FRACTURE CRITICAL CAP BEAMS

Bridge 69102

MnDOT Contract No. 1026462

FINAL REPORT

REDUNDANCY ASSESSMENT AND REPAIR REPORT

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Executive Summary

This report summarizes the approach, findings and recommendations for the redundancy investigation of Bridge 69102 for the integral hammerhead cap beam at Piers 2 and 4, and the box beam straddle bent at Pier 3.

HNTB has contracted with MnDOT to determine if the noted pier caps in Bridge 69102 are truly fracture critical as currently designated, or if structural redundancy can be demonstrated through analysis in accordance with FHWA Technical Memorandum, "Clarification of Requirements for Fracture Critical Members", and the application of criteria established in NCHRP Report 406, "Redundancy in Highway Bridge Superstructures." The investigation of redundancy included developing detailed FEM models and member capacities upon which to compare demand. In locations where structural redundancy is not present, repairs to provide load path, structural or internal member redundancy were developed to reduce the risk of fracture critical failure. While addressing redundancy, the project aims to also extend the bridge service life through painting and repair recommendations. Details of the bridge, the redundancy evaluation and recommendations are included.

Using the criteria from NCHRP 406 and based on the results of these analyses, Bridge 69102 is considered overall non-redundant, as shown:

- Integral hammerhead steel cap beam at Piers 2 and 4

  $r_1 = 3.54 > 1.0$, $r_u = 1.69 > 1.0$, $r_d = 4.26 > 1.0$, REDUNDANT

- Straddle Bent Steel Box Cross beam at Pier 3

  $r_1 = 1.75 > 1.0$, $r_u = 0.89 < 1.0$, $r_d = 0.0 < 1.0$, NOT REDUNDANT

The classification as non-redundant is due to the straddle bent steel box beam at Pier 3. This element, unlike the hammerhead steel cap beams at Piers 2 and 4, was not originally designed with alternative redundant load paths.

The bridge could be classified as redundant if an alternate load path can be designed for the straddle bent steel box beam. Load path redundancy could be achieved by modifying the framing layout to include additional members carrying the girder loads to the supports. Alternatively, internal member redundancy could be achieved by providing an alternate path for the loads by additional elements within the cross beam itself. Concept designs for both repair alternatives were prepared and submitted to MnDOT for review. The load path redundancy repair was the preferred concept.

A scoping level cost estimate was developed for the selected redundancy repair concept. The estimated cost of the load path redundancy repair is approximately $233,700.

Introduction

This report summarizes the approach, findings and recommendations for the redundancy investigation of Bridge 69102 for the integral hammerhead cap beam at Piers 2 and 4, and the box beam straddle bent at Pier 3.

HNTB has contracted with MnDOT to determine if the noted pier caps in Bridge 69102 are truly fracture critical as currently designated, or if structural redundancy can be demonstrated through analysis in accordance FHWA Technical Memorandum, "Clarification of Requirements for Fracture Critical Members", and the application of criteria established in NCHRP Report 406, "Redundancy in Highway Bridge Superstructures." The investigation of redundancy included developing detailed FEM models and member capacities upon which to compare demand. In locations where structural redundancy is not present, repairs to provide load path, structural or internal member redundancy were developed to reduce the risk of fracture critical failure. While addressing redundancy, the project aims to also extend the bridge service life through painting and repair recommendations. Details of the bridge, the redundancy evaluation and recommendations are included.

Bridge Description

Bridge No. 69102 is a flyover ramp that carries a single lane of traffic on southbound I-35 to eastbound US-2 and is considered an approach to Bridge 69100 (the Bong Bridge). The bridge is a continuous steel, multigirder, 18-span structure built in 1983. The fracture critical elements of this bridge are the pier caps of piers 2, 3, and 4. The redundancy evaluation focused on the four-span unit between in-span hinges adjacent to piers 1 and 5. The superstructure in this unit is composed of three 60" plate girders with composite concrete deck and barriers, and has a span arrangement of 105'-120'-120'-105'.

Piers 2 and 4 have integral I-girder caps supported on concrete pier walls and are anchored to the pier walls with four -2 ½ inch diameter anchor bolts. There are vertical web stiffeners on each face of the pier caps. The pier caps are not composite with the concrete deck. Adjacent to the pier caps on both sides are load path redundant diaphragms which are composite with the concrete deck. Due to the structural redundancy provided by these diaphragms, the integral pier caps were not identified as fracture critical elements in the original plans. The fascia girders are composite with the deck near the piers and likely contribute to structural redundancy as well. As such, the integral cap beams were not fabricated to meet the Fracture Critical Plan material or welding requirements defined by AASHTO and AWS. Both integral pier caps as well as the straddle bent cap are currently considered fracture critical elements.

The cap beam at Pier 3 is a welded steel box straddle bent that extends beyond the width of the deck, supported on concrete columns. The three girders frame into the cap with web bolted connections and the flanges are spliced above and below the cap. There are internal stiffeners with edge copes welded to the box pier cap. No additional load path or internal member redundancy elements are currently present at this pier. The box pier cap is identified as a fracture critical member in the original plans and is assumed to have been fabricated to meet Fracture Critical Plan material and welding requirements.

Analysis and Redundancy Investigation

The redundancy investigation was based upon the approach outlined in the NCHRP 406 "Redundancy in Highway Bridge Superstructures" with bridge redundancy defined by considering member, ultimate, damaged and functionality limit states. Each limit state was investigated through extensive finite element modeling efforts including both linear and nonlinear approaches. Given the complexity of the structures and related modeling, two models, a record model in Larsa and an independent check model in CSi Bridge, were created to assess the structural behavior.

Modeling Description

The models for Bridge 69102 from Hinge No. 1 to Hinge No. 2 implement various assumptions to accurately represent the structural behavior of the girders and deck, and their interaction with the steel pier caps. The models include multiple material property manipulations as well as precise element selection to capture local and global behavior. See Figure 1 for a representative view of the Larsa (record) model.

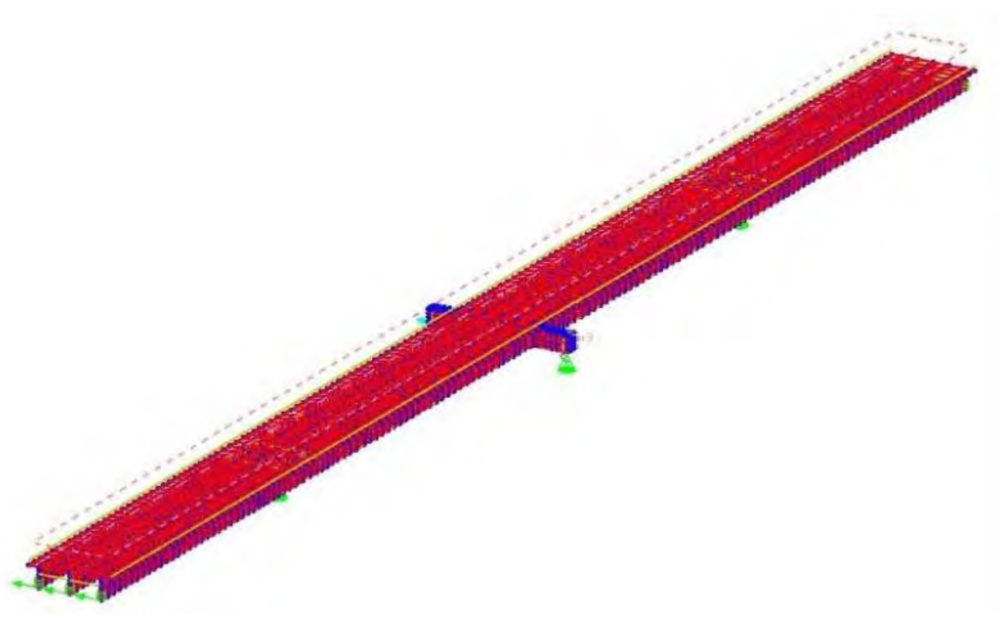


Figure 1: Larsa (Record) Model of Bridge 69102

The steel girders are modeled using 5 shells deep for the 60" web with approximate 3' increments longitudinally. The top and bottom nodes are shared with the top and bottom girder flanges which are modeled as beam elements. Beam elements are used to represent stiffeners and the connection plates of the diaphragms to the webs. These elements share nodes with each node of the web.

The deck is modeled with shell elements connected to the top nodes of the girder via rigid beam elements to represent the composite deck condition. In non-composite (no shear studs) regions, the rigid beams were replaced by axial-only constraints to remove shear transfer between the deck and underlying girders. On top of the deck, a barrier has been added using frame elements. The section properties of the barrier beam elements have been manually calculated to account for additional stiffness that may be provided to the bridge by the barrier. For positive moment regions, the full barrier concrete area is applied assuming the barrier is in compression. In negative moment regions, the element stiffness is reduced to account for the reinforcing only. Deflection joints in the barrier are modeled as element releases.

The bent plate intermediate diaphragms are modeled entirely as shell elements. They share nodes with the connection plates and are offset accordingly to imitate the existing plan connection configuration. The redundancy diaphragms are modeled similar to the intermediate diaphragms regarding their web and web connection; however, their flanges are modeled as beam elements continuous over the interior girder. In addition, rigid links have been added into the deck to represent the stud connection configuration between the diaphragm and deck per the existing plans.

The I-shaped cap beams are also modeled using shell elements to represent the web and beam elements to represent the flanges. Vertical stiffeners are also modeled as beam elements. The box beam straddle bent is represented by shell elements for the webs, flanges and internal diaphragms. The intermediate and bearing stiffeners are modeled as beam elements. Pier walls and columns supporting the cap beams are constructed of concrete and therefore have not been included in the model.

The material properties are taken from the plans. Concrete strength is 4,000 psi with a corresponding Young's Modulus of 3,605 ksi in positive moment regions. In negative moment regions, concrete has been softened to 10% of the full Young's Modulus, equal to 360.5 ksi, representing the transformed reinforcement in the deck section. Young's modulus for steel is 29,000 ksi for all steel elements.

The in-span hinges are modeled as pinned supports free to translate longitudinally, with vertical spring constants calculated the approximate the stiffness of the adjacent spans. The anchorages at piers 2 and 4 are modeled as pinned supports. The anchorages at pier 3 are modeled as pinned supports free to translate transversely, with compression-only vertical restraints.

Dead load was applied both using the self-weight feature of Larsa 4D, which uses the geometry of the modeled elements to calculate volume which is then multiplied by the density, as well as shell pressure for items like wearing surface, or line load for barriers. The weight of steel and deck were applied to the bare steel sections, while superimposed dead loads were applied to the long-term composite section. Controlling live load cases were obtained using the Larsa 4D influence surface generator feature that defines thousands of influence surfaces for every compound section in the girders at every location in the structure. These loads were then used to identify the controlling members in the structure.

Independent Modeling Description

The independent check model developed in CSi Bridge was built using the same boundary conditions, element types, material properties, and similar element refinement as described above for the Larsa (record) model. The CSi Bridge model is shown in Figure 2. HL-93 live loading was applied using CSi's moving load analysis capabilities. The software calculates an influence surface of maximum response for each element in the model. The lane placement and vehicle are defined by the user in accordance with AASHTO specifications, and the software determines the envelope of maximum and minimum response for each member in the model.

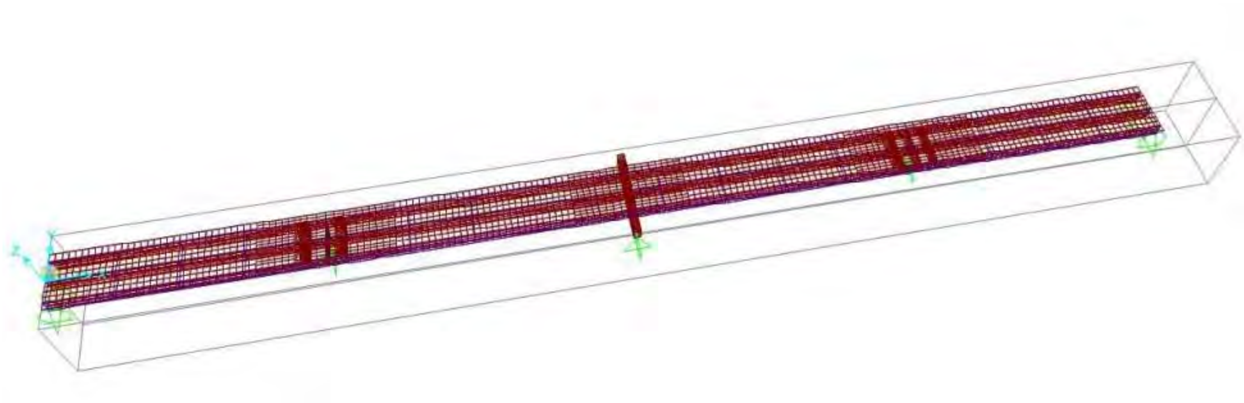


Figure 2: CSi Bridge (Independent Check) Model of Bridge 69102

Elastic models for both the record and independent check were developed and selective descriptive members compared to establish correlation between the models. This was accomplished through an iterative review process. The models were refined to establish a 1% variance between models for dead load reactions and dead load member demands (moment, shear) and a 10% variance for live load member demands. Results of the elastic comparison are summarized in Appendix 1 – Elastic Model Comparison.

Member Capacities

The member capacities were developed external to the modeling by applying AASHTO LRFD standards and considered the findings from the inspection of the fracture critical members. For each member, the demand from the record model was then compared to the established member capacities. Member capacities calculated for Bridge 69102 are summarized in Appendix 2 – Design Calculations.

Redundancy Procedure

At each critical location, the following procedure was used to evaluate the redundancy of the system:

1. Run elastic analyses for Dead Loads and Live Loads on the bridge and obtain all the demands for DC, DW, and LL min and max.

2. Determine ϕR_{req} based on required demands, using the Strength I combination:

$$\phi R_{req} = 1.25\ DL + 1.5\ DW + 1.75\ (LL + I)\ \text{(including Impact)}$$

3. Find the minimum required member capacities for the sections/members of the structure:

4. Using AASHTO Specifications calculate $R_{provided}$ at every section based on section geometry, bracing conditions and inspection conditions.

5. Using Larsa4D influence surface based LL modeler identify the controlling HL-93 truck and lane position that would maximize the moments at all locations in the bridge (Live Load Envelopes).

6. Apply the HL-93 loading at all the positions defined by Larsa4D and perform a linear elastic analysis to calculate L_{HL93}, which gives the effect of the HL-93 loads on all the members. Calculate LF_{1Req} from:

$$LF_{1Req} = \frac{\mathrm{R_{Req}} - \mathrm{D}}{\mathrm{L_{HL93}}}$$

   Based on LF_{1Req}, identify the controlling most critical members in the structure. Once these members are identified, based on the influence surfaces stored within Lars4D, identify the individual controlling position of the HL-93 trucks for each controlling load of the controlling members to use the subsequent steps.

7. Increment the HL-93 loading until the first member reaches its limiting capacity. Note the load factor L_{F1} by which the original trucks are scaled for the first member failure to occur. Calculate the member:

$$r_1 = \frac{\mathrm{LF_1}}{\mathrm{LF_{1Req}}} = \frac{\mathrm{R_{provided}} - D}{\mathrm{R_{Req}} - D}$$

   Identify the most critical member with the lowest r_1. The controlling LF_1 is the load factor associated with the first member failure and the member with the lowest r_1. This is the LF_1 used in all subsequent redundancy equations at all locations.

8. Continue beyond the elastic state and into nonlinear analyses with nonlinear geometry and material properties, increment the applied HL-93 loading until the maximum vertical deflection of a primary member reaches a deflection equal to span length / 100. Note that load factor LF_f by which the original HL-93 loads are scaled to achieve the span length / 100 displacement level. If the ratio $R_f = LF_f / LF_1$ is greater than 1.1, then the bridge has sufficient redundancy to satisfy the functionality limit state. Calculate the redundancy ratio for functionality:

$$r_f = \frac{\mathrm{R_f}}{1.1}$$

9. Continue the nonlinear analyses, incrementing the HL-93 loading until a mechanism forms causing structural collapse. Note the load factor LFu by which the original HL-93 loads are scaled to cause collapse. If the ratio $R_u = LF_u/LF_1$ is greater than 1.3, then the bridge has sufficient redundancy to satisfy the ultimate limit state. Calculate the redundancy ratio:

$$r_u = \frac{\mathrm{R_u}}{1.3}$$

10. Evaluate the damaged condition by initiating a fracture in the model at the critical location, and repeat the nonlinear analysis. Determine the load factor LF_d for the damaged bridge in terms of HL-93 loading that would cause collapse of any main members. If the ratio $R_d = LF_d/LF_1$ is greater than 0.5, the bridge provides a sufficient level of redundancy to meet the damaged limit state. Calculate the redundancy ratio for the damaged condition:

$$r_d = \frac{\mathrm{R_d}}{0.5}$$

Summary of Redundancy Results

Critical locations for redundancy assessment were based on regions of highest demand to capacity and at fracture critical members:

- Negative moment region of the fascia girder at pier 2,
- Negative bending in pier 2 cap beam
- Positive bending in pier 3 straddle bent.

The integral cap beams at pier 2 and 4 are both designated as fracture critical members. Due to the approximate symmetry of the spans modeled, and the similarity in cap beam dimensions, only the cap beam with the larger demand to capacity ratio was evaluated for redundancy. The subsequent findings are applicable to both pier caps. The results of the redundancy assessment at each location are summarized in the following table. Further description of the analyses at each location follow.

Location	**LF_1**	**r_1**	**LF_u**	**R_u**	**r_u**	**LF_f**	**R_f**	**r_f**	**LF_d**	**R_d**	**r_d**
Fascia Girder at Pier 2 (B4)	**3.88**	1.30	5.5†	1.42†	1.09†	5.5†	1.42†	1.29†	N/A	N/A	N/A
Integral Cap Beam (Pier 2)	8.50	3.54	8.50	2.19	1.69	8.5†	2.19†	1.99†	8.25	2.13	4.26
Straddle Bent (Pier 3) Near Interior Girder	4.34	1.75	4.49	1.16	0.89	4.49	1.16	1.05	0.00	0.00	0.00
Straddle Bent (Pier 3) Near Fascia Girder	5.33	2.14	N/A	N/A	N/A	N/A	N/A	N/A	1.25	0.32	0.65

† Analysis was stopped due to satisfying the minimum redundancy criteria of NCHRP 406. Actual value is likely higher than reported.

Member Limit State for Structure

Based on the $LF1_{Req}$ values calculated for each member, the critical location for first member failure is the fascia girder B4 negative moment section at Pier 2. Using Larsa4D influence surface based LL modeler, the controlling 2 x HL-93 truck plus lane position that would maximize the negative moments at this location was determined using the Larsa4D influence surface based LL modeler. The controlling truck placement is shown in Figure 3.

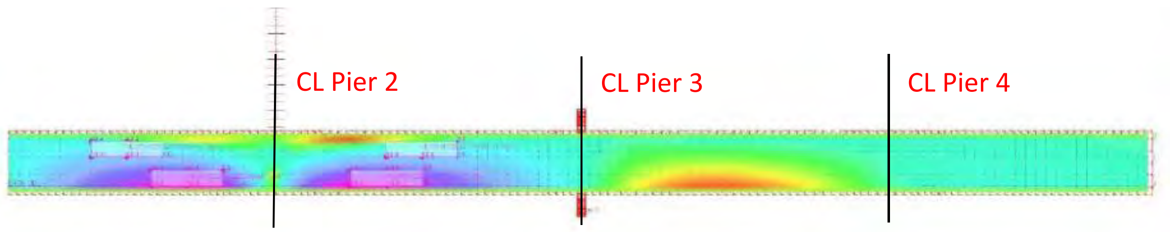


Figure 3: Controlling HL-93 Loading for Negative Bending in Fascia Girder

This HL-93 loading was incremented until the first member reached its limiting capacity. The fascia girder negative moment section at Pier 2 was found to have lowest member reserve ratio, calculated as:

$$r_1 = \frac{\mathrm{LF}_1}{\mathrm{LF}_{1\mathrm{Req}}} = = \frac{3.88}{2.98} = 1.3$$

This LF_1 value was used to calculate R_f, R_u, and R_d at all subsequent areas of investigation.

Ultimate Limit State - Fascia Girder B4 at Pier 2

With the same controlling live load placement shown in Figure 3, the analysis was continued beyond the elastic state and into nonlinear analyses with nonlinear geometry and material properties. The HL-93 loading was incremented at this critical placement until the ultimate limit state of 1.3 x LF_1 was reached. While the ultimate limit state is defined as the maximum possible truck load that can be applied on the structure before it collapses, it was decided earlier that the nonlinear analyses will be concluded when the structure passes the necessary requirement to prove redundancy in the Ultimate Limit state as LF_u > 1.3 x LF_1, which was achieved at 5.5 x HL-93 loading.

With the load factor calculated in this step as LF_u in this fashion ensures that $R_u = LF_u / LF_1 = 5.5/3.88 > 1.3$, then it is established that the bridge has a sufficient level of redundancy to satisfy the ultimate limit state. The calculated redundancy ratio:

$$r_u = \frac{\mathrm{R_u}}{1.3} \geq 1.0$$

fulfills the criterion without the need to push the analyses beyond the 5.5 x HL-93 loading.

Functionality Limit State - Fascia Girder B4 at Pier 2

In this case, at no point was the L / 100 displacement criteria reached. The displacement was measured for the case where the structure reached the required $r_u = \frac{\mathrm{R_u}}{1.3}$ and that displacement was D = 4.86" at the fascia girder in span 2/span 4, and was reached at 5.5 x HL-93 loading. Therefore, $R_f = LF_f / LF_1$ = 5.5/3.88 = 1.42 and the redundancy ratio for functionality is calculated as:

$$r_f = \frac{\mathrm{R_f}}{1.1} = \frac{1.42}{1.1} = 1.29^{\dagger}$$

The deflected shape of the model at the final increment of loading is shown in Figure 4.

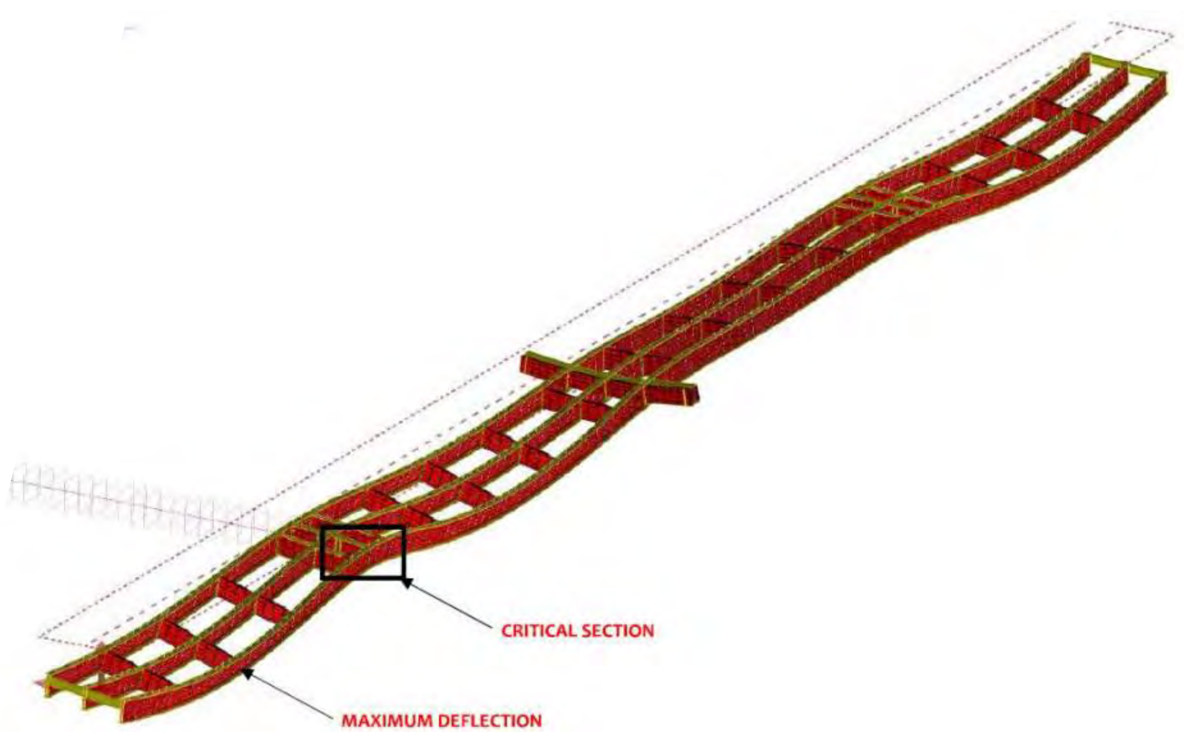


Figure 4: Deflected Shape of Bridge 69102 at 5.5 x HL-93 (Deck not shown for clarity)

Ultimate Limit State - Integral Hammer Head Pier Cap

The Larsa4D influence surface based LL modeler was used to identify the controlling HL-93 truck position that would maximize the moments at the critical location in the cap beam. For this case, the critical section in the cap beam is at the transverse section adjacent to the bearing support as shown in Figure 5.

† Analysis was stopped due to satisfying the minimum redundancy criteria of NCHRP 406. Actual value is likely higher than reported.

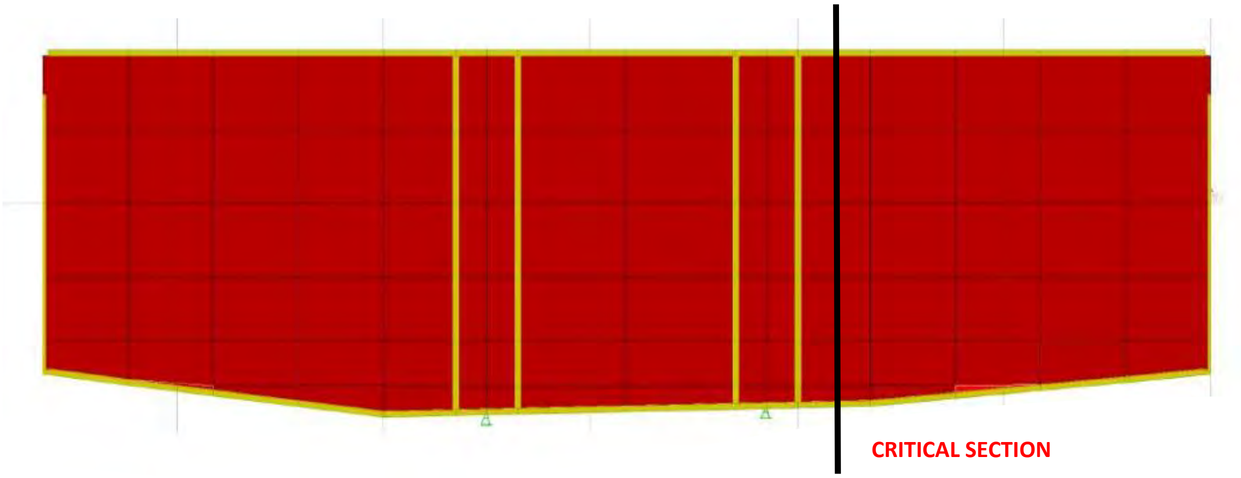


Figure 5: Integral Pier Cap with Critical Section

In this case only, given the location of the critical section for the cap beam only a single lane of HL-93 double trucks plus lane load control the worst loading condition as shown in Figure 6.

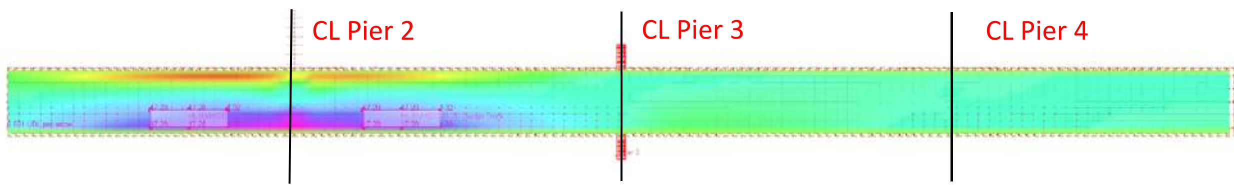


Figure 6: Controlling HL-93 Loading for Negative Bending in Pier 2 Cap Beam

The HL-93 loading was incremented until the cap beam critical section reached its limiting capacity. The member reserve ratio was calculated as:

$$r_1 = \frac{\mathrm{LF}_1}{\mathrm{LF}_{1\mathrm{Req}}} = \frac{\mathrm{R}_{\mathrm{provided}} - D}{\mathrm{R}_{\mathrm{Req}} - D} = \frac{9.46}{2.67} = 3.54$$

Initial testing increments increased the loading to 10 x HL-93 and corresponding design checks suggested that the anchorage at the bearing reaches capacity before any other components in this loading configuration. As a result, the HL-93 load was scaled back and increased slowly and incrementally to investigate the ultimate mechanism of failure. Failure of the hold down bracket holding the tension rod, based on the calculated capacity of the connection, occurred at approximately 5.2 x HL93 loading. See Appendix 2 Design Calculations for details. This failure was modeled by releasing the joint restraint at this location.

Although this release caused downwards deflection at the opposing fascia girder, it was not enough to violate the L/100 criteria. The loading increments were increased further until the connection of the cap Beam to the fascia girder reached capacity at 8.5 x HL-93 loading. At this point, the fascia and interior girder were yielding.

Nonlinear beam elements were assigned to model the flanges; however, nonlinear element behavior is limited to beam elements and cannot be applied to the shell elements used to model the web. This required a manual calculation of a reduced modulus of elasticity of the web to model plastic hinging behavior. The web was softened and the redistribution of forces was noted. The softening was iterated to reduce the resistance to less than the plastic moment of the section, M_p. In addition to the girders yielding, the cap beam to fascia girder connection exceeded the calculated capacity. Given the non-ductile, brittle nature of a connection failure it was assumed this would result in a sudden failure of the connection. The connection was removed from the model at that stage, another iteration of web softening was applied and the redistribution of forces noted. Immediately after this redistribution of forces, the Redundant Load Path Diaphragm connection exceeded the calculated capacity and failed in what is assumed to be a non-ductile, brittle failure. This ultimately caused the structure to collapse while the cap beam never neared yielding.

Figure 7 illustrates the deflected shape of the structure as failure progressed through the ultimate condition. The location of the redundant load path diaphragm connection failure is shown in Figure 8.

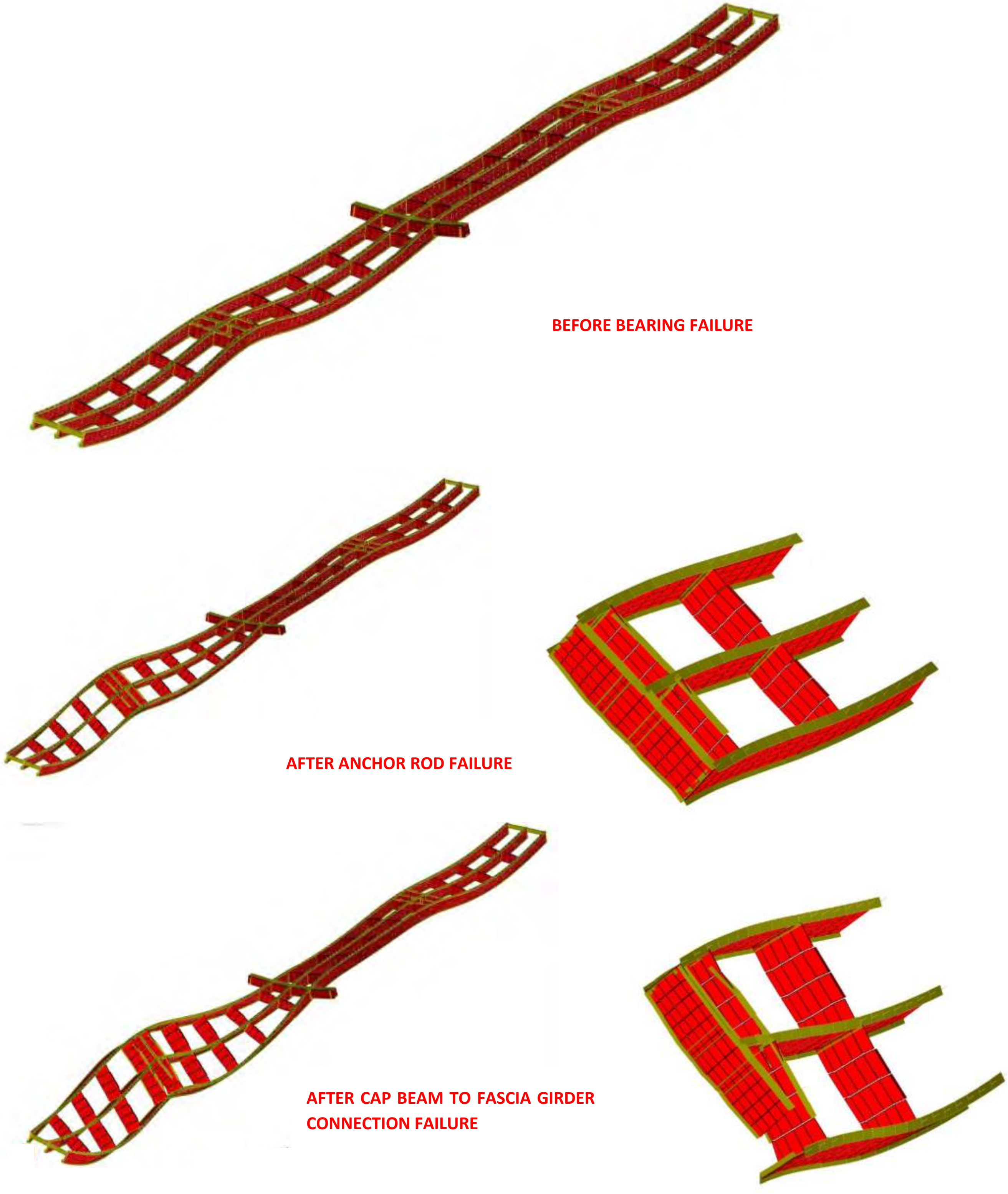


Figure 7: Progression of failure at Integral Pier Cap (Deck not shown for clarity)

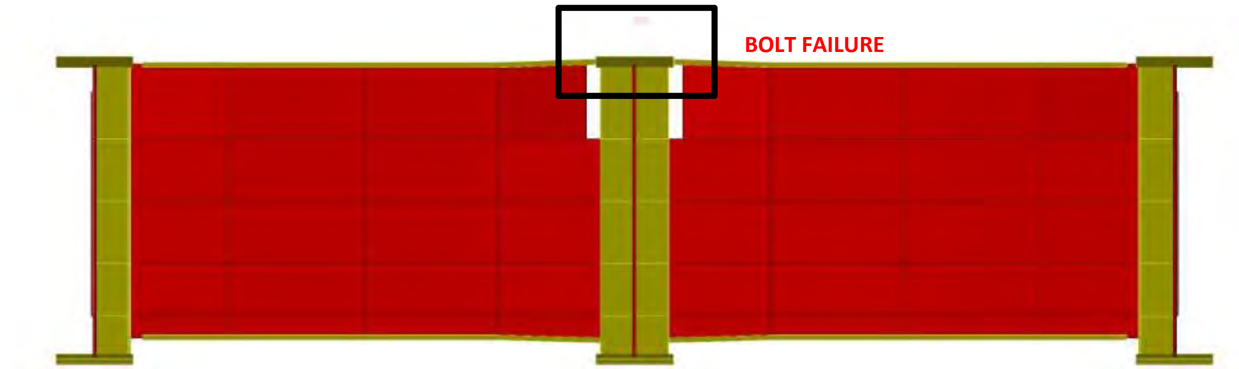


Figure 8: Location of Connection Failure in Redundant Load Path Diaphragm

Thus, the load factor calculated in this step as LF_u = 8.5 in this fashion shows that $R_u = LF_u / LF_1$ = 8.5 / 3.88 = 2.19 >> 1.3, then it is established that the bridge does exhibit sufficient level of redundancy to satisfy the ultimate limit state. The calculated redundancy ratio r_u:

$$r_u = \frac{\mathrm{R_u}}{1.3} = \frac{2.19}{1.3} = 1.685 \gg 1.0$$

does meet the criterion for being classified as a redundant structure based on the ultimate factor for this element.

