118.01**		**1388.99**	**-21.67**		**-288.40**

↓ N/A, Valid for Pile Design Only ↓

11.77 ft	11.77 ft	1389.0 k.ft	**-1677.4 k.ft**	**118.0 kip**	**-21.7 kip**

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
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Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations Cont.

Load Combinations : 3.2

LC3 - STRENGTH I BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	58.35		470.77	0.00		0.00
DW	1.5	0.91		5.14	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.35	49.33		735.87	0.00		0.00
LL+IM+PL+BR+LS	1.75	15.59		146.77	6.07		98.67
WA	1.00	-31.00		-400.21	5.97		43.08
TU	0.50	0.00		0.000	0.0000		0.000
SUM		**97.19**		**1050.34**	**-13.65**		**-199.45**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

10.81 ft	10.81 ft	1050.3 k.ft	**-1249.8 k.ft**	**97.2 kip**	**-13.7 kip**

LC4 - STRENGTH I SLIDING: $g_{p\,min}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,min}$*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.9	42.01		338.95	0.00		0.00
DW	0.65	0.39		2.23	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.00	36.54		545.09	0.00		0.00
LL+IM+PL+BR+LS	1.75	9.78		55.31	6.07		98.67
WA (static)	1.00	-31.00		-400.21	5.97		43.08
TU	0.50	0.00		0.00	0.000		0.000
SUM		**61.73**		**633.38**	**-13.65**		**-199.45**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

10.26 ft	10.26 ft	633.4 k.ft	**-832.8 k.ft**	**61.7 kip**	**-13.7 kip**

LC5 - STRENGTH III BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	58.35		470.77	0.00		0.00
DW	1.5	0.91		5.14	0.00		0.00
EH	1.425	4.01		92.00	-25.70		-341.20
EV	1.35	49.33		735.87	0.00		0.00
WA (static)	1.00	-31.00		-400.21	5.97		43.08
WS	1.40	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**81.60**		**903.57**	**-19.73**		**-298.12**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

11.07 ft	11.07 ft	903.6 k.ft	**-1201.7 k.ft**	**81.6 kip**	**-19.7 kip**

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
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Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations Cont.

Load Combinations : 3.3

LC6 - STRENGTH III SLIDING: $g_{p\,min}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,min}$*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.90	42.01		338.95	0.00		0.00
DW	0.65	0.39		2.23	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.00	36.54		545.09	0.00		0.00
WA	1.00	-31.00		-400.21	5.97		43.08
WS	1.40	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**51.96**		**578.06**	**-19.73**		**-298.12**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

11.13 ft	11.13 ft	578.1 k.ft	**-876.2 k.ft**	**52.0 kip**	**-19.7 kip**

LC7 - STRENGTH V BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	58.35		470.77	0.00		0.00
DW	1.5	0.91		5.14	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.35	49.33		735.87	0.00		0.00
LL+IM+PL+BR+LS	1.35	12.02		113.23	4.69		76.12
WA	1.00	-31.00		-400.21	5.97		43.08
WS	0.40	0.00		0.00	0.00		0.00
WL	1.00	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**93.63**		**1016.80**	**-15.04**		**-222.00**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

10.86 ft	10.86 ft	1016.8 k.ft	**-1238.8 k.ft**	**93.6 kip**	**-15.0 kip**

LC8 - STRENGTH V SLIDING: $g_{p\,min}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,min}$*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.9	42.01		338.95	0.00		0.00
DW	0.65	0.39		2.23	0.00		0.00
EH	1.425	4.01		92.00	-25.70		-341.20
EV	1	36.54		545.09	0.00		0.00
LL+IM+PL+BR+LS	1.35	7.54		42.67	4.69		76.12
WA	1.00	-31.00		-400.21	5.97		43.08
WS	0.40	0.00		0.00	0.00		0.00
WL	1.00	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**59.50**		**620.73**	**-15.04**		**-222.00**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

10.43 ft	10.43 ft	620.7 k.ft	**-842.7 k.ft**	**59.5 kip**	**-15.0 kip**

CANTILEVER ABUTMENT DESIGN - LOAD COMBINATIONS

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations Cont.

Load Combinations : 3.4

LC9 - EXTREME EVENT I BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+$g_{EQ\,MAX}$*(LL+IM+PL+BR+LS)+1.0*(EQ)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	58.35		470.77	0.00		0.00
DW	1.5	0.91		5.14	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.35	49.33		735.87	0.00		0.00
LL+IM+PL+BR+LS	0.50	4.45		41.94	1.74		28.19
WA	0.00	0.00		0.00	0.00		0.00
EQ	1.00	11.10		254.90	27.31		481.59
SUM		**128.15**		**1600.61**	**3.34**		**168.58**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

12.49 ft	12.49 ft	1600.6 k.ft	**-1432.0 k.ft**	**128.2 kip**	**3.3 kip**

LC10 - EXTREME EVENT I SLIDING: $g_{p\,min}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,min}$*(EV)+$g_{EQ\,MIN}$*(LL+IM+PL+BR+LS)+1.0*(WA)+1.0*(EQ)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.9	42.01		338.95	0.00		0.00
DW	0.65	0.39		2.23	0.00		0.00
EH	1.43	4.01		92.00	-25.70		-341.20
EV	1.00	36.54		545.09	0.00		0.00
LL+IM+PL+BR+LS	0.00	0.00		0.00	0.00		0.00
WA (seismic)	1.00	-31.00		-400.21	11.97		86.36
EQ	1.00	11.10		254.90	27.31		481.59
SUM		**63.06**		**832.96**	**13.58**		**226.75**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

13.21 ft	13.21 ft	833.0 k.ft	**-606.2 k.ft**	**63.1 kip**	**13.6 kip**

Cantilever Abutment Design - Stability

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

- AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012
- ACI 318-08 Building Code Requirements for Structural Concrete, 2005
- 2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions
- AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011

Notes:

This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).

Check Bearing Resistance (per AASHTO 11.6.3.2) -- ON SOIL

Stability : 1.0

If supported on soil, the vertical stress (σ_v) shall be calculated assuming a uniformly distributed pressure (V) over an effective base area (B-2e). AASHTO Fig 11.6.3.2-1 ----> qr / $\Phi\beta$ = q_n =

If supported on rock, the vertical stress (σ_v) shall be calculated assuming a linearly distributed pressure over an effective base area. AASHTO Fig 11.6.3.2-2 ----> qr / $\Phi\beta$ = q_n =

Factored Bearing Resistance, qr:	qr = $\Phi\beta$ * q_n =	8.35	ksf	<--- Note per Geotech, this is factored net bearing resistance				
Strength Bearing Resistance Factor, $\Phi\beta$ (AASHTO Table 11.5.7-1):		0.55		qr = $\Phi\beta$ * q_n =	8.35	ksf -----> qr / $\Phi\beta$ = qn =	15.19	ksf
Extreme Event Bearing Resistance Factor, $\Phi\beta$ (AASHTO 10.5.5.3.3):		1.00		qr = $\Phi\beta$ * q_n =	8.35	ksf -----> qr / $\Phi\beta$ = qn =	8.35	ksf

Note ---> See AASHTO Table 11.5.7-1 to determine $\Phi\beta$ Factor

	LOAD COMBINATION	Vertical Force (Kips)	Resisting Moment (Ft x K)	Overturn Moment (Ft x K)	Mnet (Ft x K)	Eccentricty from Toe, et=Mnet/V (Ft)	Eccentricty from CL, e=B/2-et (Ft)	σ_v on soil (ksf)	$\sigma_{v\,max}$ on rock (ksf)	$\sigma_{v\,min}$ on rock (ksf)	$\sigma_v < \Phi\beta * q_n$	
Strength	LC1	101.39	1294.91	-288.40	1583.31	15.62	-4.14	3.25	-0.36	9.19	OK	
Strength	LC2	118.01	1388.99	-288.40	1677.39	14.21	-2.73	4.15	1.47	8.81	OK	
Bearing	LC3	97.19	1050.34	-199.45	1249.79	12.86	-1.38	3.78	2.71	5.76	OK	
Sliding	LC4	61.73	633.38	-199.45	832.82	13.49	-2.01	2.29	1.28	4.10	OK	<--*N/A Sliding Combination
Bearing	LC5	81.60	903.57	-298.12	1201.69	14.73	-3.25	2.77	0.54	6.57	OK	
Sliding	LC6	51.96	578.06	-298.12	876.18	16.86	-5.38	1.54	-0.92	5.45	OK	<--*N/A Sliding Combination
Bearing	LC7	93.63	1016.80	-222.00	1238.80	13.23	-1.75	3.54	2.21	5.94	OK	
Sliding	LC8	59.50	620.73	-222.00	842.73	14.16	-2.68	2.10	0.77	4.41	OK	<--*N/A Sliding Combination
Ex. Bearing	LC9	128.15	1600.61	168.58	1432.03	11.17	0.31	5.73	6.03	5.14	OK	
Ex. Sliding	LC10	63.06	832.96	226.75	606.21	9.61	1.87	3.28	4.09	1.41	OK	<--*N/A Ex. Sliding Combination
Ex. Bearing	LC11	120.98	1303.78	-313.01	1616.79	13.36	-1.88	4.53	2.67	7.86	OK	
Ex. Sliding	LC12	60.34	578.06	-254.84	832.91	13.80	-2.32	2.19	1.03	4.22	OK	<--*N/A Ex. Sliding Combination

*** Sliding Load Combinations are Not Applicable for checking the Bearing**

Cantilever Abutment Design - Stability

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Check Overturning (per AASHTO 11.6.3.3) -- ON SOIL

Stability : 2.0

e allowable (ftgs on soil):	5.74	ft
e allowable (ftgs on rock):	8.61	ft

If e < e allowable, Overturning is OK:

	LOAD COMBINATION	Eccentricty from CL, e=B/2-et (Ft)	Check Overturning	
Strength	**LC1**	-4.14	OK	
Strength	**LC2**	-2.73	OK	
Bearing	**LC3**	-1.38	OK	
Sliding	**LC4**	-2.01	OK	<--*N/A Sliding Combination
Bearing	**LC5**	-3.25	OK	
Sliding	**LC6**	-5.38	OK	<--*N/A Sliding Combination
Bearing	**LC7**	-1.75	OK	
Sliding	**LC8**	-2.68	OK	<--*N/A Sliding Combination
Ex. Bearing	**LC9**	0.31	OK	
Ex. Sliding	**LC10**	1.87	OK	<--*N/A Ex. Sliding Combination
Ex. Bearing	**LC11**	-1.88	OK	
Ex. Sliding	**LC12**	-2.32	OK	<--*N/A Ex. Sliding Combination

*** Sliding Load Combinations are Not Applicable for checking Overturning**

Cantilever Abutment Design - Stability

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Check Sliding (per AASHTO 10.6.3.4)

Stability : 3.0

Ignore Passive Resistance of Soil per MassHighway

Strength Sliding Resistance Factor, $\Phi\tau$ (AASHTO Table 11.5.7-1):	1.00	
Extreme Event Sliding Resistance Factor, $\Phi\omega$ (AASHTO 10.5.5.3.3):	1.00	
Internal Friction Angle of Drained Soil, Φ_f:	30.00	degrees
tan δ: = tan Φ_f (per AASHTO 10.6.3.4-2):	0.58	for concrete against soil. Multiply by 0.8 for precast concrete footing

	LOAD COMBINATION	Vertical Force (Kips)	Rt = V * tan δ: (Kips)	$\Phi\tau$ (Strength) $\Phi\omega$ (Extreme) (Kips)	Nom. Sliding Resistance $\Phi\tau$*Rt (Kips)	Horiz Force (Kips)	Check Sliding	
Strength	**LC1**	101.39	58.53	1.00	58.53	-21.67	OK	<--*N/A Strength Combination
Strength	**LC2**	118.01	68.13	1.00	68.13	-21.67	OK	<--*N/A Strength Combination
Bearing	**LC3**	97.19	56.11	1.00	56.11	-13.65	OK	<--*N/A Bearing Combination
Sliding	**LC4**	61.73	35.64	1.00	35.64	-13.65	OK	
Bearing	**LC5**	81.60	47.11	1.00	47.11	-19.73	OK	<--*N/A Bearing Combination
Sliding	**LC6**	51.96	30.00	1.00	30.00	-19.73	OK	
Bearing	**LC7**	93.63	54.05	1.00	54.05	-15.04	OK	<--*N/A Bearing Combination
Sliding	**LC8**	59.50	34.35	1.00	34.35	-15.04	OK	
Ex. Bearing	**LC9**	128.15	73.99	1.00	73.99	3.34	OK	<--*N/A Ex. Bearing Combination
Ex. Sliding	**LC10**	63.06	36.41	1.00	36.41	13.58	OK	
Ex. Bearing	**LC11**	120.98	69.85	0.58	40.33	0.00	OK	<--*N/A Ex. Bearing Combination
Ex. Sliding	**LC12**	60.34	34.84	0.58	20.11	0.00	OK	

Results Summary:

Stability : 4.0

STABILITY RESULTS:

LOAD COMBINATION:	BEARING RESISTANCE	OVERTURNING	SLIDING	
LC1	OK	OK	OK	<== Construction
LC2	OK	OK	OK	<== Construction
LC3	OK	OK	OK	
LC4	OK	OK	OK	
LC5	OK	OK	OK	
LC6	OK	OK	OK	
LC7	OK	OK	OK	
LC8	OK	OK	OK	
LC9	OK	OK	OK	
LC10	OK	OK	OK	

Cantilever Abutment Design - Stability

*** FOR PRELIMINARY DESIGN ONLY**

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

LC11	OK	OK	OK
LC12	OK	OK	OK

SUBSTRUCTURE ANALYSIS

PIER DESIGN

* SUPERSTRUCTURE DEAD LOADS ON PIER
* SUPERSTRUCTURE LIVE LOADS ON PIER
* PIER STABILITY DESIGN

** FOR PRELIMINARY DESIGN ONLY **

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

References: AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012

Notes: This spreadsheet computes the loads on an abutment, considering the spans left or right of the abutment is simply supported.