Functionality Limit State - Integral Hammer Head Pier Cap

In this case, at no point was the L / 100 displacement criteria reached. The displacement was measured for the case where the structure reached the ultimate capacity. That displacement was D = 10.6 in downwards at the Fascia Girder in Span 1, and was reached at 8.5 x HL93. Therefore, $R_f = LF_f / LF_1$ = 8.5/3.88 = 2.19 and the redundancy ratio for functionality is calculated as:

$$r_f = \frac{\mathrm{R_f}}{1.1} = \frac{2.19}{1.1} = 1.99^{\dagger}$$

Damaged Limit State - Integral Hammer Head Pier Cap

In the damaged condition, the nonlinear model was altered to reflect a critical damaged state. This was achieved by removing the critical section as designated from the Redundancy procedure after all dead load had been added and before the first increment of live loading is applied. The pier cap model after the critical section was removed is shown in Figure 9.

† Analysis was stopped due to satisfying the minimum redundancy criteria of NCHRP 406. Actual value is likely higher than reported.

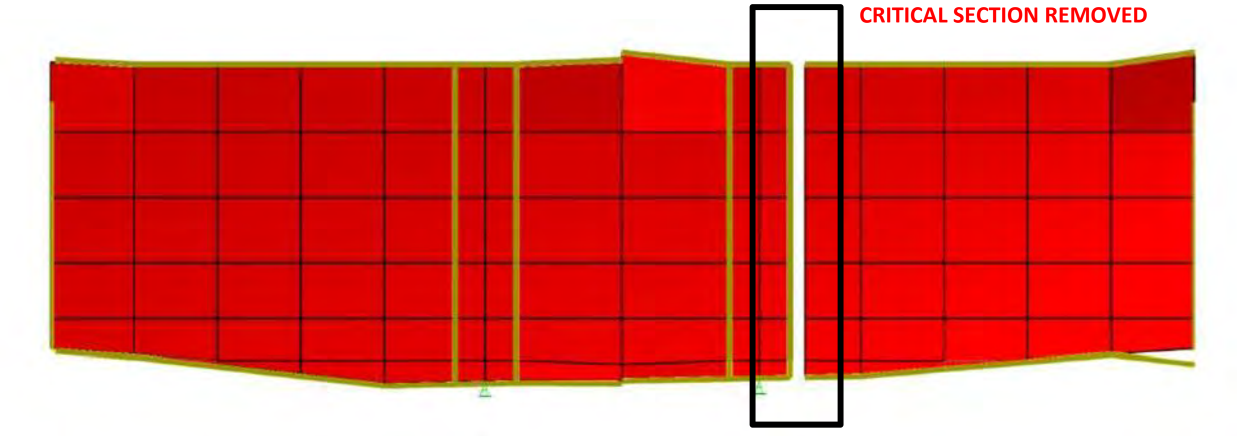


Figure 9: Location of Fracture in Damaged Condition at Integral Pier Cap

After the section was removed, the worst case position of live loading was applied to the structure incrementally until it was noted that an element had reached its capacity. The same live load position as used in the ultimate loading condition and shown in Figure 6 was again implemented for the damaged condition.

Similar to the ultimate loading condition, as the HL-93 loading was increased, other components were monitored for yielding. Interior Girder B-5 was the first element to display yielding at 5.30 x HL-93 loading. As discussed in the ultimate condition, nonlinear beam elements were assigned to model the flanges. However, nonlinear shell elements are not available for use modeling the web. This required a manual calculation of a reduced modulus of the web to replicate plastic hinging. To maintain the correct resistance and plastic moment of the section, an iteration of web softening was performed and the redistribution of forces was noted. Shortly thereafter, the anchor rod at the bearing reached its nominal capacity, calculated from the existing plans as 526 kips, at 5.85 x HL-93 loading. At that stage, the joint restraint was removed to represent failure of the anchorage. Note the deflected shape before and after the release as shown in Figure 10.

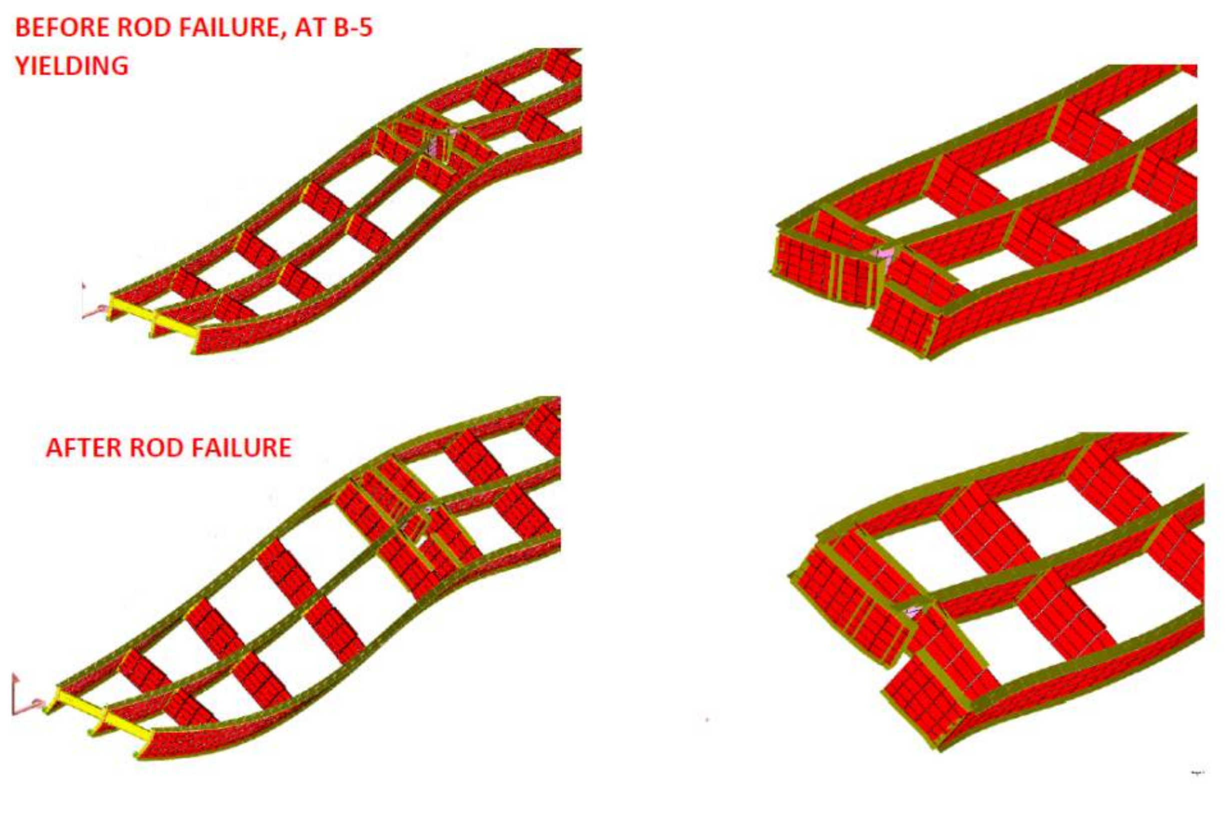


Figure 10: Deflected Shape at Integral Pier Cap – Before and After Anchorage Failure (Deck not shown for clarity)

Despite the anchor rod failing and the critical section damage, the structure was able to withstand additional loading. The live load was increased until the redundant load path diaphragm reached its capacity of 4,527 k-ft at the connection. The web was again reduced in stiffness to ensure a more accurate distribution of forces. This occurred at 8.25 x HL-93 and the structure was considered to have failed. The redundant load path diaphragm connection failed in what is assumed to be a non-ductile, brittle failure, at the location shown in Figure 8. This ultimately caused the structure to collapse while remaining non-fractured side of the cap beam never nears yielding. Note that the structure does not violate the L/100 criteria at any point for any component with a maximum deflection of D=10.7" downwards at the fascia girder in span 1.

Therefore, $R_d = LF_d / LF_1 = 8.25 / 3.88 = 2.126 >> 0.5$

$$r_d = \frac{\mathrm{R_d}}{0.5} = \frac{2.162}{0.5} = 4.25$$

<u>*Independent Analysis - Damaged Limit State at Pier 2 Cap*</u>

Following application of dead load, the cap beam was fractured by removing elements in the same location noted for the record model. The same critical static truck placement was applied to the model, as *confirmed by the influence surface generated independently in CSi Bridge and compared to the record model. Initial yielding in the interior girder occurred earlier than the record model, at approximately 4.3 x HL-93. Nonlinear behavior of the flange elements was initiated near the connection of the interior girder and the pier cap, and the stiffness of the web shell elements was reduced manually to model plastic hinging. At 5.75 x HL-93, the anchorage reached capacity and was removed from the model. The deflected shape of the independent model before and after the anchorage failure are shown in Figure 11. Live load was increased to 8.25 x HL-93. At that load level, maximum moment in the redundant load path diaphragm at the connection to the interior girder was approximately 3,700k-ft. The independent analysis was not continued, as r_d > 0.5 had been achieved. Plots comparing member response from the record and independent analyses are included in Appendix 3.*

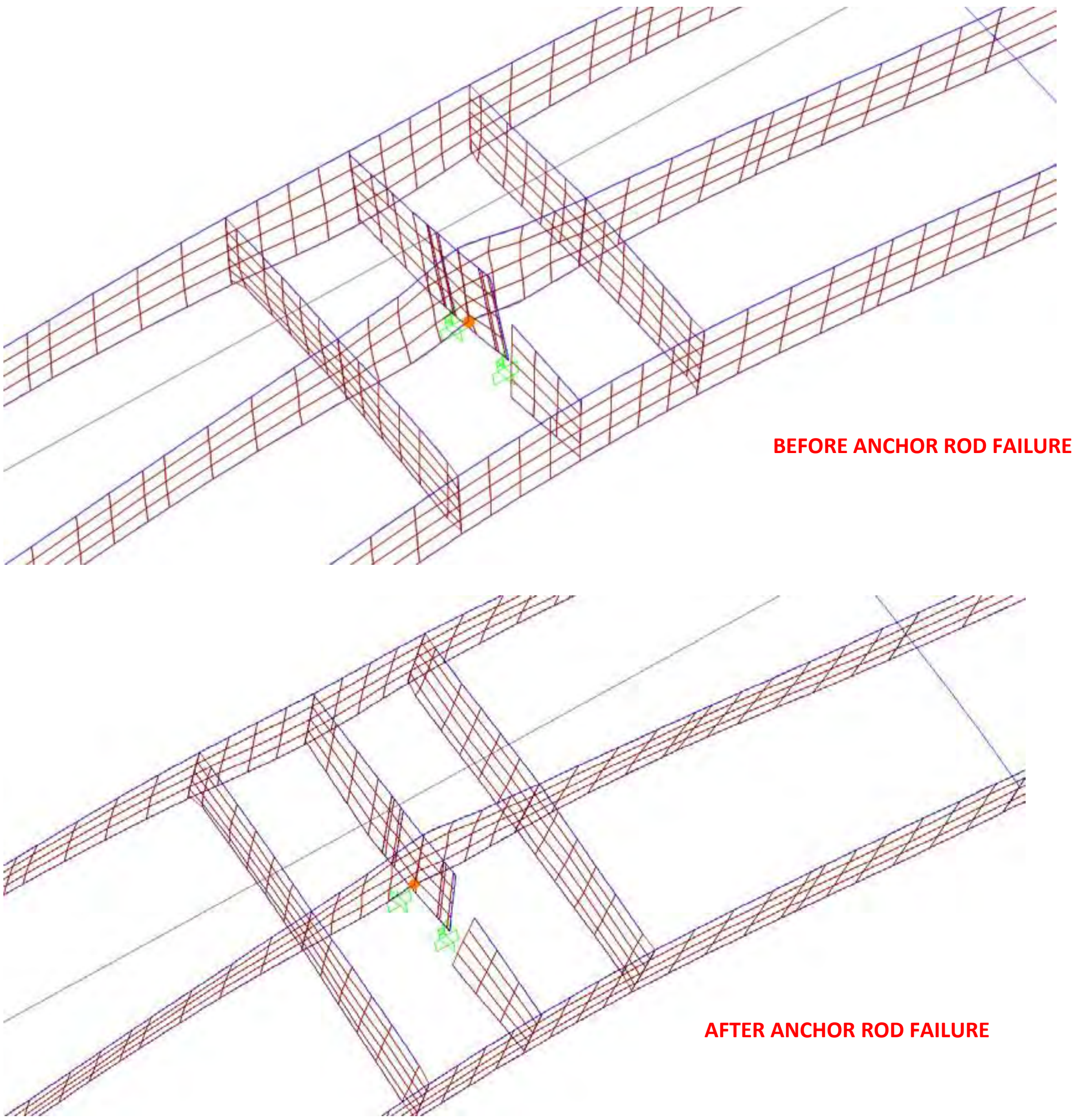


Figure 11: Independent Model Before and After Failure of Pier 2 Anchorage (Deck not shown for clarity)

Ultimate Limit State - Pier 3 Straddle Bent Cap Adjacent to Interior Girder

The Larsa4D influence surface based live load modeler was used to identify the controlling HL-93 truck plus lane load position that would maximize the positive moment at the critical location in the straddle bent cap beam. For this case, the critical section in the cap beam is at the transverse section adjacent to the interior girder as shown in Figure 12.

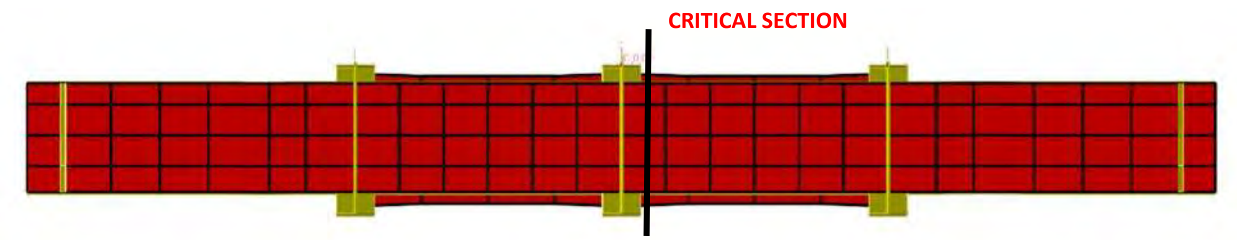


Figure 12: Straddle Bent Pier Cap with Critical Section

The largest demand results from two lanes of HL-93 double trucks, as shown in Figure 13 from LARSA 4D influence surface feature.

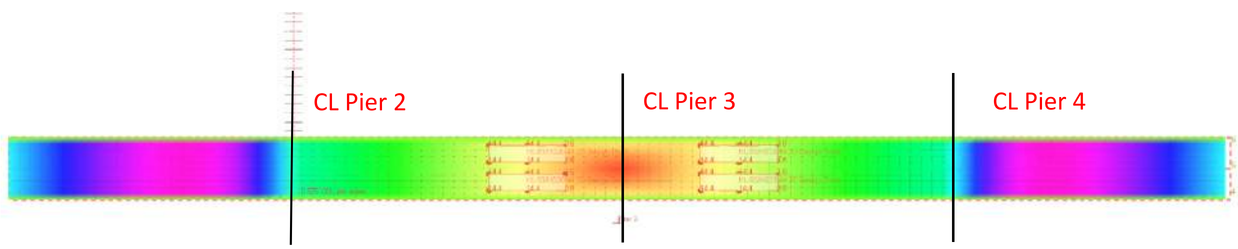


Figure 13: Controlling HL-93 Loading for Positive Bending in Pier 3 Cap Beam

The HL-93 loading was incremented until the cap beam critical section reached its limiting capacity. The member reserve ratio was calculated as:

$$r_1 = \frac{\mathrm{LF}_1}{\mathrm{LF}_{1\mathrm{Req}}} = \frac{\mathrm{R}_{\mathrm{provided}} - D}{\mathrm{R}_{\mathrm{Req}} - D} = \frac{4.34}{2.48} = 1.75$$

Initial testing increments increased the loading to 6 x HL-93 and corresponding checks against the calculated design capacities suggested that the straddle bent cap beam would fail per code much earlier than that loading stage. As a result, the HL-93 loading was scaled back and was increased slowly and incrementally to investigate the ultimate mechanism of failure. As the load was increased, it was observed that yielding of the straddle bent box section cap beam would reach its AASHTO code defined capacity at 4.5 x HL-93 loading level. Given that the straddle bent cap beam is a simply supported beam and clearly has no definable alternate load path to carry the loads, it was deemed reasonable to end the analyses and conclude that the bridge had technically collapsed at this loading level. The load factor then was defined as $LF_u = 4.5$. Therefore, $R_u = LF_u/LF_1 = 4.5/3.88 = 1.16 < 1.3$, and the redundancy ratio was calculated as:

$$r_u = \frac{\mathrm{R_u}}{1.3} = \frac{1.16}{1.3} = 0.89 < 1.0$$

The cap beam does not meet the redundancy criteria for $R_u > 1.3$.

<u>Functionality Limit State - Pier 3 Straddle Bent Cap Near Interior Girder</u>

In this case, at no point was the L / 100 displacement criteria reached. The displacement was measured for the case where the structure reached the ultimate failure at 4.5 x HL-93 loading. That displacement was D = 2.83 in at the fascia beam in span 2. Therefore, $R_f = LF_f / LF_1 = 4.5/3.88 = 1.16$ and the redundancy ratio for functionality was calculated as:

$$r_f = \frac{\mathrm{R_f}}{1.1} = \frac{1.16}{1.1} = 1.05$$

The deflected shape of the bridge at this stage is shown in Figure 14.

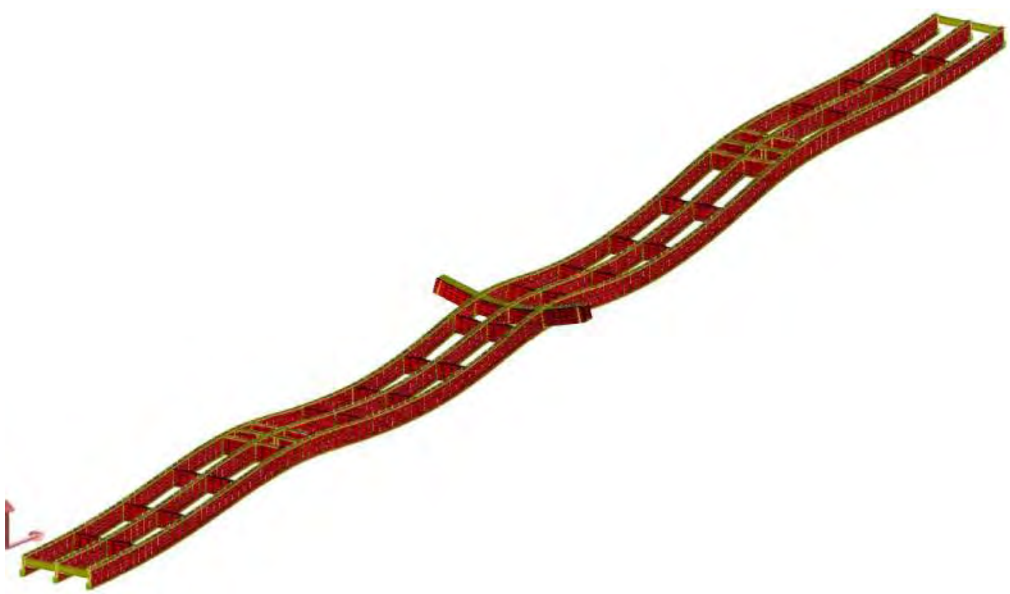


Figure 14: Deflected Shape of Bridge 69102 at Ultimate Condition for Straddle Bent (deck not shown for clarity)

<u>Independent Analysis - Ultimate Limit State at Pier 3 Cap</u>

Following application of dead load, the cap beam was fractured by removing elements in the same location noted for the record model. The same critical static truck placement was applied to the model, as confirmed by the influence surface generated independently in CSi Bridge and compared to the record model. The record model found that the box beam reached the AASHTO code capacity of 12,400 k-ft at 4.5 *x HL-93. The independent model reached this demand at 4.3 x HL-93. The deflected shape of the independent model at this stage is shown in Figure 15.*

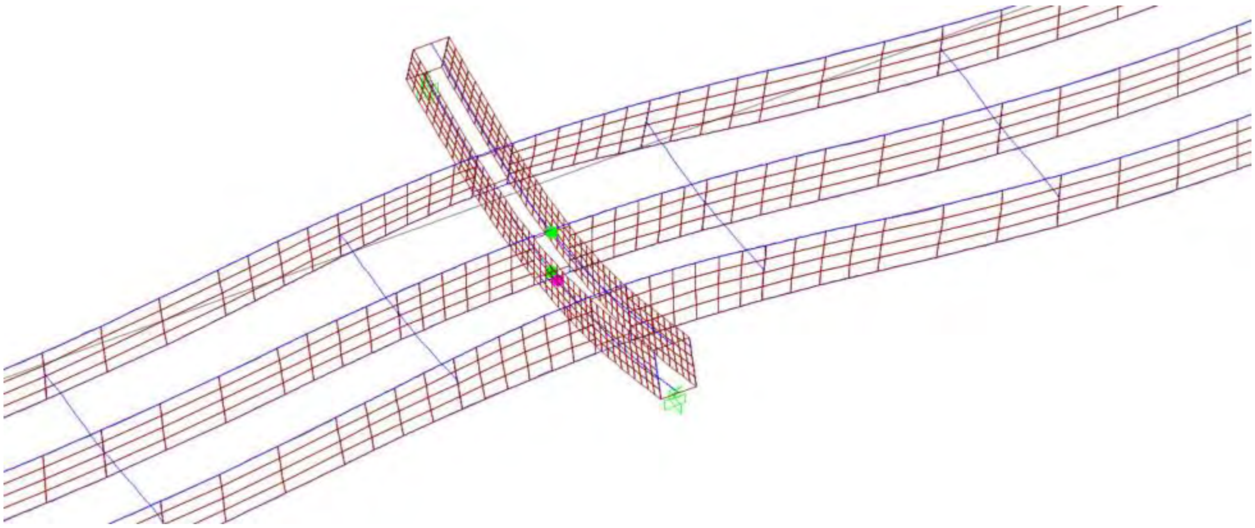


Figure 15: Deflected Shape of Independent Model at Ultimate Condition for Straddle Bent (Deck not shown for clarity)

The independent analysis continued incrementing live load to confirm the record modeler's assumption that the code failure initiates collapse. After reaching the code failure, buckled elements in the Pier 3 top flange were removed. With no additional load added, hinging was initiated in the bottom flange of P3, confirming that a mechanism occurred within the straddle bent. With additional increments of live load, yielding spread along the length of the box section and the girders adjacent to the P3 box beam began to hinge as well.

<u>Damaged Limit State – Pier 3 Straddle Bent Cap Fracture Near Interior Girder</u>

In the damaged condition, the nonlinear model was altered to reflect a critical damaged state. This was achieved by removing the critical section as designated in agreement with MnDOT, after all dead load had been added and before the first increment of live loading was applied. The straddle bent cap beam was altered as shown in Figure 16.

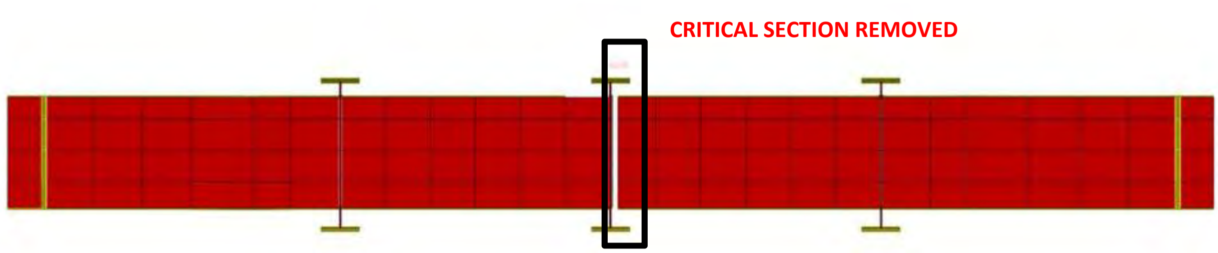


Figure 16: Location of Fracture in Damaged Condition at Straddle Bent Pier Cap

After the section was removed, the worst case of live loading was applied to the structure incrementally until an element had reached its capacity. The same critical position of live load as used in the ultimate loading condition and shown in Figure 13 was again implemented for the damaged condition.

However, live loading was never applied in this case, as before the incrementation of the live loading was initiated the fascia girder was determined to fail due to lateral torsional buckling immediately after the critical section was removed. The deformed shape in Figure 17 illustrates the extent torsion that the girder experienced immediately after removal. Note that the lateral bending demand in the bottom flange alone is 374 k-ft compared to the calculated capacity of 311 k-ft.

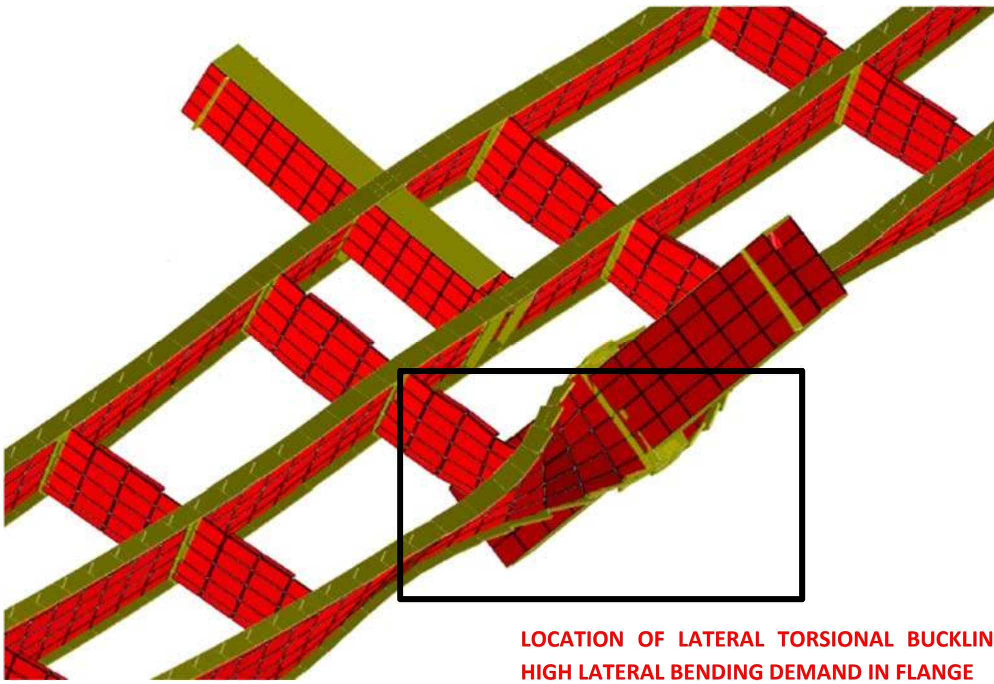


Figure 17: Deflected Shape at Straddle Bent Following Fracture Near Interior Girder (Deck not shown for clarity)

As a result, the damage to cap beam and fascia girder was deemed to cause immediate failure of the structure due to failure of the fascia girder at dead load only. Further, maximum displacement of the bent at this step was D = 11.8 in downward violating L / 100 for the straddle bent element.

Therefore, $R_d = LF_d / LF_1 = 0.0 / 3.88 = 0.0 << 0.5$

$$r_d = \frac{\mathrm{R_d}}{0.5} = \frac{0.0}{0.5} = 0.0$$

<u>*Independent Analysis Results for Damaged Limit State at Pier 3 Cap Near Interior Girder*</u>

After application of dead load, fracture through the straddle bent was modeled by removing elements near the interior girder, in the location shown above for the record model. Following fracture, no additional load was applied. Prior to the fracture, lateral bending in the bottom flange of the fascia girder was 7 k-ft.

Following the fracture, lateral bending in the same element was 800 k-ft. Deflection of the straddle bent box beam at the location of the fracture was 23.3 in downward. Deflection of the fascia girder at Pier 3 was 12.9 in downward. While the magnitude of response is significantly different than noted in the record model, the behavior and deflected shape are similar and the resulting $r_d = 0$ is the same. Figure 18 shows the deflected shape of Pier 3 following fracture. Note that in the event of a complete fracture through the pier cap, deflections in the superstructure could cause large rotations at the straddle bent bearings. Plots comparing member response from the record and independent analyses are included in Appendix 3.

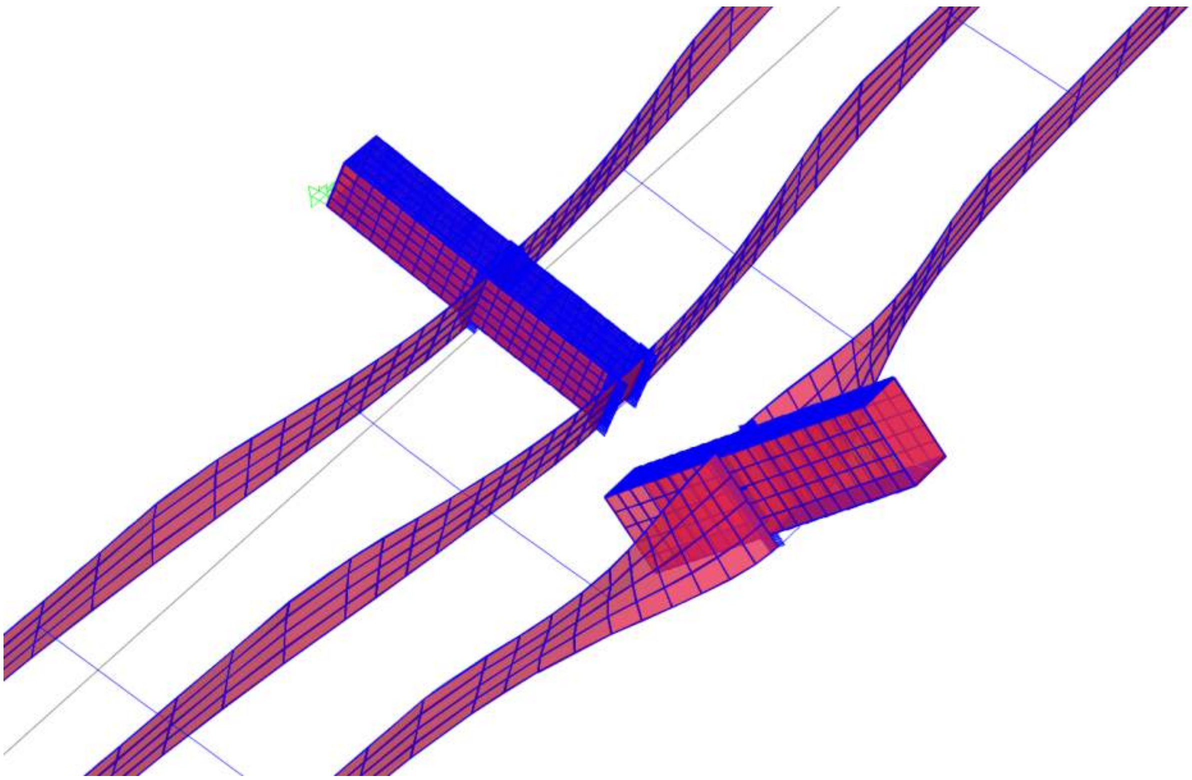


Figure 18: Deflected Shape of Independent Model Straddle Bent Following Fracture Near Interior Girder (Deck not shown for clarity)

<u>Damaged Limit State – Pier 3 Straddle Bent Cap Fracture Near Fascia Girder</u>

A second damaged condition at the straddle bent was investigated for fracture near a fascia girder. This was achieved by removing a critical section adjacent to the exterior girder after all dead load had been added and before the first increment of live loading was applied. The straddle bent box girder was altered as shown in Figure 19. Note that this cut section is similar to the critical section in the middle of the bent but shifted to be worst case for the exterior girder location.

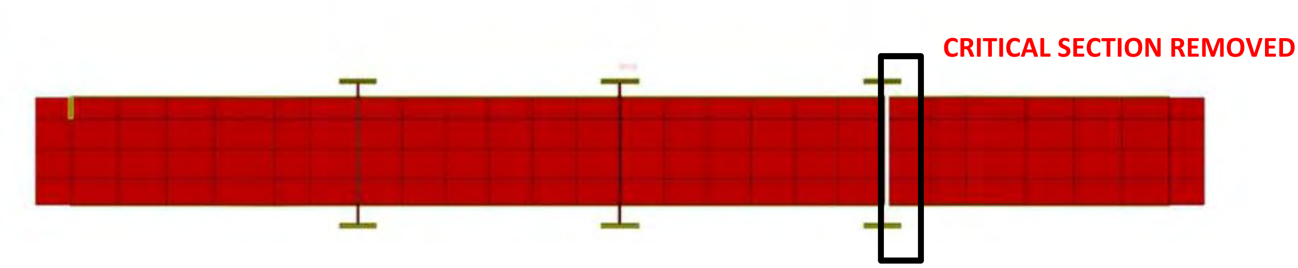


Figure 19: Location of Fracture in Damaged Condition at Straddle Bent Pier Cap

After the section was removed, the worst case of live loading that would maximize the negative effects on the cross beam at this location were obtained from investigation using influence surface analyses. The same placement of live loading as used in the ultimate loading condition was again applied to the model for the damaged loading condition. This configuration of two Lanes of HL-93 double trucks is shown in Figure 13.

After the section was cut, live loading was increased until unacceptable deformation had occurred. This was deemed the mechanism of failure at 1.25 x HL-93 loading as the displacement reached is D=23.1 in downwards which is almost double the L / 100 criteria of 120 ft/100 = 14.4 in. Therefore, $R_d = LF_d / LF_1$ = 1.25 / 3.88 = 0.322 < 0.5.

$$r_d = \frac{\mathrm{R_d}}{0.5} = \frac{0.322}{0.5} = 0.644 < 1.0$$

The deflected shape of the bridge at failure is shown in Figure 20.