SUPERSTRUCTURE DEAD LOAD

Abutment Length =	10950	mm	35.92	ft
Pier Length =	9900	mm	32.47	ft
Use =	9900	mm	32.47	ft

Length =	50400	mm	165.31	ft
Spans =	3		3	
Span Length =	16800	mm	55.10	ft

Width =	10950	mm	35.92	ft
Barrier =	225	mm	0.74	ft
Sidewalk =	1200	mm	3.94	ft
Barrier + Sidewalk =	1425	mm	4.67	ft
Roadway =	8100	mm	26.57	ft
No of Lanes	2		2.00	
Lane Width =	3657.6	mm	12.00	ft
Shoulder =	392.4	mm	1.29	ft

No of Beams =	6		6			
b =	600	mm	1.97	ft	23.62	in
d =	1500	mm	4.92	ft	59.04	in
Spacing =	1850	mm	6.07	ft	72.82	in
Distance for Beam to Beam =	9250	mm	30.34	ft	364.08	in
Overhang, OH =	850	mm	2.79	ft	33.46	in
Clear Overhang, OH_cl =	550	mm	1.80	ft	21.65	in
Clear Spacing bw Beams =	1250	mm	4.10	ft	49.20	in
Deck Thickness, ts =	225	mm	0.74	ft	8.86	in
Barrier Height =	1400	mm	4.59	ft	55.10	in
Sidewalk Height =	275	mm	0.90	ft	10.82	in

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE DEAD LOAD

CAT		Width ft	Height ft	Length ft	Volume cf	Unit Weight lbs/cf	Weight Kips	Qty #	Total Kips	DC Kips	DW Kips
DC	Beams / Girders	1.97	4.92	55.10	533.55	150	80.03	6	480.19	480.19	
DC	Sidewalks	3.94	0.9	55.10	195.40	150	29.31	2	58.62	58.62	
DC	Safety Curbs	0	0	0	0.00	150	0.00	0	0.00	0.00	
DC	Barriers	0.74	4.59	55.10	187.17	150	28.07	2	56.15	56.15	
DW	Wearing Surface	26.57	0.18	55.10	263.54	165	43.48	1	43.48		43.48
DC	End Diaphragms	4.1	4.92	2.46	49.62	150	7.44	10	74.43	74.43	
DC	Intermediate Diaphragms	4.1	4.1	0.98	16.47	150	2.47	5	12.36	12.36	
DW	Utilities				0.00	0	0.00	0	0.00		0.00
DW	Stay-In-Place Forms	0	0	0	0.00	0	0.00	0	0.00		0.00
DC	Deck	35.92	0.74	55.10	1460.59	150	219.09	1	219.09	219.09	
					0.00		0.00		0.00		
					0.00		0.00		0.00		
					0.00		0.00		0.00		
									944.32	900.84	43.48
										944.32	

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - SUPERSTRUCTURE DEAD LOAD

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE DEAD LOAD

		DC (kips)	DW (Kips)	DL (kips)	
DC	Beams / Girders	480.19			
DC	Sidewalks	58.62			
DC	Safety Curbs	0.00	0.00		
DC	Barriers	56.15			
DW	Wearing Surface		43.48		
DC	End Diaphragms	74.43			
DC	Intermediate Diaphragms	12.36			
DW	Utilities		0.00		
DW	Stay-In-Place Forms		0.00		
DC	Deck	219.09			
		DC	DW	DL	
Total Superstructure Dead Load		900.84	43.48	944.32	kips
Total Dead Load / Abutment		450.42	21.74	472.16	kips / Abutment
Length of Abutment		32.47	32.47	32.47	Abutment Length
Total (DL / Linear Foot of Abutment)		13.87	0.67	14.54	
Total (DL / Linear Foot of Pier)		27.74	1.34	29.08	
Abutment Design					
Design For: Abutment Loading		13.87	0.67	14.54	kips/LF of Abutment <-- Superstructure Dead Load (Input Tab)

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - LIVE LOAD (LL), BREAKING FORCE (BR) & SEISMIC LOAD (EQ)

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

References: AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012

Notes: This spreadsheet computes the loads on an abutment, considering the spans left or right of the abutment is simply supported.

SUPERSTRUCTURE LOADING ON ABUTMENT - VERTICAL FORCES (CONT.)

Live Load, LL

Type of Truck: HL	93	
Roadway Width =	26.57	ft
Lane Width =	12	ft
Roadway / Lane Width =	2.21	
Use --> No of Lanes =	2	
Multiple Presence Factor, m =	1	

Table 3.6.1.1.2-1—Multiple Presence Factors, *m*

Number of Loaded Lanes	Multiple Presence Factors, *m*
1	1.20
2	1.00
3	0.85
>3	0.65

Truck Loading:

Section 3.6.1.2.2

	Left/Right Span		
Span Length, L =	55.10	ft	
Dynamic Load Allowance, (IM) =	1.33		Section 3.6.2.1
Number of Lanes =	2		
Multiple Presence Factor, m =	1.00		Section 3.6.1.1.2
Vmax =	59.1	kips / Lane	<-- T3.3.1.2 Shear & End Reactions
Vmax =	118.20	kips	<- Vmax * m * # of lanes
Reaction, LL V =	118.20	kips	
Reaction, (LL+IM) V =	157.2	kips	<-- IM * V
Total Reaction, Truck (LL) =	118.2	kips	
Total Reaction, Truck (LL+IM) =	157.2	kips	

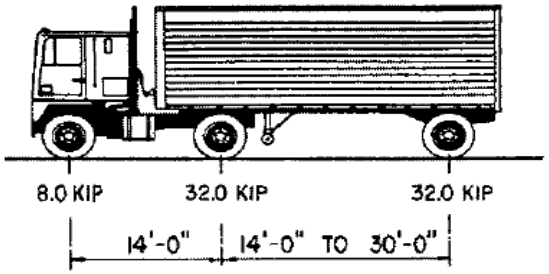


Figure 3.6.1.2.2-1

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - LIVE LOAD (LL), BREAKING FORCE (BR) & SEISMIC LOAD (EQ)

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - VERTICAL FORCES (CONT.)

Tandem Loading: Section 3.6.1.2.3

	Left/Right Span		
L =	55.10	ft	
Dynamic Load Allowance, (IM) =	1.33		Section 3.6.2.1
Number of Lanes =	2		
Multiple Presence Factor, m =	1.00		Section 3.6.1.1.2
P1 =	25	kips	
P2 =	25	kips	
Axle Spacing =	4	ft	
Vmax =	48.19	kips/ Lane	
Vmax =	96.37	Kips	<- Vmax * m * # of lanes
Reaction, LL V =	96.37	kips	
Reaction, (LL+IM) V =	128.17	kips	<-- IM * V
Total Reaction, Tandem (LL) =	96.4	kips	
Total Reaction, Tandem (LL+IM) =	128.2	kips	

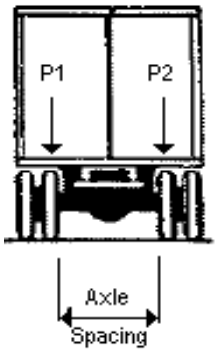
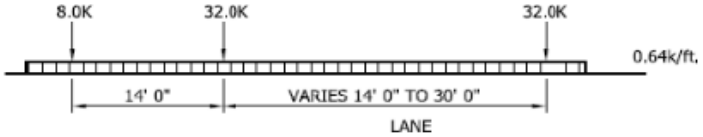


Figure 3.6.1.2.2-1

Live Load, LL (cont.)

Lane Loading: Section 3.6.1.2.4

	Left/Right Span		
L =	55.10	ft	
Number of Lanes =	2		
Multiple Presence Factor, m =	1.00		Section 3.6.1.1.2
Lane Load =	0.64	klf	
Vmax =	17.63	kips/ Lane	
Vmax =	35.27	Kips	<- Vmax * m * # of lanes
Reaction, Lane Load (LL) =	35.3	kips	
Total Reaction, Lane Load (LL) =	35.3	kips	



BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - LIVE LOAD (LL), BREAKING FORCE (BR) & SEISMIC LOAD (EQ)

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - VERTICAL FORCES (CONT.)

Pedestrian Live Load

Pedestrian Live Load, PL =	0.075	ksf	<--- per AASHTO 3.6.1.6 for Sidewalks with a Width >= 2.0 ft
Width of Sidewalk =	3.95	ft	
PL =	0.296	klf	
Length of Sidewalk =	55.10	ft	
PL =	16.32	kips	--> PL / Abutment = 8.16 kips

Bridge Width = 32.47 ft

--> PL / LF of Abutment = 0.25 klf

Live Loads

	LL	IM	LL + IM
Truck	59.10	1.33	78.60
Tandem	48.19	1.33	64.09
Lane	17.63	1	17.63
Truck + Lane	76.73		96.24
Tandem + lane	65.82		81.72
Max	76.73		96.24

Max =	96.24	kips
No of Lanes =	2.00	
m =	1.00	
LL+I =	192.47	kips
Abutment Length =	32.47	ft
LL+ I =	5.93	klf
LL + I + PL =	6.18	klf

<-- INPUT LOAD

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - LIVE LOAD (LL), BREAKING FORCE (BR) & SEISMIC LOAD (EQ)

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - LATERAL FORCES

Braking Force, BR — Section 3.6.4

Notes: Dynamic Load Allowance increase not required. AASHTO3.6.2.1
Braking Force ONLY applies to fixed bearings
Braking Force includes multiple presence factor

Type of Bearing: Fixed

25% Axle Weight of Design Truck =	25%	18.00	kips	Design Truck Axle Weight =	72
25% Axle Weight of Design Tandem =	25%	12.50	kips	Design Tandem Axle Weight =	50
5% (Axle Weight of Design Truck + Lane Load) =	5%	4.48	kips	Design Truck + Lane Axle Weight =	89.63
5% (Axle Weight of Design Tandem Load + Lane Load) =	5%	2.53	kips	Design Tandem + Lane Axle Weight =	50.64

Braking Force on Abutment (BR) =	18	kips	<---- 25% Axle Weight of Design Truck	
Number of Lanes =	2			
Multiple Presence Factor, m =	1			
BR =	1.11	klf	<--- BR / Abutment Length	<-- Input Load

Location of Load Application = *0.00* *ft above Bridge Seat*

BACKUP CALCULATIONS TO BE USED IN THE INPUT TAB

ABUTMENT LOADING CALCULATIONS - LIVE LOAD (LL), BREAKING FORCE (BR) & SEISMIC LOAD (EQ)

FOR PRELIMINARY DESIGN ONLY

GENERAL INFORMATION

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

SUPERSTRUCTURE LOADING ON ABUTMENT - LATERAL FORCES - EQ

Total Superstructure Dead Load =	29.08	kips			
Coefficient of Friction =	0.3				
Coefficient of Friction =	0.15		<-- Use %	50%	per MassDOT 3.4.4.4 -5
DL * u =	4.36	kips			
Abutment Length =	32.47	ft			
EQ =	0.13	klf	<--- INPUT LOAD		

COEFFICIENT OF FRICTION

The following friction coefficients shall be considered in calculating the sliding friction forces :

Concrete to Soil / Rock	0.30
Concrete to Steel	0.45
Steel to Steel	0.30
Steel to Teflon Plate	0.10
Brick Masonry on moist clay	0.33
Brick Masonry on dry clay	0.50
Brick Masonry on sand	0.40
Brick Masonry on gravel	0.60
Brick Masonry to Brick	0.70
Brick Masonry on rock	0.75
Granite on Granite	0.60
Limestone on Limestone	0.75
Cement Blocks on Cement Blocks	0.65
Cement concrete on dry clay	0.40
Cement concrete on wet clay	0.20
Cement concrete on wet sand	0.40
Cement concrete on dry sand	0.50 - 0.60
Cement concrete on dry gravel	0.50 - 0.60
Cement concrete on dry rock	0.60 - 0.70
Cement concrete on wet rock	0.50
Brick on Brick	0.65
Wood on Wood	0.48

Project Number:	1298\127-1298-12001-LT0077	Designed By:	alh
Description:	Khost Bridge No. 9	Checked By:	
Structure:	Abutment Design	Date:	11/8/2013

TABLE OF MAXIMUM MOMENTS, SHEARS, AND REACTIONS— SIMPLE SPANS, ONE LANE

Spans in feet; moments in thousands of foot-pounds; shears and reactions in thousands of pounds.

These values are subject to specification reduction for loading of multiple lanes.

Impact not included.

Span	Moment	End shear and end reaction (a)	Span	Moment	End shear and end reaction (a)
1	8.0(b)	32.0(b)	42	485.3(b)	56.0(b)
2	16.0(b)	32.0(b)	44	520.9(b)	56.7(b)
3	24.0(b)	32.0(b)	46	556.5(b)	57.3(b)
4	32.0(b)	32.0(b)	48	592.1(b)	58.0(b)
5	40.0(b)	32.0(b)	50	627.9(b)	58.5(b)
6	48.0(b)	32.0(b)	52	663.6(b)	59.1(b)
7	56.0(b)	32.0(b)	54	699.3(b)	59.6(b)
8	64.0(b)	32.0(b)	56	735.1(b)	60.0(b)
9	72.0(b)	32.0(b)	58	770.8(b)	60.4(b)
10	80.0(b)	32.0(b)	60	806.5(b)	60.8(b)
11	88.0(b)	32.0(b)	62	842.4(b)	61.2(b)
12	96.0(b)	32.0(b)	64	878.1(b)	61.5(b)
13	104.0(b)	32.0(b)	66	914.0(b)	61.9(b)
14	112.0(b)	32.0(b)	68	949.7(b)	62.1(b)
15	120.0(b)	34.1(b)	70	985.6(b)	62.4(b)
16	128.0(b)	36.0(b)	75	1,075.1(b)	63.1(b)
17	136.0(b)	37.7(b)	80	1,164.9(b)	63.6(b)
18	144.0(b)	39.1(b)	85	1,254.7(b)	64.1(b)
19	152.0(b)	40.4(b)	90	1,344.4(b)	64.5(b)
20	160.0(b)	41.6(b)	95	1,434.1(b)	64.9(b)
21	168.0(b)	42.7(b)	100	1,524.0(b)	65.3(b)
22	176.0(b)	43.6(b)	110	1,703.6(b)	65.9(b)
23	184.0(b)	44.5(b)	120	1,883.3(b)	66.4(b)
24	192.7(b)	45.3(b)	130	2,063.1(b)	67.6
25	207.4(b)	46.1(b)	140	2,242.8(b)	70.8
26	222.2(b)	46.8(b)	150	2,475.1	74.0
27	237.0(b)	47.4(b)	160	2,768.0	77.2
28	252.0(b)	48.0(b)	170	3,077.1	80.4
29	267.0(b)	48.8(b)	180	3,402.1	83.6
30	282.1(b)	49.6(b)	190	3,743.1	86.8
31	297.3(b)	50.3(b)	200	4,100.0	90.0
32	312.5(b)	51.0(b)	220	4,862.0	96.4
33	327.8(b)	51.6(b)	240	5,688.0	102.8
34	343.5(b)	52.2(b)	260	6,578.0	109.2
35	361.2(b)	52.8(b)	280	7,532.0	115.6
36	378.9(b)	53.3(b)	300	8,550.0	122.0
37	396.6(b)	53.8(b)			
38	414.3(b)	54.3(b)			
39	432.1(b)	54.8(b)			
40	449.8(b)	55.2(b)			

Loading -- HS 20-44 (MS18)

AASHTO Standard Specifications for Highway Bridges - 17th edition 2002

Project Number: 1298\127-1298-12001-LT0077
Description: Khost Bridge No. 9
Structure: Abutment Design

Designed By: alh
Checked By:
Date: 11/8/2013

Table 3.3.1.1
Maximum Unfactored HL-93 Live Load Moments, Shears, and Reactions
Simple Spans, One Lane, w/o Dynamic Load Allowance

	MOMENTS					SHEARS & END REACTIONS			
SPAN	TRUCK	TANDEM	LANE	TOTAL	SPAN PT.	TRUCK	TANDEM	LANE	TOTAL
FT	KIP-FT	KIP-FT	KIP-FT	KIP-FT	%	KIP	KIP	KIP	KIP
1	8.0	6.3	0.1	8.1	0.50	32.0	25.0	0.3	32.3
2	16.0	12.5	0.3	16.3	0.50	32.0	25.0	0.6	32.6
3	24.0	18.8	0.7	24.7	0.50	32.0	25.0	1.0	33.0
4	32.0	25.0	1.3	33.3	0.50	32.0	25.0	1.3	33.3
5	40.0	31.3	2.0	42.0	0.50	32.0	30.0	1.6	33.6
6	48.0	37.5	2.9	50.9	0.50	32.0	33.3	1.9	35.3
7	56.0	43.8	3.9	59.9	0.50	32.0	35.7	2.2	38.0
8	64.0	50.0	5.1	69.1	0.50	32.0	37.5	2.6	40.1
9	72.0	62.5	6.5	78.5	0.50	32.0	38.9	2.9	41.8
10	80.0	75.0	8.0	88.0	0.50	32.0	40.0	3.2	43.2
11	84.5	92.0	9.3	101.3	0.40	32.0	40.9	3.5	44.4
12	92.2	104.0	11.1	115.1	0.40	32.0	41.7	3.8	45.5
13	103.0	115.9	13.4	129.3	0.45	32.0	42.3	4.2	46.5
14	110.9	128.3	15.5	143.8	0.45	32.0	42.9	4.5	47.3
15	118.8	140.6	17.8	158.4	0.45	34.1	43.3	4.8	48.1
16	126.7	153.0	20.3	173.3	0.45	36.0	43.8	5.1	48.9
17	134.6	165.4	22.9	188.3	0.45	37.6	44.1	5.4	49.6
18	142.6	177.8	25.7	203.4	0.45	39.1	44.4	5.8	50.2
19	150.5	190.1	28.6	218.7	0.45	40.4	44.7	6.1	50.8
20	158.4	202.5	31.7	234.2	0.45	41.6	45.0	6.4	51.4
21	166.3	214.9	34.9	249.8	0.45	42.7	45.2	6.7	52.0
22	174.2	227.3	38.3	265.6	0.45	43.6	45.5	7.0	52.5
23	182.2	239.6	41.9	281.5	0.45	44.5	45.7	7.4	53.0
24	190.1	252.0	45.6	297.6	0.45	45.3	45.8	7.7	53.5
25	198.0	264.4	49.5	313.9	0.45	46.1	46.0	8.0	54.1
26	210.2	276.8	53.5	330.3	0.45	46.8	46.2	8.3	55.1
27	226.1	289.1	57.7	346.9	0.45	47.4	46.3	8.6	56.0
28	241.9	301.5	62.1	363.6	0.45	48.0	46.4	9.0	57.0
29	257.8	313.9	66.6	380.5	0.45	48.8	46.6	9.3	58.1
30	273.6	326.3	71.3	397.5	0.45	49.6	46.7	9.6	59.2
31	289.4	338.6	76.1	414.7	0.45	50.3	46.8	9.9	60.2
32	307.0	351.0	81.1	432.1	0.45	51.0	46.9	10.2	61.2
33	324.9	363.4	86.2	449.6	0.45	51.6	47.0	10.6	62.2
34	332.0	375.0	92.5	467.5	0.50	52.2	47.1	10.9	63.1
35	350.0	387.5	98.0	485.5	0.50	52.8	47.1	11.2	64.0
36	368.0	400.0	103.7	503.7	0.50	53.3	47.2	11.5	64.9
37	386.0	412.5	109.5	522.0	0.50	53.8	47.3	11.8	65.7
38	404.0	425.0	115.5	540.5	0.50	54.3	47.4	12.2	66.5
39	422.0	437.5	121.7	559.2	0.50	54.8	47.4	12.5	67.2
40	440.0	450.0	128.0	578.0	0.50	55.2	47.5	12.8	68.0

Project Number: 1298\127-1298-12001-LT0077
Description: Khost Bridge No. 9
Structure: Abutment Design

Designed By: alh
Checked By:
Date: 11/8/2013

Table 3.3.1.2

Maximum Unfactored HL-93 Live Load Moments, Shears, and Reactions

Simple Spans, One Lane, w/o Dynamic Load Allowance

	MOMENTS					SHEARS & END REACTIONS			
SPAN FT	TRUCK KIP-FT	TANDEM KIP-FT	LANE KIP-FT	TOTAL KIP-FT	SPAN PT. %	TRUCK KIP	TANDEM KIP	LANE KIP	TOTAL KIP
42	485.2	474.8	139.7	624.9	0.45	56.0	47.6	13.4	69.4
44	520.9	499.5	153.3	674.2	0.45	56.7	47.7	14.1	70.8
46	556.5	524.3	167.6	724.1	0.45	57.4	47.8	14.7	72.1
48	592.2	549.0	182.5	774.6	0.45	58.0	47.9	15.4	73.4
50	627.8	573.8	198.0	825.8	0.45	58.6	48.0	16.0	74.6
52	663.4	598.5	214.2	877.6	0.45	59.1	48.1	16.6	75.7
54	699.1	623.3	230.9	930.0	0.45	59.6	48.1	17.3	76.8
56	734.7	648.0	248.4	983.1	0.45	60.0	48.2	17.9	77.9
58	770.4	672.8	266.4	1036.8	0.45	60.4	48.3	18.6	79.0
60	806.0	697.5	285.1	1091.1	0.45	60.8	48.3	19.2	80.0
62	841.6	722.3	304.4	1146.1	0.45	61.2	48.4	19.8	81.0
64	877.3	747.0	324.4	1201.7	0.45	61.5	48.4	20.5	82.0
66	912.9	771.8	345.0	1257.9	0.45	61.8	48.5	21.1	82.9
68	948.6	796.5	366.2	1314.8	0.45	62.1	48.5	21.8	83.9
70	984.2	821.3	388.1	1372.3	0.45	62.4	48.6	22.4	84.8
75	1070.0	887.5	450.0	1520.0	0.50	63.0	48.7	24.0	87.0
80	1160.0	950.0	512.0	1672.0	0.50	63.6	48.8	25.6	89.2
85	1250.0	1012.5	578.0	1828.0	0.50	64.1	48.8	27.2	91.3
90	1340.0	1075.0	648.0	1988.0	0.50	64.5	48.9	28.8	93.3
95	1430.0	1137.5	722.0	2152.0	0.50	64.9	48.9	30.4	95.3
100	1520.0	1200.0	800.0	2320.0	0.50	65.3	49.0	32.0	97.3
110	1700.0	1325.0	968.0	2668.0	0.50	65.9	49.1	35.2	101.1
120	1880.0	1450.0	1152.0	3032.0	0.50	66.4	49.2	38.4	104.8
130	2060.0	1575.0	1352.0	3412.0	0.50	66.8	49.2	41.6	108.4
140	2240.0	1700.0	1568.0	3808.0	0.50	67.2	49.3	44.8	112.0
150	2420.0	1825.0	1800.0	4220.0	0.50	67.5	49.3	48.0	115.5
160	2600.0	1950.0	2048.0	4648.0	0.50	67.8	49.4	51.2	119.0
170	2780.0	2075.0	2312.0	5092.0	0.50	68.0	49.4	54.4	122.4
180	2960.0	2200.0	2592.0	5552.0	0.50	68.3	49.4	57.6	125.9
190	3140.0	2325.0	2888.0	6028.0	0.50	68.5	49.5	60.8	129.3
200	3320.0	2450.0	3200.0	6520.0	0.50	68.6	49.5	64.0	132.6

http://www.dot.nd.gov/manuals/bridge/lrfd-bridge-design/Section03A.pdf

PIER DESIGN -INPUT

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012	AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011
ACI 318-08 Building Code Requirements for Structural Concrete, 2005	
2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions	

General Notes: **This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).**

Changes made for Wall/ Pier option | Job Specific Notes

Project Notes: For the Preliminary Design it was assumed: 1) the centroid of the superstructure loads were located at the CL of the pier. 2) The superstructure Pier loads = 2 x the superstructure loads / pier length 3) This design was based on Pier 1

General Design Parameters

Input Section : 1.0

GEOMETRY INFORMATION INPUT:

PROPOSED TOP OF ROADWAY ELEV:				ft		m
PROPOSED TOP OF BACKWALL ELEV:			6099.43	ft	1859.582	m
PROPOSED BRIDGE SEAT ELEV:	H_Backwall = 0.00	ft	6099.43	ft	1859.582	m
PROPOSED TOP OF FOOTING ELEV:	H_Footing = 2.95	ft	6071.88	ft	1851.183	m
PROPOSED BOT. OF FOOTING ELEV:			6068.93	ft	1850.284	m
ELEVATION OF HIGH WATER:	FOR NO WATER = 0.00		6097.36	ft	1858.951	m
PROPOSED BRIDGE SEAT WIDTH:			4.59	ft	1.399	m
PROPOSED BACKWALL WIDTH:			0.00	ft	0.000	m
ABUTMENT/WALL DESIGN LENGTH:	1.00	Design for:	32.47	ft	9.900	m
FOOTING LENGTH			43.62	ft	13.300	m

DW CALCULATION INPUT:

WEARING SURFACE DEPTH:	2.13 IN	x 1. Layers	0.18	ft <-- ---	0.054	m
ROADWAY WIDTH:			26.57	ft	8.101	m
BRIDGE SPAN:	Total Length = 165.312	<-- 3 Spans @	55.10	ft	16.800	m
NUMBER OF GIRDERS:			6			

MATERIAL PROPERTIES:

CUBIC WEIGHT CONCRETE:	150.00	pcf
COMP. STRENGTH OF CONC. = F'c:	4.00	ksi
MAXIMUM SIZE OF COARSE AGGREGATE	1.50	in
TENSILE STRENGTH OF REBAR = Fy:	60.00	ksi
CUBIC WEIGHT OF HOT MIX ASPHALT (HMA):	165.00	pcf

GEOTECHNICAL INFORMATION:

BEARING RESISTANCE (CAPACITY):	8.35	ksf	<-- Per Geotech Report
FACTORED BEARING RESISTANCE, qr :	8.35	ksf	<-- Assumed
WEIGHT OF SOIL BACKFILL:	115.00	Lbs/CF	<-- Assumed
WALL ON ROCK?	N	(Y OR N)	
WALL ON PILES?	N	(Y OR N)	
GRAVITY WALL?	N	(Y OR N)	
BETA: SLOPE OF BACKFILL:	0.00	DEG	<-- Assumed
THETA: BATTER ANGLE BACKWALL:	90.00	DEG	AASHTO Table 3.11.5.3-1
PHI: FRICTION ANGLE OF BACKFILL:	30.00	DEG	<-- Assumed
DELTA: ANGLE BACKWALL FRICTION:	20.00	DEG	<-- Assumed δ=2/3 (ϕ)

Fill-in for Abutment / Pier Design
Khost Bridge No.10

CANTILEVER ABUTMENT DESIGN	N
GRAVITY ABUTMENT DESIGN	N
CANTILEVER WALL DESIGN	N
GRAVITY WALL DESIGN	N
PIER DESIGN	Y

PIER DESIGN -INPUT

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

General Loading Parameters

Input Section : 2.0

LIVE LOAD INFORMATION:

APPROACH SLAB:	N	(Y OR N)
ROADWAY WITHIN H/2 OF TOP OF WALL:	Y	(Y OR N)
Live Load Surcharge to be Considered?:	N	
SURCHARGE HEIGHT:	0.00	ft REF: Table 3.11.6.4-1
Construction Surcharge, q:	250.00	psf REF: C3.4.2.1

SEISMIC LOAD INFORMATION:

WALL RESTRAINED HORZ. MOVMT.(Y/N):	N	(Y OR N)
SEISMIC ACCELERATION COEFF. A:	0.290	REF: FIG.3.10.2.1-2, AASHTO
SEISMIC CATEGORY:	D	<---Assumed based on Location & AASHTO Seimic Design Guide

RAILING CLASS: S3-TL4 (CT) (PER MASSDOT LRFD BRIDGE MANUAL PART 1) 3.3.2.2 <--- N/A

Horizontal Railing Design Load	0.00	kips
Horizontal Railing Impact Length	0.00	ft
Wall Height+Rail Height	0.00	ft
Distributed Horizontal Railing Design Load @ top of wall	0.00	klf
Distributed Horizontal Railing Design Load @ bottom of wall	0.00	klf/wall height
Railing Dead Load	0.00	
Additional Moment From Railing Impact	0.00	<--- **Note:** The added moment from top of railing to bottom of railing is distributed along bottom of footing*

SURCHARGE HEIGHT (Per ASSHTO 3.11.6.4 Live Load Surchage)

ABUTMENTS ----> Table 3.11.6.4-1

Table 3.11.6.4-1 - Equivalent Height of Soil for Vehicular Loading on Abutments Perpindicular to Traffic

Abutment Height (ft)	h_{eq} (ft)
5	4
10	3
>20	2

Surcharge Height = 0.00 ft

RETAINING WALLS -- --> Table 3.11.6.4-2

See Table 3.11.6.4-2 for Equivalent Height of Soil for Vechicular Loading on Retaining Walls Parallel to Traffic.

Retaining Wall Height (ft)	heq (ft) Distance from wall backface to edge of traffic	
	0.0 ft	≥ 1.0 ft
5	5	2
10	3.5	2
>20	2	2

Distance from wall backface to edge of traffic = 0.0 ft

Surcharge Height = 0.00 ft

Note: See 3.11.6.5 for Possible Reduction of Surcharge

PIER DESIGN -INPUT

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Superstructure Loading Parameters

Input Section : 3.0

ADDITIONAL LOADS ON STRUCTURE

(load is per linear foot of structure (Abutment/ Pier/ Wall) NOT the Footing, arm from front edge of bridge seat)

LOADS		LOAD (klf)	ARM (feet)			
(DC+DW), SUPERSTRUCT. DEAD LOAD:	DL	29.08	2.30	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
DC (Structural Components & nonstructural attachments)	DC	27.74	2.30	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
DW (Wearing Surface & Utilities)	DW	1.34	2.30	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
(LL+IM+PL), LIVE LOAD, IMPACT AND PED LL:	LL+IM+PL	12.36	2.30	Distance from front face of the abutment/Pier/Wall to CL of bearing	Include =	Y
WS, WIND LOAD ON STRUCTURE:	WS	0.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
WL, WIND LOAD ON LIVE LOAD:	WL	0.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
BR, BREAKING LOAD :	BR	2.22	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
TU, THERMAL FORCE:	TU	0.00	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
EQ, SEISMIC LOAD ON SUPERSTRUCTURE:	EQ	0.27	0.00	Distance above the bridge seat where the longitudinal force is applied.	Include =	Y
CT, VEHICLE COLLISION LOAD	CT	0.00	0.00	Distance above top pf wall equal to the height of rail	Include =	Y

Note: Per AASHTO 11.5.1, abutments and retaining walls should be designed for EH, WA, LS, DS, DC, TU, EQ. Therefore, including wind and breaking forces is conservative. Say OK

PIER DESIGN -INPUT

FOR PRELIMINARY DESIGN ONLY

General Information

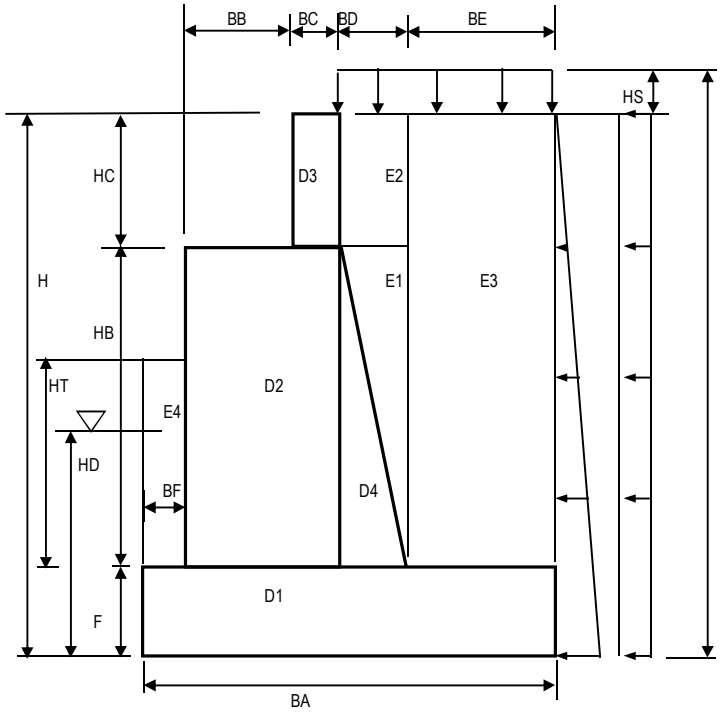
Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Abutment Geometry

Input Section : 4.0

CALCULATION OF WALL AND BACKFILL GEOMETRY:

		Prelim Size	User Adjust	Final Size (ft)	Approx Size (mm)
HEIGHT OF ABUTMENT / WALL, H:	H =	30.500	0.00	30.50	9200
HEIGHT OF FOOTING, F:	F =	2.950	0.00	2.95	900
HEIGHT OF STEM, HB:	HB =	27.550	0.00	27.55	8300
HEIGHT OF BACKWALL, HC:	HC =	0.000	0.00	0.00	0
HEIGHT OF HIGH WATER, HD:	HD =	28.430	0.00	28.43	8600
HEIGHT OF SURCHARGE, HS:	HS =	0.000	0.00	0.00	0
WIDTH OF FOOTING, BA:	BA =	15.090	0.00	15.09	4600
WIDTH OF BRIDGE SEAT, BB:	BB =	4.590	0.00	4.59	1400
WIDTH OF BACKWALL, BC:	BC =	0.000	0.00	0.00	0
WIDTH OF BATTER OF STEM, BD:	BD =	0.000	0.00	0.00	0
WIDTH OF FOOTING HEEL, BE:	BE =	5.250	0.00	5.25	1600
WIDTH OF FOOTING TOE, BF:	BF =	5.250	0.00	5.25	1600
HEIGHT OF SOIL OVER TOE, HT:	HT =	11.100	6.50	17.60	5300
HEIGHT OF SOIL OVER HEEL, HH:	HH =	11.100	0.00	11.10	3400
HEIGHT OF SOIL AT BACKFACE FACE (HEEL), HS1	Hss1 =			14.05	4300
HEIGHT OF SOIL AT FRONT FACE FACE (TOE), HS2	Hss2 =			14.05	4300



OVERALL QUANTITIES:

WEIGHT OF CONCRETE WALL/L.F.:	25.646	Kips per l.f.
CONCRETE QUANTITY / L.F.:	6.332	C.Y. per l.f.