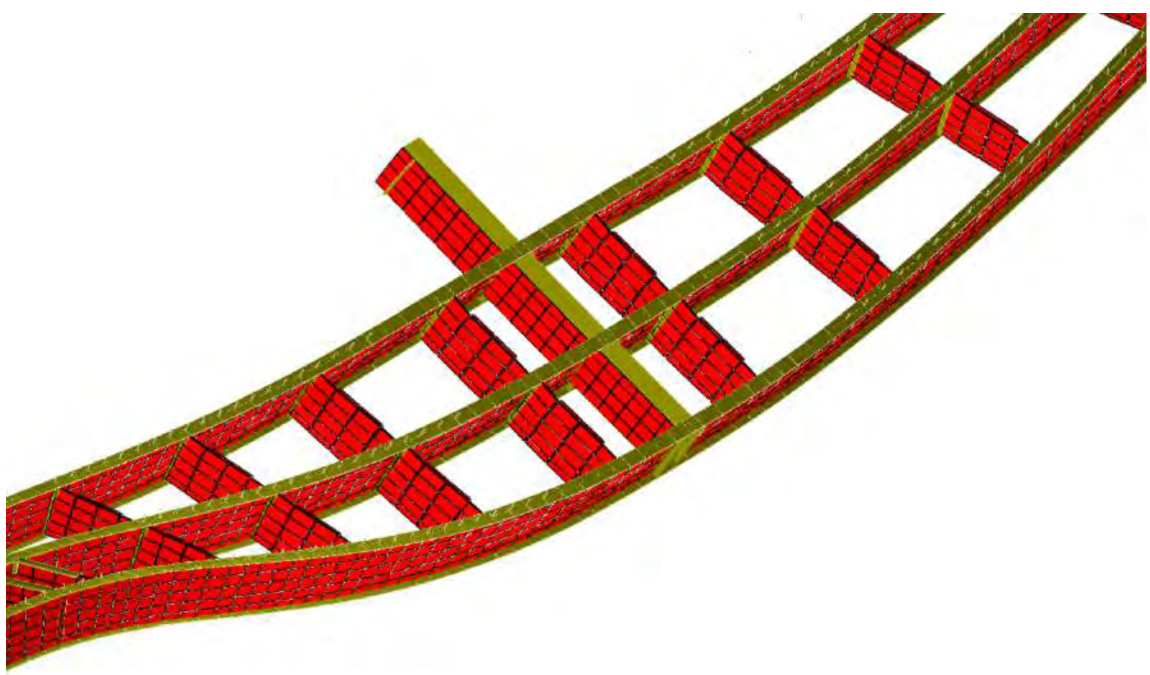


Figure 20: Deflected Shape at Straddle Bent Following Fracture Near Exterior Girder (Deck not shown for clarity)

Independent Analysis of Damaged Limit State at Pier 3 Cap Near Fascia Girder

After application of dead load, fracture through the straddle bent was modeled by removing elements near the fascia girder, in the location shown above for the record model. A support was added to the free end of the straddle bent, outside of the fascia girder, to avoid a structural instability and allow the analysis to continue. Deflection in the fascia girder was 15.6 in downward following removal of the fractured elements. Live load was incremented to 1.0 x HL-93, where deflection in the fascia girder was 22.25 in downward. The magnitude of load and deflection are similar to those noted in the record model, and the resulting $r_d < 1.0$, so no additional live load increments were placed on the independent model. Figure 21 shows the deflected shape of the model near Pier 3 following fracture. Note that in the event of a complete fracture through the pier cap, deflections in the superstructure could cause large rotations at the straddle bent bearings. Plots comparing member response from the record and independent analyses are included in Appendix 3.

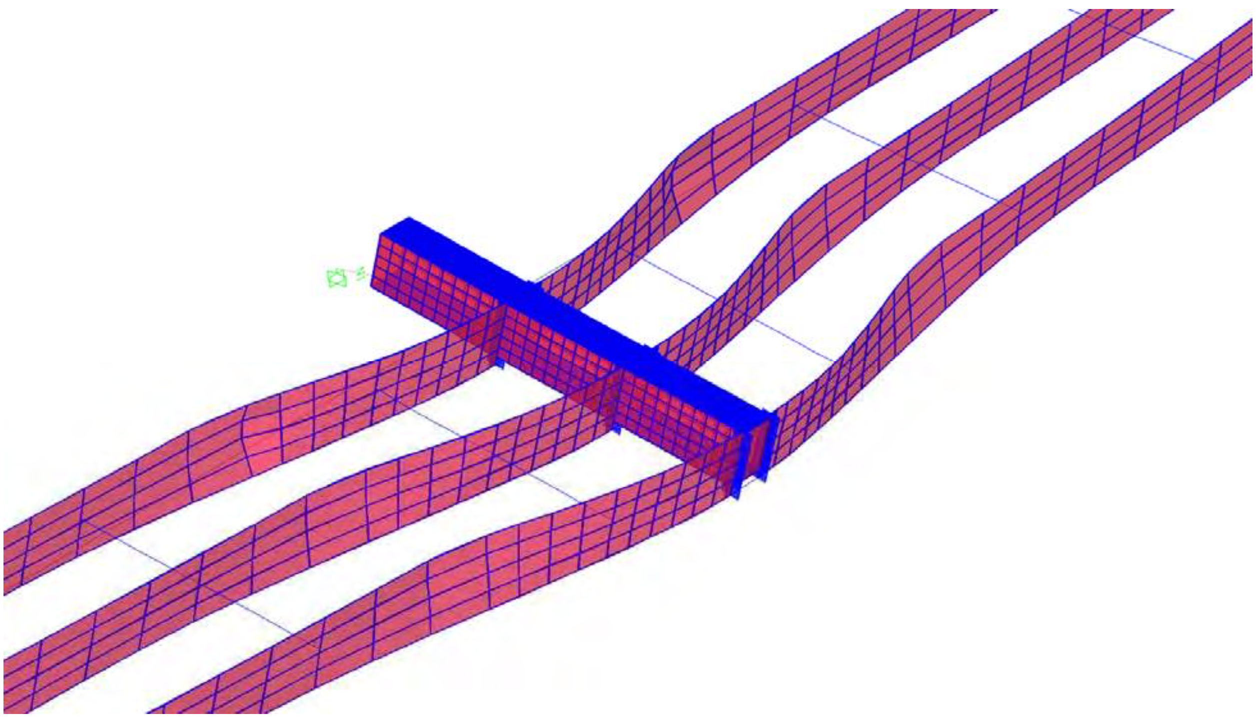


Figure 21: Deflected Shape of Independent Model Straddle Bent Following Fracture Near Exterior Girder (Deck not shown for clarity)

Conclusions and Recommendations

Using the criteria from NCHRP 406 and based on the results of these analyses, that are also confirmed by the independent modeling, Bridge 69102 is considered overall non-redundant, as shown:

- Integral hammerhead steel cap beam at Piers 2 and 4

  $r_1 = 3.54 > 1.0$, $r_u = 1.69 > 1.0$, $r_d = 4.26 > 1.0$, REDUNDANT

- Straddle Bent Steel Box Cross beam at Pier 3

  $r_1 = 1.75 > 1.0$, $r_u = 0.89 < 1.0$, $r_d = 0.0 < 1.0$, NOT REDUNDANT

However, when the results are inspected more closely, the only element in the structure that would force the structure to be classified as non-redundant is the straddle bent steel box cross beam at Pier 3. This element, unlike the hammerhead steel cap beams at Piers 2 and 4, was not originally designed with alternative redundant load paths.

Therefore, based on the above results, the bridge could be classified as redundant if an alternate load path can be designed for the straddle bent steel box beam. Load path or structural redundancy could be achieved by modifying the framing layout to include an alternate load path that would carry the girder loads to the supports. Alternatively, internal member redundancy could be achieved by providing an alternate path for the loads to be resisted through added back up elements within the cross beam itself. Conceptual drawings of both alternatives are included in Appendix 4 – Proposed Redundancy Repairs. MnDOT Bridge Office selected the load path redundancy repair as the preferred alternative, but has opted not to implement the redundancy repairs at the time of this report. The proposed load path redundancy repair is conceptual and would require further analysis and design to confirm that it provides redundancy as defined by NCHRP 406.

A scoping level cost estimate was developed for both repair concepts. The estimated cost of the load path redundancy repair is approximately $233,700, while the estimated cost of the internal member redundancy repair is $159,00. Details of the cost estimate are included in Appendix 5 – Scoping Level Cost Estimate of Repairs.

Additional repairs proposed to extend the service life of the bridge include repainting steel the pier caps, girders below expansion joints, and the bottom flanges of fascia girders to address areas of localized paint failure.

Appendices

Appendix 1. Elastic Model Comparisons
Appendix 2. Member Capacity Calculations
Appendix 3. Redundancy Analysis Comparisons
Appendix 4. Proposed Redundancy Repairs
Appendix 5. Scoping Level Cost Estimate of Repairs

Appendix 1

Elastic Model Comparisons

	Record	Independent	Difference	
Stage	[k]	[k]	[k]	[%]
Steel	418.9	414.1	4.82	-1.16%
Pour Deck	1422.5	1411.9	10.6	0.75%
Parapet	317.1	317.1	0.0	0.01%
Total	2158.6	2143.2	15.4	0.71%

Figure 1: Dead Load Reactions

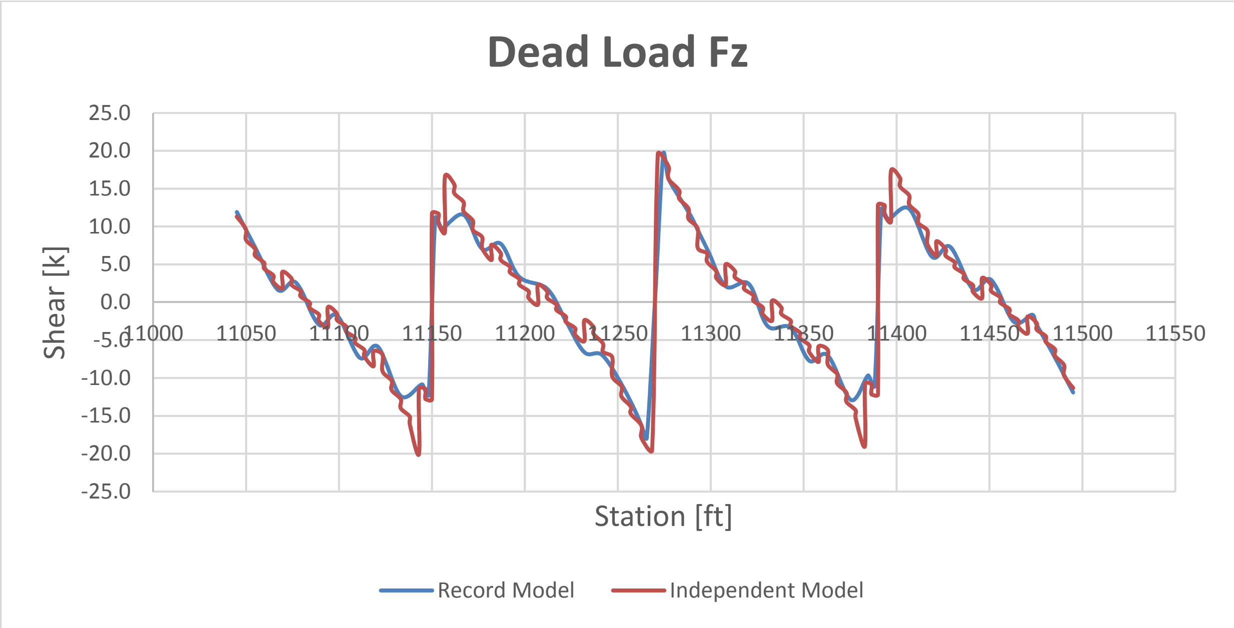


Figure 2: Girder B6 Dead Load Shear

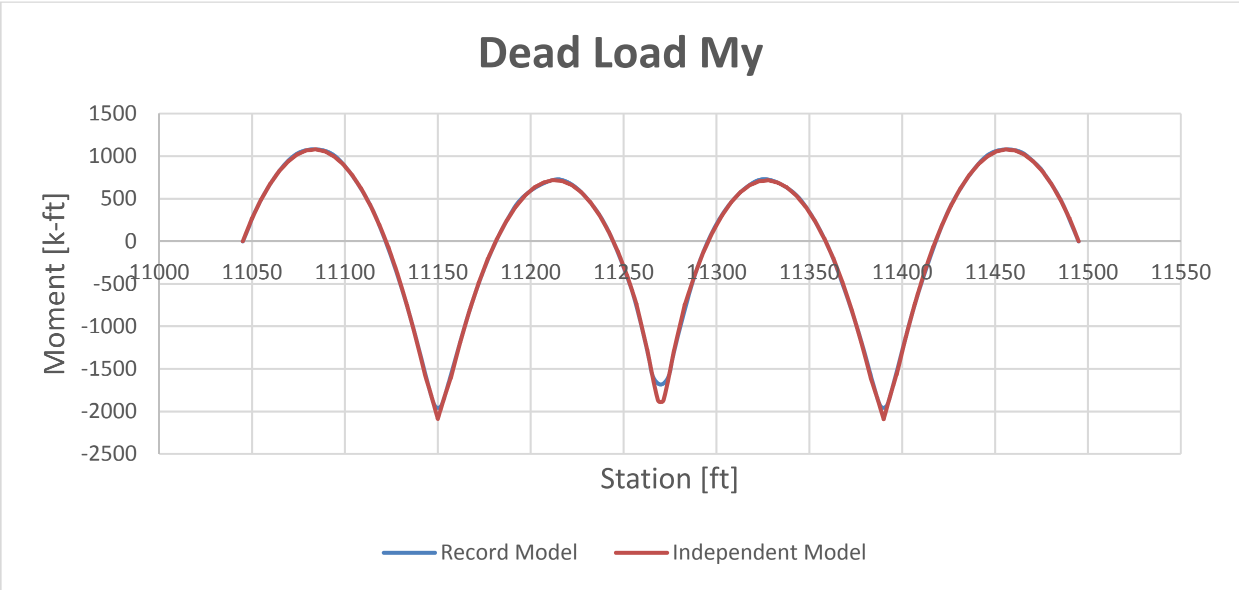


Figure 3: Girder B6 Dead Load Moment

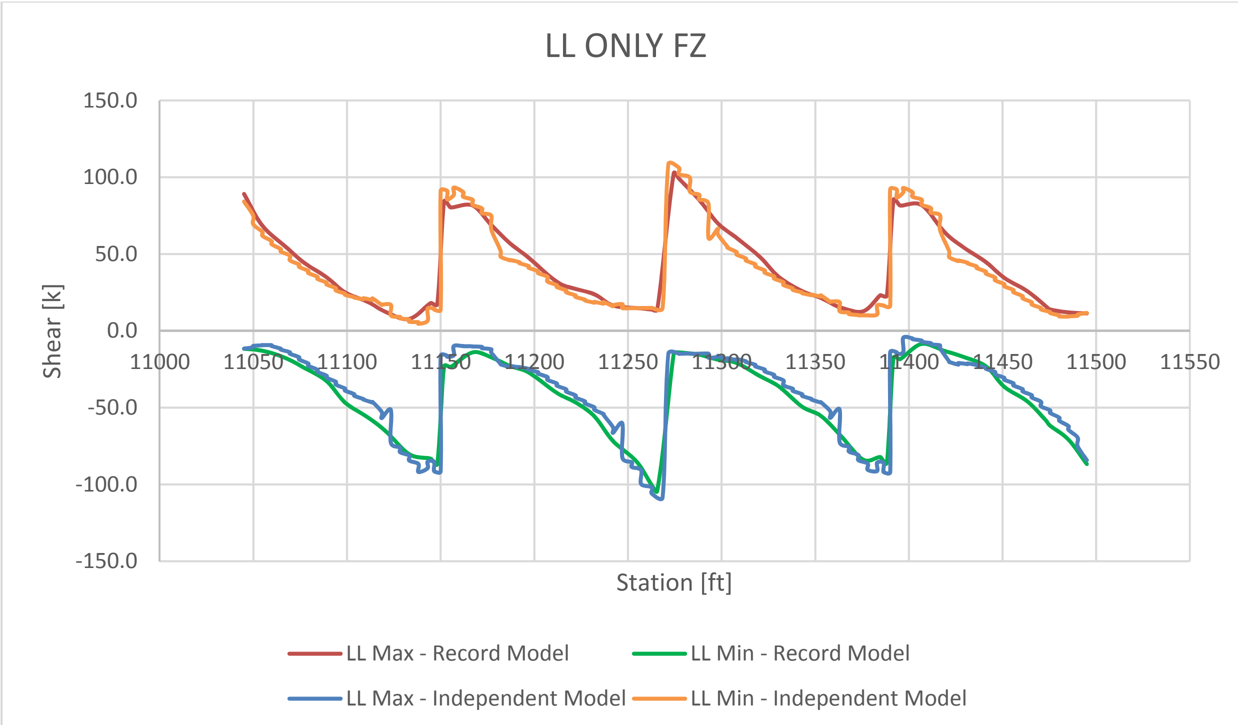


Figure 4: Girder B6 Live Load Shear

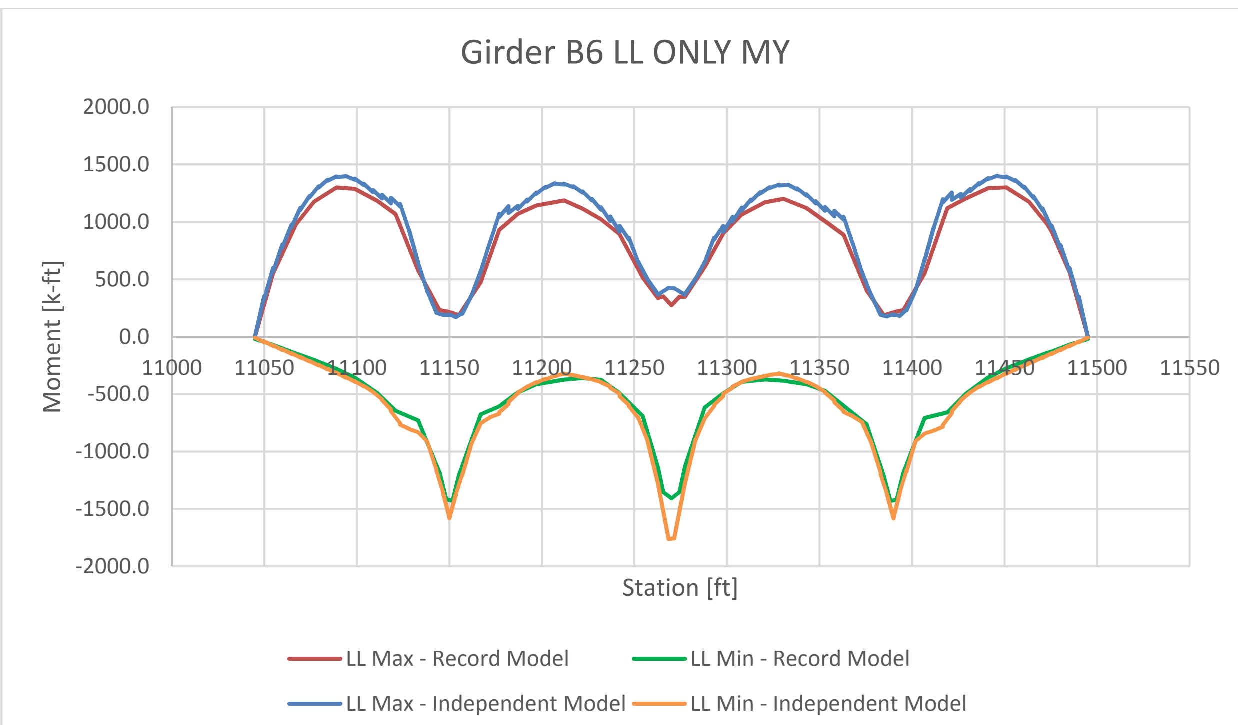


Figure 5: Girder B6 Live Load Moment

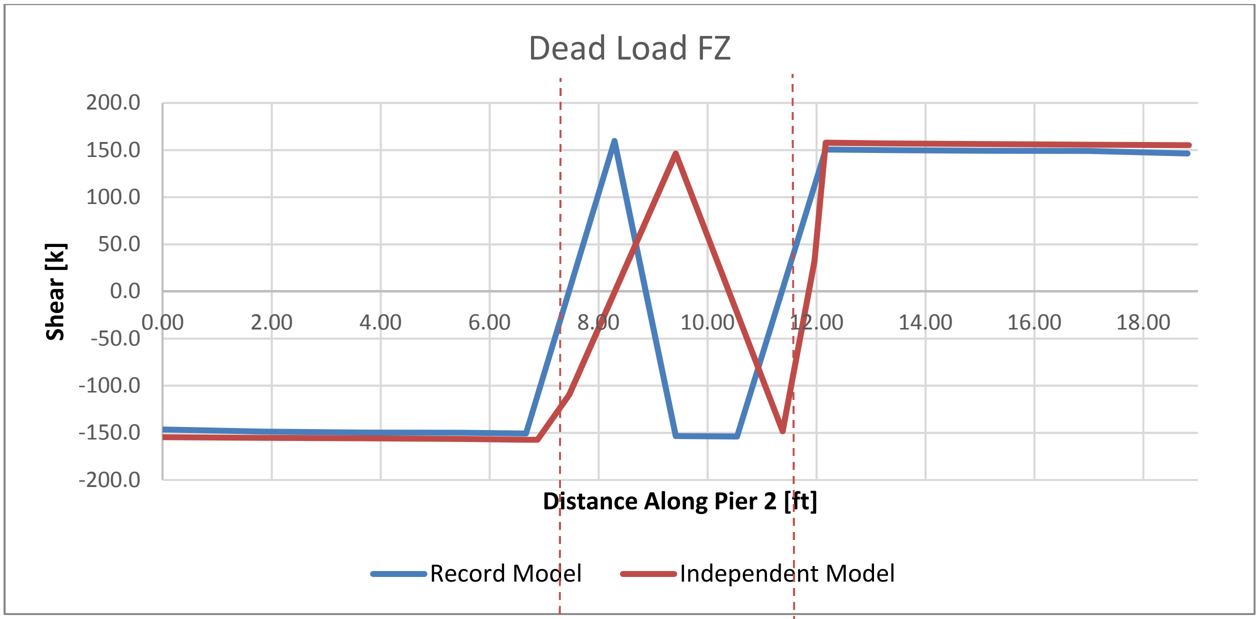
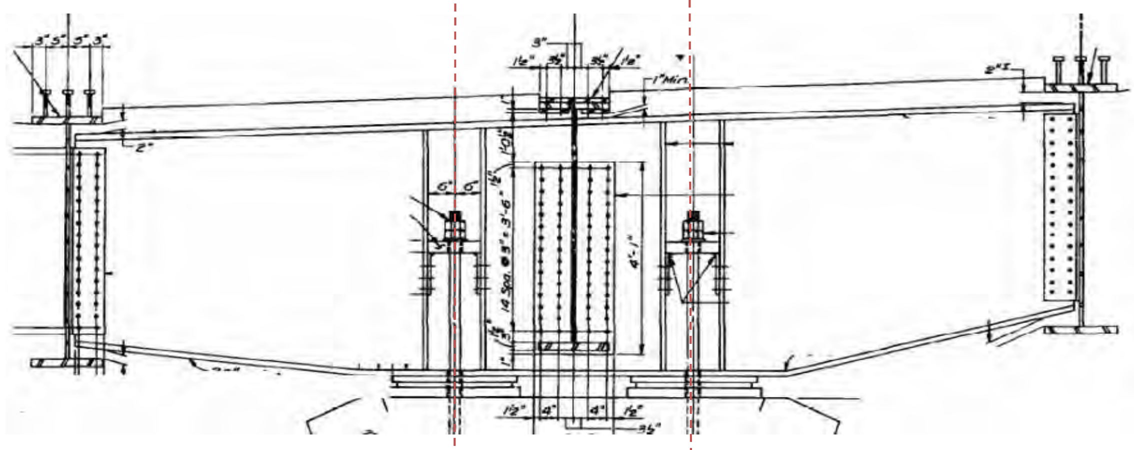


Figure 6: Pier 2 Cap Beam Dead Load Shear



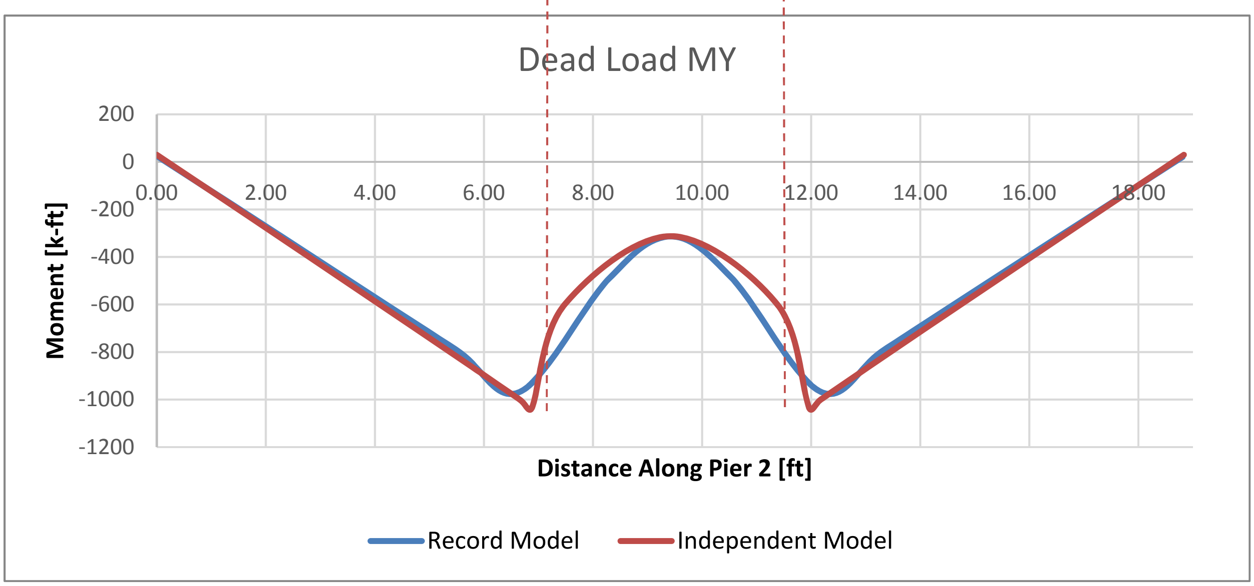


Figure 7: Pier 2 Cap Beam Dead Load Moment

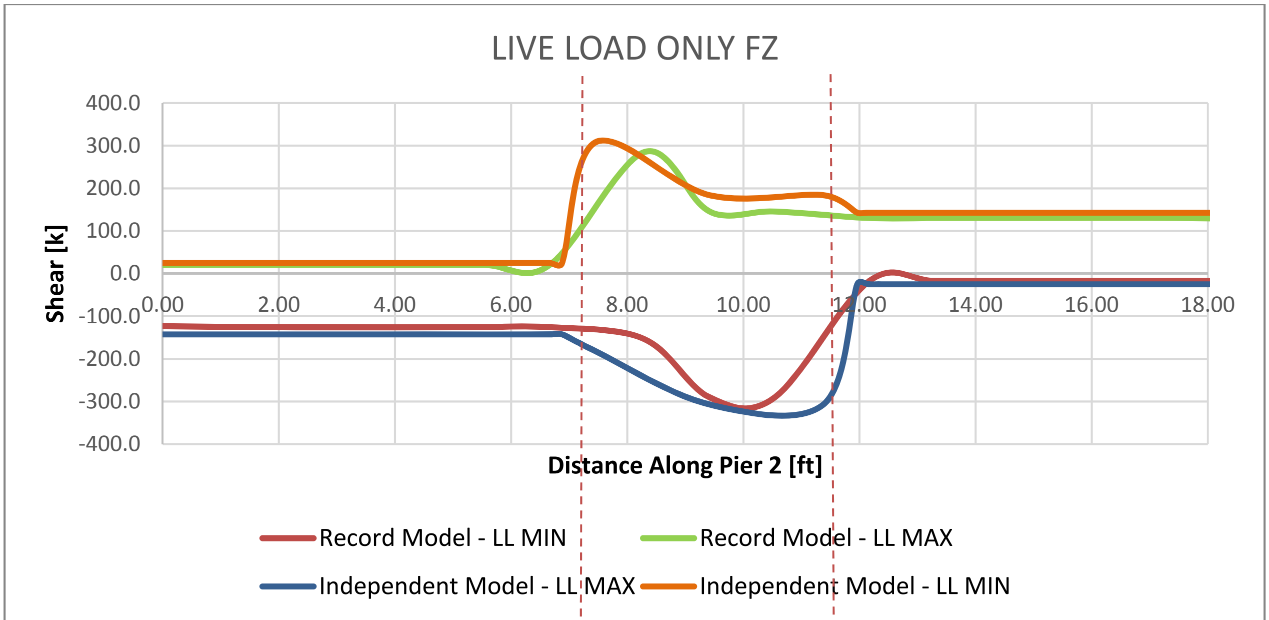
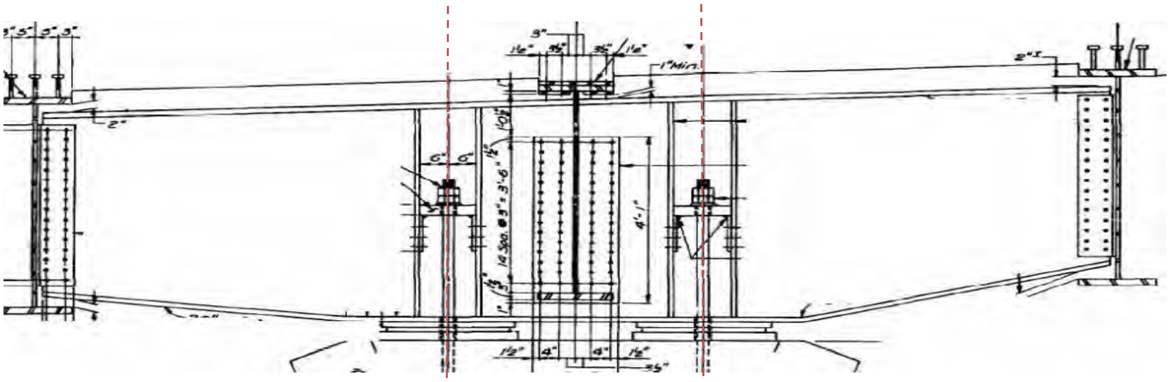


Figure 8: Pier 2 Cap Beam LL Shear



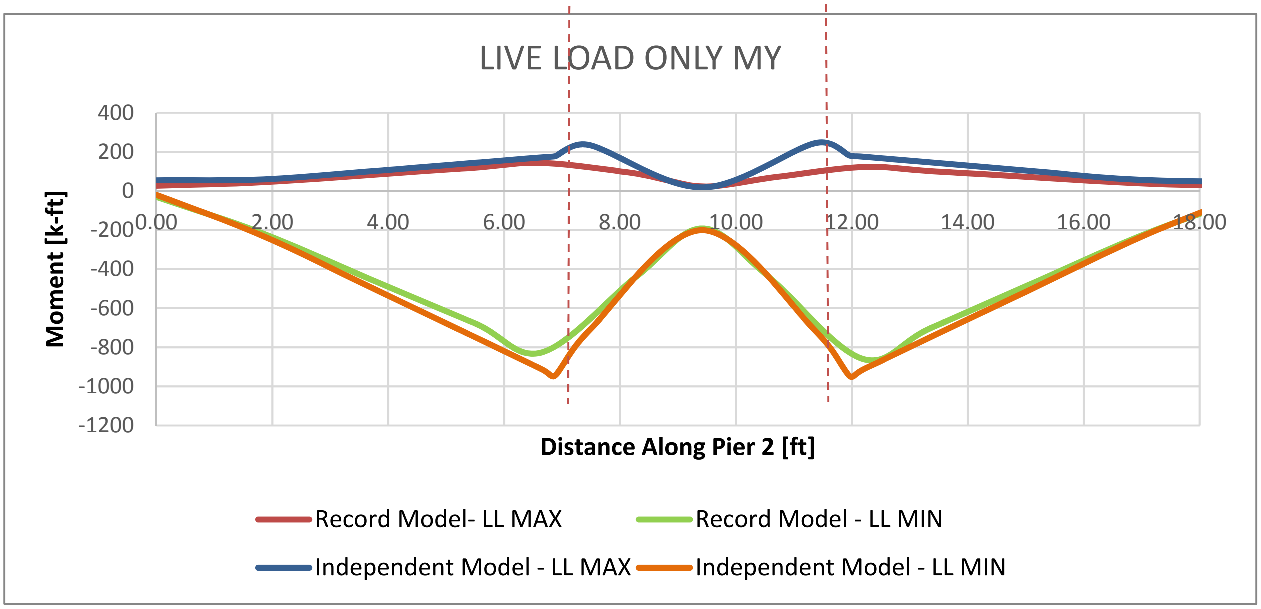


Figure 9: Pier 2 Cap Beam LL Moment

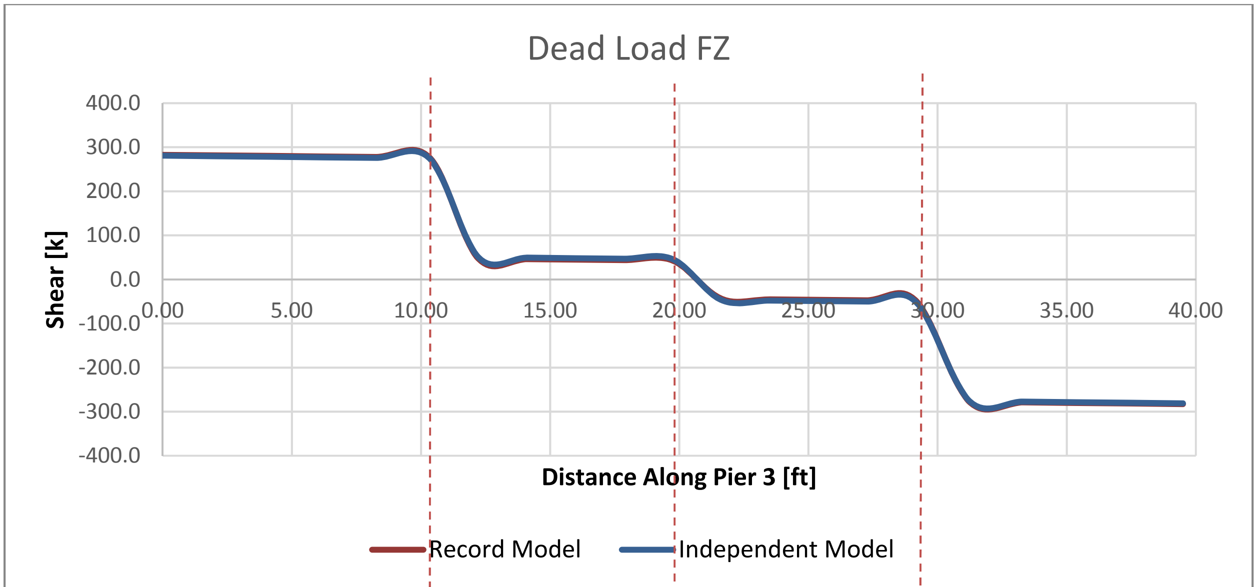
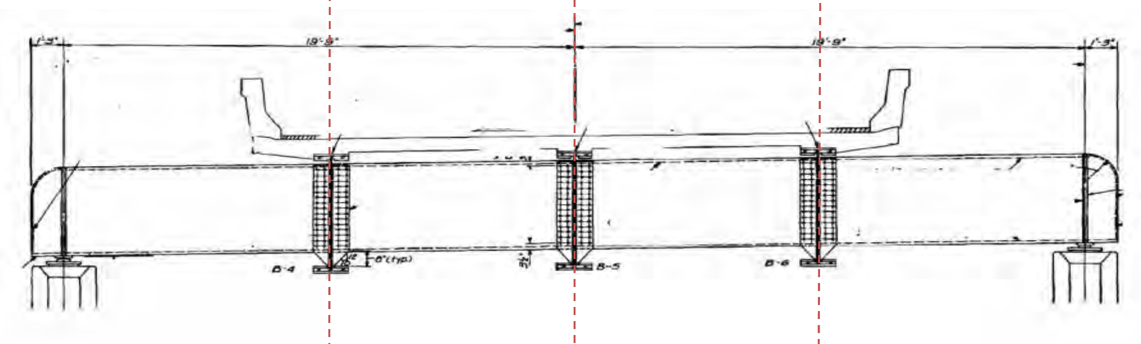