SUMMARY OF QUANTITIES:

STEEL / L.F. =	270.179	LBS/L.F.
CONC. / L.F =	6.332	C.Y./L.F.

Geometry Check: Check Width: **ok**
Check Height: **ok**

PIER DESIGN - PRIMARY LOADS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

- AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012
- ACI 318-08 Building Code Requirements for Structural Concrete, 2005
- 2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions
- AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011

Notes:

This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).

Changes made for Wall/ Pier option **Job Specific Notes**

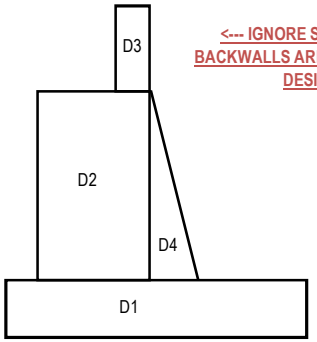
Calculate Dead Loads

Primary Loads Section : 1.0

Superstructure Loads: Vertical: Horizontal:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	Superstructure	27.74	7.55	209.31			
DW	Superstructure	1.34	7.55	10.10			

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.



<--- IGNORE SECTION D3, BACKWALLS ARE N/A FOR PIER DESIGN

Substructure Loads: Vertical: Horizontal:

AREA #		Volume (CF)	γ_{conc} (pcf)	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	D1	44.52	150.00	6.68	7.55	50.38			
	D2	126.45	150.00	18.97	7.55	143.11			
	D3	0.00	150.00	0.00	9.84	0.00			
	D4	0.00	150.00	0.00	9.84	0.00			
	Subtotal Concrete			**25.65**		**193.50**			

<-- N/A FOR PIER DESIGN

<-- N/A, NO BATTER FOR THIS DESIGN

Total Dead Load: Vertical: Horizontal:

AREA #	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
TOTAL DC (Super + Sub)	**53.39**		**402.81**			
TOTAL DW (Super)	**1.34**		**10.10**			
TOTAL DC (Substr. Only - Construction)	**25.65**		**193.50**			

PIER DESIGN - PRIMARY LOADS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Earth Loads

Primary Loads Section : 2.0

Compute Horizontal Earth Pressure, EH:

Coulomb's Active Earth Pressure: (per MHD 3.1.5 and AASHTO 3.11.5.3)

PHI, $\phi f'$ =	30.00	Degrees,	Rad =	0.52
DELTA, δ =	20.00	Degrees,	Rad =	0.35
BETA, β =	0.00	Degrees,	Rad =	0.00
THETA, θ =	90.00	Degrees,	Rad =	1.57
Γ (per AASHTO Eq. 3.11.5.3-2)=	2.68			
Ka (per AASHTO Eq. 3.11.5.3-1)=	**0.297**			

Earth Pressure Coefficient to be Used for Design per MassDOT

MassDOT Bridge Manual Section 3.1.5 Earth Pressure Computations

All Walls on Rock	ko	0.500	
All Walls on Piles	ko	0.500	
Cantilever Walls < than 16' in Height	0.5*(Ko + Ka)	0.399	
Cantilever Walls > than 16' in Height	Ka	0.297	<-- USE
Gravity wall supported on Spread Footing	Ka	0.297	

At-Rest Earth Pressure Coeff:

Ko = **0.500**

Earth Pressure Coefficient to be Used for Design per MHD:

Per MHD 3.1.5, design of walls on rock or piles shall use Ko. Cantilever walls less than 16.00' shall use 0.5*(Ko+Ka).
Cantilever walls greater than or equal to 16.00' in height or any spread footing-supported gravity wall shall use Ka.
Active pressure coefficients shall be estimated using Coulomb Theory.

WALL ON LEDGE:	N	(Y OR N)
WALL ON PILES:	N	(Y OR N)
Wall Height:	30.5	ft
Earth pressure Type:	Ka	
Ke =	**0.297**	**<===== Governs.**

Earth Pressure Coefficients to be Used for Design per Geotechnical Report:

Ko =	0.00	
Ka =	0.00	
Ke (geotech) =	**0.000**	**<=== Does not govern.**

Compute Lateral Earth Pressure:

Application of lateral earth pressure shall be per AASHTO Figure C3.11.5.3-1. This shows a different application for Gravity and Cantilever (semi-gravity) walls.
Note that the reduction in lateral earth pressures due to the water table is not included in this section. It is included in the WA (Bouyancy) section of this design.

Cantilever (semi-gravity) Walls:

Load inclination from horizontal, min = $\phi/3$ =	10.00	degrees
Load inclination from horizontal, max = ϕ*2/3 =	20.00	degrees
GAMMA =	115.00	pcf
H = Soil Height at Back face, Hss1	14.05	Feet
Lateral Earth Load, Pa = 1/2*Ke*γ*H^2 =	3.37	kips
Arm for Horiz Load above BOF = H/3 =	4.68	ft
Arm for Vert Load from Toe = F =	15.09	ft

Consider minimum inclination for Sliding, Overturning and Bearing Pressure:

Vertical Component, Pav = Pa*sin(ϕ/3) =	0.59	klf
Horizontal Component, Pah = Pa*cos(ϕ/3) =	3.32	klf

Consider maximum inclination for Footing Heel Reinforcement:

Vertical Component, Pav = Pa*sin(ϕ*2/3) =	1.15	klf
Horizontal Component, Pah = Pa*cos(ϕ*2/3) =	3.17	klf

THIS SECTION IS FOR CANTILEVER OR SEMI-GRAVITY WALLS ONLY

Gravity Walls:

Load inclination from horizontal = $\delta + (90-\theta)$ =	20.00	degrees
GAMMA =	115.00	pcf
H =	14.05	Feet
Lateral Earth Load, Pa = 1/2*Ke*γ*H^2 =	3.37	kips
Arm for Horiz Load above BOF = H/3 =	4.68	ft
Arm for Vert Load from Toe=(BF+BB+BC+BD*2/3) =	9.84	ft

Consider for Sliding, Overturning, Bearing Pressure and Footing Reinforcement:

Vertical Component, Pav = Pa*sin(δ+(90−θ)) =	1.15	klf
Horizontal Component, Pah = Pa*cos(δ+(90−θ)) =	3.17	klf
Is the wall a Gravity Wall?	N	

N/A ---> THIS SECTION IS FOR GRAVITY WALLS ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Earth Loads Continued..

Primary Loads Section : 2.1

Include Passive Earth Pressure	Y
Pp Factor	1

∅ = Soil Friction Angle	30.00	degrees	
δ = Wall Interface Friction	20.00	degrees = 2/3 * ∅ --> 11.6.5.5	
Kp = Passive Earth Pressure Coefficient	3.20	Fig A11.4-2	<-- For the preliminary design it was assumed kp = kpe (see below for kpe back-up)
γ = Unit Weight of Soil	115.00	pcf	
H = Hss2= Height of Soil at Front Face	14.05	ft	
Lateral EQ Load, Pp = 1/2*γ*Kp*H^2=	36.32	klf ---> Equation A11.4-4	
Arm for Horiz Load above BOF = H/3 =	4.68	ft (AASHTO pg 11-112)	

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Earth Loads Continued..

Primary Loads Section : 2.2

Horizontal Earth Pressure, EH:

AREA #	Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EH: Pa	0.59	15.09	8.84	3.32	4.68	15.56
EH: Pp			0.00	-36.32	4.68	-170.11
EH (For all cases except heel reinforcement):	0.59	15.09	8.84	-33.00	9.37	-309.09
EH: Pa	1.15	15.09	17.42	3.17	4.68	14.85
EH: Pp			0.00			0.00
EH (For Heel Reinforcement):	1.15	15.09	17.42	3.17	4.68	14.85

<=== Note, Based on AASHTO Figure C11.5.6-1, both the vertical and horizontal components of EH should be included here because they carry the same load factor.

Vertical Earth Pressure, EV:

AREA #		Volume (CF)	γ_{SOIL} (plf)	Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)	
EV	E1	0.00	115.00	0.00	9.84	0.00				<-- N/A Batter = 0
	E2	0.00	115.00	0.00	9.84	0.00				<-- N/A Batter = 0
	E3	144.64	115.00	16.63	12.47	207.33				
	E4	92.40	115.00	10.63	2.63	27.89				
TOTAL EV				**27.26**		**235.23**				

Note, **per AASHTO 11.6.1.2**, the weight of the soil over the battered portion of the stem or over the base of a footing may be considered as part of the effective weight of the abutment. This is consistant with design.

Earth Surcharge, ES: (This applies for construction case only)

q =	250.00	psf
Uniform Load on Wall, p=Ke*q =	0.074	ksf
Wall Height, H =	30.50	Feet
Heel Length, BE =	5.25	Feet
Footing Width, BA =	15.09	Feet
Wall Length Considered =	1.00	ft

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
ES	P_{con}(h) = p*H*Length =				2.27	15.25	34.57
	P_{con}(v) = q*BE*Length =	1.31	12.47	16.36			
TOTAL ES		**1.31**		**16.36**	**2.27**		**34.57**

PIER DESIGN - PRIMARY LOADS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

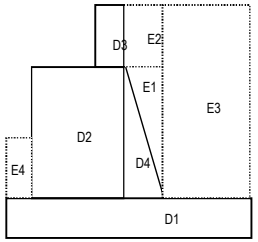
Calculate Live Loads

Primary Loads Section : 3.0

Superstructure Loads:

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
LL+IM+PL	Superstructure	12.36	7.55	93.24			
BR	Superstructure				2.217	30.50	67.63

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.



<--- IGNORE SECTION D3, BACKWALLS ARE N/A FOR PIER DESIGN

Live Load Surcharge Loads: LS

Per AASHTO 3.11.6.4, a live load surcharge shall be applied where vehicular load is expected to act on the surface of the backfill within a distance equal to one-half the wall height behind the back face of the wall.
If the surcharge is for highway, the intensity of the load shall be consistent with provisions of Article 3.6.1.2. See Tables 3.11.6.4-1 and 3.11.6.4-2 for equivalent heights.

Compute Horizontal Live Load Surcharge: (To be used for bearing pressure and sliding load cases):

Ke =	0.297	
Unit Weight of Soil, γ =	115.000	pcf
Surcharge Height, heq =	0.00	Feet
LS(h) =(Ke)(γ)(heq)*H =	0.00	kips
Moment arm = H/2 =	15.25	kips

Compute Vertical Live Load Surcharge: (To be used for bearing pressure cases only):

LS(v) =(γ)(heq)(BD+BE) =	0.00	kips
Moment arm = Ba-(BD+BE)/2 =	12.47	kips

Compute Vertical Live Load Surcharge: (To be used for heel reinf cases only):

LS(v) =(γ)(heq)(BE) =	0.00	kips
Moment arm (to back of batter) = BE/2 =	2.63	kips

Live Load Surcharge, LS: Summary

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
LS	LS(v)	0.00	12.47	0.00			
	LS(h)				0.00	15.25	0.00

Total Live Load Load:

AREA #	Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
TOTAL LL+IM+PED+BR+LS	12.36		93.24	2.22		67.63
TOTAL LL+IM+PED+BR+LS (Sliding Only)	12.36		93.24	2.22		67.63
TOTAL LS (Heel Reinf Only)	0.00	2.63	0.00			

PIER DESIGN - PRIMARY LOADS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Buoyancy Forces

Primary Loads Section : 4.0

HEIGHT OF STEM AT HIGH WATER:	25.48	
HEIGHT OF FOOTING AT HIGH WATER:	2.95	
WIDTH OF FOOTING, BA	15.09	
SOIL WEIGHT - WATER WEIGHT	52.60	pcf
UPWARD BOUYANT FORCE	-62.40	pcf

Horizontal Force = B(h) = (γ-(γ-62.4))*Ka)H^2/2, acts at HD/3:

Bouyant Load, WA: Vertical: Horizontal:

AREA #		VOLUME (CF)	GAMMA (#/CF)	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
WA	B1 (Ftg)	44.52	-62.40	-2.78	7.55	-20.96			
	B2 (Stem)	116.95	-62.40	-7.30	7.55	-55.06			
	B3 (Soil over Ftg)	267.54	-62.40	-16.69	12.47	-208.10			
	STATIC						7.50	9.48	71.05
	SEISMIC						20.68	9.48	195.94
TOTAL WA (Static)				**-26.77**		**-284.12**	**7.50**		**71.05**
TOTAL WA (Seismic)				**-26.77**		**-284.12**	**20.68**		**195.94**

Calculate Wind Loads

Primary Loads Section : 5.0

Superstructure Loads: Vertical: Horizontal:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
WS	**Superstructure**				**0.00**	**30.50**	**0.00**
WL	**Superstructure**				**0.00**	**30.50**	**0.00**

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

Calculate Temperature Loads

Primary Loads Section : 6.0

Superstructure Loads: Vertical: Horizontal:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
TU	**Superstructure**				**0.00**	**30.50**	**0.00**

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

PIER DESIGN - PRIMARY LOADS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Seismic Forces

Primary Loads Section : 7.0

Per the latest MassDOT Bridge Design Manual: 3.4.5.1 For wingwalls and free standing retaining walls classified as SDC A or B a seismic analysis is not required. For walls classified as SDC C or D, the dynamic soil forces shall be used.

Superstructure Loads:

AREA #		Vertical: Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horizontal: Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EQ	**Superstructure**				**0.269**	**30.50**	**8.19**

* See the load column under "Additional Loads on Structure" in the "General Loading Parameters" section for the above forces.

Substructure Loads:

(Ref: AASHTO 4th Ed., A11.1.1.1 for Mononobe-Okabe Analysis.)

GAMMA = unit weight of soil =	115.00	Lbs/CF		
H = height of soil face =	30.50	Feet		
PHI = angle of internal friction of soil =	30.00	Degrees =	0.52	Radians
DELTA = angle of friction between soil & abut =	20.00	Degrees =	0.35	Radians
i = backfill slope angle =	0.00	Degrees =	0.00	Radians
BETA = slope of wall to the vertical	0.00	Degrees =	0.00	Radians
A =	0.29			
kh = horizontal acceleration coefficient	0.435			
kv = vertical acceleration coefficient	0.000			
THETA = arc tan (kh/(1-Kv) =	23.51	Degrees =	0.41	Radians
Kae (per AASHTO Eq. A11.1.1.1-2) =	**0.820**	**<===== Governs.**		

Consider Cohesion? N ------> kh = a * 0.5, Wall is NOT Restrained from Horizontal Movement

Earth Pressure Coefficients to be Used for Design per Geotechnical Report:

Kae (geotech) = **0.000** **<=== Does not govern.**

N/A
NOT GIVEN IN GEOTECH REPORT

Load inclination from horizontal = δ =	20.00	degrees
Lateral EQ Load, Eae = 1/2*γ*Kae*H^2*(1-kv) =	43.85	klf
Arm for Horiz Load above BOF = H/3 =	10.17	ft (AASHTO pg 11-112)
Arm for Vert Load from Toe = BA =	15.09	ft

Consider for Sliding, Overturning, Bearing Pressure and Footing Reinforcement:

Vertical Component, Eav = Eae*sin(δ) =	15.00	klf	Include EQ In Design = Y
Horizontal Component, Eah = Eae*cos(δ) =	41.21	klf	EQ Factor = 1

PIER DESIGN - PRIMARY LOADS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Seismic Forces

Primary Loads Section : 7.1

Include Seismic Passive Earth Pressure	Y	
Epe Factor	1	
kh = horizontal acceleration coefficient	0.435	
∅ = Soil Friction Angle	30.00	degrees
δ = Wall Interface Friction	20.00	degrees = 2/3 * ∅ --> 11.6.5.5
Kpe = Seismic Passive Earth Pressure Coefficient	3.20	Fig A11.4-2
γ = Unit Weight of Soil	115.00	pcf
Hff = Height of Soil at Front Face	20.55	ft
Lateral EQ Load, Epe = 1/2*γ*Kpe*H^2=	77.70	klf ---> Equation A11.4-4
Arm for Horiz Load above BOF = Hff/3 =	6.85	ft (AASHTO pg 11-112)

SECTION 11: WALLS, ABUTMENTS, AND PIERS 11-117

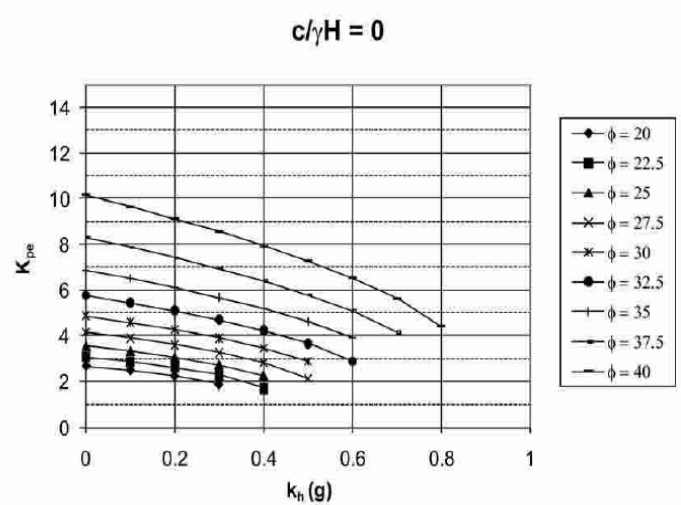


Figure A11.4-2—Seismic Passive Earth Pressure Coefficient Based on Log Spiral Procedure for $c/\gamma H$ = 0 and 0.05 (c = soil cohesion, γ = soil unit weight, and H = height or depth of wall over which the passive resistance acts)

Note: $k_h = A_s = k_{h0}$ for wall heights greater than 20 ft.

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Calculate Seismic Forces Continued..

Primary Loads Section : 7.2

WALL INERTIA EFFECTS

Per **AASHTO DIV 1A 6.4.3**, seismic design should take into account forces arising from seismically inducd lateral earth pressures (as computed above), additional forces arising from wall inertia and the transfer of seismic forces from the bridge deck through bearing supports which do not slide freely.

The following table computes the inertia forces due to the weight of the concrete and backfill.

kh = 0.435

AREA #		DL (Kips)	DL*kh (Kips)	ARM (Feet)	MOM (Ft x K)
DL Wall	D1	6.68	2.90	1.48	4.28
	D2	18.97	8.25	16.73	138.00
	D3	0.00	0.00	30.50	0.00
	D4	0.00	0.00	12.13	0.00
	Subtotal	**25.65**	**11.16**	**12.75**	**142.28**
DL Backfill	E1	0.00	0.00	21.32	0.00
	E2	0.00	0.00	30.50	0.00
	E3	16.63	7.24	16.73	121.01
	E4	10.63	4.62	11.75	54.31
	Subtotal	**27.26**	**11.86**	**14.79**	**175.33**
TOTAL		**52.90**	**23.01**	**13.80**	**317.61**

Total Seismic Loads, EQ:

AREA #		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
EQ	EQ Superstructure =				0.269	30.50	8.195
	Eae(v)	15.00	15.09	226.34			
	Eae(h)				41.21	10.17	418.97
	Epe				-77.70	6.85	-532.27
	Fwi(h)				23.01	13.80	317.61
TOTAL EQ		**15.00**		**226.34**	**-13.21**		**212.51**

PIER DESIGN - LOAD COMBINATIONS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012
ACI 318-08 Building Code Requirements for Structural Concrete, 2005
2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions
AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011

Notes:

This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).

Job Specific Notes

Summary of Primary Loads

Load Combinations : 1.0

INCLUDE SEISMIC = Y

Load		Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)	Notes	LRFD Load Combination Load Case
Dead Load	$DC_{SUB+SUPER}$	53.39	0.00	402.81	0.00	0.00	0.00	Super + Sub	
	DW	1.34	0.00	10.10	0.00	0.00	0.00	Super Only	
	DC_{SUB}	25.65	0.00	193.50	0.00	0.00	0.00	Sub Only - Construction	LC1 only
Earth Load	EH	0.59	15.09	8.84	-33.00	9.37	-309.09	All cases except Heel	Used in all load cases
	EH	1.15	15.09	17.42	3.17	4.68	14.85	For Heel Reinforcement	Not used in any load case
	EV	27.26	0.00	235.23	0.00	0.00	0.00		
Earth Load Surcharge	ES	1.31	0.00	16.36	2.27	0.00	34.57		
Live Load Surcharge	LS(v)	0.00	12.47	0.00	0.00	0.00	0.00		
	LS(h)	0.00	0.00	0.00	0.00	15.25	0.00		
Live Load	LL+IM+PED+BR+LS	12.36	0.00	93.24	2.22	0.00	67.63		
	LL+IM+PED+BR+LS	12.36	0.00	93.24	2.22	0.00	67.63	No LS for Sliding LC	LC4, LC8 & LC10
	LS	0.00	2.63	0.00	0.00	0.00	0.00		
Bouyant Load	WA	-26.77	0.00	-284.12	7.50	0.00	71.05	Static	
	WA	-26.77	0.00	-284.12	20.68	0.00	195.94	Seismic	LC9 &LC10
Wind Load	WS	0.00	0.00	0.00	0.00	30.50	0.00		
	WL	0.00	0.00	0.00	0.00	30.50	0.00		
Temperature Load	TU	0.00	0.00	0.00	0.00	30.50	0.00		
Seismic Load	EQ	15.00	0.00	226.34	-13.21	0.00	212.51		
Vehicle Collision Load	CT	0.00	0.00	0.00	0.00	0.00	0.00	Stem Wall	LC11 & LC12
	CT	0.00	0.00	0.00	0.00	0.00	0.00	Stability	

PIER DESIGN - LOAD COMBINATIONS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Limit States and Load Factors

Load Combinations : 2.0

Service Limit State

Per AASHTO 10.5.2, foundation design at the service limit state shall include settlements, horizontal movements, overall stability (of earth slopes) and scour at the design flood.
* These items are part of the geotechnical scope and are therefore NOT included in this design.

Strength Limit States

Per AASHTO 10.5.3, foundation design at the strength limit strength shall include structural resistance, scour, nominal bearing resistance, overturning or excessive loss of contact, sliding and constructability.
* These items, except scour, are addressed in this design.

Extreme Events Limit States

Per AASHTO 10.5.4, foundation shall be designed for extreme events such as a seismic event and vehicle collision.
* These items are addressed in this design.

Since these factors are 1.0, they have not yet been incorporated into the design template.

Computation of the Load Modification Factor, h_i:

		Extreme	Strength
h_D Ductility Factor, (AASHTO 1.3.3):		1.00	1.00
h_R Redundancy Factor, (AASHTO 1.3.4):		1.00	1.00
h_I Operational Importance Factor, (AASHTO 1.3.5):		1.00	1.00
h_i (for loads for which γ_i(max) is appropriate) (AASHTO Eq 1.3.2.1-2):	$h_i = h_D h_R h_I \geq 0.95$	1.00	1.00
h_i (for loads for which γ_i(min) is appropriate) (AASHTO Eq 1.3.2.1-3):	$h_i = 1 / h_D h_R h_I \leq 1.00$	1.00	1.00

h_D Ductility Factor (for all other limit states h_D = 1.00)

$h_D \geq$	1.05	for nonductile components and connections.
$h_D =$	1.00	for conventional designs and details complying with the specifications.
$h_D \geq$	0.95	for components and connections for which additional ductility-enhancing me

h_R Redundancy Factor (for all other limit states h_R = 1.00)

$h_R \geq$	1.05	for nonredundant members
$h_R =$	1.00	for conventional levels of redundancy
$h_R \geq$	0.95	for exceptinal levels of redundancy

h_I Operational Importance Factor

$h_I \geq$	1.05	for a bridge of operational importance
$h_I =$	1.00	for typical bridges
$h_I \geq$	0.95	for relatively less important bridges

Load Factors for Permanent Loads (per AASHTO Table 3.4.1-2), g_p:

	Maximum	Minimum
DC (Dead Load, General):	1.25	0.90
DW (Wearing Surface & Utilities):	1.50	0.65
EH (Horiz Earth):	1.43	0.90
ES (Horiz Earth):	1.50	0.75
EV (Vertical Earth, Retaining Structure):	1.35	1.00

<-- An average of Active and At-rest Coefficients used based on MHD's earth pressure design guidelines.

Live Load Factor During a Seismic Event, g_{EQ}:

	Maximum	Minimum
g_{EQ} (AASHTO 3.4.1):	0.50	0.00

<--- **Seismic Included**

PIER DESIGN - LOAD COMBINATIONS

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations & Notes

Load Combinations : 3.0

NOTES:

1. Load Combination Strength II does not need to be checked since it applies to special design vehicles.
2. Load Combination Strength III does not need to be checked during construction since WS is not a significant load.
3. Load Combination Strength IV does not need to be checked since it applies to bridges with very high dead load to live load ratios.
4. Load Combination Strength V does not need to be checked during construction since WS and WL are not significant loads.
5. Extreme Event load combinations do not need to be checked during construction.
6. Extreme Event II load combinations does not need to be checked for abutments.
7. Service limit state load combinations do not need to be checked for abutment stability / reinforcement.
8. Fatigue limit state load combinations do not need to be checked for abutment stability / reinforcement.
9. All remaining load cases shall be checked using load factors which would provide max effect for either bearing or sliding / eccentricity similar to AASHTO Figures C11.5.5-1 and C11.5.5.2.
10. Bouyancy has been included in sliding load combinations. A load factor of 0.0 has been used for bearing pressure load combinations since it is conservative to ignore sliding for these computations.

Strength	LC1	LC1 - STRENGTH I CONSTRUCTION (Before Bridge Construction): gp max*(DCsub)+gp max*(EH)+gp max*(EV)+γp max*(ES)
Strength	LC2	LC2 - STRENGTH I CONSTRUCTION (Before Bridge LL): gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+γp max*(ES)
Bearing	LC3	LC3 - STRENGTH I BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)
Sliding	LC4	LC4 - STRENGTH I SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)
Bearing	LC5	LC5 - STRENGTH III BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)
Sliding	LC6	LC6 - STRENGTH III SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)
Bearing	LC7	LC7 - STRENGTH V BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)
Sliding	LC8	LC8 - STRENGTH V SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)
Extreme Bearing	LC9	LC9 - EXTREME EVENT I BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+gEQ MAX*(LL+IM+PL+BR+LS)+1.0*(EQ)
Extreme Sliding	LC10	LC10 - EXTREME EVENT I SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+gEQ MIN*(LL+IM+PL+BR+LS)+1.0*(WA)+1.0*(EQ)
Extreme Bearing	LC11	LC11 - EXTREME EVENT II BEARING: gp max*(DC+DW)+gp max*(EH)+gp max*(EV)+0.50*(LL+IM+PL+BR+LS)+1.0*(CT)
Extreme Sliding	LC12	LC12 - EXTREME EVENT II SLIDING: gp min*(DC+DW)+gp max*(EH)+gp min*(EV)+0.50*(LL+IM+PL+BR+LS)+1.0*(WA)+1.0*(CT)

PIER DESIGN - LOAD COMBINATIONS

FOR PRELIMINARY DESIGN ONLY

General Information

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Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations

Load Combinations : 3.1

↓ N/A, Valid for Pile Design Only ↓

NA (for Bottom row of piles) From Pile Design =	0
Bottom Row to Edge of Toe =	0

↓ N/A, Valid for Pile Design Only ↓

Distance of Pile Group N.A. From Footing Toe (See Pile Design Spreadsheet): 0.00 ft

LC1 - STRENGTH I CONSTRUCTION (Before Bridge Construction): $g_{p\,max}$*(DCsub)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+$\gamma_{p\,max}$*(ES)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC_{SUB}	1.25	32.06		241.87	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.35	36.80		317.56	0.00		0.00
ES	1.50	1.97		24.54	3.40		51.86
SUM		**71.66**		**596.57**	**-43.62**		**-388.59**

Distance of Vertical Force (V) From The Footing Toe	Offset of Pile Group N.A. From Original Location of V	Equivalent Moment Due to Offset of Pile Group N.A. From Original Location of V	**Mom. to Be Used On Pile Group = O.T. Mom. - Equivalent Mom.**	**Vertical Force to Be Used On Pile Group**	**Horizontal Force to Be Used On Pile Group**
8.32 ft	8.32 ft	596.6 k.ft	**-985.2 k.ft**	**71.7 kip**	**-43.6 kip**

LC2 - STRENGTH I CONSTRUCTION (Before Bridge LL): $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+$\gamma_{p\,max}$*(ES)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	66.73		503.51	0.00		0.00
DW	1.5	2.01		15.16	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.35	36.80		317.56	0.00		0.00
ES	1.50	1.97		24.54	3.40		51.86
SUM		**108.35**		**873.37**	**-43.62**		**-388.59**

↓ N/A, Valid for Pile Design Only ↓

8.06 ft	8.06 ft	873.4 k.ft	**-1262.0 k.ft**	**108.3 kip**	**-43.6 kip**

PIER DESIGN - LOAD COMBINATIONS

FOR PRELIMINARY DESIGN ONLY

General Information

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Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations Cont.

Load Combinations : 3.2

LC3 - STRENGTH I BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	66.73		503.51	0.00		0.00
DW	1.5	2.01		15.16	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.35	36.80		317.56	0.00		0.00
LL+IM+PL+BR+LS	1.75	21.63		163.16	3.88		118.35
WA	1.00	-26.77		-284.12	7.50		71.05
TU	0.50	0.00		0.000	0.0000		0.000
SUM		**101.23**		**727.87**	**-35.65**		**-251.05**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

7.19 ft	7.19 ft	727.9 k.ft	**-978.9 k.ft**	**101.2 kip**	**-35.6 kip**

LC4 - STRENGTH I SLIDING: $g_{p\,min}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,min}$*(EV)+1.75*(LL+IM+PL+BR+LS)+1.0*(WA)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.9	48.05		362.53	0.00		0.00
DW	0.65	0.87		6.57	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.00	27.26		235.23	0.00		0.00
LL+IM+PL+BR+LS	1.75	21.63		163.16	3.88		118.35
WA (static)	1.00	-26.77		-284.12	7.50		71.05
TU	0.50	0.00		0.00	0.000		0.000
SUM		**71.87**		**495.97**	**-35.65**		**-251.05**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

6.90 ft	6.90 ft	496.0 k.ft	**-747.0 k.ft**	**71.9 kip**	**-35.6 kip**

LC5 - STRENGTH III BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	66.73		503.51	0.00		0.00
DW	1.5	2.01		15.16	0.00		0.00
EH	1.425	0.84		12.60	-47.02		-440.45
EV	1.35	36.80		317.56	0.00		0.00
WA (static)	1.00	-26.77		-284.12	7.50		71.05
WS	1.40	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**79.61**		**564.71**	**-39.53**		**-369.40**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

7.09 ft	7.09 ft	564.7 k.ft	**-934.1 k.ft**	**79.6 kip**	**-39.5 kip**

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LRFD Load Combinations Cont.