Figure 10: Pier 3 Box Dead Load Shear



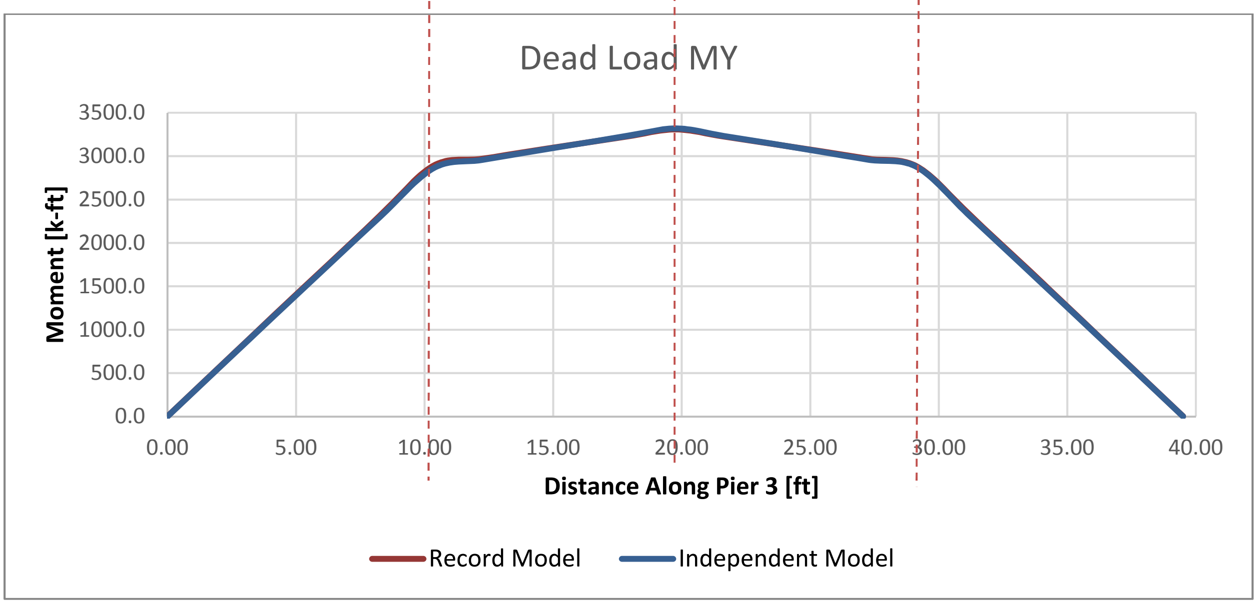


Figure 11: Pier 3 Box Dead Load Moment

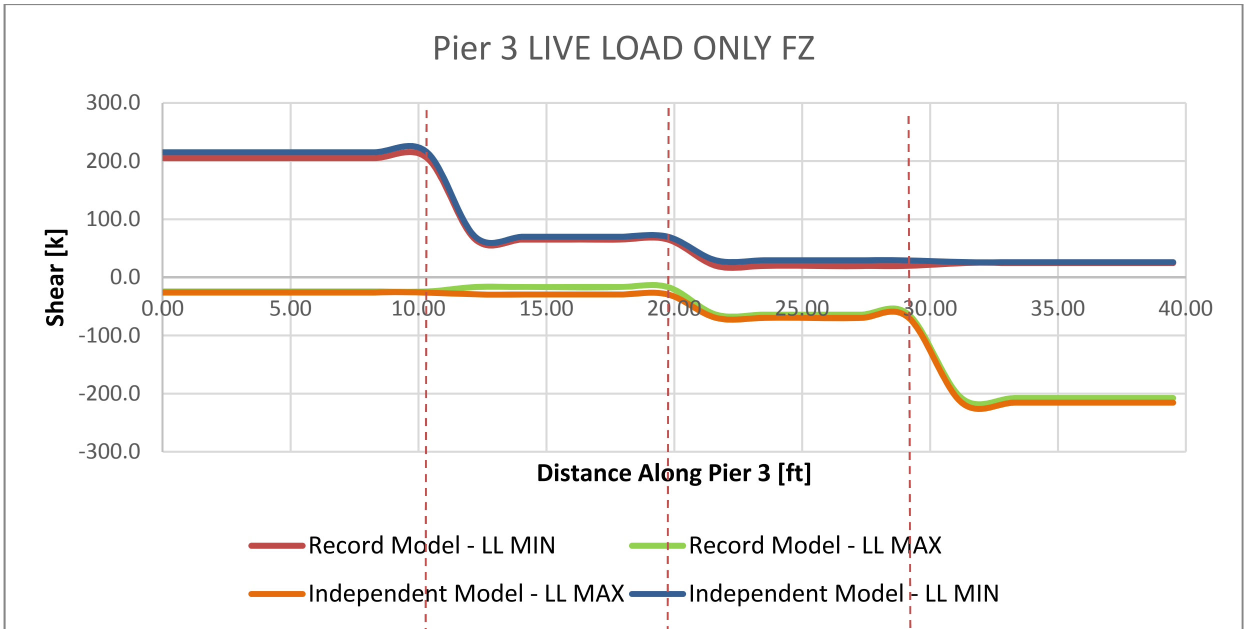


Figure 12: Pier 3 Box Live Load Shear

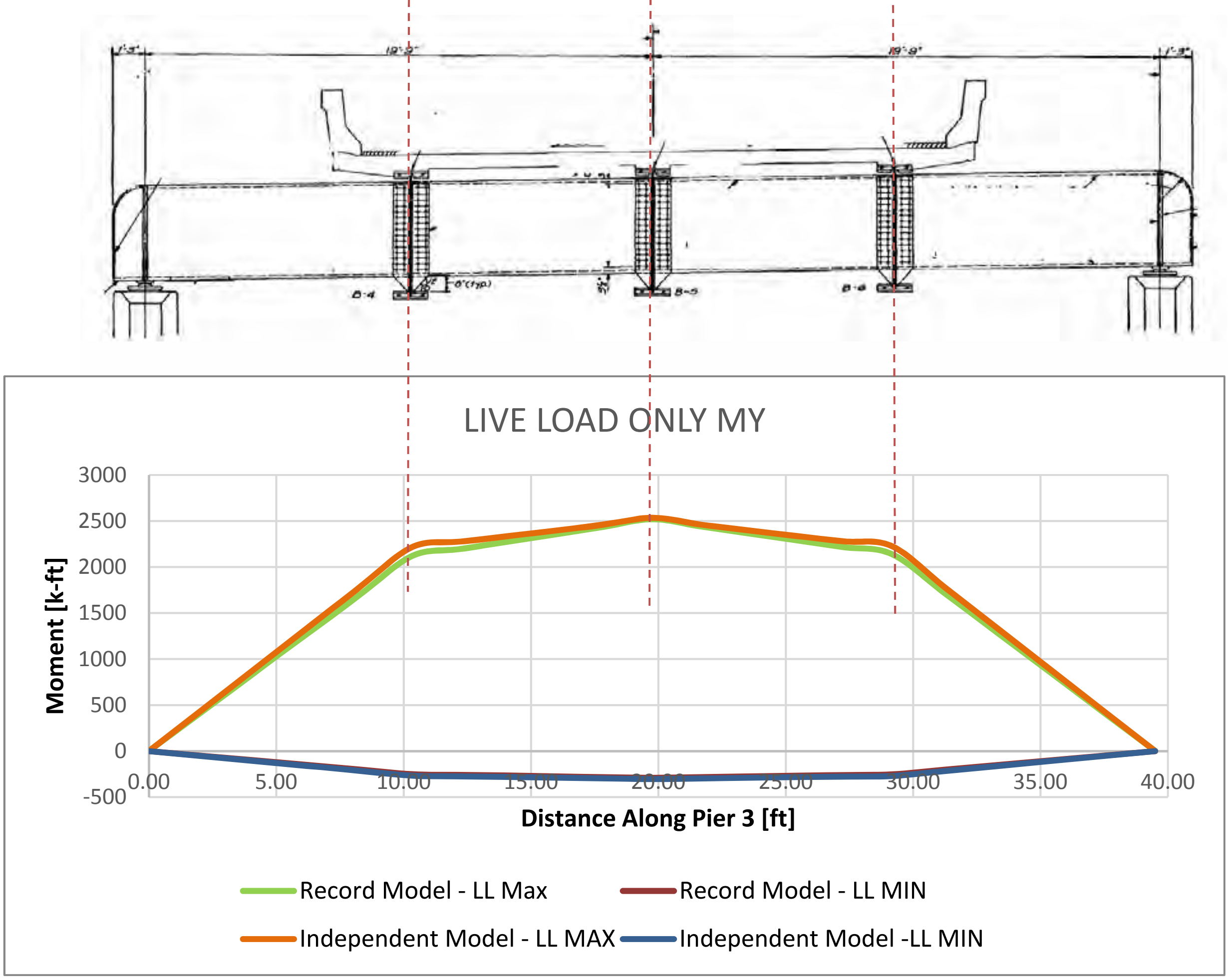


Figure 13: Pier 3 Box Live Load Moment

Appendix 2

Member Capacity Calculations

HNTB	Prepared by: Craig Hetue	Approved by:	Document number: QF 06
Calculation Cover Sheet	Revision Number: 0	Revision Date: 6/19/2017	Page 1 of __

Project: Fracture Critical Pier Caps	Job No: 64517	Design Criteria Document:
Client: MnDOT	Discipline:	Calculation No:

Name or Description of Calculation: Bridge 69102 Member Capacity and Redundancy Calculations.

Calc. Rev. No.	Originator	Checker	Senior Technical Reviewer (if required)	Confirmation Required (Y/N)

Calculation Objective: Establish the Member Capacity and redundancy values for Member and Ultimate loading conditions.

Calculation Methodology/List of Assumptions:
Applied AASHTO design and NCHRP 406 criteria to establish the redundancy limit states.

References/Inputs:

Attachments: (List each attachment following the subject calculation)
Bridge 69102 Design Calculations

Conclusions:

Document Check:	Name	Signature	Date
Originator:	Michael Xin	[signature]	27 July 17
Checker:	Travis Konda	[signature]	28JUL17
BackChecker:	Michael Xin	[signature]	29 July 17
Updater:	Michael Xin	[signature]	29 July 17
Verifier:	Travis Konda	[signature]	30JUL17

BRIDGE 69102 DESIGN CALCULATION

HNTB JOB #: 64517

INDEX OF DESIGN CALCULATION

1. Design Summary

HNTB	By: MX	Date: 08/03/17	Job No. 64517
	Chkd By: TFS	Date: 8/6/2017	
HNTB Corp.	Bckchk By: MX	Date: 8/7/2017	Sht. No.

	Marco ID	LF1	r_1	LF_u	$LF_u/LF1_{\_B4}$	r_u	LF_d	$LF_d/LF1_{\_B4}$	r_d
Case 1: Edge Beam B4	1172	**3.88**	1.30	> 5.5	1.42	1.09	N/A	N/A	N/A
Case 2: Cap Beam	1189	8.50	3.54	8.50	2.19	1.69	8.25	2.13	4.26
Case 3a: Straddle Bent	1203	4.34	1.75	4.49	1.16	0.89	0.00	0.00	0.00
Case 3b: Straddle Bent	1201	5.33	2.14	N/A	N/A	N/A	1.25	0.32	0.65

Made by: MX 07/29/17
Checked By: TFK on 07/31/17
Backchecked By: MX on 07/31/17

Summary of Elastic Results for Bridge 69102

	Location	Macro ID	Larsa Sta. (ft)	LF1	r_1
	HINGE 1	1001	0.0	4.87	2.07
Span 2 (B6)	0.0	1002	12.3	8.74	3.72
	CF2	1003	24.5	5.78	2.27
	0.0	1004	36.8	4.86	1.94
	CF3	1005	49.0	4.73	1.92
	0.0	1006	61.3	5.54	2.32
	CF4	1007	73.5	7.17	3.18
	0.0	1008	86.9	6.97	2.88
	Section Change	1009	87.0	12.36	5.06
	0.0	1010	90.7	10.97	4.26
	0.0	1011	94.3	8.80	3.43
	CF5	1012	98.0	6.81	2.60
	0.0	1013	101.0	6.03	2.33
	Pier 2	1014	104.0	4.23	1.49
	Pier 2	1015	105.0	3.98	1.40
	Pier 2	1016	106.0	4.02	1.41
Span 3 (B6)	0.0	1017	109.0	6.01	2.34
	CF6	1018	112.0	6.76	2.56
	Section Change	1019	123.0	13.34	5.32
	0.0	1020	123.1	6.40	2.69
	CF7	1021	137.0	7.70	3.48
	0.0	1022	149.5	6.26	2.68
	CF8	1023	162.0	5.51	2.31
	0.0	1024	174.5	5.97	2.44
	CF9	1025	187.0	7.08	2.98
	0.0	1026	206.9	6.92	2.94
	Section Change	1027	207.0	14.97	6.35
	0.0	1028	209.5	13.28	5.54
	CF10	1029	212.0	11.35	4.70
	0.0	1030	218.0	7.14	2.89
	0.0	1031	221.0	5.66	2.24
	Pier 3	1032	224.0	6.78	2.71
	Pier 3	1033	225.0	6.99	2.77
	Pier 3	1034	226.0	7.13	2.89
Span 4 (B6)	0.0	1035	232.0	7.14	2.89
	CF11	1036	238.0	11.40	4.72
	Section Change	1037	243.0	13.66	5.80
	0.0	1038	243.1	6.33	2.70
	CF12	1039	263.0	6.79	2.87
	0.0	1040	275.5	5.79	2.40
	CF13	1041	288.0	5.44	2.26
	0.0	1042	300.5	6.42	2.72
	CF14	1043	313.0	8.33	3.72
	0.0	1044	326.9	7.17	3.00
	Section Change	1045	327.0	13.16	5.25
	CF15	1046	338.0	6.96	2.67
	Pier 4	1047	344.0	4.15	1.46
	Pier 4	1048	345.0	3.83	1.33
	Pier 4	1049	346.0	4.31	1.52
	0.0	1050	349.0	6.11	2.34
	CF16	1051	352.0	6.91	2.61
	Section Change	1052	363.0	12.78	5.23
	0.0	1053	363.1	6.56	2.72

Made by: MX 07/29/17
Checked By: TFK on 07/31/17
Backchecked By: MX on 07/31/17

Summary of Elastic Results for Bridge 69102

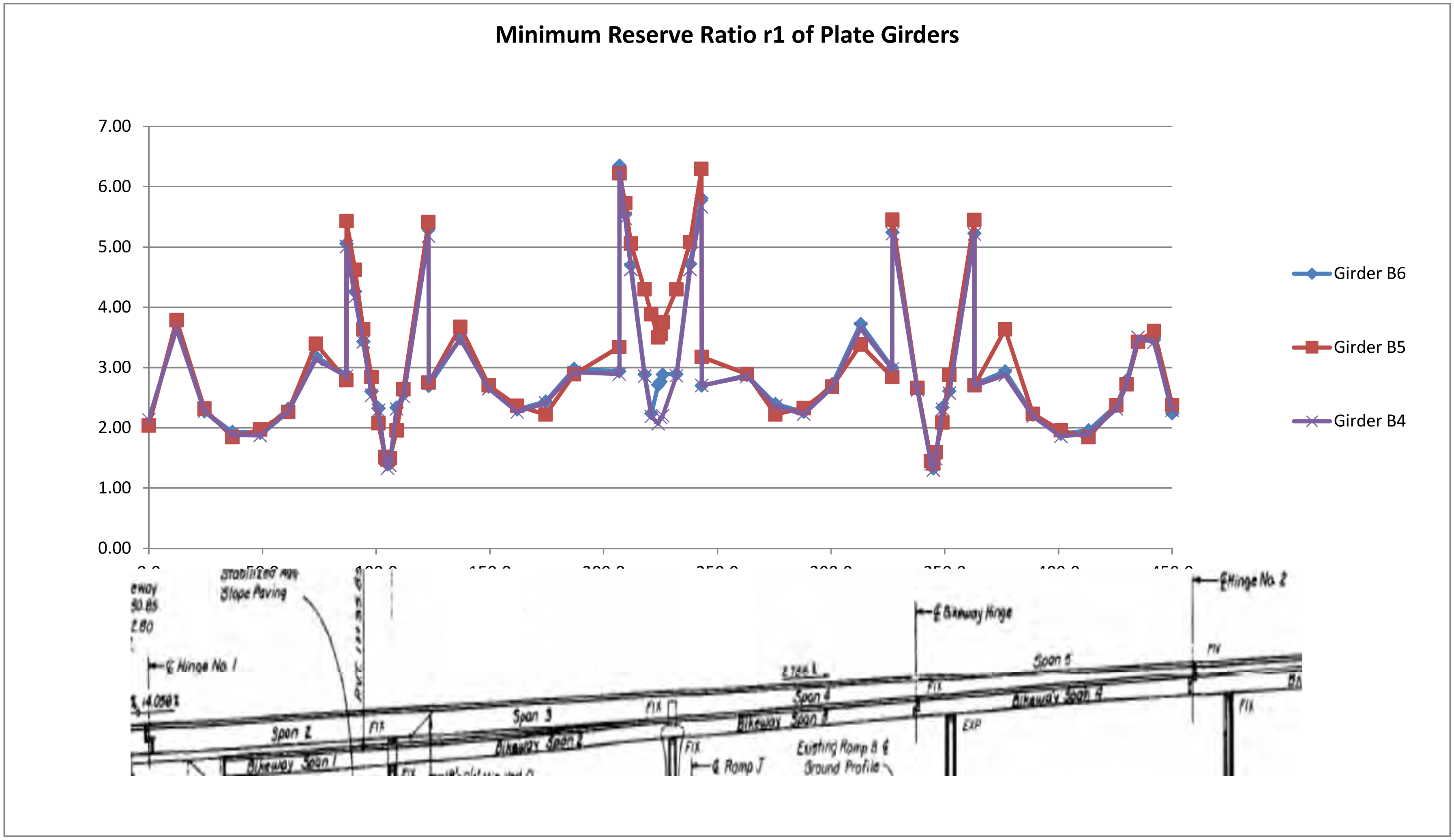
	Location	Macro ID	Larsa Sta. (ft)	LF1	r_1
Span 5 (B6)	CF17	1054	376.5	6.57	2.94
	0.0	1055	388.8	5.29	2.22
	CF18	1056	401.0	4.67	1.90
	0.0	1057	413.3	4.91	1.96
	CF19	1058	425.5	6.03	2.37
	0.0	1059	430.0	7.10	2.79
	0.0	1060	435.0	9.07	3.43
	0.0	1061	442.0	8.13	3.46
	HINGE 2	1062	450.0	5.31	2.24
	HINGE 1	1063	0.0	4.81	2.04
Span 2 (B5)	0.0	1064	12.3	9.48	3.79
	CF2	1065	24.5	5.83	2.32
	0.0	1066	36.8	4.55	1.84
	CF3	1067	49.0	4.85	1.97
	0.0	1068	61.3	5.36	2.26
	CF4	1069	73.5	8.11	3.40
	0.0	1070	86.9	6.45	2.79
	Section Change	1071	87.0	12.55	5.43
	0.0	1072	90.7	11.37	4.62
	0.0	1073	94.3	9.30	3.64
	CF5	1074	98.0	7.26	2.84
	0.0	1075	101.0	5.30	2.08
	Pier 2	1076	104.0	3.92	1.52
	Pier 2	1077	105.0	3.81	1.47
	Pier 2	1078	106.0	3.83	1.49
Span 3 (B5)	0.0	1079	109.0	4.93	1.96
	CF6	1080	112.0	6.65	2.64
	Section Change	1081	123.0	13.46	5.41
	0.0	1082	123.1	6.60	2.75
	CF7	1083	137.0	8.80	3.68
	0.0	1084	149.5	6.33	2.70
	CF8	1085	162.0	5.69	2.37
	0.0	1086	174.5	5.25	2.22
	CF9	1087	187.0	6.71	2.89
	0.0	1088	206.9	7.72	3.34
	Section Change	1089	207.0	14.32	6.22
	0.0	1090	209.5	13.50	5.73
	CF10	1091	212.0	12.15	5.06
	0.0	1092	218.0	10.43	4.30
	0.0	1093	221.0	9.47	3.88
	Pier 3	1094	224.0	8.59	3.50
	Pier 3	1095	225.0	8.72	3.55
	Pier 3	1096	226.0	9.20	3.75
Span 4 (B5)	0.0	1097	232.0	10.43	4.29
	CF11	1098	238.0	12.20	5.08
	Section Change	1099	243.0	14.52	6.30
	0.0	1100	243.1	7.57	3.18
	CF12	1101	263.0	6.71	2.89
	0.0	1102	275.5	5.26	2.22
	CF13	1103	288.0	5.59	2.33
	0.0	1104	300.5	6.29	2.68
	CF14	1105	313.0	7.95	3.38
	0.0	1106	326.9	6.99	2.84
	Section Change	1107	327.0	13.55	5.45
	CF15	1108	338.0	6.72	2.67

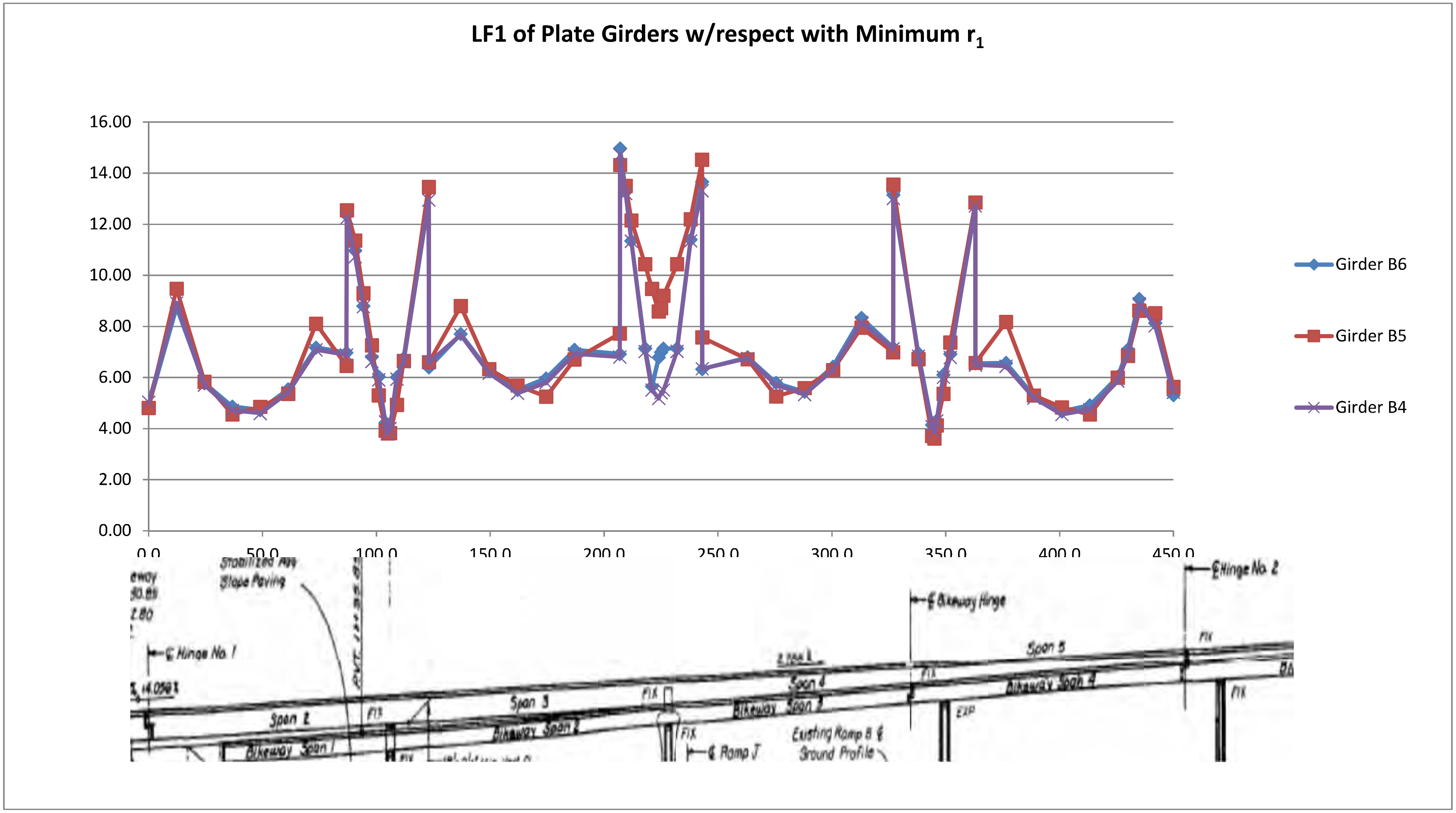
	Summary of Elastic Results for Bridge 69102				
	Location	Macro ID	Larsa Sta. (ft)	LF1	r_1
	Pier 4	1109	344.0	3.71	1.45
	Pier 4	1110	345.0	3.61	1.41
	Pier 4	1111	346.0	4.13	1.60
Span 5 (B5)	0.0	1112	349.0	5.36	2.09
	CF16	1113	352.0	7.37	2.87
	Section Change	1114	363.0	12.86	5.45
	0.0	1115	363.1	6.57	2.71
	CF17	1116	376.5	8.17	3.63
	0.0	1117	388.8	5.29	2.23
	CF18	1118	401.0	4.83	1.96
	0.0	1119	413.3	4.56	1.84
	CF19	1120	425.5	5.99	2.37
	0.0	1121	430.0	6.85	2.72
	0.0	1122	435.0	8.62	3.43
	0.0	1123	442.0	8.52	3.60
	HINGE 2	1124	450.0	5.63	2.38
	HINGE 1	1125	0.0	5.03	2.14
Span 2 (B4)	0.0	1126	12.3	8.92	3.64
	CF2	1127	24.5	5.71	2.27
	0.0	1128	36.8	4.72	1.89
	CF3	1129	49.0	4.60	1.87
	0.0	1130	61.3	5.42	2.27
	CF4	1131	73.5	7.08	3.14
	0.0	1132	86.9	6.88	2.85
	Section Change	1133	87.0	12.26	5.01
	0.0	1134	90.7	10.73	4.17
	0.0	1135	94.3	8.78	3.43
	CF5	1136	98.0	6.63	2.54
	0.0	1137	101.0	5.91	2.29
	Pier 2	1138	104.0	4.26	1.49
	Pier 2	1139	105.0	3.81	1.33
	Pier 2	1140	106.0	4.00	1.37
	0.0	1141	109.0	5.94	2.31
	CF6	1142	112.0	6.62	2.52
	Section Change	1143	123.0	12.95	5.18

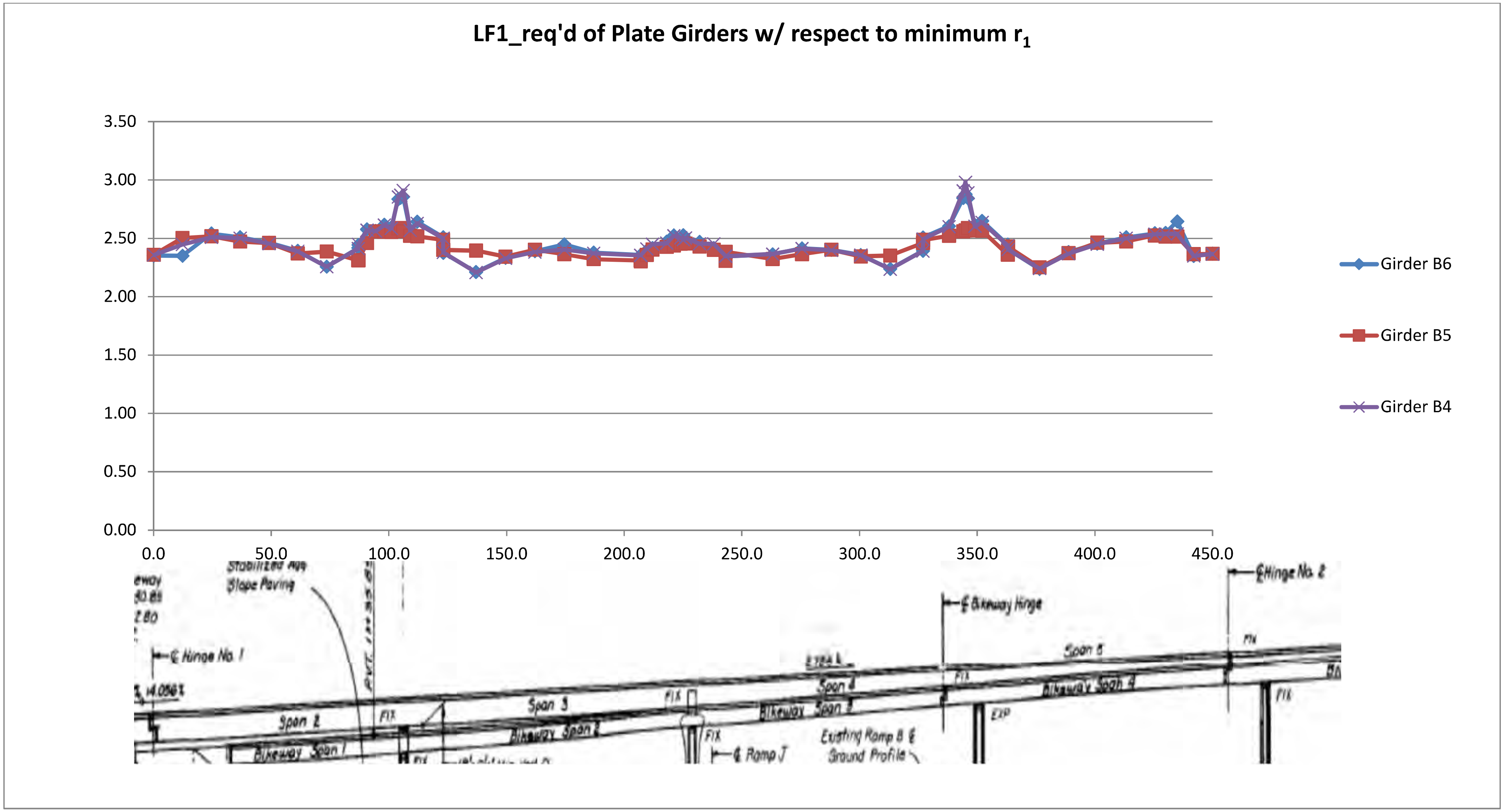
Made by: MX 07/29/17
Checked By: TFK on 07/31/17
Backchecked By: MX on 07/31/17

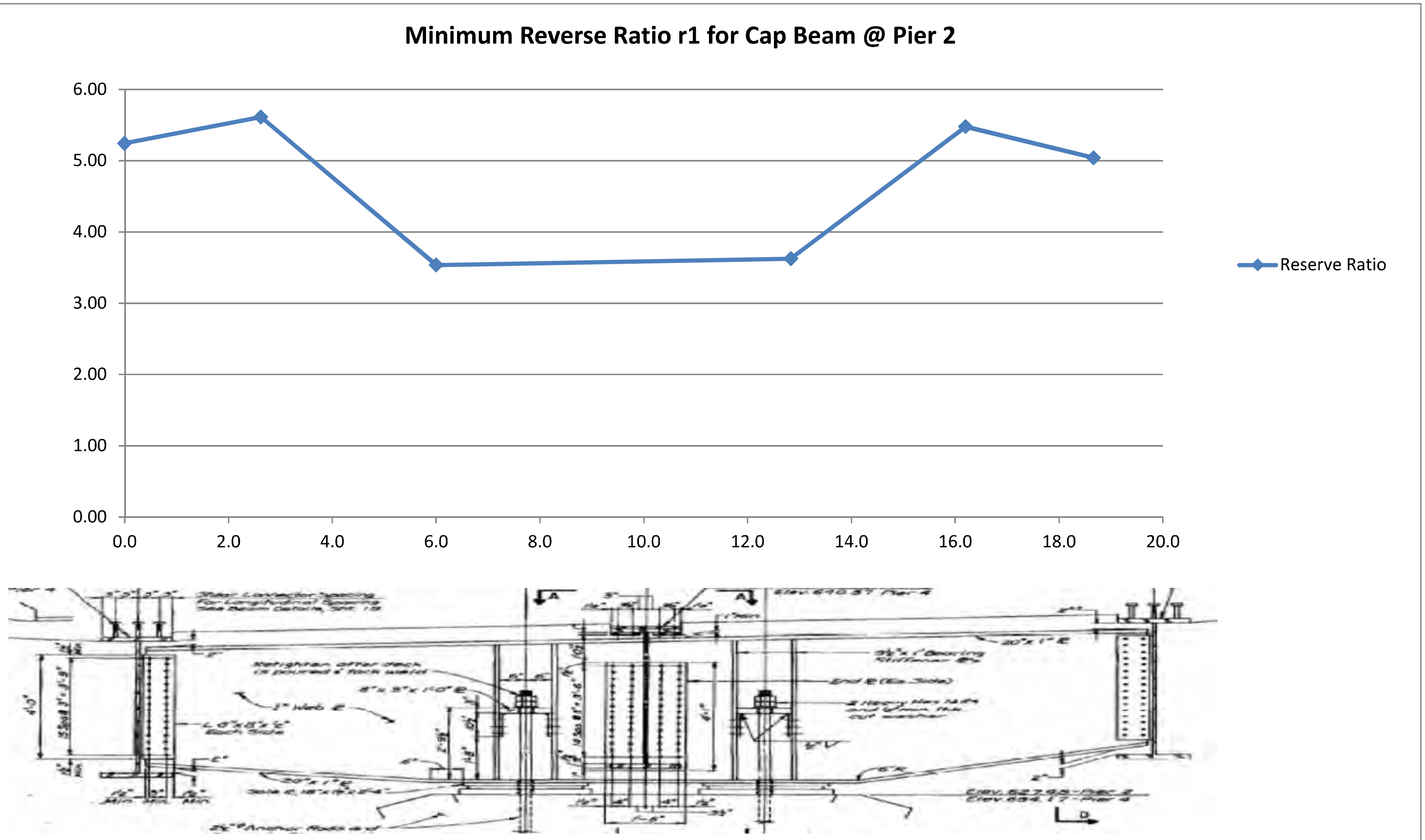
	Summary of Elastic Results for Bridge 69102				
	Location	Macro ID	Larsa Sta. (ft)	LF1	r_1
Span 3 (B4)	0.0	1144	123.1	6.59	2.77
	CF7	1145	137.0	7.67	3.47
	0.0	1146	149.5	6.17	2.65
	CF8	1147	162.0	5.39	2.26
	0.0	1148	174.5	5.80	2.41
	CF9	1149	187.0	6.93	2.92
	0.0	1150	206.9	6.80	2.89
	Section Change	1151	207.0	14.72	6.25
	0.0	1152	209.5	13.20	5.48
	CF10	1153	212.0	11.34	4.63
	0.0	1154	218.0	7.02	2.86
	0.0	1155	221.0	5.51	2.19
	Pier 3	1156	224.0	5.18	2.07
	Pier 3	1157	225.0	5.40	2.17
	Pier 3	1158	226.0	5.51	2.20
Span 4 (B4)	0.0	1159	232.0	7.03	2.86
	CF11	1160	238.0	11.35	4.63
	Section Change	1161	243.0	13.32	5.67
	0.0	1162	243.1	6.34	2.70
	CF12	1163	263.0	6.75	2.85
	0.0	1164	275.5	5.70	2.36
	CF13	1165	288.0	5.34	2.23
	0.0	1166	300.5	6.29	2.67
	CF14	1167	313.0	8.15	3.65
	0.0	1168	326.9	7.12	2.98
	Section Change	1169	327.0	13.02	5.22
	CF15	1170	338.0	6.84	2.63
	Pier 4	1171	344.0	4.08	1.40
	Pier 4	1172	345.0	3.88	1.30
	Pier 4	1173	346.0	4.30	1.49
Span 5 (B4)	0.0	1174	349.0	6.01	2.31
	CF16	1175	352.0	6.79	2.58
	Section Change	1176	363.0	12.72	5.22
	0.0	1177	363.1	6.49	2.70
	CF17	1178	376.5	6.44	2.87
	0.0	1179	388.8	5.20	2.19
	CF18	1180	401.0	4.55	1.86
	0.0	1181	413.3	4.75	1.90
	CF19	1182	425.5	5.86	2.31
	0.0	1183	430.0	6.90	2.72
	0.0	1184	435.0	8.89	3.50
	0.0	1185	442.0	8.03	3.42
	HINGE 2	1186	450.0	5.42	2.29
	CB_Sect_1 @ CAP Beam at Pier 2	1187	0.0	12.69	5.24