Load Combinations : 3.3

LC6 - STRENGTH III SLIDING: $q_{p\,min}$*(DC+DW)+$q_{p\,max}$*(EH)+$q_{p\,min}$*(EV)+1.0*(WA)+1.4*(WS)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.90	48.05		362.53	0.00		0.00
DW	0.65	0.87		6.57	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.00	27.26		235.23	0.00		0.00
WA	1.00	-26.77		-284.12	7.50		71.05
WS	1.40	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**50.24**		**332.81**	**-39.53**		**-369.40**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

6.62 ft	6.62 ft	332.8 k.ft	**-702.2 k.ft**	**50.2 kip**	**-39.5 kip**

LC7 - STRENGTH V BEARING: $q_{p\,max}$*(DC+DW)+$q_{p\,max}$*(EH)+$q_{p\,max}$*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	66.73		503.51	0.00		0.00
DW	1.5	2.01		15.16	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.35	36.80		317.56	0.00		0.00
LL+IM+PL+BR+LS	1.35	16.68		125.87	2.99		91.30
WA	1.00	-26.77		-284.12	7.50		71.05
WS	0.40	0.00		0.00	0.00		0.00
WL	1.00	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**96.29**		**690.58**	**-36.53**		**-278.10**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

7.17 ft	7.17 ft	690.6 k.ft	**-968.7 k.ft**	**96.3 kip**	**-36.5 kip**

LC8 - STRENGTH V SLIDING: $q_{p\,min}$*(DC+DW)+$q_{p\,max}$*(EH)+$q_{p\,min}$*(EV)+1.35*(LL+IM+PL+BR+LS)+1.0*(WA)+0.4*(WS)+1.0*(WL)+0.50*(TU)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.9	48.05		362.53	0.00		0.00
DW	0.65	0.87		6.57	0.00		0.00
EH	1.425	0.84		12.60	-47.02		-440.45
EV	1	27.26		235.23	0.00		0.00
LL+IM+PL+BR+LS	1.35	16.68		125.87	2.99		91.30
WA	1.00	-26.77		-284.12	7.50		71.05
WS	0.40	0.00		0.00	0.00		0.00
WL	1.00	0.00		0.00	0.00		0.00
TU	0.50	0.00		0.00	0.0000		0.0000
SUM		**66.93**		**458.68**	**-36.53**		**-278.10**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

6.85 ft	6.85 ft	458.7 k.ft	**-736.8 k.ft**	**66.9 kip**	**-36.5 kip**

PIER DESIGN - LOAD COMBINATIONS

FOR PRELIMINARY DESIGN ONLY

General Information

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Structure:	Abutment Design	**Date:**	November 6, 2013

LRFD Load Combinations Cont.

Load Combinations : 3.4

LC9 - EXTREME EVENT I BEARING: $g_{p\,max}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,max}$*(EV)+$g_{EQ\,MAX}$*(LL+IM+PL+BR+LS)+1.0*(EQ)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	1.25	66.73		503.51	0.00		0.00
DW	1.5	2.01		15.16	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.35	36.80		317.56	0.00		0.00
LL+IM+PL+BR+LS	0.50	6.18		46.62	1.11		33.81
WA	0.00	0.00		0.00	0.00		0.00
EQ	1.00	15.00		226.34	-13.21		212.51
SUM		**127.56**		**1121.78**	**-59.13**		**-194.13**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

8.79 ft	8.79 ft	1121.8 k.ft	**-1315.9 k.ft**	**127.6 kip**	**-59.1 kip**

LC10 - EXTREME EVENT I SLIDING: $g_{p\,min}$*(DC+DW)+$g_{p\,max}$*(EH)+$g_{p\,min}$*(EV)+$g_{EQ\,MIN}$*(LL+IM+PL+BR+LS)+1.0*(WA)+1.0*(EQ)

LOAD	Load Factor	Vertical Force (Kips)	Arm (Feet)	Resisting Moment (Ft x K)	Horiz Force (Kips)	Arm (Feet)	Overturn Moment (Ft x K)
DC	0.9	48.05		362.53	0.00		0.00
DW	0.65	0.87		6.57	0.00		0.00
EH	1.43	0.84		12.60	-47.02		-440.45
EV	1.00	27.26		235.23	0.00		0.00
LL+IM+PL+BR+LS	0.00	0.00		0.00	0.00		0.00
WA (seismic)	1.00	-26.77		-284.12	20.68		195.94
EQ	1.00	15.00		226.34	-13.21		212.51
SUM		**65.24**		**559.15**	**-39.56**		**-32.01**

Load Factors Based on this particular LRFD Combination

↓ N/A, Valid for Pile Design Only ↓

8.57 ft	8.57 ft	559.1 k.ft	**-591.2 k.ft**	**65.2 kip**	**-39.6 kip**

Cantilever Abutment Design - Stability

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

References:

- AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012
- ACI 318-08 Building Code Requirements for Structural Concrete, 2005
- 2009 MassDOT LRFD Bridge Manual, including draft Novemeber 2012 provisions
- AASHTO Guide Specifications for LRFD Seismic Bridge Design 2011

Notes:

This template assumes that the soils strata behind the abutment is uniform (only 1 strata is considered).

Check Bearing Resistance (per AASHTO 11.6.3.2) -- ON SOIL

Stability : 1.0

If supported on soil, the vertical stress (σ_v) shall be calculated assuming a uniformly distributed pressure (V) over an effective base area (B-2e). AASHTO Fig 11.6.3.2-1 ----> qr / $\Phi\beta$ = q_n =

If supported on rock, the vertical stress (σ_v) shall be calculated assuming a linearly distributed pressure over an effective base area. AASHTO Fig 11.6.3.2-2 ----> qr / $\Phi\beta$ = q_n =

Factored Bearing Resistance, qr: qr = $\Phi\beta$ * q_n = 8.35 ksf <--- Note per Geotech, this is factored net bearing resistance

Strength Bearing Resistance Factor, $\Phi\beta$ (AASHTO Table 11.5.7-1): 0.55 qr = $\Phi\beta$ * q_n = 8.35 ksf -----> qr / $\Phi\beta$ = qn = 15.19 ksf

Extreme Event Bearing Resistance Factor, $\Phi\beta$ (AASHTO 10.5.5.3.3): 1.00 qr = $\Phi\beta$ * q_n = 8.35 ksf -----> qr / $\Phi\beta$ = qn = 8.35 ksf

Note ---> See AASHTO Table 11.5.7-1 to determine $\Phi\beta$ Factor

	LOAD COMBINATION	Vertical Force (Kips)	Resisting Moment (Ft x K)	Overturn Moment (Ft x K)	Mnet (Ft x K)	Eccentricty from Toe, et=Mnet/V (Ft)	Eccentricty from CL, e=B/2-et (Ft)	σ_v on soil (ksf)	$\sigma_{v\,max}$ on rock (ksf)	$\sigma_{v\,min}$ on rock (ksf)	$\sigma_v < \Phi\beta * q_n$	
Strength	LC1	71.66	596.57	-388.59	985.16	13.75	-6.20	2.61	-6.96	16.46	OK	
Strength	LC2	108.35	873.37	-388.59	1261.96	11.65	-4.10	4.65	-4.53	18.89	OK	
Bearing	LC3	101.23	727.87	-251.05	978.92	9.67	-2.12	5.23	1.04	12.38	OK	
Sliding	LC4	71.87	495.97	-251.05	747.02	10.39	-2.85	3.46	-0.63	10.16	OK	<--*N/A Sliding Combination
Bearing	LC5	79.61	564.71	-369.40	934.10	11.73	-4.19	3.39	-3.51	14.06	OK	
Sliding	LC6	50.24	332.81	-369.40	702.20	13.98	-6.43	1.80	-5.18	11.84	OK	<--*N/A Sliding Combination
Bearing	LC7	96.29	690.58	-278.10	968.68	10.06	-2.51	4.79	0.00	12.76	OK	
Sliding	LC8	66.93	458.68	-278.10	736.78	11.01	-3.46	3.04	-1.67	10.54	OK	<--*N/A Sliding Combination
Ex. Bearing	LC9	127.56	1121.78	-194.13	1315.91	10.32	-2.77	6.18	-0.86	17.77	OK	
Ex. Sliding	LC10	65.24	559.15	-32.01	591.15	9.06	-1.52	3.60	1.72	6.93	OK	<--*N/A Ex. Sliding Combination
Ex. Bearing	LC11	124.91	848.83	-406.64	1255.46	10.05	-2.51	6.21	0.03	16.52	OK	
Ex. Sliding	LC12	68.78	332.81	-244.51	577.32	8.39	-0.85	4.10	3.02	6.10	OK	<--*N/A Ex. Sliding Combination

*** Sliding Load Combinations are Not Applicable for checking the Bearing**

Cantilever Abutment Design - Stability

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Check Overturning (per AASHTO 11.6.3.3) -- ON SOIL

Stability : 2.0

e allowable (ftgs on soil):	3.77	ft
e allowable (ftgs on rock):	5.66	ft

If e < e allowable, Overturning is OK:

	LOAD COMBINATION	Eccentricty from CL, e=B/2-et (Ft)	Check Overturning	
Strength	**LC1**	-6.20	OK	
Strength	**LC2**	-4.10	OK	
Bearing	**LC3**	-2.12	OK	
Sliding	**LC4**	-2.85	OK	<--*N/A Sliding Combination
Bearing	**LC5**	-4.19	OK	
Sliding	**LC6**	-6.43	OK	<--*N/A Sliding Combination
Bearing	**LC7**	-2.51	OK	
Sliding	**LC8**	-3.46	OK	<--*N/A Sliding Combination
Ex. Bearing	**LC9**	-2.77	OK	
Ex. Sliding	**LC10**	-1.52	OK	<--*N/A Ex. Sliding Combination
Ex. Bearing	**LC11**	-2.51	OK	
Ex. Sliding	**LC12**	-0.85	OK	<--*N/A Ex. Sliding Combination

*** Sliding Load Combinations are Not Applicable for checking Overturning**

Cantilever Abutment Design - Stability

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

Check Sliding (per AASHTO 10.6.3.4)

Stability : 3.0

Ignore Passive Resistance of Soil per MassHighway

Strength Sliding Resistance Factor, $\Phi\tau$ (AASHTO Table 11.5.7-1):	1.00	
Extreme Event Sliding Resistance Factor, $\Phi\omega$ (AASHTO 10.5.5.3.3):	1.00	
Internal Friction Angle of Drained Soil, Φ_f:	30.00	degrees
tan δ: = tan Φ_f (per AASHTO 10.6.3.4-2):	0.58	for concrete against soil. Multiply by 0.8 for precast concrete footing

	LOAD COMBINATION	Vertical Force (Kips)	Rt = V * tan δ: (Kips)	$\Phi\tau$ (Strength) $\Phi\omega$ (Extreme) (Kips)	Nom. Sliding Resistance $\Phi\tau$*Rt (Kips)	Horiz Force (Kips)	Check Sliding	
Strength	**LC1**	71.66	41.37	1.00	41.37	-43.62	OK	<--*N/A Strength Combination
Strength	**LC2**	108.35	62.55	1.00	62.55	-43.62	OK	<--*N/A Strength Combination
Bearing	**LC3**	101.23	58.45	1.00	58.45	-35.65	OK	<--*N/A Bearing Combination
Sliding	**LC4**	71.87	41.49	1.00	41.49	-35.65	OK	
Bearing	**LC5**	79.61	45.96	1.00	45.96	-39.53	OK	<--*N/A Bearing Combination
Sliding	**LC6**	50.24	29.01	1.00	29.01	-39.53	OK	
Bearing	**LC7**	96.29	55.59	1.00	55.59	-36.53	OK	<--*N/A Bearing Combination
Sliding	**LC8**	66.93	38.64	1.00	38.64	-36.53	OK	
Ex. Bearing	**LC9**	127.56	73.64	1.00	73.64	-59.13	OK	<--*N/A Ex. Bearing Combination
Ex. Sliding	**LC10**	65.24	37.67	1.00	37.67	-39.56	OK	
Ex. Bearing	**LC11**	124.91	72.12	0.58	41.64	0.00	OK	<--*N/A Ex. Bearing Combination
Ex. Sliding	**LC12**	68.78	39.71	0.58	22.93	0.00	OK	

Results Summary:

Stability : 4.0

STABILITY RESULTS:

LOAD COMBINATION:	BEARING RESISTANCE	OVERTURNING	SLIDING	
LC1	OK	OK	OK	<== Construction
LC2	OK	OK	OK	<== Construction
LC3	OK	OK	OK	
LC4	OK	OK	OK	
LC5	OK	OK	OK	
LC6	OK	OK	OK	
LC7	OK	OK	OK	
LC8	OK	OK	OK	
LC9	OK	OK	OK	
LC10	OK	OK	OK	

Cantilever Abutment Design - Stability

FOR PRELIMINARY DESIGN ONLY

General Information

Project Number:	1298\127-1298-12001-LT0077	**Designed By:**	ALH
Description:	Khost Bridge No. 9	**Checked By:**	
Structure:	Abutment Design	**Date:**	November 6, 2013

LC11	OK	OK	OK
LC12	OK	OK	OK

SUBSTRUCTURE ANALYSIS

BACKUP INFORMATION FOR SUBSTRUCTURE ANALYSIS

*DESIGN ASSUMPTIONS

* SEISMIC DESIGN CATEGORY (SDC)

** FOR PRELIMINARY DESIGN ONLY **

PROJECT INFORMATION

127-1298-12001-LT0077

PRELIMINARY DESIGN INFORMATION & ASSUMPTIONS

Information from Geotechnical Report

Geotechnical Report for Gardez to Khost Road Rehabilitation/ Reconstruction Project, Paktia Province, Afghanistan
Prepared by: The Louis Berger Group, Inc., Dated April 2009

Soil

Allowable Bearing pressure, qa =	400	kN/m^2	8354.00	psf

Seismic

Importance Category, IC =	I
Coefficient of Acceleration, a =	0.29

Assumptions

Unit Weight of Soil, γ =	115	pcf			
phi, $\emptyset$ =	30				
Bridge Bearing Thickness =	3	in	0.25	ft	<--- Same thickness as the Khost Bridge

SEISMIC DESIGN CATEGORY (SDC)

PGA =	0.29	g	* SEE ATTACHED HAZARD MAPS
S_S, 0.2 SEC =	0.64	g	* SEE ATTACHED HAZARD MAPS
S_1, 1.0 SEC =	0.47	g	* SEE ATTACHED HAZARD MAPS

Table 3.4.2.3-2—Values of F_v as a Function of Site Class and Mapped 1-sec Period Spectral Acceleration Coefficient

Site Class	Mapped Spectral Response Acceleration Coefficient at 1-sec Periods				
	$S_1 \le 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 0.4$	$S_1 \ge 0.5$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	[a]	[a]	[a]	[a]	[a]

Note: Use straight line interpolation for intermediate values of S_1, where S_1 is the spectral acceleration coefficient at 1.0 sec obtained from the ground motion maps.

[a] Site-specific response geotechnical investigation and dynamic site response analyses should be considered (Article 3.4.3).