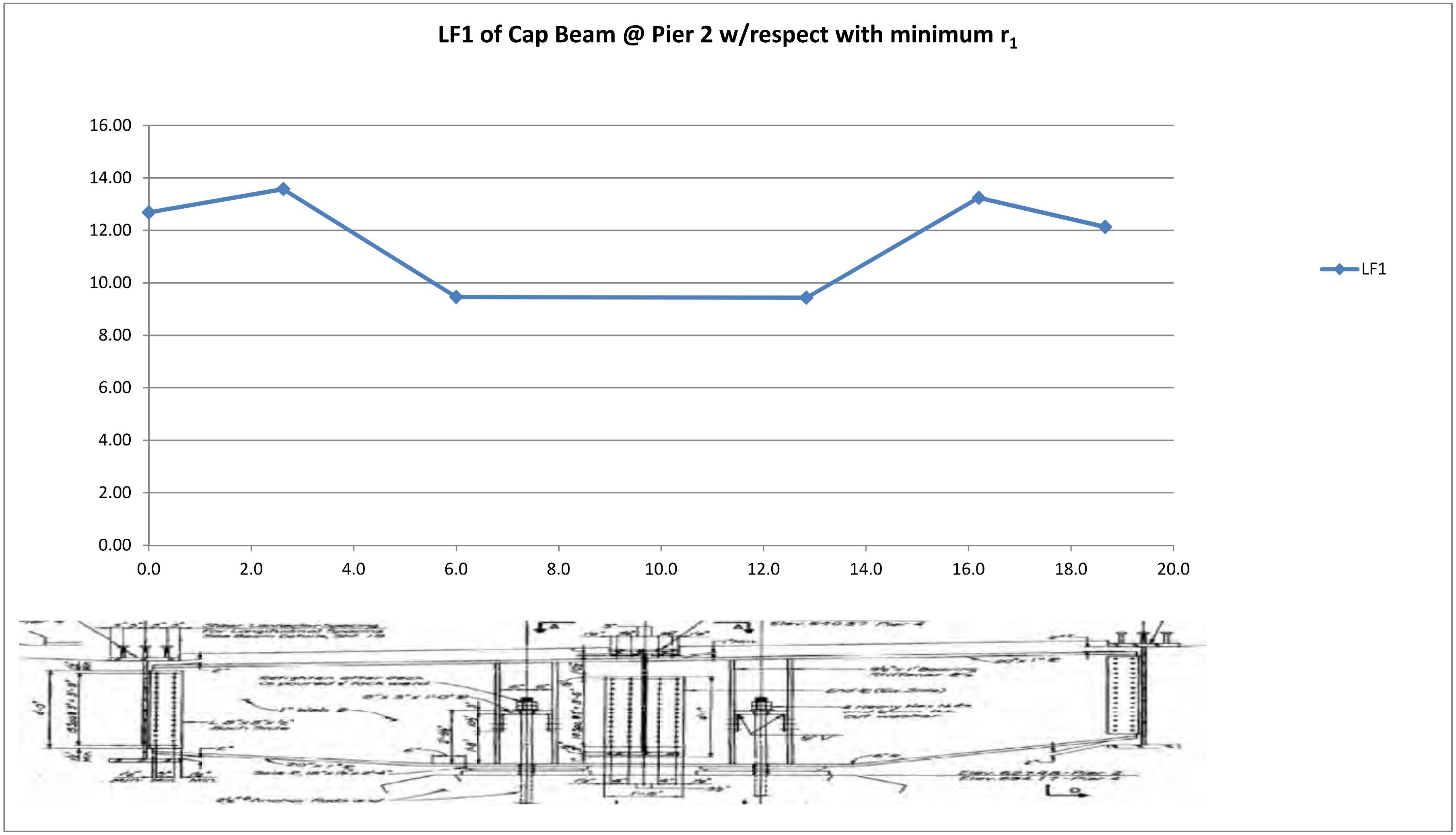
Summary of Elastic Results for Bridge 69102				
Location	Macro ID	Larsa Sta. (ft)	LF1	r_1
CB_Sect_2 @ CAP Beam at Pier 2	1188	2.6	13.57	5.61
CB_Sect_3 @ CAP Beam at Pier 2	1189	6.0	9.46	3.54
CB_Sect_3 @ CAP Beam at Pier 2	1190	12.8	9.44	3.63
CB_Sect_2 @ CAP Beam at Pier 2	1191	16.2	13.25	5.48
CB_Sect_1 @ CAP Beam at Pier 2	1192	18.7	12.14	5.04
CB_Sect_1 @ CAP Beam at Pier 4	1193	0.0	637.37	98.38
CB_Sect_2 @ CAP Beam at Pier 4	1194	2.6	647.85	98.91
CB_Sect_3 @ CAP Beam at Pier 4	1195	6.0	657.26	99.38
CB_Sect_3 @ CAP Beam at Pier 4	1196	12.8	657.26	99.38
CB_Sect_2 @ CAP Beam at Pier 4	1197	16.2	647.85	98.91
CB_Sect_1 @ CAP Beam at Pier 4	1198	18.7	637.37	98.38
Straddel Bent	1199	0.0	9.88	3.96
Straddel Bent	1200	5.2	9.70	3.90
Straddel Bent	1201	10.3	5.33	2.14
Straddel Bent	1202	15.0	4.80	1.93
Straddel Bent	1203	19.8	4.34	1.75
Straddel Bent	1204	24.5	4.76	1.92
Straddel Bent	1205	29.2	5.23	2.10
Straddel Bent	1206	34.3	9.51	3.84
Straddel Bent	1207	39.5	9.68	3.90
CF5 -RLPD_Sect_1	1208	1.0	76.25	25.96
CF5 -RLPD_Sect_2	1209	4.7	46.51	18.12
CF5 -RLPD_Sect_3	1210	9.4	25.26	7.71
CF5 -RLPD_Sect_2	1211	14.1	43.60	17.51
CF5 -RLPD_Sect_1	1212	18.0	53.85	20.97
CF6 -RLPD_Sect_1	1213	1.0	48.39	27.41
CF6 -RLPD_Sect_2	1214	4.7	48.39	27.41
CF6 -RLPD_Sect_3	1215	9.4	48.39	27.41
CF6 -RLPD_Sect_2	1216	14.1	48.39	27.41
CF6 -RLPD_Sect_1	1217	18.0	48.39	27.41
CF10 -RLPD_Sect_1	1218	1.0	48.39	27.41
CF10 -RLPD_Sect_2	1219	4.7	48.39	27.41
CF10 -RLPD_Sect_3	1220	9.4	48.39	27.41
CF10 -RLPD_Sect_2	1221	14.1	48.39	27.41
CF10 -RLPD_Sect_1	1222	18.0	48.39	27.41
CF11 -RLPD_Sect_1	1223	1.0	48.39	27.41
CF11 -RLPD_Sect_2	1224	4.7	48.39	27.41
CF11 -RLPD_Sect_3	1225	9.4	48.39	27.41
CF11 -RLPD_Sect_2	1226	14.1	48.39	27.41
CF11 -RLPD_Sect_1	1227	18.0	48.39	27.41

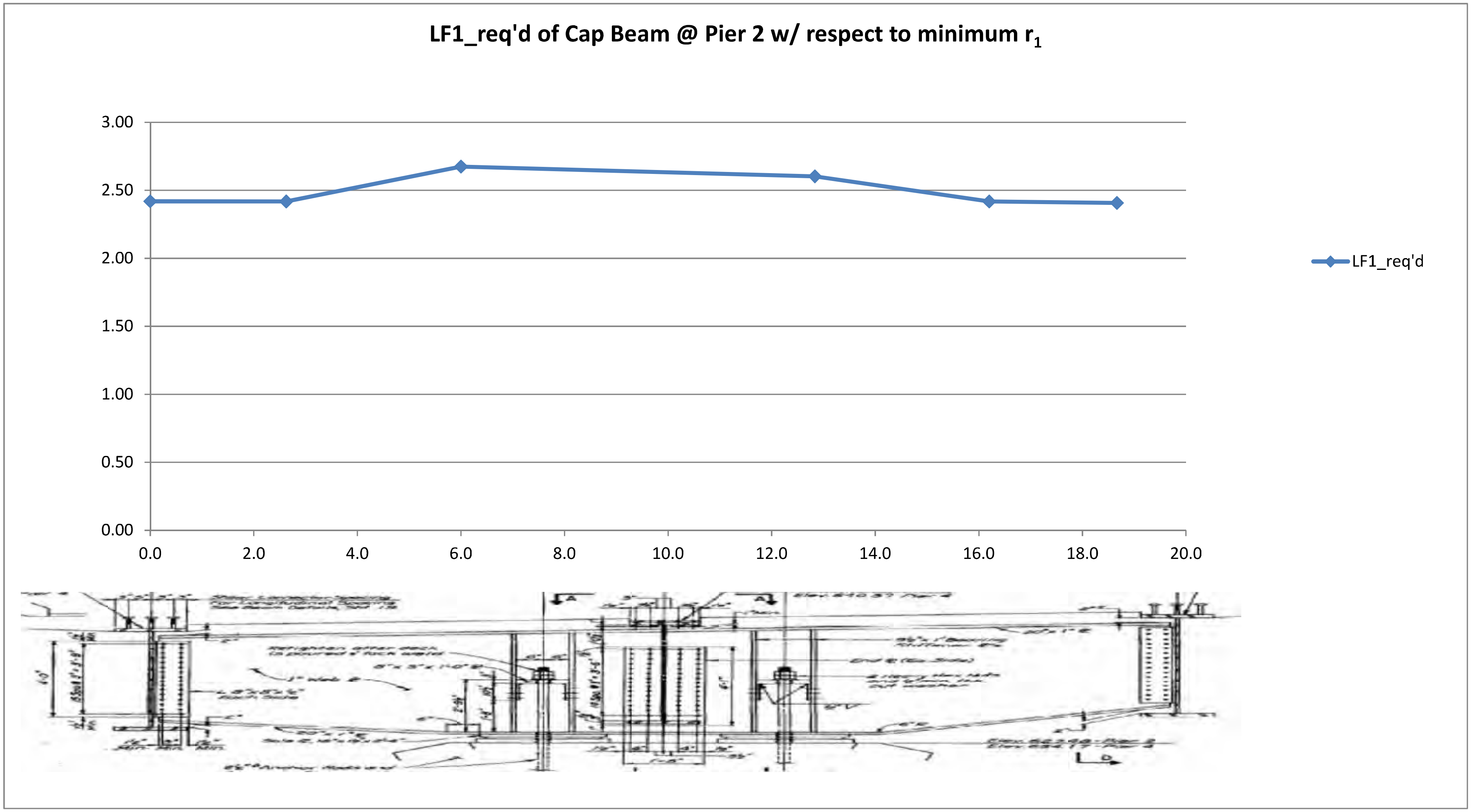

Minimum Reserve Ratio r1 of Plate Girders
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Girder B6
Girder B5
Girder B4
Stabilized and Slope Paving
€ Hinge No. 1
Span 2
Bikeway Span 1
Span 3
Bikeway Span 2
Span 4
Bikeway Span 3
€ Ramp J
Existing Ramp B € Ground Profile
€ Bikeway Hinge
Span 5
Bikeway Span 4
EXP
€ Hinge No. 2

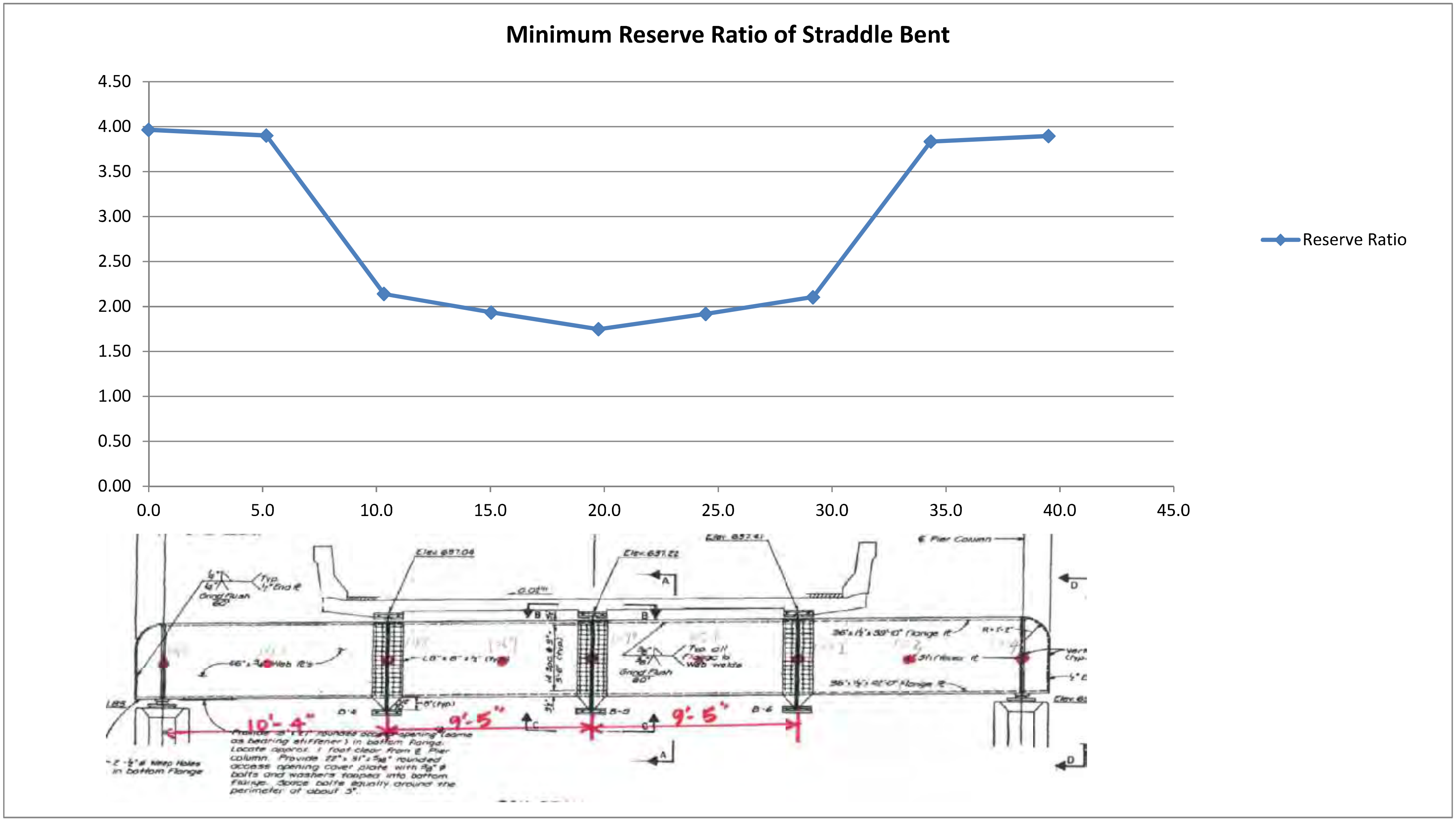

LF1 of Plate Girders w/respect with Minimum r_1
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
Girder B6
Girder B5
Girder B4
Stabilized Hwy Slope Paving
℄ Hinge No. 1
Span 2
Bikeway Span 1
Span 3
Bikeway Span 2
℄ Ramp J
Span 4
Bikeway Span 3
Existing Ramp B ℄ Ground Profile
℄ Bikeway Hinge
Span 5
Bikeway Span 4
℄ Hinge No. 2

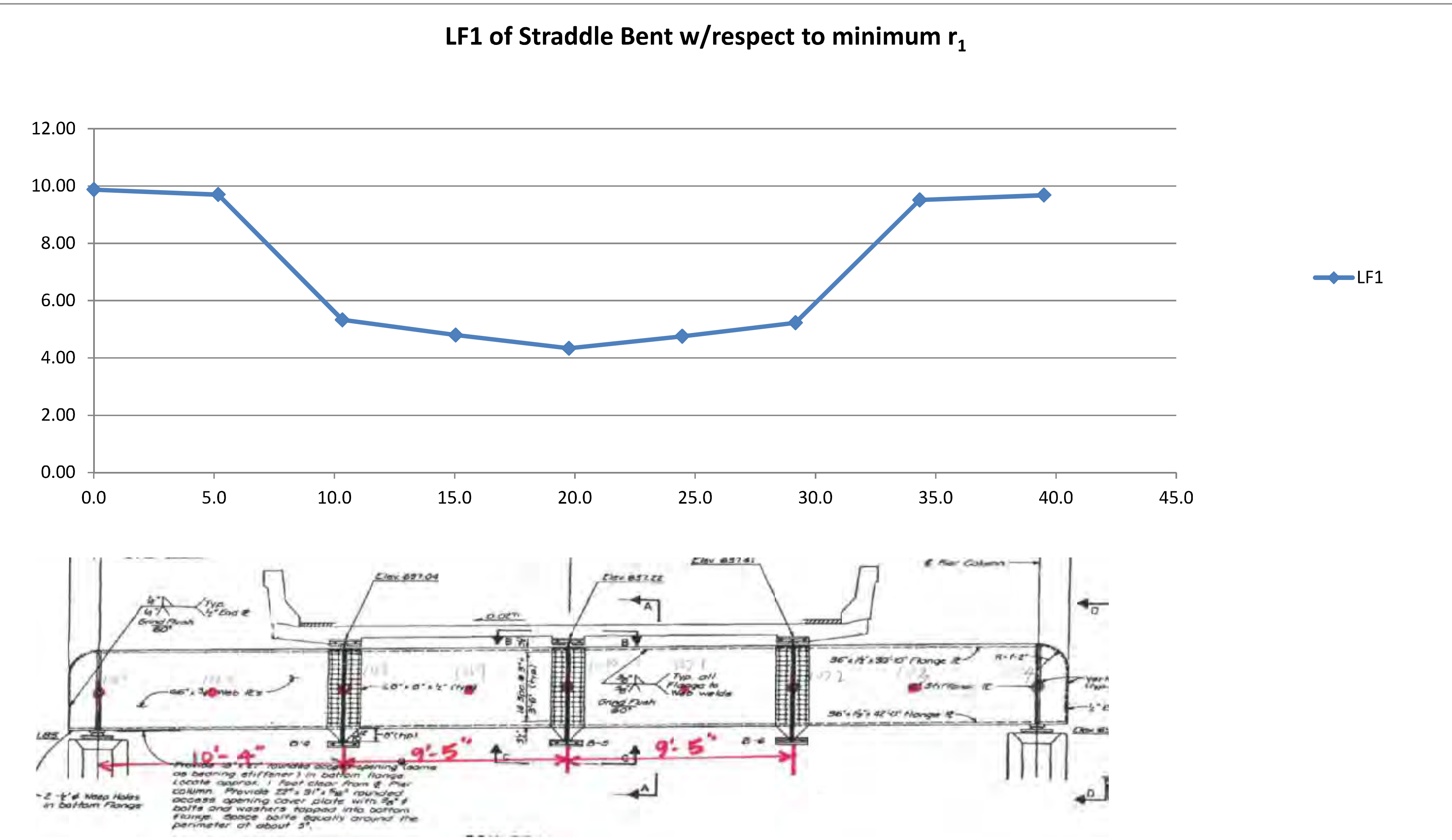

LF1_req'd of Plate Girders w/ respect to minimum r1
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
Girder B6
Girder B5
Girder B4
Slope Paving
℄ Hinge No. 1
Span 2
Bikeway Span 1
Span 3
Bikeway Span 2
℄ Ramp J
Span 4
Bikeway Span 3
Existing Ramp B ℄ Ground Profile
℄ Bikeway Hinge
Span 5
Bikeway Span 4
℄ Hinge No. 2
FIX
EXP

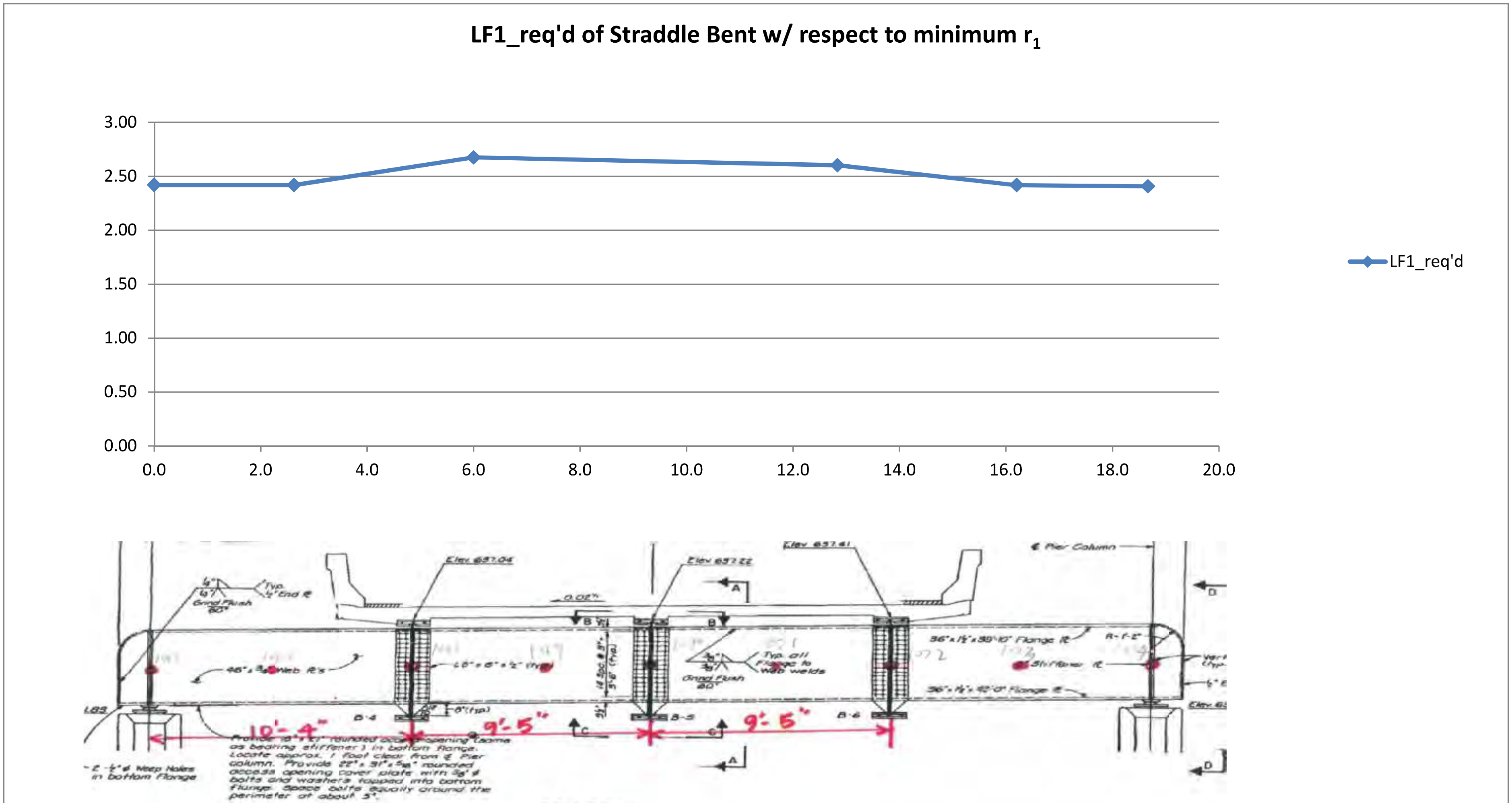

Minimum Reverse Ratio r1 for Cap Beam @ Pier 2
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Reserve Ratio


LF1 of Cap Beam @ Pier 2 w/respect with minimum r_1
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
LF1


LF1_req'd of Cap Beam @ Pier 2 w/ respect to minimum r_1
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
LF1_req'd


Minimum Reserve Ratio of Straddle Bent
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
Reserve Ratio
10'-4"
9'-5"
9'-5"


LF1 of Straddle Bent w/respect to minimum r_1
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
LF1
10'-4"
9'-5"
9'-5"
Elev. 857.04
Elev. 857.22
Elev. 857.41
Pier Column


LF1_req'd of Straddle Bent w/ respect to minimum r_1
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
LF1_req'd
10'-4"
9'-5"
9'-5"
Elev 657.04
Elev 657.22
Elev 657.41
Pier Column
0.02'/'
B-4
B-5
B-6

2. Design Data

	Location	Girder Node ID from MX	Is plate girder or box girder ?	Larsa Station	Flange lateral bending stress	Load Factor		Resistance Factor		Longitudinal Stiffener dist to Bott Flange		Transverse Stiffener			Hybrid factor	Material Properties								Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Shear Stud Location	Unbracing length for M-	Is Section Loss Considered /	Top steel flange width	Top steel flange thk
								Flexual	Shear	No, of Longitudinal stiffener provided ?	Dist from stiffener to bottom flg	Is transverse stiffener provided?	Transverse Stiffener Spacing	Is end panel or interior panel?		Specified min flg yield strength	Specified web flg yield strength	Specified min yield strength of comp. flg	Rebar yield strength	Conc deck	Girder E	Conc deck	Modular Ratio									
					f_l	Condition Factor ϕ_c	System Factor ϕs	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	(Stud provided =Yes: No shear stud = No)	L_b		b_{f_top}	$t_{\_top\ flg}$
								6.5.4.2	6.5.4.2						6.10.1.10.1																	
				(ft)	(ksi)						(in)		(ft)			(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)		(in^2)	(in)	(in)	(ft)		(in)		(in)	(in)
	HINGE 1	1001	Plate Girder	0.000		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
Span 2 (B6)	0	1002	Plate Girder	12.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF2	1003	Plate Girder	24.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1004	Plate Girder	36.75		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF3	1005	Plate Girder	49.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1006	Plate Girder	61.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF4	1007	Plate Girder	73.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1008	Plate Girder	86.90		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	Section Change	1009	Plate Girder	87.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	0	1010	Plate Girder	90.67		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	0	1011	Plate Girder	94.33		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	CF5	1012	Plate Girder	98.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	0	1013	Plate Girder	101.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 2	1014	Plate Girder	104.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 2	1015	Plate Girder	105.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 2	1016	Plate Girder	106.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
Span 3 (B6)	**0**	1017	Plate Girder	109.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	CF6	1018	Plate Girder	112.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Section Change	1019	Plate Girder	123.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	0	1020	Plate Girder	123.10		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF7	1021	Plate Girder	137.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1022	Plate Girder	149.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF8	1023	Plate Girder	162.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1024	Plate Girder	174.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF9	1025	Plate Girder	187.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1026	Plate Girder	206.90		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	Section Change	1027	Plate Girder	207.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	0	1028	Plate Girder	209.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	CF10	1029	Plate Girder	212.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	0	1030	Plate Girder	218.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	0	1031	Plate Girder	221.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Pier 3	1032	Plate Girder	224.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Pier 3	1033	Plate Girder	225.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Pier 3	1034	Plate Girder	226.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
Span 4 (B6)	0	1035	Plate Girder	232.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	CF11	1036	Plate Girder	238.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Section Change	1037	Plate Girder	243.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	0	1038	Plate Girder	243.10		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF12	1039	Plate Girder	263.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1040	Plate Girder	275.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF13	1041	Plate Girder	288.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1042	Plate Girder	300.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF14	1043	Plate Girder	313.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1044	Plate Girder	326.90		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	Section Change	1045	Plate Girder	327.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	CF15	1046	Plate Girder	338.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 4	1047	Plate Girder	344.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 4	1048	Plate Girder	345.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 4	1049	Plate Girder	346.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
Span 5 (B6)	0	1050	Plate Girder	349.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	CF16	1051	Plate Girder	352.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Section Change	1052	Plate Girder	363.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	0	1053	Plate Girder	363.10		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF17	1054	Plate Girder	376.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1055	Plate Girder	388.75		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF18	1056	Plate Girder	401.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1057	Plate Girder	413.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF19	1058	Plate Girder	425.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1059	Plate Girder	430.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1060	Plate Girder	435.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1061	Plate Girder	442.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	HINGE 2	1062	Plate Girder	450.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88

								Resistance Factor		Longitudinal Stiffener dist to Bott Flange		Transverse Stiffener			Hybrid factor	Material Properties																
	Location	Girder Node ID from MX	Is plate girder or box girder ?	Larsa Station	Flange lateral bending stress	Load Factor		Flexual	Shear	No. of Longitudinal stiffener provided ?	Dist from stiffener to bottom flg	Is transverse stiffener provided?	Transverse Stiffener Spacing	Is end panel or interior panel?		Specified min flg yield strength	Specified web flg yield strength	Specified min yield strength of comp. flg	Rebar yield strength	Conc deck	Girder E	Conc deck	Modular Ratio	Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Shear Stud Location	Unbracing length for M-	Is Section Loss Considered /	Top steel flange width	Top steel flange thk
					f_l	Condition Factor ϕ_c	System Factor ϕs	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	(Stud provided =Yes: No shear stud = No)	L_b		b_{f_top}	$t_{\_top\ flg}$
								6.5.4.2	6.5.4.2						6.10.1.10.1																	
				(ft)	(ksi)						(in)		(ft)			(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)		(in^2)	(in)	(in)	(ft)		(in)		(in)	(in)
	HINGE 1	1063	Plate Girder	0.000		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
Span 2 (B5)	0	1064	Plate Girder	12.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	CF2	1065	Plate Girder	24.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1066	Plate Girder	36.75		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	CF3	1067	Plate Girder	49.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1068	Plate Girder	61.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	CF4	1069	Plate Girder	73.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1070	Plate Girder	86.90		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	Section Change	1071	Plate Girder	87.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	294.0	No	16.0	1.75
	0	1072	Plate Girder	90.67		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	294.0	No	16.0	1.75
	0	1073	Plate Girder	94.33		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	294.0	No	16.0	1.75
	CF5	1074	Plate Girder	98.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	0	1075	Plate Girder	101.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Pier 2	1076	Plate Girder	104.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Pier 2	1077	Plate Girder	105.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Pier 2	1078	Plate Girder	106.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
Span 3 (B5)	0	1079	Plate Girder	109.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	CF6	1080	Plate Girder	112.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Section Change	1081	Plate Girder	123.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	1.75
	0	1082	Plate Girder	123.10		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	CF7	1083	Plate Girder	137.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	0	1084	Plate Girder	149.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	CF8	1085	Plate Girder	162.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	0	1086	Plate Girder	174.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	CF9	1087	Plate Girder	187.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	0	1088	Plate Girder	206.90		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	Section Change	1089	Plate Girder	207.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	1.75
	0	1090	Plate Girder	209.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	1.75
	CF10	1091	Plate Girder	212.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	0	1092	Plate Girder	218.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	0	1093	Plate Girder	221.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	Pier 3	1094	Plate Girder	224.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	Pier 3	1095	Plate Girder	225.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	Pier 3	1096	Plate Girder	226.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
Span 4 (B5)	0	1097	Plate Girder	232.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	CF11	1098	Plate Girder	238.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	156.0	No	16.0	1.75
	Section Change	1099	Plate Girder	243.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	1.75
	0	1100	Plate Girder	243.10		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	CF12	1101	Plate Girder	263.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	0	1102	Plate Girder	275.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	CF13	1103	Plate Girder	288.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	0	1104	Plate Girder	300.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	CF14	1105	Plate Girder	313.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	0	1106	Plate Girder	326.90		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	0.88
	Section Change	1107	Plate Girder	327.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	300.0	No	16.0	1.75
	CF15	1108	Plate Girder	338.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Pier 4	1109	Plate Girder	344.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Pier 4	1110	Plate Girder	345.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Pier 4	1111	Plate Girder	346.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
Span 5 (B5)	0	1112	Plate Girder	349.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	CF16	1113	Plate Girder	352.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	84.0	No	16.0	1.75
	Section Change	1114	Plate Girder	363.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	294.0	No	16.0	1.75
	0	1115	Plate Girder	363.10		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	CF17	1116	Plate Girder	376.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1117	Plate Girder	388.75		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	CF18	1118	Plate Girder	401.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1119	Plate Girder	413.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	CF19	1120	Plate Girder	425.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1121	Plate Girder	430.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1122	Plate Girder	435.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	0	1123	Plate Girder	442.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88
	HINGE 2	1124	Plate Girder	450.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	4.0	8.5	1.5	9.4	Yes	294.0	No	16.0	0.88