- Assume Site Class C or D

Fv (Range for Site Class C & D) =	1.3	-->	1.6		
Fv (Range for Site Class C & D) =	1.33	-->	1.53	<--- Range for S_1 =	0.47

Say Fv =	1.53
SD1 =	0.72

$$S_{D1} = F_v S_1 \qquad (3.4.1\text{-}3)$$

Table 3.5-1—Partitions for Seismic Design Categories A, B, C, and D

Value of $S_{D1} = F_v S_1$	SDC
$S_{D1} < 0.15$	A
$0.15 \le S_{D1} < 0.30$	B
$0.30 \le S_{D1} < 0.50$	C
$0.50 \le S_{D1}$	D

Sesimic Design Cateogry , SDC = D

SEISMIC DESIGN CATEGORY (SDC)

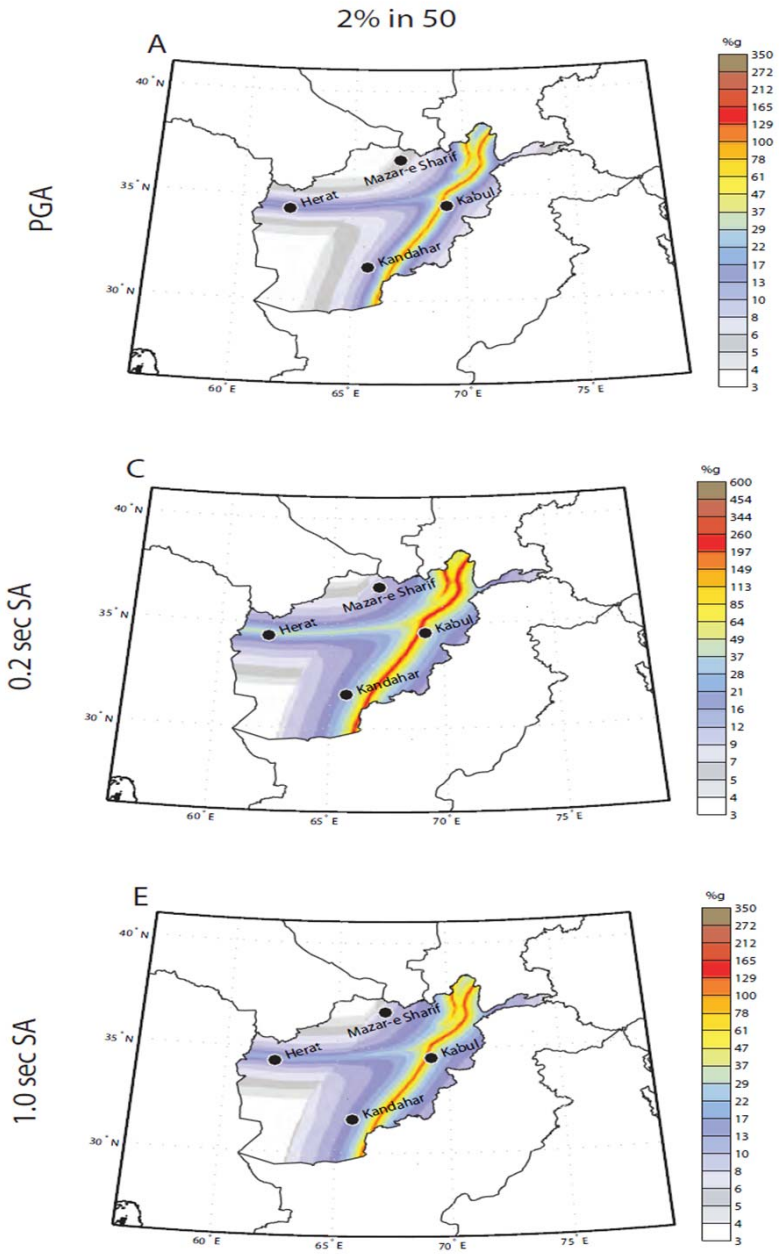

Figure 7. Ground motions for fault sources for PGA (A, B), 0.2-second SA (C, D), and 1.0-second SA (E, F) at 2-percent (A, C, E) and 10-percent (B, D, F) probability of exceedance in 50 years.

Section 5
Bill of Quantities

Gardez-Khost Road Project

Section 2 --- Km 27+000 to 65+000

Project Name **Gardez - Khost Road Phase IV - Construction of Bridge #09**

USAID Spec No. (UFGS Spec No.)	ITEM DESCRIPTION		Bill of Quantity (BOQ)-Bridge09	Quantity	Price	
	BoQ Ref. #	Description	UNIT	Section 2 Phase IV Construction of Bridge#09	Unit Price	Total Price
Division 150 - Project Requirements						$0.00
Section 151	**Mobilization**					$0.00
	08-151-01	Mobilization	LS			$0.00
Section 159	**Demining**					$0.00
	08-159-01	De-mining and Technical survey	m2			$0.00
	08-159-02	Mine Clearance	m^2			$0.00
Section 160	**Snow Removal**					$0.00
	08- 160-01	Snow Removal	day			$0.00
		Emergency Work	day			$0.00
						$0.00
						$0.00
Division 200 - Earthwork						$0.00
Section 201 (Section 31 10 00)	**Clearing and Grubbing**					$0.00
	08-201-01	Clearing and Grubbing	ha			$0.00
Section 203 (Section 02 41 19)	**Removal of Structure and Obstructions**					$0.00
	08-203-01	Removal and disposal of existing structure (Retaining wall, Head wall, wing wall, culverts, lined Ditch)	m^3	410.00		$0.00
	08-203-02	Removal and disposal of existing pavement (asphalt)	m^3	390.00		$0.00
	08-203-03	Removal and Disposal of Existing PCC Pavement	m^3			$0.00
	08-203-04	Removal and Disposal of Existing Bridge	each	1.00		$0.00
						$0.00
Section 204 (Section 31 20 00, 31 23 19, 31 25 00, & 31 52 13)	**Excavation and Embankment**					$0.00
	08- 204-01	Roadway Excavation	m^3	141.00		$0.00
	08- 204-02	Bridge Excavation	m^3	3,500.00		$0.00
	08- 204-02	River Training Soil Excavation	m^3			$0.00
	08- 204-03	Select Topping	m^3	1,701.00		$0.00
	08- 204-04	Structural Backfill	m^3	5,400.00		$0.00
	08- 204-05	Embankment	m^3	5,400.00		$0.00
	08-204-06	Embankment(Granular material with 0-8% passing 75µm sieve)	m^3			$0.00

Gardez-Khost Road Project

Section 2 --- Km 27+000 to 65+000

Project Name **Gardez - Khost Road Phase IV - Construction of Bridge #09**

USAID Spec No. (UFGS Spec No.)	ITEM DESCRIPTION		Bill of Quantity (BOQ)-Bridge09	Quantity	Price	
	BoQ Ref. #	Description	UNIT	Section 2 Phase IV Construction of Bridge#09	Unit Price	Total Price
Section 205	**Rock Blasting**					$0.00
(Section 31 20 00)	08-205-01	Rock Excavation (Inclusive of blasting assumed 10% of total bridge excavtion)	m^3	400.00		$0.00
						$0.00
Division 250- Slope Reinforcement and Retaining wall						$0.00
						$0.00
Section 251 (Section 31 37 00)	**Riprap**					$0.00
	08-251-01	Placed Riprap (at Abutments & Piers 1,500mm thick)	m^3	1,000.00		$0.00
	08-251-02	Grouted Riprap	m^3	126.00		$0.00
Section 253	**Gabions and Revet Mattresses**					$0.00
	08-253-01	Gabions and Revet Mattresses	m^3			$0.00
						$0.00
Division 300- Aggregate Course						$0.00
						$0.00
Section 301 (Section 32 12 16)	**Untreated Aggregate Course**					$0.00
	08- 301-01	Crushed Aggregate Base Grad. Des. D, 200 mm Carriageway	m^3	610.00		$0.00
	08- 301-02	Crushed Aggregate Base Grad. Des. D, 325 mm, Shoulder	m^3	500.00		$0.00
	08- 301-05	Stone Aggregate for Catch Trench, 75 mm (max.)	m^3			$0.00
						$0.00
Division 400- Asphalt pavement and surface Treatment						$0.00
						$0.00
Section 400.3.1	**Asphalt Concrete Surface (Wearing Course)**					$0.00
(Section 32 12 16)	08-400.3.1-01	50 mm Asphalt Concrete Surface (Wearing Course)	m^2	4,000.00		$0.00
Section 400.3.2	**Asphalt Concrete Binder Course**					$0.00
(Section 32 12 16)	08-400.3.2-01	75 mm Asphalt Concrete Binder Course	m^2	3,100.00		$0.00
Section 411	**Asphalt Prime Coat**					$0.00
(Section 32 12 16)	08-411-01	Asphalt Prime Coat	m^2	4,000.00		$0.00
Section 412	**Asphalt Tack Coat**					$0.00
(Section 32 12 16)	08-412-01	Asphalt Tack Coat Emulsified Asphalt	m^2	3,500.00		$0.00
						$0.00

Gardez-Khost Road Project

Section 2 --- Km 27+000 to 65+000

Project Name **Gardez - Khost Road Phase IV - Construction of Bridge #09**

USAID Spec No. (UFGS Spec No.)	ITEM DESCRIPTION		Bill of Quantity (BOQ)-Bridge09	Quantity	Price	
	BoQ Ref. #	Description	UNIT	Section 2 Phase IV Construction of Bridge#09	Unit Price	Total Price
Division 500- Rigid Pavement						$0.00
						$0.00
Section 500.1	**Rigid Pavements**					$0.00
	08-501-01	Portland Cement Pavement, 250mm thick (New and patching)	m^2			$0.00
						$0.00
Division 550-Bridges and Culverts Construction						$0.00
Section 552 (Section 03 30 00 & 07 95 65)	**Structural Concrete**					$0.00
	08-552-01	Plain Cement Concrete, Class B (15MPa) below bottom slab of box culverts, wing walls, guardwall	m^3	2.00		$0.00
	08-552-02	Structural Concrete, Class A (25MPa) for reinforced concrete box culverts, cut-off walls, wing walls, sleeper slabs	m^3	20.00		$0.00
	08-552-03	Plain Cement Concrete Class B (15MPa) below pier and abutment pile caps and approach slabs	m^3			$0.00
	08-552-04	Structural Concrete (30MPa) for piers,abutments, Walls, and Approach slabs	m^3	1,000.00		$0.00
	08-552-05	Structural Concrete (30MPa) for reinforced concrete deck slabs , beams and diaphragms	m^3	500.00		$0.00
	08-552-06	Structural Concrete (30MPa) for curbs, barriers and sidewalks	m^3	70.00		$0.00
	08-552-09	Drainage Spouts in Super-structure	each			$0.00
	08-552-10	Weep Holes in Abutment Walls	each	8.00		$0.00
	08-552-11	Asphaltic Bridge Joints	lm	40.00		$0.00
Section 554 (Section 03 30 00)	**Reinforcing Steel**					$0.00
	08-554-01	Reinforcing steel Grade 60 in abutments, piers, walls and approach slabs	ton	65.00		$0.00
	08-554-02	Reinforcing steel Grade 60 for Barriers, Curb and Sidewalks	ton	6.00		$0.00
	08-554-03	Reinforcing steel grade 60 in diaphragms, beams, deck slabs	ton	50.00		$0.00
Section 556	**Bridge Railing**					$0.00
	08-556-01	Concrete Barrier as Bridge Railing, 30 Mpa Structural Concrete	lm			$0.00
	08-556-02	Bridge Steel Railing with RC Post	lm			$0.00

Gardez-Khost Road Project

Section 2 --- Km 27+000 to 65+000

Project Name **Gardez - Khost Road Phase IV - Construction of Bridge #09**

USAID Spec No. (UFGS Spec No.)	ITEM DESCRIPTION		Bill of Quantity (BOQ)-Bridge09	Quantity	Price	
	BoQ Ref. #	Description	UNIT	Section 2 Phase IV Construction of Bridge#09	Unit Price	Total Price
Section 559 (Section 07 11 13 & 07 15 53)	**Waterproofing**					$0.00
	08-559-01	Waterproofing Membrane	m^2	410.00		$0.00
	08-559-02	Bituminous Dampproofing	m^2	230.00		
Section 564 (Section 07 95 63)	**Bearing Devices**					$0.00
	08-564-01	Reinforced Elastomeric Bearings	lm	36.00		$0.00
						$0.00
Section 567	**Subsurface Exploration**					$0.00
	08-567-01	Soil Investigation Borings	lm			$0.00
	08-567-02	Standard Penetration Testing	tests			
	08-567-03	Rock Coring	lm			$0.00
	08-567-04	Axial Compressive Testing of Rock Core Samples	each			$0.00
	08-567-05	Split Spoon Samples	each			$0.00
	08-567-06	Consolidation Test	each			$0.00
						$0.00
Section 568	**Repair of Bridge Structures**					$0.00
	08-568-01	Sealing of Cracks by injection of Epoxy Resin, Conform to AASHTO M 235	m^2			$0.00
	08-568-02	Patching of Cracks using Non Shrink Grout, Conform to ASTM C1107	m^2			$0.00
						$0.00
Division 600-Incidental Construction						$0.00
Section 602	**Reinforced Concrete Culverts, mortared joints**					$0.00
	08- 602-01	RC_Pipe, Ø 610 mm	lm			$0.00
	08- 602-02	RC_Pipe, Ø 1000 mm	lm			$0.00
	08- 602-03	RC_Box, 2000x2000 mm	lm			$0.00
						$0.00
						$0.00
Section 607	**Cleaning & Repairing**					$0.00
	08-607-03	Cleaning, Reconditioning and Repairing of existing Drainage structure	lm			$0.00

Gardez-Khost Road Project

Section 2 --- Km 27+000 to 65+000

Project Name **Gardez - Khost Road Phase IV - Construction of Bridge #09**

USAID Spec No. (UFGS Spec No.)	ITEM DESCRIPTION		Bill of Quantity (BOQ)-Bridge09	Quantity	Price	
	BoQ Ref. #	Description	UNIT	Section 2 Phase IV Construction of Bridge#09	Unit Price	Total Price
Section 608	**Paved Waterways**					$0.00
	08-608-01	Type 2_ Class "B" Stone Masonry Lined Ditch A (Trapezoidal)	lm			$0.00
Section 620 (Section 32 32 40)	**Stone Masonry**					$0.00
	08-620-01	Class "B" _ Retaining Wall, Guardwall, Culvert-Inlet/Outlet Structure, Bed Protection, causeways	m^3	450.00		$0.00
						$0.00
Section 633	**Permanent Traffic Control**					$0.00
	08-633-01	Road Signs, Series R/W/I/S, with aluminum panels, retro reflective sheeting type IX, type L-1 letters, galvanized steel posts	ea			$0.00
Section 634 (Section 32 12 16)	**Permanent Pavement Markings**					$0.00
	08-634-01	Type "A" Pavement Marking	m^2	135.00		$0.00
Section 638	**Project Information Signages**					$0.00
	08-638-01	Project Information Signages	ls			$0.00
						$0.00
		Total Estimated Cost				

Bill of Quantities Back-up

Gardez-Khost Bridge 09
AESP WO-LT-077 Calculations

Prepared by Tetra Tech, Inc.
Afghan Engineering Support Program

Prepared for USAID

Division : 05 Civil

Division 200 - Earthwork

Section	Item No.	Description
203	08-203-01	Removal and disposal of existing structure (retaining wall, Headwall, wing wall, culverts, lined Ditch, Fences, Houses

Station	Description	Length (m)	Area (sq. m.)	Volume (cu. m.)
49+950.000 - 49+980.000	Existing Guardwall	30	0.8	24.0
50+064.195 - 50+089.195 RT	Existing Guardwall	25	0.8	20.0
50+066.200 - 50+100.000 LT	Slope Protection	33.8	4.14	139.9
50+066.200 - 50+190.000 LT	Existing Guardwall	123.8	0.8	99.0
50+190.000 - 50+210.000	Existing Retaining Wall	20	2.56	51.2
50+222.000	Culvert C-154 LT Headwall	5	2.25	11.3
50+222.000	Culvert C-154 LT Wingwalls	6	1.25	7.5
50+250.000 - 50+310.000 RT	Existing Parapet Wall	60	0.15	9.0
50+310.000 - 50+330.000 LT	Existing Guardwall	20	0.8	16.0
			Subtotal	353.9
			Contingency (15%)	53.1
			Total for Item	**407.0 m^3**