	Location	Girder Node ID from MX	Is plate girder or box girder ?	Larsa Station (ft)	Flange lateral bending stress f_l (ksi)	Load Factor: Condition Factor ϕ_c	Load Factor: System Factor ϕ_s	Resistance Factor: Flexual ϕ_f (6.5.4.2)	Resistance Factor: Shear ϕ_v (6.5.4.2)	Longitudinal Stiffener dist to Bott Flange: No. of Longitudinal stiffener provided ?	Longitudinal Stiffener dist to Bott Flange: Dist from stiffener to bottom flg d_s (in)	Transverse Stiffener: Is transverse stiffener provided? (Yes =0,No=1)	Transverse Stiffener: Transverse Stiffener Spacing d_o (ft)	Transverse Stiffener: Is end panel or interior panel? (Interior =0, End=1)	Hybrid factor R_h (6.10.1.10.1)	Material Properties: Specified min flg yield strength F_{yf} (ksi)	Specified web flg yield strength F_{yw} (ksi)	Specified min yield strength of comp. flg F_{yc} (ksi)	Rebar yield strength F_{y_rebar} (ksi)	Conc deck f'_c (ksi)	Girder E $E_{\_steel}$ (ksi)	Conc deck $E_{\_deck}$ (ksi)	Modular Ratio n	Area of deck rebar within effective width A_{rs} (in^2)	Deck thickness $t_{\_deck}$ (in)	Haunch thickness $h_{\_haunch}$ (in)	Effective width of the deck b_{eff} (ft)	Shear Stud Location (Stud provided =Yes: No shear stud = No)	Unbracing length for M- L_b (in)	Is Section Loss Considered /	Top steel flange width b_{f_top} (in)	Top steel flange thk $t_{\_top\ flg}$ (in)
	HINGE 1	1125	Plate Girder	0.000		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
Span 2 (B4)	0	1126	Plate Girder	12.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF2	1127	Plate Girder	24.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1128	Plate Girder	36.75		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF3	1129	Plate Girder	49.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1130	Plate Girder	61.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF4	1131	Plate Girder	73.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1132	Plate Girder	86.90		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	Section Change	1133	Plate Girder	87.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	0	1134	Plate Girder	90.67		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	0	1135	Plate Girder	94.33		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	CF5	1136	Plate Girder	98.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	0	1137	Plate Girder	101.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 2	1138	Plate Girder	104.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 2	1139	Plate Girder	105.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 2	1140	Plate Girder	106.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
Span 3 (B4)	0	1141	Plate Girder	109.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	CF6	1142	Plate Girder	112.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Section Change	1143	Plate Girder	123.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	0	1144	Plate Girder	123.10		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF7	1145	Plate Girder	137.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1146	Plate Girder	149.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF8	1147	Plate Girder	162.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1148	Plate Girder	174.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF9	1149	Plate Girder	187.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1150	Plate Girder	206.90		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	Section Change	1151	Plate Girder	207.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	0	1152	Plate Girder	209.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	CF10	1153	Plate Girder	212.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	0	1154	Plate Girder	218.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	0	1155	Plate Girder	221.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Pier 3	1156	Plate Girder	224.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Pier 3	1157	Plate Girder	225.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Pier 3	1158	Plate Girder	226.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
Span 4 (B4)	0	1159	Plate Girder	232.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	CF11	1160	Plate Girder	238.00		1.00	1.00	1.0	1.0	0	10000.0	0	13.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	156.0	No	16.0	1.75
	Section Change	1161	Plate Girder	243.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	0	1162	Plate Girder	243.10		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF12	1163	Plate Girder	263.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1164	Plate Girder	275.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF13	1165	Plate Girder	288.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1166	Plate Girder	300.50		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	CF14	1167	Plate Girder	313.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	0	1168	Plate Girder	326.90		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	0.88
	Section Change	1169	Plate Girder	327.00		1.00	1.00	1.0	1.0	0	10000.0	0	25.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	300.0	No	16.0	1.75
	CF15	1170	Plate Girder	338.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 4	1171	Plate Girder	344.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 4	1172	Plate Girder	345.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Pier 4	1173	Plate Girder	346.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
Span 5 (B4)	0	1174	Plate Girder	349.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	CF16	1175	Plate Girder	352.00		1.00	1.00	1.0	1.0	0	10000.0	0	7.00	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	84.0	No	16.0	1.75
	Section Change	1176	Plate Girder	363.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	1.75
	0	1177	Plate Girder	363.10		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF17	1178	Plate Girder	376.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1179	Plate Girder	388.75		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF18	1180	Plate Girder	401.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1181	Plate Girder	413.25		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	CF19	1182	Plate Girder	425.50		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1183	Plate Girder	430.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1184	Plate Girder	435.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	0	1185	Plate Girder	442.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88
	HINGE 2	1186	Plate Girder	450.00		1.00	1.00	1.0	1.0	0	10000.0	0	24.50	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	3.3	8.5	1.5	7.8	Yes	294.0	No	16.0	0.88

	Location	Girder Node ID from MX	Is plate girder or box girder ?	Larsa Station	Flange lateral bending stress	Load Factor		Resistance Factor: Flexual	Resistance Factor: Shear	Longitudinal Stiffener dist to Bott Flange: No. of Longitudinal stiffener provided ?	Longitudinal Stiffener dist to Bott Flange: Dist from stiffener to bottom flg	Transverse Stiffener: Is transverse stiffener provided?	Transverse Stiffener: Transverse Stiffener Spacing	Transverse Stiffener: Is end panel or interior panel?	Hybrid factor	Material Properties: Specified min flg yield strength	Material Properties: Specified web flg yield strength	Material Properties: Specified min yield strength of comp. flg	Material Properties: Rebar yield strength	Material Properties: Conc deck	Material Properties: Girder E	Material Properties: Conc deck	Material Properties: Modular Ratio	Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Shear Stud Location	Unbracing length for M-	Is Section Loss Considered /	Top steel flange width	Top steel flange thk
					f_l	Condition Factor ϕ_c	System Factor ϕs	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	(Stud provided =Yes: No shear stud = No)	L_b		b_{f_top}	$t_{\_top\ flg}$
								6.5.4.2	6.5.4.2						6.10.1.10.1																	
				(ft)	(ksi)						(in)		(ft)			(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)		(in^2)	(in)	(in)	(ft)		(in)		(in)	(in)
CAP Beam at Pier 2	CB_Sect_1	1187	Plate Girder	0.00		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_2	1188	Plate Girder	2.63		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_3	1189	Plate Girder	6.00		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_3	1190	Plate Girder	12.83		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_2	1191	Plate Girder	16.20		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_1	1192	Plate Girder	18.67		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
CAP Beam at Pier 4	CB_Sect_1	1193	Plate Girder	0.00		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_2	1194	Plate Girder	2.63		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_3	1195	Plate Girder	6.00		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_3	1196	Plate Girder	12.83		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_2	1197	Plate Girder	16.20		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
	CB_Sect_1	1198	Plate Girder	18.67		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	20.0	1.00
Straddel Bent	Support	1199	Box Girder	0.00		1.00	1.00	1.0	1.0	0	10000.0	0	20.62	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	247.4	No	36.0	1.5
	0	1200	Box Girder	5.17		1.00	1.00	1.0	1.0	0	10000.0	1	20.62	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	247.4	No	36.0	1.5
	Bracing	1201	Box Girder	10.33		1.00	1.00	1.0	1.0	0	10000.0	0	20.62	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	247.4	No	36.0	1.5
	0	1202	Box Girder	15.04		1.00	1.00	1.0	1.0	0	10000.0	1	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	113.0	No	36.0	1.5
	Bracing	1203	Box Girder	19.75		1.00	1.00	1.0	1.0	0	10000.0	0	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	113.0	No	36.0	1.5
	0	1204	Box Girder	24.46		1.00	1.00	1.0	1.0	0	10000.0	1	9.42	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	113.0	No	36.0	1.5
	Bracing	1205	Box Girder	29.17		1.00	1.00	1.0	1.0	0	10000.0	0	20.62	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	247.4	No	36.0	1.5
	0	1206	Box Girder	34.33		1.00	1.00	1.0	1.0	0	10000.0	1	20.62	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	247.4	No	36.0	1.5
	Support	1207	Box Girder	39.50		1.00	1.00	1.0	1.0	0	10000.0	0	20.62	1	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0		No	247.4	No	36.0	1.5
CF5	RLPD_Sect_1	1208	Plate Girder	1.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	8.5	0.0	12.0	No	113.0	No	16.0	1.00
CF5	RLPD_Sect_2	1209	Plate Girder	4.71		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF5	RLPD_Sect_3	1210	Plate Girder	9.42		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF5	RLPD_Sect_2	1211	Plate Girder	14.13		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF5	RLPD_Sect_1	1212	Plate Girder	18.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF6	RLPD_Sect_1	1213	Plate Girder	1.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF6	RLPD_Sect_2	1214	Plate Girder	4.71		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF6	RLPD_Sect_3	1215	Plate Girder	9.42		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF6	RLPD_Sect_2	1216	Plate Girder	14.13		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF6	RLPD_Sect_1	1217	Plate Girder	18.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF10	RLPD_Sect_1	1218	Plate Girder	1.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF10	RLPD_Sect_2	1219	Plate Girder	4.71		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF10	RLPD_Sect_3	1220	Plate Girder	9.42		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF10	RLPD_Sect_2	1221	Plate Girder	14.13		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF10	RLPD_Sect_1	1222	Plate Girder	18.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF11	RLPD_Sect_1	1223	Plate Girder	1.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF11	RLPD_Sect_2	1224	Plate Girder	4.71		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF11	RLPD_Sect_3	1225	Plate Girder	9.42		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF11	RLPD_Sect_2	1226	Plate Girder	14.13		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00
CF11	RLPD_Sect_1	1227	Plate Girder	18.00		1.00	1.00	1.0	1.0	0	10000.0	0	5	0	1.0	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	0.0	0.0	0.0	0.0	No	113.0	No	16.0	1.00

Non-Composite Section																Composite Section with Modular Ratio = n (at Positive Moment Region)							Is it Cap Beam ?	Composite Section with Modular Ratio = 3n(at Positive Moment Reigion)						
Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area per web	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
$A_{st\_top\_flg}$	b_{f_bott}	$t_{bott\ flg}$	$A_{st\_bott\_flg}$	D_{web}	t_{web}	A_{web}	A_{steel}	I_{steel}	Y_T	Y_D	S_{top_flg}	S_{bott_flg}	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$		$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$		$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
(in^2)	(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0		199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2

Non-Composite Section																Composite Section with Modular Ratio = n (at Positive Moment Region)							Is it Cap Beam ?	Composite Section with Modular Ratio = 3n(at Positive Moment Reigion)						
Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area per web	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
$A_{st\_top\_flg}$	b_{f_bott}	$t_{bott\ flg}$	$A_{st\_bott\_flg}$	D_{web}	t_{web}	A_{web}	A_{steel}	I_{steel}	Y_T	Y_D	S_{top_flg}	S_{bott_flg}	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$		$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$		$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
(in^2)	(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	330.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3		224.1	145195.9	21.2	11.2	52.3	12940.0	2777.3		142.0	107920.4	31.0	21.0	42.5	5150.4	2536.5
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
28.00	16.0	1.500	24.0	60.0	0.8750	52.5	104.5	64993.5	30.5	32.7	2128.2	1986.9	597.3	512.0		227.6	139713.3	21.0	11.0	52.3	12723.7	2672.9		145.5	103792.2	30.3	20.3	42.9	5101.8	2419.1
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7		184.8	91652.5	16.6	6.6	55.2	13953.6	1660.9		102.8	69174.9	26.3	16.3	45.4	4242.6	1522.2

Non-Composite Section															Composite Section with Modular Ratio = n (at Positive Moment Region)							Is it Cap Beam ?	Composite Section with Modular Ratio = 3n(at Positive Moment Reigion)						
Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area per web	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
$A_{\_st\_top\_flg}$	b_{f_bott}	$t_{\_bott\ flg}$	$A_{\_st\_bott\_flg}$	$D_{\_web}$	$t_{\_web}$	$A_{\_web}$	$A_{\_steel}$	$I_{\_steel}$	Y_T	Y_D	$S_{\_top\_flg}$	$S_{\_bott\_flg}$	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$	$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$		$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
(in^2)	(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
28.00	16.0	1.750	28.0	60.0	0.7500	45.0	101.0	66897.2	31.8	31.8	2107.0	2107.0	597.3	597.3	203.3	138497.4	22.9	12.9	50.6	10695.2	2739.8		135.1	102703.3	32.3	22.3	41.2	4601.7	2493.9
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
28.00	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9		131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2
14.00	16.0	0.875	14.0	60.0	0.5625	33.8	61.8	36067.1	30.9	30.9	1168.2	1168.2	298.7	298.7	164.1	87987.7	18.1	8.1	53.6	10831.4	1640.7		95.9	65532.7	27.9	17.9	43.9	3662.4	1494.2

Non-Composite Section																Composite Section with Modular Ratio = n (at Positive Moment Region)							Is it Cap Beam ?	Composite Section with Modular Ratio = 3n(at Positive Moment Reigion)						
Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area per web	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
$A_{\_st\_top\_flg}$	$bf_{\_bott}$	$t_{\_bott\ flg}$	$A_{\_st\_bott\_flg}$	$D_{\_web}$	$t_{\_web}$	$A_{\_web}$	$A_{\_steel}$	$I_{\_steel}$	Y_T	Y_D	$S_{\_top\_flg}$	$S_{\_bott\_flg}$	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$		$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$		$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
(in^2)	(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)		(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)
20.00	20.0	1.000	20.0	54.0	1.0000	54.0	94.0	43375.3	28.0	28.0	1549.1	1549.1	706.7	666.7		94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	Yes	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1
20.00	20.0	1.000	20.0	58.5	1.0000	58.5	98.5	52089.3	30.3	30.3	1722.0	1722.0	706.7	666.7		98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	Yes	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0
20.00	20.0	1.000	20.0	63.0	1.0000	63.0	103.0	61800.6	32.5	32.5	1901.6	1901.6	706.7	666.7		103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	Yes	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6
20.00	20.0	1.000	20.0	63.0	1.0000	63.0	103.0	61800.6	32.5	32.5	1901.6	1901.6	706.7	666.7		103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	Yes	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6
20.00	20.0	1.000	20.0	58.5	1.0000	58.5	98.5	52089.3	30.3	30.3	1722.0	1722.0	706.7	666.7		98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	Yes	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0
20.00	20.0	1.000	20.0	54.0	1.0000	54.0	94.0	43375.3	28.0	28.0	1549.1	1549.1	706.7	666.7		94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	Yes	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1
20.00	20.0	1.000	20.0	54.0	1.0000	54.0	94.0	43375.3	28.0	28.0	1549.1	1549.1	706.7	666.7		94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	Yes	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1
20.00	20.0	1.000	20.0	58.5	1.0000	58.5	98.5	52089.3	30.3	30.3	1722.0	1722.0	706.7	666.7		98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	Yes	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0
20.00	20.0	1.000	20.0	63.0	1.0000	63.0	103.0	61800.6	32.5	32.5	1901.6	1901.6	706.7	666.7		103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	Yes	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6
20.00	20.0	1.000	20.0	63.0	1.0000	63.0	103.0	61800.6	32.5	32.5	1901.6	1901.6	706.7	666.7		103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	Yes	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6
20.00	20.0	1.000	20.0	58.5	1.0000	58.5	98.5	52089.3	30.3	30.3	1722.0	1722.0	706.7	666.7		98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	Yes	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0
20.00	20.0	1.000	20.0	54.0	1.0000	54.0	94.0	43375.3	28.0	28.0	1549.1	1549.1	706.7	666.7		94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	Yes	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
54.00	36.0	1.500	54.00	46.0	0.750	34.500	177.000	73106	25	25	2984	2984	16551	16551		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9		177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2
16.00	16.0	1.000	16.0	56.0	0.5625	31.5	63.5	34226.7	29.0	29.0	1180.2	1180.2	373.3	341.3		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2		63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2

	Composite Section with Modular Ratio = n (at Negative Moment Region)									Girder Section Properties without Section Loss																		
Is redundant Load Path Diaphragm ?	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	**Location**	**Steel Section No.**	Top Flange PL width	Bottom Flange PL width	Top Flange PL thickness	Bottom Flange PL thickness	Top Flg Width (2-L8x8x3/4)	Bottom Flg Width (2_L8x8x3/4)	Area of Top Flg (2-L8x8x3/4)	Area of Bott Flg (2-L8x8x3/4)	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg	Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Top Flange: 2-L8x8x3/4			Bottom Flange: 2-L8x8x3/4			Web thickness	Web depth	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg
	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$			$W_{\_tc1}$	$W_{\_bc1}$	$T_{\_tc1}$	$T_{\_bc1}$	$W_{\_tfg}$	$W_{\_bfg}$	$A_{\_2\text{-}L8x8x3/4}$	$A_{\_2\text{-}L8x8x3/4}$	T_y	B_y	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_1\text{-}L8x8x3/4}$	Flg Thickness $T_{\_tflg}$	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_2\text{-}L8x8x3/4}$	Flg Thickness $B_{\_tflg}$	$T_{\_web}$	$D_{\_web}$	T_x
	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)			(in)	(in)	(in)	(in)	(in)	(in)	(in^2)	(in^2)	(in)	(in)	(in^4)	(in^4)	(in)	(in^4)	(in^4)	(in)	(in)	(in)	(in)
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	HINGE 1	B6_Sect_1	16.000	16.0	0.875	0.875	0.000	0.000	0.00	0.00	0	0	0	0	0	0	0	0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF2	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF3	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF4	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B6_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF5	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 2	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 2	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 2	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF6	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B6_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	CF7	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF8	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF9	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B6_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Section Change	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	CF10	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	CF11	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Section Change	b6_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.00	0.00	0	0	0	0	0.00	0.00	0.00	0.00	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF12	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF13	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF14	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B6_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF15	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 4	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 4	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 4	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF16	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B6_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF17	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF18	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF19	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	HINGE 2	B6_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000

Designed by: MX on 07/12/17
Checked by TFK on 07/30/17
Backchecked by MX on 07/31/17

	Composite Section with Modular Ratio = n (at Negative Moment Region)									Girder Section Properties without Section Loss																		
Is redundant Load Path Diaphragm ?	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	**Location**	**Steel Section No.**	Top Flange PL width	Bottom Flange PL width	Top Flange PL thickness	Bottom Flange PL thickness	Top Flg Width (2-L8x8x3/4)	Bottom Flg Width (2_L8x8x3/4)	Area of Top Flg (2-L8x8x3/4)	Area of Bott Flg (2-L8x8x3/4)	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg	Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Top Flange: 2-L8x8x3/4			Bottom Flange: 2-L8x8x3/4			Web thickness	Web depth	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg
	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$			$W_{\_tc1}$	$W_{\_bc1}$	$T_{\_tc1}$	$T_{\_bc1}$	$W_{\_tfg}$	$W_{\_bfg}$	$A_{\_2\text{-}L8x8x3/4}$	$A_{\_2\text{-}L8x8x3/4}$	T_y	B_y	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_1\text{-}L8x8x3/4}$	Flg Thickness $T_{\_tflg}$	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_2\text{-}L8x8x3/4}$	Flg Thickness $B_{\_tflg}$	$T_{\_web}$	$D_{\_web}$	T_x
	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)			(in)	(in)	(in)	(in)	(in)	(in)	(in^2)	(in^2)	(in)	(in)	(in^4)	(in^4)	(in)	(in^4)	(in^4)	(in)	(in)	(in)	(in)
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	HINGE 1	B5_Sect_1	16.000	16.0	0.875	0.875	0.000	0.000	0.00	0.00	0	0	0	16	0	0	0	0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF2	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF3	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF4	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B5_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Section Change	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	0.0	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	0.0	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	CF5	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	0.0	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Pier 2	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Pier 2	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Pier 2	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	0.0	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	CF6	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Section Change	B5_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	CF7	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF8	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF9	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B5_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Section Change	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	CF10	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	CF11	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Section Change	B5_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.00	0.00	0	0	0	0	0.00	0.00	0.00	0.00	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF12	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF13	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF14	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B5_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Section Change	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	CF15	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Pier 4	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Pier 4	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Pier 4	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	0.0	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	CF16	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	104.5	64993.5	40.5	30.5	32.7	2128.2	1986.9	Section Change	B5_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.875	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF17	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF18	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	CF19	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	0.0	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.8	41153.4	38.6	28.6	33.1	1437.6	1242.4	HINGE 2	B5_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000

Bridge # 69102

Designed by: MX on 07/12/17
Checked by TFK on 07/30/17
Backchecked by MX on 07/31/17

	Composite Section with Modular Ratio = n (at Negative Moment Region)									Girder Section Properties without Section Loss																		
Is redundant Load Path Diaphragm ?	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	Location	Steel Section No.	Top Flange PL width	Bottom Flange PL width	Top Flange PL thickness	Bottom Flange PL thickness	Top Flg Width (2-L8x8x3/4)	Bottom Flg Width (2_L8x8x3/4)	Area of Top Flg (2-L8x8x3/4)	Area of Bott Flg (2-L8x8x3/4)	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg	Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Top Flange: 2-L8x8x3/4			Bottom Flange: 2-L8x8x3/4			Web thickness	Web depth	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg
	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$			$W_{\_tc1}$	$W_{\_bc1}$	$T_{\_tc1}$	$T_{\_bc1}$	$W_{\_tfg}$	$W_{\_bfg}$	$A_{\_2\text{-}L8x8x3/4}$	$A_{\_2\text{-}L8x8x3/4}$	T_y	B_y	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_1\text{-}L8x8x3/4}$	Flg Thickness $T_{\_tflg}$	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_2\text{-}L8x8x3/4}$	Flg Thickness $B_{\_tflg}$	$T_{\_web}$	$D_{\_web}$	T_x
	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)			(in)	(in)	(in)	(in)	(in)	(in)	(in^2)	(in^2)	(in)	(in)	(in^4)	(in^4)	(in)	(in^4)	(in^4)	(in)	(in)	(in)	(in)
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	HINGE 1	B4_Sect_1	16.000	16.0	0.875	0.875	0.000	0.000	0.00	0.00	0	0	0	0	0	0	0	0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF2	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF3	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF4	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B4_Sect_1	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF5	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 2	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 2	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 2	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF6	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B4_Sect_2	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	CF7	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF8	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF9	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B4_Sect_3	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Section Change	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	CF10	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Pier 3	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	0.0	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	CF11	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	101.0	66897.2	41.8	31.8	31.8	2107.0	2107.0	Section Change	B4_Sect_4	16.0	16.0	1.750	1.750	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	61.8	36067.1	40.9	30.9	30.9	1168.2	1168.2	0.0	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.00	0.00	0	0	0	0	0.00	0.00	0.00	0.00	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF12	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF13	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF14	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B4_Sect_5	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF15	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 4	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 4	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Pier 4	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	0.0	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	CF16	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2	Section Change	B4_Sect_6	16.0	16.0	1.750	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	60.0	0.000
	71.9	47806.6	35.7	25.7	36.1	1861.3	1325.5	0.0	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF17	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF18	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	CF19	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	0.0	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000
	65.1	40320.9	39.0	29.0	32.8	1390.7	1231.0	HINGE 2	B4_Sect_7	16.0	16.0	0.875	0.875	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.563	60.0	0.000

	Composite Section with Modular Ratio = n (at Negative Moment Region)									Girder Section Properties without Section Loss																		
Is redundant Load Path Diaphragm ?	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	**Location**	**Steel Section No.**	Top Flange PL width	Bottom Flange PL width	Top Flange PL thickness	Bottom Flange PL thickness	Top Flg Width (2-L8x8x3/4)	Bottom Flg Width (2_L8x8x3/4)	Area of Top Flg (2-L8x8x3/4)	Area of Bott Flg (2-L8x8x3/4)	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg	Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Top Flange: 2-L8x8x3/4			Bottom Flange: 2-L8x8x3/4			Web thickness	Web depth	Distance from CG of top flg (2-L8x8x3/4) to Top/Top flg
	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$			$W_{\_tc1}$	$W_{\_bc1}$	$T_{\_tc1}$	$T_{\_bc1}$	$W_{\_tfg}$	$W_{\_bfg}$	$A_{\_2\text{-}L8x8x3/4}$	$A_{\_2\text{-}L8x8x3/4}$	T_y	B_y	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_1\text{-}L8x8x3/4}$	Flg Thickness $T_{\_tflg}$	$I_{\_strong\_2\text{-}L8x8x3/4}$	$I_{\_weak\_2\text{-}L8x8x3/4}$	Flg Thickness $B_{\_tflg}$	$T_{\_web}$	$D_{\_web}$	T_x
	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)			(in)	(in)	(in)	(in)	(in)	(in)	(in^2)	(in^2)	(in)	(in)	(in^4)	(in^4)	(in)	(in^4)	(in^4)	(in)	(in)	(in)	(in)
	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	CB_Sect_1 @ CAP Beam at Pier 2	CB_Sect_3	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	54.0	0.000
	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	CB_Sect_2 @ CAP Beam at Pier 2	CB_Sect_2	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	58.5	0.000
	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	CB_Sect_3 @ CAP Beam at Pier 2	CB_Sect_1	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	63.0	0.000
	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	CB_Sect_3 @ CAP Beam at Pier 2	CB_Sect_1	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	63.0	0.000
	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	CB_Sect_2 @ CAP Beam at Pier 2	CB_Sect_2	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	58.5	0.000
	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	CB_Sect_1 @ CAP Beam at Pier 2	CB_Sect_3	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	54.0	0.000
	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	CB_Sect_1 @ CAP Beam at Pier 4	CB_Sect_3	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	54.0	0.000
	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	CB_Sect_2 @ CAP Beam at Pier 4	CB_Sect_2	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	58.5	0.000
	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	CB_Sect_3 @ CAP Beam at Pier 4	CB_Sect_1	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	63.0	0.000
	103.0	61800.6	N/A	32.5	32.5	1901.6	1901.6	CB_Sect_3 @ CAP Beam at Pier 4	CB_Sect_1	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	63.0	0.000
	98.5	52089.3	N/A	30.3	30.3	1722.0	1722.0	CB_Sect_2 @ CAP Beam at Pier 4	CB_Sect_2	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	58.5	0.000
	94.0	43375.3	N/A	28.0	28.0	1549.1	1549.1	CB_Sect_1 @ CAP Beam at Pier 4	CB_Sect_3	20.0	20.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	1.000	54.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	Support	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	0.0	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	Bracing	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	0.0	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	Bracing	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	0.0	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	Bracing	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	0.0	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
	177.0	73106.0	N/A	24.5	24.5	2983.9	2983.9	Straddel Bent	Support	36.0	36.0	1.500	1.500	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.750	46.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF5 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF5 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF5 -RLPD_Sect_3	RLPD_Sect_3	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF5 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF5 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF6 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF6 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF6 -RLPD_Sect_3	RLPD_Sect_3	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF6 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF6 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes																												
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF10 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF10 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF10 -RLPD_Sect_3	RLPD_Sect_3	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF10 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF10 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF11 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF11 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF11 -RLPD_Sect_3	RLPD_Sect_3	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF11 -RLPD_Sect_2	RLPD_Sect_2	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000
Yes	63.5	34226.7	N/A	29.0	29.0	1180.2	1180.2	CF11 -RLPD_Sect_1	RLPD_Sect_1	16.0	16.0	1.000	1.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.563	56.0	0.000

Bridge # 69102

Designed by: MX on 07/12/17
Checked by TFK on 07/30/17
Backchecked by MX on 07/31/17

Girder Section Properties																	Web Proportion Limit (6.10.2.1)				Flange Proportions (6.10.2.2)				
Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Left Stringer Spacing	Right Stringer Spacing	Overhang Width	Effective Width (Link from plan)	Total thickness of concrete deck	Thickness of wearing surface	Effective thickness of concrete deck	Fillet Height	Fillet Width	% of rebar within effective of deck	Area of rebar within effective deck width	Fy_rebar	Top Flange Loss	Bottom Flange Loss	Web Loss		Web Proportion	Check if Longitudinal Stiffener is required ?	Check Web Longitudinal Stiffener Requirement	Check Proportion Requirement of Web with Longitudinal Stiffener ($D/t_w \le 300$)	Check if $b_f/(2t_f) \le 12$	Check if $b_f \ge D/6$	Check if $t_f \ge 1.1t_w$	Check if $0.1 \le I_{yc}/I_{yt} \le 10$	$I_{y\_top\ Flg}/I_{y\_bott}$
B_x	$S_{\_Left\ Stringer}$	$S_{\_Right\_Stringer}$	$b_{\_overhang}$	$B_{\_effective}$	$t_{\_deck\_total}$	$t_{\_wearing}$	$t_{\_deck\_effective}$	$H_{\_fillet}$	$b_{\_fillet}$		A_{rs}		%	%	%		D/t_w	("0" = No req'd, "1" = Req'd)	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	
																	6.10.2.1.1	6.10.2.1.1	6.10.2.1.1	6.10.2.1.2	6.10.2.2.1	6.10.2.2.2	6.10.2.2.3	6.10.2.2.4	
(in)	(ft)	(ft)	(ft)	(ft)	(in)	(in)	(in)	(in)	(in)		(in^2)	(ksi)				(in n³)		D/tw ≤ 150	OK	OK	OK	OK	OK	OK	
0.000	x	x		7.792	9.000	2.000	8.50	1.500	16.0	0.421%	3.343	60.0	0.00%	0.00%	0.00%		106.7	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9	2	8.5	1.5	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000

Girder Section Properties

Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Left Stringer Spacing	Right Stringer Spacing	Overhang Width	Effective Width (Link from plan)	Total thickness of concrete deck	Thickness of wearing surface	Effective thickness of concrete deck	Fillet Height	Fillet Width	% of rebar within effective of deck	Area of rebar within effective deck width	Fy_rebar	Top Flange Loss	Bottom Flange Loss	Web Loss	pro	Web Proportion Limit (6.10.2.1): Web Proportion	Check if Longitudinal Stiffener is required ?	Check Web Longitudinal Stiffener Requirement	Check Proportion Requirement of Web with Longitudinal Stiffener ($D/t_w \le 300$)	Flange Proportions (6.10.2.2): Check if $b_f/(2t_f) \le 12$	Check if $b_f \ge D/6$	Check if $t_f \ge 1.1t_w$	Check if $0.1 \le I_{yc}/I_{yt} \le 10$	$I_{y\_top\ Flg}/I_{y\_bott}$
B_x	$S_{\_Left\ Stringer}$	$S_{\_Right\_Stringer}$	$b_{\_overhang}$	$B_{\_effective}$	$t_{\_deck\_total}$	$t_{\_wearing}$	$t_{\_deck\_effective}$	$H_{\_fillet}$	$b_{\_fillet}$		A_{rs}		%	%	%		D/t_w	("0" = No req'd, "1" = Req'd)	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	
																	6.10.2.1.1	6.10.2.1.1	6.10.2.1.1	6.10.2.1.2	6.10.2.2.1	6.10.2.2.2	6.10.2.2.3	6.10.2.2.4	
(in)	(ft)	(ft)	(ft)	(ft)	(in)	(in)	(in)	(in)	(in)		(in^2)	(ksi)			(in	n^3)		$D/tw \le 150$	OK	OK	OK	OK	OK	OK	
0.000	x	x		9.417	9.000	2.000	8.50	1.500	16.0	0.421%	4.040	60.0	0.00%	0.00%	0.00%		106.7	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9	2	8.5	1.5	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		68.57	0	0	0	0	0	0	0	1.167
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		9.417	9.000	2.000	8.5	1.500	16	0.421%	4.040	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000

Bridge # 69102

Designed by: MX on 07/12/17
Checked by TFK on 07/30/17
Backchecked by MX on 07/31/17

Girder Section Properties																	Web Proportion Limit (6.10.2.1)				Flange Proportions (6.10.2.2)				
Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Left Stringer Spacing	Right Stringer Spacing	Overhang Width	Effective Width (Link from plan)	Total thickness of concrete deck	Thickness of wearing surface	Effective thickness of concrete deck	Fillet Height	Fillet Width	% of rebar within effective of deck	Area of rebar within effective deck width	Fy_rebar	Top Flange Loss	Bottom Flange Loss	Web Loss	pro	Web Proportion	Check if Longitudinal Stiffener is required ?	Check Web Longitudinal Stiffener Requirement	Check Proportion Requirement of Web with Longitudinal Stiffener ($D/t_w \le 300$)	Check if $b_f/(2t_f) \le 12$	Check if $b_f \ge D/6$	Check if $t_f \ge 1.1t_w$	Check if $0.1 \le I_{yc}/I_{yt} \le 10$	$I_{y\_top\ Flg}/I_{y\_bott}$
B_x	$S_{\_Left\ Stringer}$	$S_{\_Right\_Stringer}$	$b_{\_overhang}$	$B_{\_effective}$	$t_{\_deck\_total}$	$t_{\_wearing}$	$t_{\_deck\_effective}$	$H_{\_fillet}$	$b_{\_fillet}$		A_{rs}		%	%	%		D/t_w	("0" = No req'd, "1" = Req'd)	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	
																	6.10.2.1.1	6.10.2.1.1	6.10.2.1.1	6.10.2.1.2	6.10.2.2.1	6.10.2.2.2	6.10.2.2.3	6.10.2.2.4	
(in)	(ft)	(ft)	(ft)	(ft)	(in)	(in)	(in)	(in)	(in)		(in^2)	(ksi)				(in^3)		D/tw ≤ 150	OK	OK	OK	OK	OK	OK	
0.000	x	x		7.792	9.000	2.000	8.50	1.500	16.0	0.421%	3.343	60.0	0.00%	0.00%	0.00%		106.7	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.000%		60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9	2	8.5	1.5	16	0.000%		60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		80.00	0	0	0	0	0	0	0	1.167
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	1.283%	10.197	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000
0.000	x	x		7.792	9.000	2.000	8.5	1.500	16	0.421%	3.343	60	0.00%	0.00%	0.00%		106.67	0	0	0	0	0	0	0	1.000

Bridge # 69102

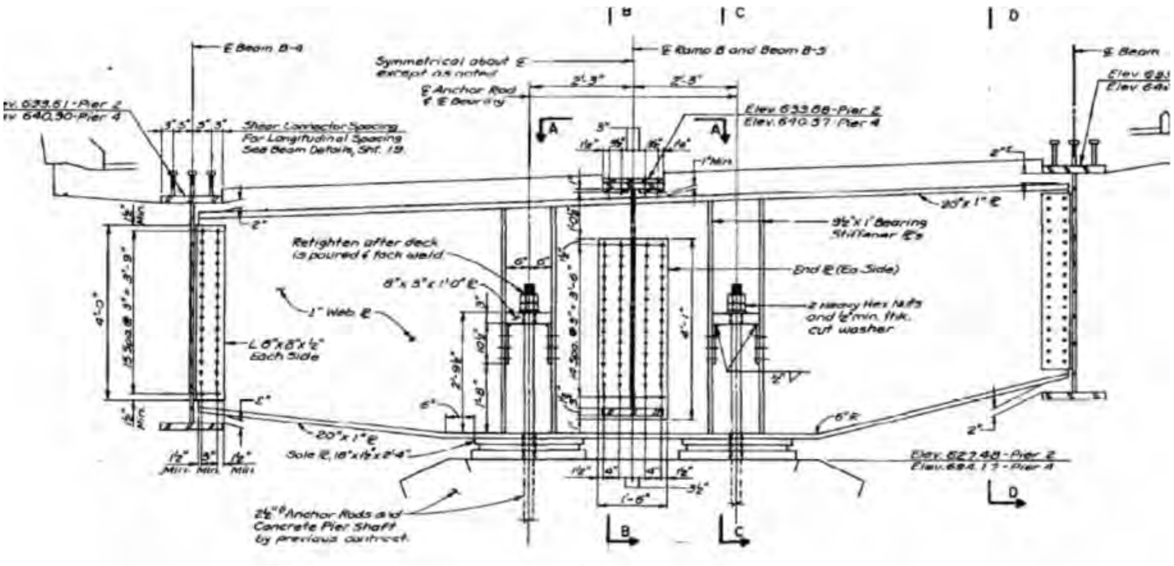
Designed by: MX on 07/12/17
Checked by TFK on 07/30/17
Backchecked by MX on 07/31/17

Girder Section Properties																	Web Proportion Limit (6.10.2.1)				Flange Proportions (6.10.2.2)				
Distance from CG of bottom flg(2-L8x8x3/4) to Bott/Bott flg	Left Stringer Spacing	Right Stringer Spacing	Overhang Width	Effective Width (Link from plan)	Total thickness of concrete deck	Thickness of wearing surface	Effective thickness of concrete deck	Fillet Height	Fillet Width	% of rebar within effective of deck	Area of rebar within effective deck width	Fy_rebar	Top Flange Loss	Bottom Flange Loss	Web Loss	pro	Web Proportion	Check if Longitudinal Stiffener is required ?	Check Web Longitudinal Stiffener Requirement	Check Proportion Requirement of Web with Longitudinal Stiffener ($D/t_w \le 300$)	Check if $b_f/(2t_f) \le 12$	Check if $b_f \ge D/6$	Check if $t_f \ge 1.1t_w$	Check if $0.1 \le I_{yc}/I_{yt} \le 10$	$I_{y\_top\ Flg}/I_{y\_bott}$
B_x	$S_{\_Left\ Stringer}$	$S_{\_Right\_Stringer}$	$b_{\_overhang}$	$B_{\_effective}$	$t_{\_deck\_total}$	$t_{\_wearing}$	$t_{\_deck\_effective}$	$H_{\_fillet}$	$b_{\_fillet}$		A_{rs}		%	%	%		D/t_w	("0" = No req'd, "1" = Req'd)	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	"0" = OK, "1" = NG	
																	6.10.2.1.1	6.10.2.1.1	6.10.2.1.1	6.10.2.1.2	6.10.2.2.1	6.10.2.2.2	6.10.2.2.3	6.10.2.2.4	
(in)	(ft)	(ft)	(ft)	(ft)	(in)	(in)	(in)	(in)	(in)		(in^2)	(ksi)				(in n^3)		D/tw ≤ 150	OK	OK	OK	OK	OK	OK	
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		54.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		58.50	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		63.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		63.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		58.50	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		54.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		54.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		58.50	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		63.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		63.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		58.50	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000	0.000	0.000	0	1.500	20	0.000%	0.000	60	0.00%	0.00%	0.00%		54.00	0	0	0	0	0	1	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		0.000		0.000			36	0.000%	0.000		0.00%	0.00%	0.00%		61.33	0	0	0	0	0	0	0	1.000
0.000	x	x		12.000	9.000	2.000	8.5	1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000
0.000	x	x						1.500	16	0.000%	0.000	60	0.00%	0.00%	0.00%		99.56	0	0	0	0	0	0	0	1.000

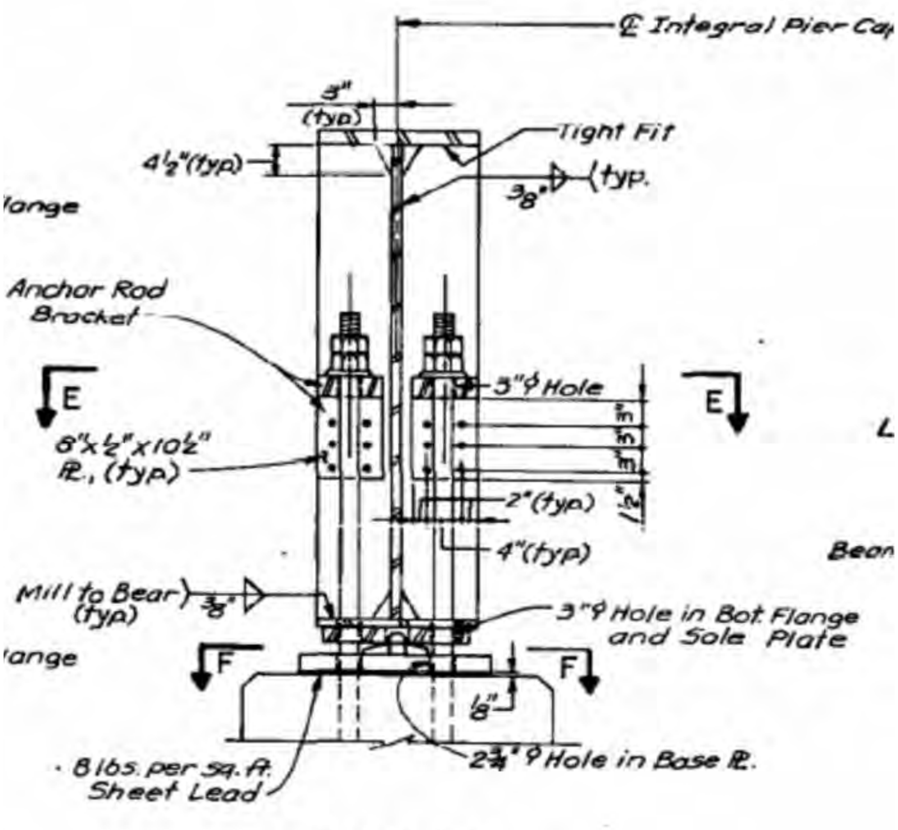
K:\64517\Work\Design\Elastic_as_built\Br_69102_Design_Data

		Web 1		Web 2		Top Flg		Bottom Flg		Girder web area per web	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange	F_{yc}	$\lambda_f = b_{fc}/t_{fc}$	$1.12*(Ek_s/F_{yc})^{1/2}$	$F_{cv} = 0.58*F_{yc}$	A_o
Girder Node ID		Depth	Thk	Depth	Thk	Width	Thk t	Width	Thk t	$A_{\_web}$	$A_{\_steel}$	$I_{\_steel\_strong}$	Y_T	Y_D	$S_{\_top\_flg}$	$S_{\_bott\_flg}$	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$		AASHTO 6.11.8.2.2-8	AASHTO 6.11.8.2.2-5	AASHTO 6.11.8.2.2-5	
		(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)	(ksi)		(ksi)	(ksi)	(in^2)
1199	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1200	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1201	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1202	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1203	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1204	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1205	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1206	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4
1207	Box_Sect_1	46	0.75	46	0.75	36	1.5	36	1.5	34.5	177	73106	24.5	24.5	2984	2984	16551	16551	50	24	62.3	29	1674.4

3. Hold Down Capacity at Pier 2



℄ Beam B-4
Symmetrical about ℄ except as noted
℄ Anchor Rod ℄ ℄ Bearing
℄ Ramp B and Beam B-3
Shear Connector Spacing For Longitudinal Spacing See Beam Details, Sht. 19.
Retighten after deck is poured & tack weld
8"x 3"x 1'-0" ℄
1" Web ℄
L 6"x 6"x ½" Each Side
20"x 1" ℄
Sole ℄, 18"x 1½"x 2'-4"
2½"ϕ Anchor Rods and Concrete Pier Shaft by previous contract.
9½"x 1" Bearing Stiffener ℄s
End ℄ (Ea. Side)
2 Heavy Hex Nuts and ½" min. thk. cut washer
Elev. 633.08 - Pier 2
Elev. 640.37 - Pier 4
Elev. 627.48 - Pier 2



℄ Integral Pier Cap
3" (typ)
4½"(typ)
Tight Fit
⅜" (typ.
Anchor Rod Bracket
6"x ½"x 10½" ℄, (typ)
3"ϕ Hole
2"(typ)
4"(typ)
Mill to Bear (typ) ⅜"
3"ϕ Hole in Bot. Flange and Sole Plate
⅛"
2¾"ϕ Hole in Base ℄.
8 lbs. per sq. ft. Sheet Lead
E
F

SECTION C–C

1. Check Anchor Rod Tensile Capacity

Φ_t =	0.9	(AISC LRFD Chapter D, D2)
Tension Dia =	2.5	in
F_{y_rod} =	50	ksi
Fu =	65	ksi
$T_u = \Phi_t F_y A_g$ =	221	kips per rod
At yield $T_u = \Phi_t F_y A_g$ =	245	kips per rod
$T_u = F_u A_{net}$ =	319	kips per rod

2. Check Bolt Capacity on angle plate

Connection Input Data

Web Thickness	1	in
Bolt Diameter =	0.875	inch
Bolt Area =	0.601	in^2
Bolt hole diameter =	1.00	inch
8"x1/2"x10 1/2"	0.5	inch
Connection plate yield strength =	50	ksi
Connection plate ultimate strength =	65	ksi
Surface condition specification =	A	

Check Bolt Capacity

Input Bolt Pattern (Each side)

Vertical:

Spacing =	3	inch
End Distance =	1.5	inch
Bolt clear distance =	2.000	inch

6.13.2.7 Shear Resistance

$\phi_{bolt\ shear}$ =	0.8
Length Factor =	1

"The nominal shear resistance of a high-strength bolt or an ASTM A307 bolt at the strength limit state in joints whose length between extreme fasteners measured parallel to the line of action of the force is less than 50.0 inches shall be taken as…where threads are included" in the shear plane:"

$R_n = 0.38 A_b F_{ub} N_s$ **BOLT THREADS INCLUDED FROM SHEAR PLANE**

Fub =	120	ksi, Reference 6.4.3
Ns =	1	
Rn =	27.4	kips/bolt
ϕRn x Length Factor =	21.9	kips/bolt

Bearing Resistance will be not control

Total No of HS 7/8" dia bolts per rod =	12	per bolts
Bolt Capacity =	263	kips per rod

Use bolt capacity as hold down capacity since tension rod stength is unknown and it can beyond yield.

No of Anchor Rod =	2	rods
Uplift capacity =	526	kips

4. Connection Capacities

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX 07/29/17

Connection Capacity Check

Maximum D/C = 0.448

Plate Girder/Cap Beam Connection @ Pier 2 & 4

Connection Input Data

Web Thickness	1	in
Bolt Diameter =	0.875	inch
Bolt Area =	0.601	in^2
Bolt hole diameter =	1.00	inch
Gap between connection plate and floorbeam web =	x	inch
L8x8x1/2 thickness =	0.5	inch
Connection plate yield strength =	50	ksi
Connection plate ultimate strength =	65	ksi
Surface condition specification =	A	

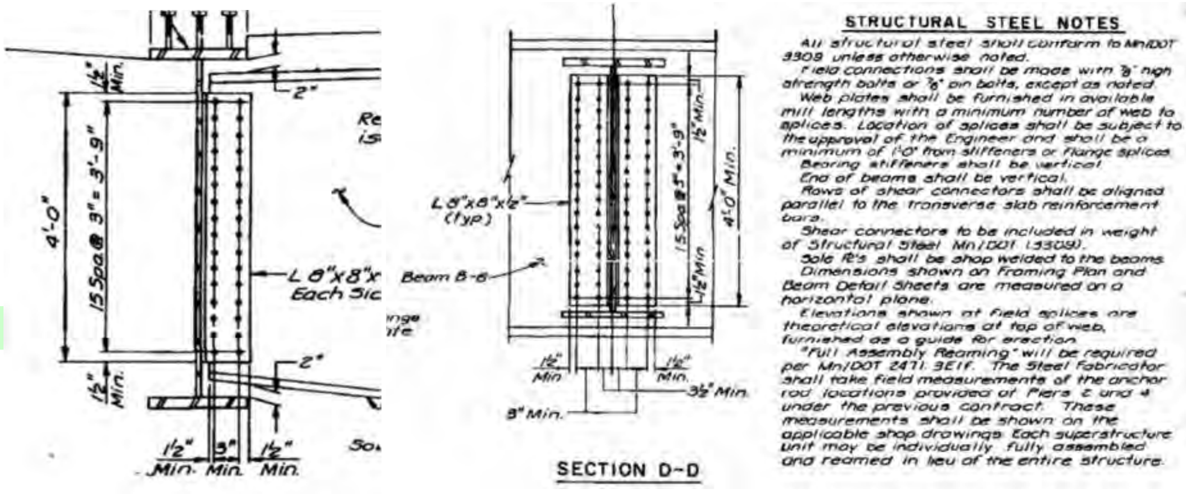
Connection Loading	Macro ID_1 =	1188	1191
	Macro ID_2 =	1194	1197

Strength 1:

Shear Force =	432.2	kips
Assumed Axial Load =	0.0	kips
Assumed Moment =	193.6	kip-ft

Service 2:

Shear Force =	N/A	kips
Assumed Axial Load =	N/A	kips
Assumed Moment =	N/A	kip-ft



All design checks OK? OK @ Plate Girder/Cap Beam Connection @ Pier 2 & 4

BOLT THREADS INCLUDED FROM SHEAR PLANE

Check Bolt Capacity

Input Bolt Pattern (Each side)

Vertical:

Number of spaces =	15	
Number of bolt rows =	16	
Spacing =	3	inch
End Distance =	1.5	inch
Vertical Plate Dimension =	48	inch
Bolt clear distance =	2.000	inch
Bolt end distance =	1.000	inch

Horizontal:

Number of spaces =	1	
Number of bolt columns =	2	
Spacing =	3	inch
CL Connection - first column =	N/A	inch
Connection End distance =	N/A	inch
Floorbeam End distance =	N/A	inch
Horizontal Plate Dimension =	N/A	inch
Bolt clear distance =	2.000	inch
Bolt end end distance =	1.5	inch
Bolt floorbeam end distance =	1.5	inch

Total Number of Bolts: 32 bolts, each side

BOLT PATTERN INPUT			Column 1	Column 2	Column 3
Y X→ ↓	Coord.		0	3	0
			1	2	0
Row 1	0	1	1	1	0
Row 2	3	2	1	1	0
Row 3	6	3	1	1	0
Row 4	9	4	1	1	0
Row 5	12	5	1	1	0
Row 6	15	6	1	1	0
Row 7	18	7	1	1	0
Row 8	21	8	1	1	0
Row 9	24	9	1	1	0
Row 10	27	10	1	1	0
Row 11	30	11	1	1	0
Row 12	33	12	1	1	0
Row 13	36	13	1	1	0
Row 14	39	14	1	1	0
Row 15	42	15	1	1	0
Row 16	45	16	1	1	0
Row 17	0	0	0	0	0
Row 18	0	0	0	0	0

Bolt Group CG:		
x =	1.5	inch
y =	22.5	inch

J =	6192.0	bolt-in^2
SM =	274.6	bolt-in
Eccent =	5.375	inch

IX Calculation		
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
0.0	0.0	0.0
0.0	0.0	0.0
IX =	72.0	bolt-in^2

IY Calculation		
506.3	506.3	0.0
380.3	380.3	0.0
272.3	272.3	0.0
182.3	182.3	0.0
110.3	110.3	0.0
56.3	56.3	0.0
20.3	20.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
20.3	20.3	0.0
56.3	56.3	0.0
110.3	110.3	0.0
182.3	182.3	0.0
272.3	272.3	0.0
380.3	380.3	0.0
506.3	506.3	0.0
0.0	0.0	0.0
0.0	0.0	0.0
IY =	6120.0	bolt-in^2

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX 07/29/17

Bolt Shear Forces:

	Strength 1	Service 2
Fy =	13.5	N/A
Fx =	0.0	N/A
Fmy =	0.6	N/A
Fmx =	8.4	N/A
Fmy - ecc =		N/A
Fmx - ecc =		N/A
Resultant =	16.4	N/A

Strength 1:	**16.4**	kips/bolt
Service 2:	**N/A**	kips/bolt

GEOMETRY CHECKS

Geometry Criteria:

			OK?	Reference
Bolt Minimum Spacing =	2.625	inch	OK	6.13.2.6.1
Bolt Maximum Spacing =	7	inch	OK	6.13.2.6.2
Minimum Edge Distance =	1.25	inch	OK	Table 6.13.2.6.6-1
Maximum Edge Distance =	5	inch	OK	6.13.2.6.6

Resistance Criteria

6.13.2.7 Shear Resistance

$\phi_{bolt\ shear}$ = 0.8
Length Factor = 1

"The nominal shear resistance of a high-strength bolt or an ASTM A307 bolt at the strength limit state in joints whose length between extreme fasteners measured parallel to the line of action of the force is less than 50.0 inches shall be taken as…where threads are included" in the shear plane:"

$R_n = 0.38A_bF_{ub}N_s$ **BOLT THREADS INCLUDED FROM SHEAR PLANE**

Fub =	120	ksi, Reference 6.4.3
Ns =	2	
Rn =	54.8	kips/bolt
ϕRn x Length Factor =	43.9	kips/bolt

43.9 kips > 16.4 kips OK (D/C = 0.373977)

Check L8x8x1/2 Shear Capacity

Gross shear Area per Angle, A_{vg} =	24	in^2/angle
Gross shear Area per Angle, A_{vn} =	16	in^2/angle
Total of Angle for connection =	2	

For shear yield
$R_r = \Phi_v 0.58F_yA_{vg}$ = 1392 kips (6.13.5.3-1)

For shear fracture
$R_r = \Phi_{vu}0.58R_pF_uA_{vn}$ = 965 kips (6.13.5.3-2)

Controlling R_r = 965 kips OK (D/C = 0.447823)

Check Block shear Capacity
By inspection, block shear is not controlled.

6.13.2.8 Slip Resistance

$\phi_{bolt\ slip}$ = 1

"The nominal slip resistance of a bolt in a slip-critical connection shall be taken as:"

$R_n = K_hK_sN_sP_t$

Kh = hole size factor specified in Table 2
Kh = 1 for stand-size holes
Ks = surface condition factor specified in Table 3
Ks = 0.33
Pt = minimum required bolt tension specified in Table 1
Pt = FALSE kips

Rn = 0 kips/bolt

N/A N/A

6.13.2.9 Bearing Resistance

$\phi_{bolt\ bearing}$ = 0.8

"…the nominal resistance of interior and end bolt holes at the strength limit state, Rn, shall be taken as:"

"With bolts spaced at a clear distance between holes not less than 2.0d and with a clear end distance not less than 2.0d:"

$Rn = 2.4dtF_u$

"If either the clear distance between holes is less than 2.0d, or the clear end distance is less than 2.0d:"

$Rn = 1.2L_ctF_u$

Lc @ L8x8x1/2 =	1.000	inch
Lc @ web plate =	1.500	inch
Rn @ L8x8x1/2 =	78.0	kips/bolt
Rn @ web plates =	117.0	kips/bolt
ϕR_n =	62.4	kips/bolt

62.4 kips > 16.4 kips OK (D/C = 0.262937)

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX 07/29/17

Connection Capacity Check

Maximum D/C = 0.283

Plate Girder/Straddle Bent Connection @ Pier 3

Connection Input Data

Plate girder Web Thk	0.75	in
Bolt Diameter =	0.875	inch
Bolt Area =	0.601	in^2
Bolt hole diameter =	1.00	inch
Gap between connection plate and floorbeam web =	x	inch
L8x8x1/2 thickness =	0.5	inch
Connection plate yield strength =	50	ksi
Connection plate ultimate strength =	65	ksi
Surface condition specification =	A	

Connection Loading

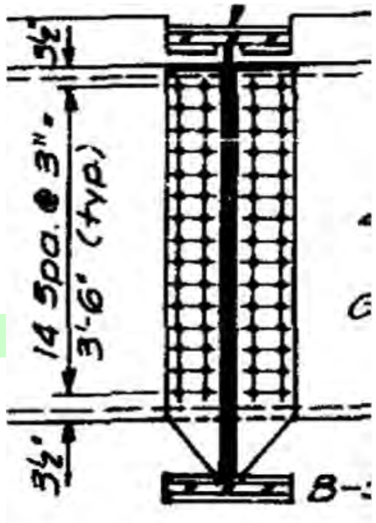
	Macro ID_1 =	1031	1035
	Macro ID_2 =	1093	1097

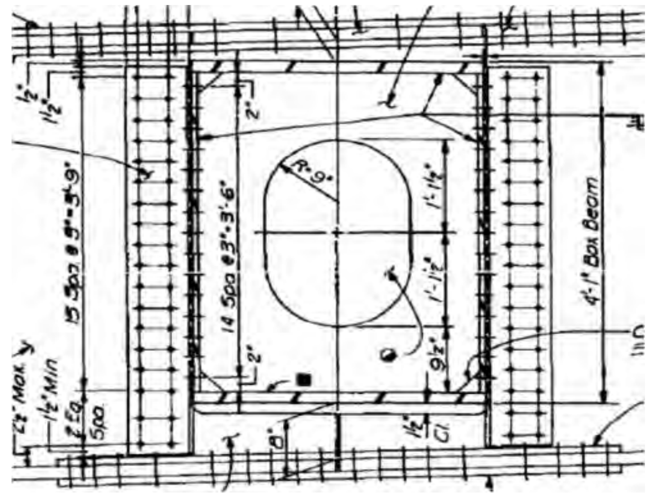
<u>Strength 1:</u>

Shear Force =	307.6	kips
Assumed Axial Load =	0.0	kips
Assumed Moment =	131.4	kip-ft

<u>Service 2:</u>

Shear Force =	N/A	kips
Assumed Axial Load =	N/A	kips
Assumed Moment =	N/A	kip-ft





All design checks OK? OK @ Plate Girder/Straddle Bent Connection @ Pier 3

BOLT THREADS INCLUDED FROM SHEAR PLANE

Check Bolt Capacity

Input Bolt Pattern (Each side)

Vertical:

Number of spaces =	17	
Number of bolt rows =	18	
Spacing =	3	inch
End Distance =	1.5	inch
Vertical Plate Dimension =	54	inch
Bolt clear distance =	2.000	inch
Bolt end distance =	1.000	inch

Horizontal:

Number of spaces =	1	
Number of bolt columns =	2	
Spacing =	3.5	inch
CL Connection - first column =	N/A	inch
Connection End distance =	N/A	inch
Floorbeam End distance =	N/A	inch
Horizontal Plate Dimension =	N/A	inch
Bolt clear distance =	2.500	inch
Bolt end end distance =	1.5	inch
Bolt floorbeam end distance =	1.5	inch

Total Number of Bolts: 36 bolts, each side

BOLT PATTERN INPUT			Column 1	Column 2	Column 3
Y X → ↓	Coord.		0	3.5	0
			1	2	0
Row 1	0	1	1	1	0
Row 2	3	2	1	1	0
Row 3	6	3	1	1	0
Row 4	9	4	1	1	0
Row 5	12	5	1	1	0
Row 6	15	6	1	1	0
Row 7	18	7	1	1	0
Row 8	21	8	1	1	0
Row 9	24	9	1	1	0
Row 10	27	10	1	1	0
Row 11	30	11	1	1	0
Row 12	33	12	1	1	0
Row 13	36	13	1	1	0
Row 14	39	14	1	1	0
Row 15	42	15	1	1	0
Row 16	45	16	1	1	0
Row 17	48	17	1	1	0
Row 18	51	18	1	1	0

Bolt Group CG:		
x =	1.75	inch
y =	25.5	inch

J =	8831.3	bolt-in^2
SM =	345.5	bolt-in
Eccent =	5.125	inch

IX Calculation		
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
IX =	110.3	bolt-in^2

IY Calculation		
650.3	650.3	0.0
506.3	506.3	0.0
380.3	380.3	0.0
272.3	272.3	0.0
182.3	182.3	0.0
110.3	110.3	0.0
56.3	56.3	0.0
20.3	20.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
20.3	20.3	0.0
56.3	56.3	0.0
110.3	110.3	0.0
182.3	182.3	0.0
272.3	272.3	0.0
380.3	380.3	0.0
506.3	506.3	0.0
650.3	650.3	0.0
IY =	8721.0	bolt-in^2

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX 07/29/17

Bolt Shear Forces:

	Strength 1	Service 2
Fy =	8.5	N/A
Fx =	0.0	N/A
Fmy =	0.3	N/A
Fmx =	4.6	N/A
Fmy - ecc =		N/A
Fmx - ecc =		N/A
Resultant =	10.0	N/A

Strength 1:	**10.0**	kips/bolt
Service 2:	**N/A**	kips/bolt

GEOMETRY CHECKS

Geometry Criteria:

			OK?	Reference
Bolt Minimum Spacing =	2.625	inch	OK	6.13.2.6.1
Bolt Maximum Spacing =	7	inch	OK	6.13.2.6.2
Minimum Edge Distance =	1.25	inch	OK	Table 6.13.2.6.6-1
Maximum Edge Distance =	5	inch	OK	6.13.2.6.6

Resistance Criteria

6.13.2.7 Shear Resistance

$\phi_{bolt\ shear}$ = 0.8
Length Factor = 1

"The nominal shear resistance of a high-strength bolt or an ASTM A307 bolt at the strength limit state in joints whose length between extreme fasteners measured parallel to the line of action of the force is less than 50.0 inches shall be taken as…where threads are included" in the shear plane:"

$R_n = 0.38A_bF_{ub}N_s$ **BOLT THREADS INCLUDED FROM SHEAR PLANE**

Fub =	120	ksi, Reference 6.4.3
Ns =	2	
Rn =	54.8	kips/bolt
ϕRn x Length Factor =	43.9	kips/bolt

43.9 kips > 10.0 kips OK (D/C = 0.226966)

Check L8x8x1/2 Shear Capacity

Gross shear Area per Angle, A_{vg} =	27	in^2/angle
Gross shear Area per Angle, A_{vn} =	18	in^2/angle
Total of Angle for connection =	2	

For shear yield
$R_r = \Phi_v 0.58F_yA_{vg}$ = 1566 kips (6.13.5.3-1)

For shear fracture
$R_r = \Phi_{vu}0.58R_pF_uA_{vn}$ = 1086 kips (6.13.5.3-2)

Controlling R_r = 1086 kips OK (D/C = 0.283287)

Check Block shear Capacity
By inspection, block shear is not controlled.

6.13.2.8 Slip Resistance

$\phi_{bolt\ slip}$ = 1

"The nominal slip resistance of a bolt in a slip-critical connection shall be taken as:"

$R_n = K_hK_sN_sP_t$

Kh = hole size factor specified in Table 2
Kh = 1 for stand-size holes
Ks = surface condition factor specified in Table 3
Ks = 0.33
Pt = minimum required bolt tension specified in Table 1
Pt = FALSE kips

Rn = 0 kips/bolt

N/A N/A

6.13.2.9 Bearing Resistance

$\phi_{bolt\ bearing}$ = 0.8

"…the nominal resistance of interior and end bolt holes at the strength limit state, Rn, shall be taken as:"

"With bolts spaced at a clear distance between holes not less than 2.0d and with a clear end distance not less than 2.0d:"

$Rn = 2.4dtF_u$

"If either the clear distance between holes is less than 2.0d, or the clear end distance is less than 2.0d:"

$Rn = 1.2L_ctF_u$

Lc @ L8x8x1/2 =	1.000	inch
Lc @ web plate =	1.500	inch
Rn @ L8x8x1/2 =	78.0	kips/bolt
Rn @ web plates =	87.8	kips/bolt
ϕR_n =	62.4	kips/bolt

62.4 kips > 10.0 kips OK (D/C = 0.159576)

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX on 07/29/17

Connection Capacity Check

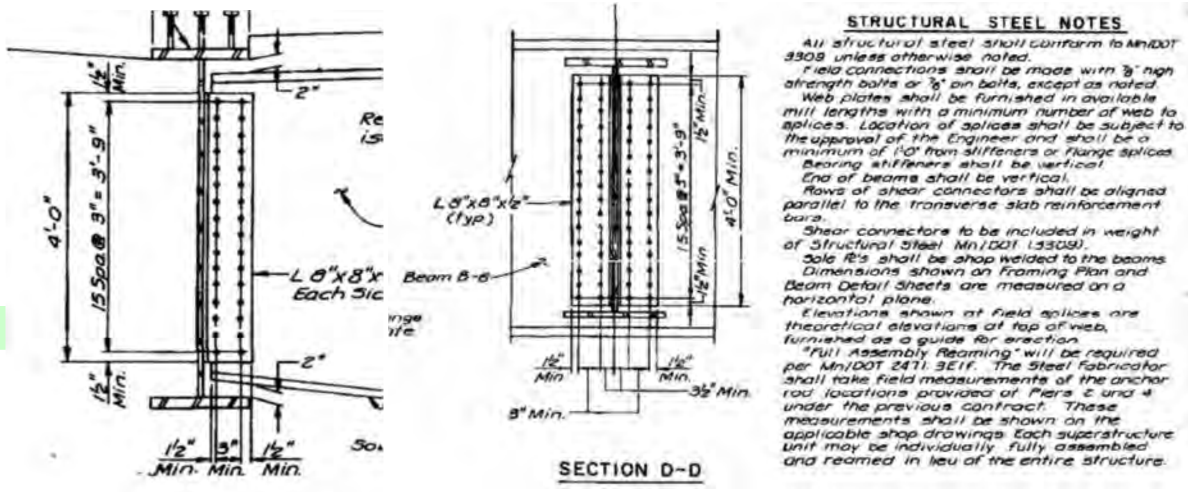
Maximum D/C = 1.015

Plate Girder/Cap Beam Connection @ Pier 2 & 4

Connection Input Data

Web Thickness	1	in
Bolt Diameter =	0.875	inch
Bolt Area =	0.601	in^2
Bolt hole diameter =	1.00	inch
Gap between connection plate and floorbeam web =	x	inch
L8x8x1/2 thickness =	0.5	inch
Connection plate yield strength =	50	ksi
Connection plate ultimate strength =	65	ksi
Surface condition specification =	A	

Connection Loading	Macro ID_1 =	1188	1191
	Macro ID_2 =	1194	1197



Strength 1:

Shear Force =	980.1	kips
Assumed Axial Load =	0.0	kips
Assumed Moment =	439.0	kip-ft

Service 2:

Shear Force =	N/A	kips
Assumed Axial Load =	N/A	kips
Assumed Moment =	N/A	kip-ft
Stay pullout force on FB Bott. FLG =	N/A	kips

All design checks OK? NG @ Plate Girder/Cap Beam Connection @ Pier 2 & 4

BOLT THREADS INCLUDED FROM SHEAR PLANE

Check Bolt Capacity

Input Bolt Pattern (Each side)

Vertical:

Number of spaces =	15	
Number of bolt rows =	16	
Spacing =	3	inch
End Distance =	1.5	inch
Vertical Plate Dimension =	48	inch
Bolt clear distance =	2.000	inch
Bolt end distance =	1.000	inch

Horizontal:

Number of spaces =	1	
Number of bolt columns =	2	
Spacing =	3	inch
CL Connection - first column =	N/A	inch
Connection End distance =	N/A	inch
Floorbeam End distance =	N/A	inch
Horizontal Plate Dimension =	N/A	inch
Bolt clear distance =	2.000	inch
Bolt end end distance =	1.5	inch
Bolt floorbeam end distance =	1.5	inch

Total Number of Bolts: 32 bolts, each side

BOLT PATTERN INPUT			Column 1	Column 2	Column 3
Y X→ ↓	Coord.		0	3	0
			1	2	0
Row 1	0	1	1	1	0
Row 2	3	2	1	1	0
Row 3	6	3	1	1	0
Row 4	9	4	1	1	0
Row 5	12	5	1	1	0
Row 6	15	6	1	1	0
Row 7	18	7	1	1	0
Row 8	21	8	1	1	0
Row 9	24	9	1	1	0
Row 10	27	10	1	1	0
Row 11	30	11	1	1	0
Row 12	33	12	1	1	0
Row 13	36	13	1	1	0
Row 14	39	14	1	1	0
Row 15	42	15	1	1	0
Row 16	45	16	1	1	0
Row 17	0	0	0	0	0
Row 18	0	0	0	0	0

Bolt Group CG:		
x =	1.5	inch
y =	22.5	inch

J =	6192.0	$bolt\text{-}in^2$
SM =	274.6	bolt-in
Eccent =	5.375	inch

IX Calculation		
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
0.0	0.0	0.0
0.0	0.0	0.0
IX =	72.0	$bolt\text{-}in^2$

IY Calculation		
506.3	506.3	0.0
380.3	380.3	0.0
272.3	272.3	0.0
182.3	182.3	0.0
110.3	110.3	0.0
56.3	56.3	0.0
20.3	20.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
20.3	20.3	0.0
56.3	56.3	0.0
110.3	110.3	0.0
182.3	182.3	0.0
272.3	272.3	0.0
380.3	380.3	0.0
506.3	506.3	0.0
0.0	0.0	0.0
0.0	0.0	0.0
IY =	6120.0	$bolt\text{-}in^2$

Bolt Shear Forces:

	Strength 1	Service 2
Fy =	30.6	N/A
Fx =	0.0	N/A
Fmy =	1.3	N/A
Fmx =	19.1	N/A
Fmy - ecc =		N/A
Fmx - ecc =		N/A
Resultant =	37.2	N/A

Strength 1:	**37.2**	kips/bolt
Service 2:	**N/A**	kips/bolt

GEOMETRY CHECKS

Geometry Criteria:

			OK?	Reference
Bolt Minimum Spacing =	2.625	inch	OK	6.13.2.6.1
Bolt Maximum Spacing =	7	inch	OK	6.13.2.6.2
Minimum Edge Distance =	1.25	inch	OK	Table 6.13.2.6.6-1
Maximum Edge Distance =	5	inch	OK	6.13.2.6.6

Resistance Criteria

6.13.2.7 Shear Resistance

$\phi_{bolt\ shear}$ = 0.8
Length Factor = 1

"The nominal shear resistance of a high-strength bolt or an ASTM A307 bolt at the strength limit state in joints whose length between extreme fasteners measured parallel to the line of action of the force is less than 50.0 inches shall be taken as…where threads are included" in the shear plane:"

$R_n = 0.38A_bF_{ub}N_s$ **BOLT THREADS INCLUDED FROM SHEAR PLANE**

Fub =	120	ksi, Reference 6.4.3
Ns =	2	
Rn =	54.8	kips/bolt
ϕRn x Length Factor =	43.9	kips/bolt

43.9 kips > 37.2 kips OK (D/C = 0.848026)

Check L8x8x1/2 Shear Capacity

Gross shear Area per Angle, A_{vg} =	24	in^2/angle
Gross shear Area per Angle, A_{vn} =	16	in^2/angle
Total of Angle for connection =	2	

For shear yield
$R_r = \Phi_v 0.58F_yA_{vg}$ = 1392 kips (6.13.5.3-1)

For shear fracture
$R_r = \Phi_{vu}0.58R_pF_uA_{vn}$ = 965 kips (6.13.5.3-2)

Controlling R_r = 965 kips NG (D/C = 1.015478)

Check Block shear Capacity
By inspection, block shear is not controlled.