203	08-203-02	Removal and disposal of existing pavement (asphalt)

Station	Description	Length (m)	Thickness (m)	Width (m)	Volume (cu. m.)
49+870.000 - 50+008.80	Pavement Limits	138.8	0.125	7	121.5
50+069.20 - 50+340.00	Pavement Limits	270.8	0.125	7	237.0
				Subtotal	358.5
				Contingency (5%)	17.9
				Total for Item	**376.4 m^3**

204	08-204-01	Roadway Excavation
		See Attached Cut-Fill Estimate
		Total for Item **140.2 m^3**

204	08-204-03	Select Topping

Material with CBR between 4% and 8%

Length (m)	Thickness (m)	Width (m)	Volume (cu. m.)
600	0.3	9	1620.0
		Subtotal	1620.0
		Contingency (5%)	81.0
		Total for Item	**1701.0 m^3**

204	08-204-05	Embankment
		See Attached Cut-Fill Estimate
		Total for Item **5368.3 m^3**

Division 250 - Slope Reinforcement and Retaining Wall

Section	Item No.	Description
251	08-251-02	Grouted Riprap

Station	Description	Thickness (m)	Area (sq. m)	Volume (cu. m.)
50+066.200 - 50+100.000	Slope Protection - Left	0.3	400	120.0
			Subtotal	120.0
			Contingency (5%)	6.0
			Total for Item	**126.0 m^3**

Division 300 - Aggregate Course

Section	Item No.	Description
301	08-301-01	Crushed Aggregate Base Grad. Des. D, 200mm Carriageway

Station	Description	Length (m)	Thickness (m)	Width (m)	Volume (cu. m.)
49+870.000 - 50+008.80	Pavement Limits	138.8	0.2	7	194.3
50+069.20 - 50+340.00	Pavement Limits	270.8	0.2	7	379.1
				Subtotal	573.4
				Contingency (5%)	28.7
				Total for Item	**602.1 m^3**

Section	Item No.	Description
301	08-301-02	Crushed Aggregate Base Grad. Des. D, 325mm Carriageway

Station	Description	Length (m)	Area (sq. m)	Volume (cu. m.)
49+870.000 - 50+008.80	Pavement Limits	138.8	1.06	147.1
50+069.20 - 50+340.00	Pavement Limits	270.8	1.06	287.0
			Subtotal	434.1
			Contingency (15%)	65.1
			Total for Item	**499.2 m^3**

Division 400 - Asphalt pavement and surface Treatment

Section	Item No.	Description
400	08-400.3.1-01	50mm Asphalt Concrete Surface (Wearing Course)

Station	Description	Length (m)	Width (m)	Area (cu. m.)
49+870.000 - 50+340.00	Pavement Limits	470	7	3290.0
			Subtotal	3290.0
			Contingency (5%)	164.5
			Total for Item	**3454.5 m^2**

400	08-400.3.2-01	75mm Asphalt Concrete Surface Binder Course

Station	Description	Length (m)	Width (m)	Area (cu. m.)
49+870.000 - 50+008.80	Pavement Limits	138.8	7	971.6
50+069.20 - 50+340.00	Pavement Limits	270.8	7	1895.6
			Subtotal	2867.2
			Contingency (5%)	143.4
			Total for Item	**3010.6 m^2**

411	08-411-01	Asphalt Prime Coat

Station	Description	Length (m)	Width (m)	Area (sq. m.)
49+870.000 - 50+340.00	Pavement Limits	470	7	3290.0
			Subtotal	3290.0
			Contingency (20%)	658.0
			Total for Item	**3948.0 m^2**

412	08-412-01	Asphalt Tack Coat Emulsified Asphalt

Station	Description	Length (m)	Width (m)	Area (sq. m.)
49+870.000 - 50+008.80	Pavement Limits	138.8	7	971.6
50+069.20 - 50+340.00	Pavement Limits	270.8	7	1895.6
			Subtotal	2867.2
			Contingency (20%)	573.4
			Total for Item	**3440.6 m^2**

Division 550 - Bridges and Culverts Construction

Section	Item No.	Description
552	08-552-01	Plain Cement Concrete, Class B (15MPa) below bottom slab of box culverts, wing walls, guardwall

Station	Description	Thickness (m)	Length (m)	Width (m)	(Volume cu. m.)
50+222.000	Culvert C-154 Extension	0.15	2.98	3.1	1.3857
				Subtotal	1.4
				Contingency (20%)	0.3
				Total for Item	**1.7 m^3**

552	08-552-02	Structural Concrete, Class A (25MPa) for reinforced concrete box culverts, cut-off walls, wing walls, sleeper slabs

Station	Description	Thickness (m)	Length (m)	Width (m)	(Volume cu. m.)
50+222.000	Culvert C-154 Wingwall				
	Apron	0.25	6	10	15
	Walls	0.75	6	0.25	1.125
				Subtotal	16.1
				Contingency (10%)	3.2
				Total for Item	**19.3 m^3**

Division 600 - Incidental Construction

Section	Item No.	Description
620	08-620-01	Stone Masonry

Station	Description		Length (m)	Area (sq. m.)	Volume (cu. m.)
49+950.000 - 49+980.000	Guardwall		30	0.8	24.0
50+064.195 - 50+089.195 RT	Guardwall		25	0.8	20.0
50+066.200 - 50+100.000 LT	Slope Protection		33.8	4.14	139.9
50+066.200 - 50+190.000 LT	Existing Guardwall		123.8	0.8	99.0
50+190.000 - 50+210.000	Existing Retaining Wall		20	2.56	51.2
50+222.000	Culvert C-154 Extension				
		H (m)	*W (m)*		
	Left and Right Walls	*1.8*	*0.8*	*1.44*	
	Top and bottom	*0.3*	*1.5*	*0.45*	
			2.98	1.89	5.6
50+222.000	Culvert C-154 LT Headwall		5	2.25	11.3
50+222.000	Culvert C-154 LT Wingwalls		6	1.25	7.5
50+250.000 - 50+310.000 RT	Parapet Wall		60	0.25	15.0
50+310.000 - 50+330.000 LT	Guardwall		20	0.8	16.0
				Subtotal	389.5
				Contingency (15%)	58.4
				Total for Item	**447.9 m^3**

634	08-634-01	Type "A" Pavement Marking

Station	Description	Length (m)	Width (mm)	Area (sq. m.)
49+870.000 - 50+340.00	Centerline Intermittent 3m L, 6m Gap	470	100	15.7
49+870.000 - 50+340.00	Left Edgeline : Solid	470	100	47.0
49+870.000 - 50+340.00	Left Edgeline : Solid	470	100	47.0
			Subtotal	109.7
			Contingency (20%)	21.9
			Total for Item	**131.6 m^2**

Cut Fill Estimate

	Station	Cut Area	Fill Area	Length	Volume Cut	Volume Fill
Units		m^2	m^2	m	m^3	m^3
	49+860	0	0			
				20	0	0
	49+880	0	0			
				20	17.3	2.437
	49+900	1.73	0.2437			
				20	17.3	167.937
	49+920	0.63	1.608			
				20	6.3	76.08
	49+940	0	6			
				20	0	225.5
	49+960	0	16.55			
				20	0	291.1
	49+980	0	12.56			
				40	0	835
	50+000	0	25.2			
				8	0	201.6
	50+008	0	25.2			
Bridge				61	0	
	50+069	0	37.11			
				11	0	421.74
	50+080	0	39.57			
				20	0	777.9
	50+100	0	38.22			
				20	0	817.9
	50+120	0	43.57			
				20	0	811.3
	50+140	0	37.56			
				20	0	528.8
	50+160	0	15.32			
				20	0	283.1
	50+180	0	12.99			
				20	0	238
	50+200	0	10.81			
				20	0	231.6
	50+220	0	12.35			
				20	0	209.4
	50+240	0	8.59			
				20	0	121.5
	50+260	0	3.56			
				20	0	42.3
	50+280	0	0.67			
				20	17.2	6.7
	50+300	1.72	0			
				20	37.8	0
	50+320	2.06	0			
				20	41.1	0
	50+340	2.05	0			
				20	20.5	0
	50+360	0	0			
	Total				140.2	6287.5

Net	6147.3
Plus 15%	7069.3
Subtract Select Topping	1701
Total Embankment	5368.3

Reinforced Concrete Beams Quantities

Loading HS25/MLC-70(Wheeled)/MLC-70(Tracked)?

Bridge Length =	50.4	m
Span Length =	16.8	m
No. of Spans =	3	

Concrete	Length (m)	Width (m)	Height (m)	Volume (m^3)	Qty	Total Volume (m^3)
Abutments						
Abutment Footing	13.45	7.00	1.00	94.15	2	188.30
Abutment Stem - East	10.95	1.40	6.51	99.81	1	99.81
Abutment Stem - West	10.95	1.40	6.30	96.58	1	96.58
Abutment Backwall	10.05	0.40	0.70	2.81	2	5.63
Abutment Batter - East	10.95	1.60	6.51	57.04	1	57.04
Abutment Batter - West	10.95	1.60	6.30	55.19	1	55.19
Abutment Keeper Block	1.40	0.45	1.50	0.95	4	3.78
Approach Slab	5.00	10.95	0.25	13.69	2	27.38
Abutment Totals				420.21		533.70
Piers						
Pier Footing	13.30	4.70	0.90	56.26	2	112.52
Pier Stem	10.80	1.50	8.40	136.08	2	272.16
Pier Ends	0.75	0.75	9.83	5.53	4	22.11
Pier Keeper	0.45	1.50	1.50	1.01	4	4.05
Pier Totals				198.88		410.84
Superstructure						
Beam	16.80	0.60	1.50	15.12	18	272.16
End Diaphragm	1.25	0.75	1.50	1.41	10	14.06
Pier Diaphragm	1.25	1.20	1.50	2.25	10	22.50
Interior Diaphagm	1.25	0.30	1.50	0.56	15	8.44
Deck	50.40	10.95	0.23	124.17	1	124.17
Barrier	50.40	0.23	1.40	15.88	2	31.75
Sidewalk	50.40	1.20	0.28	16.63	2	33.26
Superstructure Totals				176.02		506.35
Concrete Totals						1451
Say --->						**1460** m^3, Use: 1570

Totals (Without Contingency)		
Sub Struct.	945 Cubic Meter, Say	1000
Deck Beams & Diaph.	441 Cubic Meter, Say	500
Barrier & Sidewalks:	65 Cubic Meter, Say	70

Reinforcement Steel	Volume (m^3)	Volume (cy)	#Steel/ cy Conc	Steel (lbs)	Qty	Total Steel (lbs)	
Abutments							
Abutment Footing	94.15	123.14	120	14777.22	2	29554.44	
Abutment Stem - East	99.81	130.55	100	13055.12	1	13055.12	
Abutment Stem - West	96.58	126.32	100	12632.05	1	12632.05	
Abutment Backwall	2.81	3.68	150	552.09	2	1104.17	
Abutment Batter - East	57.04	74.60	100	7460.07	1	7460.07	
Abutment Batter - West	55.19	72.18	100	7218.31	1	7218.31	
Abutment Keeper Block	0.95	1.24	150	185.40	4	741.61	
Approach Slab	13.69	17.90	150	2685.38	2	5370.77	
Abutment Totals				55880.27		77136.55	= 34989 kg
Piers							
Pier Footing	56.26	73.58	120	8830.08	2	17660.15	
Pier Stem	136.08	177.99	100	17798.58	2	35597.17	
Pier Ends	5.53	7.23	150	1084.38	4	4337.52	
Pier Keeper	1.01	1.32	150	198.64	4	794.58	
Pier Totals				27911.68		58389.42	= 26485 kg
Superstructure							
Beam	15.12	19.78	150	2966.43	18	53395.75	
End Diaphragm	1.41	1.84	150	275.90	10	2758.96	Deck
Pier Diaphragm	2.25	2.94	150	441.43	10	4414.33	
Interior Diaphagm	0.56	0.74	150	110.36	15	1655.37	Beams & Diaph
Deck	124.17	162.41	200	32482.42	1	32482.42	
Barrier	15.88	20.77	150	3114.75	2	6229.50	Barriers & Sdwlks
Sidewalk + Curb	16.63	21.75	150	3263.07	2	6526.15	
Superstructure Totals				42654.36		107462.48	
Steel Totals						242988	lbs
Steel Totals						110218	kg
Say --->						**111000**	kg, Use: 121

Totals (Without Contingency)		
Sub Struct.	61 Metric Tons, Say	65
Deck Beams & Diaph.	94707 lbs = 43 Metric Tons, Say	50
Barrier & Sidewalks:	12756 lbs = 6 Metric Tons, Say	6

Excavation	Bot Length (m)	Bot Width (m)	Top Length (m)	Top Width (m)	Height (m)	Volume (m^3)	Qty	Total Volume (m^3)	
Substructure									
Abutment	14.05	7.60	23.85	18.95	4.90	948.69	2	1897.39	
Pier	13.90	5.30	22.60	14.00	4.35	848.40	2	1696.80	
Excavation Totals						1797.10		3594	
Say --->								**3600**	m^3

Backfill	Bot Length (m)	Bot Width (m)	Top Length (m)	Top Width (m)	Height (m)	Volume (m^3)	Qty	Total Volume (m^3)	
Abutment									
Abutment Backfill Area (total)	14.05	7.60	26.42	20.24	6.19	1983.49	2	3966.99	
Abutment Concrete Volume						-502.54	1	-502.54	
Abutment Totals (plus 25% compaction)						1480.95		4330.56	
Abutment Rip Rap	Same as pier							-487.20	
Pier									
Pier Excavation Area (total)	13.90	5.30	22.60	14.00	4.35	848.40	2	1696.80	
Pier Footing			13.30	4.70	0.90	-56.26	2	-112.52	
Pier Stem			10.80	1.50	1.95	-31.59	2	-63.18	
Pier Rip Rap	18.80	9.50	10.80	1.50	1.50	-243.60	2	-487.20	
Pier Totals						516.95		1033.91	
Bacfill Totals						516.95		5364	
Say --->								**5400**	m^3

	Totals (Without Contingency)	
Soil Exc. (90%)	3235 Cubic Meter	Say 3500
Rock Exc. (10%)	359 Cubic Meter	Say 400
Backfill Abutment	4331 Cubic Meter	
Rip Rap Abutment	487 Cubic Meter	
Backfill Pier	1034 Cubic Meter	
Rip Rap Pier	487 Cubic Meter	
Backfill total	5364 Cubic Meter	Say 5400
Rip Rap Total	974 Cubic Meter	Say 1000

Elastomeric Bearings	# of Spans	Beams Per Span	Bearing Per Beam			Total Qty (#)
Abutment and Piers						
Elastomeric Bearings	3.00	6.00	2.00			36

Asphaltic Bridge Joints	Lane Width (m)	Number of Lanes	# Of Joints			Total Joint Length (m)	
Abutment and Piers							
Asphaltic Bridge Joints	4.05	2.00	4.00			32.4	
						32	
Say --->						**40**	m

Bituminous Dampproofing	Length (m)	Height (m)	Area (m^2)	Qty	Total Area (m^2)	
Abutments						
Behind Abutment Stem	10.95	7.90	86.51	2	173.01	
Top of Approach Slab	5.00	5.00	25.00	2	50.00	
			111.51		223.01	
					223	
Say --->					**230**	m^2

Wearing Surface & Membrane Waterproofing	Length (m)	Width (m)	Area (m^2)	Qty	Total Area (m^2)	
Roadway						
Asphalt Paving (50mm thick)	50.40	8.10	408.24	1	408.24	
Total:			408.24		408.24	
					408	
Say --->					**410**	m^2

Weep Holes	# per Abutment	Qty	Total Area (m^2)
Abutments			
Weep Holes	4.00	2	8.00
Total:	4.00		8.00
			8
Say --->			**8**

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