6.13.2.8 Slip Resistance

$\phi_{bolt\ slip}$ = 1

"The nominal slip resistance of a bolt in a slip-critical connection shall be taken as:"

$R_n = K_hK_sN_sP_t$

Kh = hole size factor specified in Table 2
Kh = 1 for stand-size holes
Ks = surface condition factor specified in Table 3
Ks = 0.33
Pt = minimum required bolt tension specified in Table 1
Pt = FALSE kips

Rn = 0 kips/bolt

N/A N/A

6.13.2.9 Bearing Resistance

$\phi_{bolt\ bearing}$ = 0.8

"…the nominal resistance of interior and end bolt holes at the strength limit state, Rn, shall be taken as:"

"With bolts spaced at a clear distance between holes not less than 2.0d and with a clear end distance not less than 2.0d:"

$Rn = 2.4dtF_u$

"If either the clear distance between holes is less than 2.0d, or the clear end distance is less than 2.0d:"

$Rn = 1.2L_ctF_u$

Lc @ L8x8x1/2 =	1.000	inch
Lc @ web plate =	1.500	inch
Rn @ L8x8x1/2 =	78.0	kips/bolt
Rn @ web plates =	117.0	kips/bolt
ϕR_n =	62.4	kips/bolt

62.4 kips > 37.2 kips OK (D/C = 0.596232)

Bridge 69102 Ultimate Connection Capacity

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX on 07/29/17

Connection Capacity Check

Maximum D/C = 0.409

Plate Girder/Straddle Bent Connection @ Pier 3

Connection Input Data		
Plate girder Web Thk	0.75	in
Bolt Diameter =	0.875	inch
Bolt Area =	0.601	in^2
Bolt hole diameter =	1.00	inch
Gap between connection plate and floorbeam web =	x	inch
L8x8x1/2 thickness =	0.5	inch
Connection plate yield strength =	50	ksi
Connection plate ultimate strength =	65	ksi
Surface condition specification =	A	

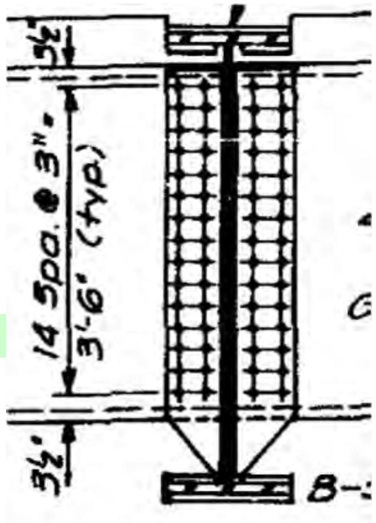
Connection Loading	Macro ID_1 =	1031	1035
	Macro ID_2 =	1093	1097

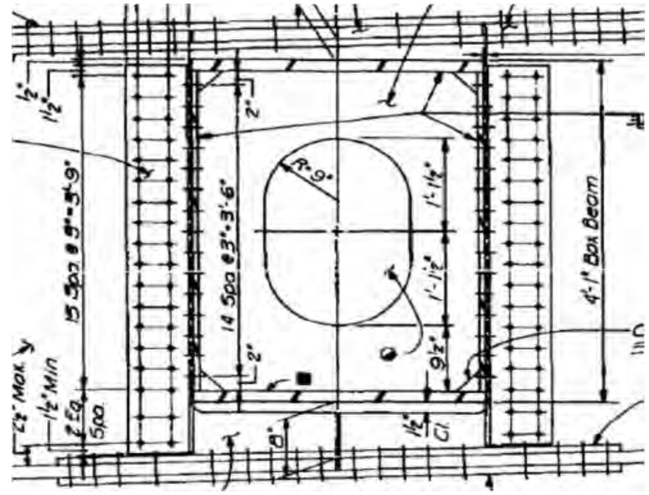
<ins>Strength 1:</ins>

Shear Force =	444.6	kips
Assumed Axial Load =	0.0	kips
Assumed Moment =	189.9	kip-ft

<ins>Service 2:</ins>

Shear Force =	N/A	kips
Assumed Axial Load =	N/A	kips
Assumed Moment =	N/A	kip-ft





All design checks OK? OK @ Plate Girder/Straddle Bent Connection @ Pier 3

BOLT THREADS INCLUDED FROM SHEAR PLANE

Check Bolt Capacity

Input Bolt Pattern (Each side)

Vertical:

Number of spaces =	17	
Number of bolt rows =	18	
Spacing =	3	inch
End Distance =	1.5	inch
Vertical Plate Dimension =	54	inch
Bolt clear distance =	2.000	inch
Bolt end distance =	1.000	inch

Horizontal:

Number of spaces =	1	
Number of bolt columns =	2	
Spacing =	3.5	inch
CL Connection - first column =	N/A	inch
Connection End distance =	N/A	inch
Floorbeam End distance =	N/A	inch
Horizontal Plate Dimension =	N/A	inch
Bolt clear distance =	2.500	inch
Bolt end end distance =	1.5	inch
Bolt floorbeam end distance =	1.5	inch

Total Number of Bolts: 36 bolts, each side

BOLT PATTERN INPUT			Column 1	Column 2	Column 3
Y X →					
↓	Coord.		0	3.5	0
			1	2	0
Row 1	0	1	1	1	0
Row 2	3	2	1	1	0
Row 3	6	3	1	1	0
Row 4	9	4	1	1	0
Row 5	12	5	1	1	0
Row 6	15	6	1	1	0
Row 7	18	7	1	1	0
Row 8	21	8	1	1	0
Row 9	24	9	1	1	0
Row 10	27	10	1	1	0
Row 11	30	11	1	1	0
Row 12	33	12	1	1	0
Row 13	36	13	1	1	0
Row 14	39	14	1	1	0
Row 15	42	15	1	1	0
Row 16	45	16	1	1	0
Row 17	48	17	1	1	0
Row 18	51	18	1	1	0

Bolt Group CG:		
x =	1.75	inch
y =	25.5	inch

J =	8831.3	bolt-in^2
SM =	345.5	bolt-in
Eccent =	5.125	inch

IX Calculation		
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
3.06	3.06	0.0
IX =	110.3	bolt-in^2

IY Calculation		
650.3	650.3	0.0
506.3	506.3	0.0
380.3	380.3	0.0
272.3	272.3	0.0
182.3	182.3	0.0
110.3	110.3	0.0
56.3	56.3	0.0
20.3	20.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
20.3	20.3	0.0
56.3	56.3	0.0
110.3	110.3	0.0
182.3	182.3	0.0
272.3	272.3	0.0
380.3	380.3	0.0
506.3	506.3	0.0
650.3	650.3	0.0
IY =	8721.0	bolt-in^2

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX on 07/29/17

Bolt Shear Forces:

	Strength 1	Service 2
Fy =	12.3	N/A
Fx =	0.0	N/A
Fmy =	0.5	N/A
Fmx =	6.6	N/A
Fmy - ecc =		N/A
Fmx - ecc =		N/A
Resultant =	14.4	N/A

Strength 1:	**14.4**	kips/bolt
Service 2:	**N/A**	kips/bolt

GEOMETRY CHECKS

Geometry Criteria:

			OK?	Reference
Bolt Minimum Spacing =	2.625	inch	OK	6.13.2.6.1
Bolt Maximum Spacing =	7	inch	OK	6.13.2.6.2
Minimum Edge Distance =	1.25	inch	OK	Table 6.13.2.6.6-1
Maximum Edge Distance =	5	inch	OK	6.13.2.6.6

Resistance Criteria

6.13.2.7 Shear Resistance

$\phi_{bolt\ shear}$ = 0.8
Length Factor = 1

"The nominal shear resistance of a high-strength bolt or an ASTM A307 bolt at the strength limit state in joints whose length between extreme fasteners measured parallel to the line of action of the force is less than 50.0 inches shall be taken as…where threads are included" in the shear plane:"

$R_n = 0.38A_bF_{ub}N_s$ **BOLT THREADS INCLUDED FROM SHEAR PLANE**

Fub =	120	ksi, Reference 6.4.3
Ns =	2	
Rn =	54.8	kips/bolt
ϕRn x Length Factor =	43.9	kips/bolt

43.9 kips > 14.4 kips OK (D/C = 0.32806)

Check L8x8x1/2 Shear Capacity

Gross shear Area per Angle, A_{vg} =	27	in^2/angle
Gross shear Area per Angle, A_{vn} =	18	in^2/angle
Total of Angle for connection =	2	

For shear yield
$R_r = \Phi_v 0.58F_yA_{vg}$ = 1566 kips (6.13.5.3-1)

For shear fracture
$R_r = \Phi_{vu} 0.58R_pF_uA_{vn}$ = 1086 kips (6.13.5.3-2)

Controlling R_r = 1086 kips OK (D/C = 0.409468)

Check Block shear Capacity
By inspection, block shear is not controlled.

6.13.2.8 Slip Resistance

$\phi_{bolt\ slip}$ = 1

"The nominal slip resistance of a bolt in a slip-critical connection shall be taken as:"

$R_n = K_hK_sN_sP_t$

Kh = hole size factor specified in Table 2
Kh = 1 for stand-size holes
Ks = surface condition factor specified in Table 3
Ks = 0.33
Pt = minimum required bolt tension specified in Table 1
Pt = FALSE kips

Rn = 0 kips/bolt

N/A N/A

6.13.2.9 Bearing Resistance

$\phi_{bolt\ bearing}$ = 0.8

"…the nominal resistance of interior and end bolt holes at the strength limit state, Rn, shall be taken as:"

"With bolts spaced at a clear distance between holes not less than 2.0d and with a clear end distance not less than 2.0d:"

$Rn = 2.4dtF_u$

"If either the clear distance between holes is less than 2.0d, or the clear end distance is less than 2.0d:"

$Rn = 1.2L_ctF_u$

Lc @ L8x8x1/2 =	1.000	inch
Lc @ web plate =	1.500	inch
Rn @ L8x8x1/2 =	78.0	kips/bolt
Rn @ web plates =	87.8	kips/bolt
ϕR_n =	62.4	kips/bolt

62.4 kips > 14.4 kips OK (D/C = 0.230653)

Designed by MX on 07/14/17
Checked by TFK on 07/29/17
Backchecked by MX on 07/29/17

Connection Capacity Check

Maximum D/C = 0.131

Plate Girder/Redundant Load Path Diaphragm @ Pier 2 & 4

Connection Input Data

Web Thickness	0.5625	in
Bolt Diameter =	0.875	inch
Bolt Area =	0.601	in^2
Bolt hole diameter =	1.00	inch
Gap between connection plate and floorbeam web =	x	inch
L8x8x1/2 thickness =	0.5	inch
Connection plate yield strength =	50	ksi
Connection plate ultimate strength =	65	ksi
Surface condition specification =	A	

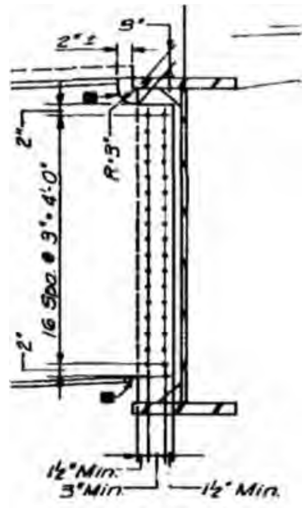
Connection Loading	Macro ID_1 =	1208	1212
	Macro ID_2 =	1213	1217

Strength 1:

Shear Force =	134.2	kips
Assumed Axial Load =	0.0	kips
Assumed Moment =	61.5	kip-ft

Service 2:

Shear Force =	N/A	kips
Assumed Axial Load =	N/A	kips
Assumed Moment =	N/A	kip-ft
Stay pullout force on FB Bott. FLG =	N/A	kips



STRUCTURAL STEEL NOTES

All structural steel shall conform to Mn/DOT 3309 unless otherwise noted.

Field connections shall be made with ⅞" high strength bolts or ⅞" pin bolts, except as noted.

Web plates shall be furnished in available mill lengths with a minimum number of web to splices. Location of splices shall be subject to the approval of the Engineer and shall be a minimum of 1'-0" from stiffeners or flange splices.

Bearing stiffeners shall be vertical.

End of beams shall be vertical.

Rows of shear connectors shall be aligned parallel to the transverse slab reinforcement bars.

Shear connectors to be included in weight of Structural Steel Mn/DOT (3309).

Sole ℞'s shall be shop welded to the beams.

Dimensions shown on Framing Plan and Beam Detail Sheets are measured on a horizontal plane.

Elevations shown at field splices are theoretical elevations at top of web, furnished as a guide for erection.

"Full Assembly Reaming" will be required per Mn/DOT 2471 3E1f. The Steel Fabricator shall take field measurements of the anchor rod locations provided at Piers 2 and 4 under the previous contract. These measurements shall be shown on the applicable shop drawings. Each superstructure unit may be individually fully assembled and reamed in lieu of the entire structure.

All design checks OK? **OK** @ Plate Girder/Cap Beam Connection @ Pier 2 & 4

BOLT THREADS INCLUDED FROM SHEAR PLANE

Check Bolt Capacity

Input Bolt Pattern (Each side)

Vertical:

Number of spaces =	16	
Number of bolt rows =	17	
Spacing =	3	inch
End Distance =	1.5	inch
Vertical Plate Dimension =	51	inch
Bolt clear distance =	2.000	inch
Bolt end distance =	1.000	inch

Horizontal:

Number of spaces =	1	
Number of bolt columns =	2	
Spacing =	3	inch
CL Connection - first column =	N/A	inch
Connection End distance =	N/A	inch
Floorbeam End distance =	N/A	inch
Horizontal Plate Dimension =	N/A	inch
Bolt clear distance =	2.000	inch
Bolt end end distance =	1.5	inch
Bolt floorbeam end distance =	1.5	inch

Total Number of Bolts: 34 bolts, each side

BOLT PATTERN INPUT			Column 1	Column 2	Column 3
Y X → ↓	Coord.		0	3	0
			1	2	0
Row 1	0	1	1	1	0
Row 2	3	2	1	1	0
Row 3	6	3	1	1	0
Row 4	9	4	1	1	0
Row 5	12	5	1	1	0
Row 6	15	6	1	1	0
Row 7	18	7	1	1	0
Row 8	21	8	1	1	0
Row 9	24	9	1	1	0
Row 10	27	10	1	1	0
Row 11	30	11	1	1	0
Row 12	33	12	1	1	0
Row 13	36	13	1	1	0
Row 14	39	14	1	1	0
Row 15	42	15	1	1	0
Row 16	45	16	1	1	0
Row 17	48	17	1	1	0
Row 18	0	0	0	0	0

Bolt Group CG:		
x =	1.5	inch
y =	24	inch

J =	7420.5	bolt-in^2
SM =	308.6	bolt-in
Eccent =	5.5	inch

IX Calculation		
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
2.3	2.3	0.0
0.0	0.0	0.0
IX =	76.5	bolt-in^2

IY Calculation		
576.0	576.0	0.0
441.0	441.0	0.0
324.0	324.0	0.0
225.0	225.0	0.0
144.0	144.0	0.0
81.0	81.0	0.0
36.0	36.0	0.0
9.0	9.0	0.0
0.0	0.0	0.0
9.0	9.0	0.0
36.0	36.0	0.0
81.0	81.0	0.0
144.0	144.0	0.0
225.0	225.0	0.0
324.0	324.0	0.0
441.0	441.0	0.0
576.0	576.0	0.0
0.0	0.0	0.0
IY =	7344.0	bolt-in^2

Bolt Shear Forces:

	Strength 1	Service 2			
Fy =	3.9	N/A			
Fx =	0.0	N/A			
Fmy =	0.1	N/A			
Fmx =	2.4	N/A			
Fmy - ecc =		N/A			
Fmx - ecc =		N/A	Strength 1:	**4.7**	kips/bolt
Resultant =	4.7	N/A	Service 2:	**N/A**	kips/bolt

GEOMETRY CHECKS

Geometry Criteria:

			OK?	Reference
Bolt Minimum Spacing =	2.625	inch	OK	6.13.2.6.1
Bolt Maximum Spacing =	7	inch	OK	6.13.2.6.2
Minimum Edge Distance =	1.25	inch	OK	Table 6.13.2.6.6-1
Maximum Edge Distance =	5	inch	OK	6.13.2.6.6

Resistance Criteria

6.13.2.7 Shear Resistance

$\phi_{bolt\ shear}$ = 0.8
Length Factor = 1

"The nominal shear resistance of a high-strength bolt or an ASTM A307 bolt at the strength limit state in joints whose length between extreme fasteners measured parallel to the line of action of the force is less than 50.0 inches shall be taken as…where threads are included" in the shear plane:"

$R_n = 0.38A_bF_{ub}N_s$ **BOLT THREADS INCLUDED FROM SHEAR PLANE**

Fub =	120	ksi, Reference 6.4.3
Ns =	2	
Rn =	54.8	kips/bolt
ϕRn x Length Factor =	43.9	kips/bolt

43.9 kips > 4.7 kips OK (D/C = 0.108043)

Check L8x8x1/2 Shear Capacity

Gross shear Area per Angle, A_{vg} =	25.5	in^2/angle
Gross shear Area per Angle, A_{vn} =	17	in^2/angle
Total of Angle for connection =	2	

For shear yield
$R_r = \Phi_v 0.58 F_y A_{vg}$ = 1479 kips (6.13.5.3-1)

For shear fracture
$R_r = \Phi_{vu} 0.58 R_p F_u A_{vn}$ = 1025 kips (6.13.5.3-2)

Controlling R_r = 1025 kips OK (D/C = 0.130843)

Check Block shear Capacity
By inspection, block shear is not controlled.

6.13.2.8 Slip Resistance

$\phi_{bolt\ slip}$ = 1

"The nominal slip resistance of a bolt in a slip-critical connection shall be taken as:"

$R_n = K_h K_s N_s P_t$

Kh = hole size factor specified in Table 2
Kh = 1 for stand-size holes
Ks = surface condition factor specified in Table 3
Ks = 0.33
Pt = minimum required bolt tension specified in Table 1
Pt = FALSE kips

Rn = 0 kips/bolt

N/A N/A

6.13.2.9 Bearing Resistance

$\phi_{bolt\ bearing}$ = 0.8

"…the nominal resistance of interior and end bolt holes at the strength limit state, Rn, shall be taken as:"

"With bolts spaced at a clear distance between holes not less than 2.0d and with a clear end distance not less than 2.0d:"

$Rn = 2.4dtF_u$

"If either the clear distance between holes is less than 2.0d, or the clear end distance is less than 2.0d:"

$Rn = 1.2L_ctF_u$

Lc @ L8x8x1/2 =	1.000	inch
Lc @ web plate =	1.500	inch
Rn @ L8x8x1/2 =	78.0	kips/bolt
Rn @ web plates =	65.8	kips/bolt
ϕR_n =	52.7	kips/bolt

52.7 kips > 4.7 kips OK (D/C = 0.090031)

5. Capacity of the Redundant Load Path Diaphragm

Diaphragm Negative Moment Capacity @ Pier4 2 & 4

ΦM_{nc} = 4527 k-ft

DETERMINE THE CAPACITY OF THE REDUNDANT DIAPHRAGM @ PIERS 2 & 4

1. AT THE SECTION NEAR THE BEAM B-5

IF THE CAP BEAM @ PIER 2 OR PIER 4 IS FRACTURE, THE LOAD ON THE CAP BEAM WILL BE REDISTRIBUTED TO THE REDUNDANT LOAD PATH DIAPHRAGM. THE TOP FLANGE OF THE DIAPHRAGM NEAR THE BEAM B-5 WILL BE UNDER TENSION.

1) THE TENSION CAPACITY ON THE 16"×1" SPLICE PL IS:

FOR YIELDING, $T_y = \phi_y A_g F_y$

$= 0.95 \times 16" \times 1" \times 50 \text{ ksi}$

$= 760 \text{ Kips}$

FOR FRACTURE $T_u = \phi_u A_n F_u$

STD BOLT HOLE DIA.

$= 0.8 \times (16" - 4 \times 1") \times 1 \times 65 \text{ ksi}$

$= 624 \text{ Kips}$

2) BOLT CAPACITY ON SPLICE PLATE ($\frac{7}{8}$" ϕ H.S. BOLT)

BOLT SHEAR CAPACITY $R_n = 0.38 A_b F_{ub} N_s$

(ASSUME BOLT THREADS INCLUDED FROM SHEAR PLANE)

$= 0.38 \times (7/8)^2 \frac{\pi}{4} \times 120\text{ksi} \times 1$

$= 27.4$ K/BOLT

$\phi_v R_n = 0.8 \times 27.4$

$= 21.92$ K/BOLT

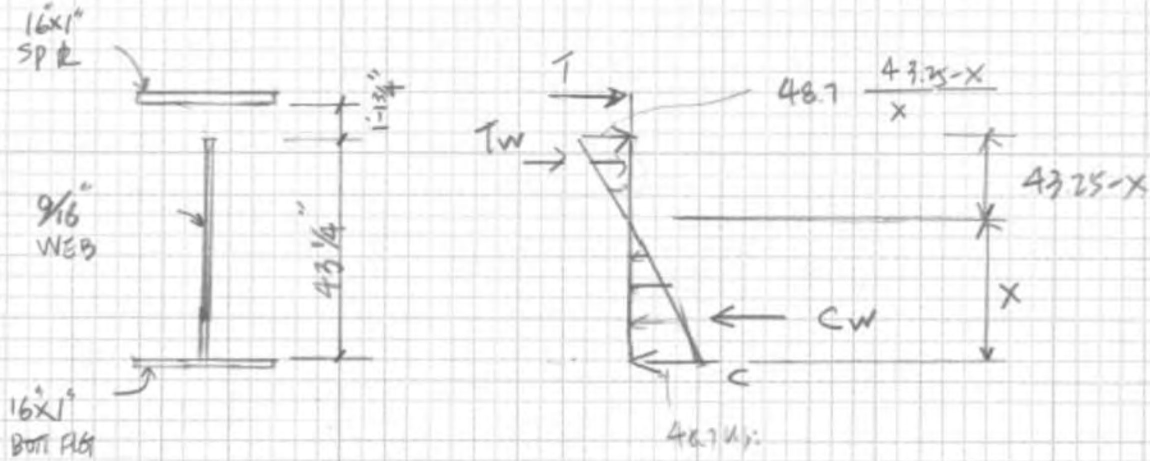
THE TOTAL NO OF $\frac{7}{8}$" ϕ H.S. ASTM A325 BOLTS IS $10 \times 4 = 40$ BOLTS AT EACH SIDE OF SPLICE PLATE.

THE BOLT SHEAR CAPACITY = (40 BOLTS)(21.92 K/BOLT)

= 876 KIPS

THEREFORE, THE SPLICE PL DUE TO FRACTURE IS CONTROLLED. $T_u = 624$ KIPS

FROM SPREADSHEET CALCULATION, THE COMPRESSIVE STRENGTH ON THE BOTTOM OF FLANGE $\phi F_{nc} = 48.7$ KSI



$C = 16 \times 1" \times 48.7$ ksi

$= 779$ K

$C_w = \frac{1}{2} \times (48.7)(9/16)\,x$

$= 13.7\,x$

$T = 760$ K (CONTROL BY SPLICE PL YIELDING SINCE SPLICE PL FAILURE BY FRACTURE IS UNLIKELY WITH SHEAR STUDS AND REBAR IN THE DECK

$= 760$ K

$T_w = \frac{1}{2}(48.7)\left(\frac{43.25-x}{x}\right)(9/6)(43.25-x)$

$= 13.7\,\frac{(43.25-x)^2}{x}$

HNTB	By: MX	Date: 07/14/17	Job No. 64517
	Chkd By: TFK	Date: 7/28/2017	
HNTB Corp.	Bckchk By: MX	Date: 7/29/2017	Sht. No.

$C + C_w = T + T_w$

$779 + 13.7x = 760 + 137\left(\frac{43.25 - x}{x}\right)^2$

$x = 22''$

$M_n = 779 \times (0.5 + 22) + 13.7 \times 22 \times 22 \times 2/3$

$+ 800 \times (43.25 - 22 + 13.75 + 0.5)$

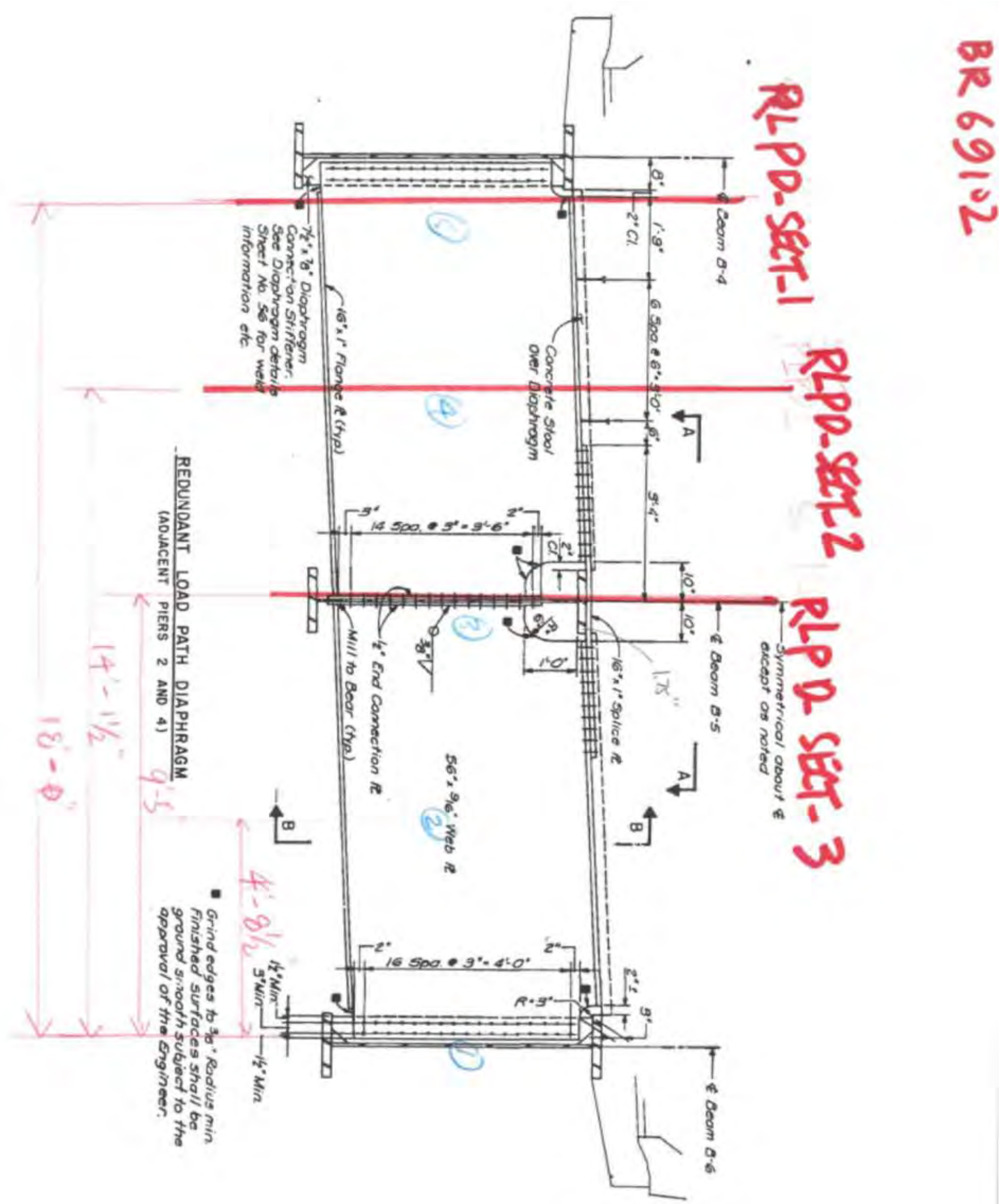
$+ 13.7 \cdot \frac{(43.25 - 22)^2}{22} \cdot (43.25 - 22) \times \frac{2}{3}$

$= 17527 + 4420 + 28400 + 3984$

$= 54330$ K-in

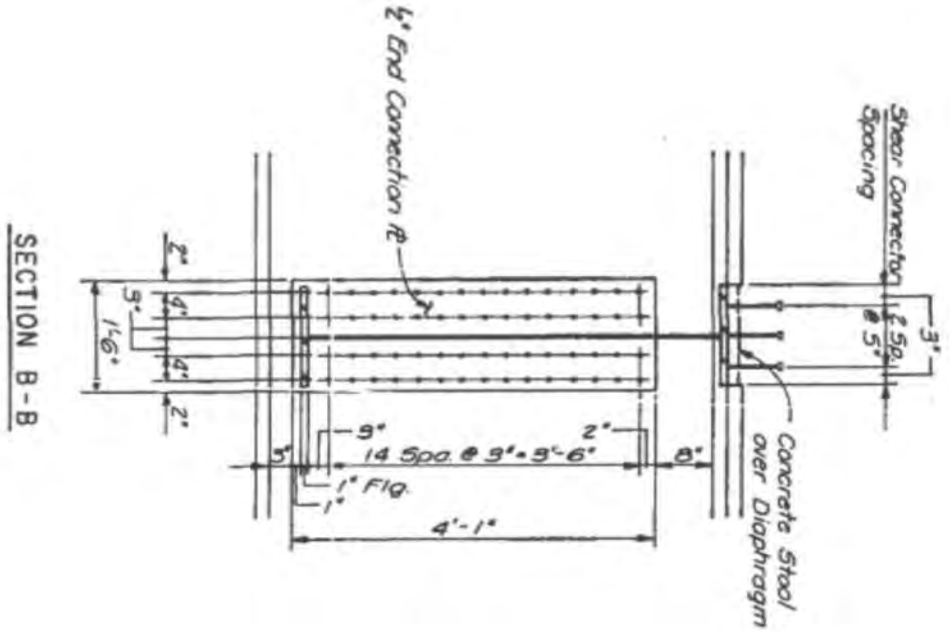
$= \underline{4527 \text{ K-FT}}$

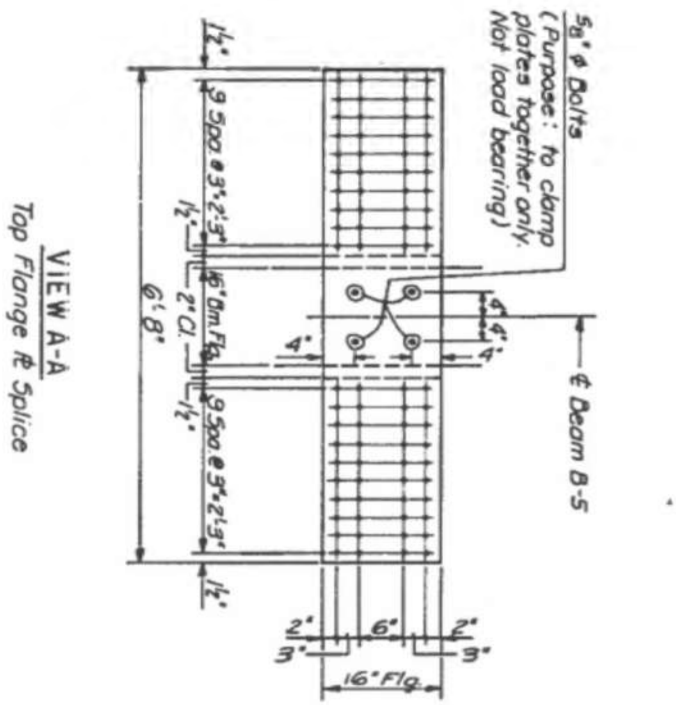
HNTB	By:	MX	Date:	07/14/17	Job No.	64517
	Chkd By:	TFK	Date:	7/28/2017		
HNTB Corp.	Bckchk By:	MX	Date:	7/29/2017	Sht. No.	



HNTB	By: MX	Date: 07/14/17	Job No. 64517
	Chkd By: TFK	Date: 7/28/2017	
HNTB Corp.	Bckchk By: MX	Date: 7/29/2017	Sht. No.

BR 69102





6. Sample Calculation for Girder B4 at Pier 4

A design spreadsheet is developed to calculate the capacities, LF1, r1, D/C ratio of the girders, cap beams and straddle beam. The calculations were performed on several locations along those structural elements using Microsoft Macro. The following shows an example calculation at the pier 4 location of edge girder B4.

HNTB	By:	MX	Date:	07/06/17	Job No.	64517
	Chkd By:	TFK	Date:	7/30/2017		
HNTB Corp.	Bckchk By:	MX	Date:	7/31/2017	Sht. No.	

Load Rating For Girder

Node ID : 1172
Iarsa ID: 345.0 (Station)

		Fy_Rebar =	60 ksi	Is it Cap Beam ?	0
Evaulation Factors (for Strength Limit States)		Deck rebar Area, Ars =	10.19685348 in^2	Is redundant Load Path Diaphragm ?	0
1. Condition Factor ϕ_c =	1.00	Is plate girder or box girder ?	Plate Girder	Is Continuous span ?	Yes
2. System Factor ϕs =	1.00	No of Webs of the Box Girder =	1 webs		
		Is transverse bending consider?	Yes		

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Location	Node ID	Iarsa Sta	Inventory Rating				For Composite Positive Moment		For Non -Composite Positive Moment (Comp Flg full Bracing)		For Negative Moment for plate girders or positive moment for Steel Box Beam Strandel Bent				Positive Moment Capacity	Negative Moment Capacity
		Iarsa	$RF_{\_flexure}$		$RF_{\_shear}$	$RF_{\_inv}$	M_n	Positive $1.3R_hM_y$	Positive M_p (Use if θ_{RL} >0.009 Radians)	Positive $1.3R_hM_y$	Negative M_p (For Comparsion purpose only)	M_{nc} (Yield)	F_{nc_final}	M_c (Based on F_{nc}) (failure before yielding)	To use	To use
			Top Flange	Bott Flange			k-ft	k-ft	k-ft	k-ft	k-ft	k-ft	(ksi)	k-ft	k-ft	k-ft
Controlling Rating	1172	345.0	3.09	1.62	7.96	1.62	12795	14507	N/A	N/A	Yield	-9964	50.00	N/A	12795	-9964
	1172	345.0	3.09	1.62	7.96	1.62	12795	14507	N/A	N/A	Yield	9964	50.00	N/A		

Is it composite section ? **Yes**

(+) Stress indicates Tension

HNTB	By:
	Chkd By:
HNTB Corp.	Bckchk By:

Load Rating For Girder

Node ID : 1172
larsa ID: 345.0 (Station)

Evaulation Factors (for Strength Limit States)
1. Condition Factor ϕ_c = 1.00
2. System Factor ϕ_S = 1.00

Location	Node ID	larsa Sta	Maximum Positive M_u	Max Negative M_u	Web Shear			$LF1_{\text{with respect to Minimum r\_1}}$	$LF1_{\_Top\_Flg}$	$LF1_{\_Bott\_Flg}$	$LF1_{\_Shear}$	$LF1_{req'd\_Top\_Flg}$	$LF1_{req'd\_bott\_Flg}$	$LF1_{req'd\_shear}$	Min Reserve ratio r_1	$LF1_{\text{req'd with respect to Minimum r\_1}}$
	3	4	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		larsa	To use	To use	Demand/ Capacity	Ultimate Shear Force, V_u (kips)	Capacity, $\Phi_v V_n$ (kips)									
			k-ft	k-ft												
Controlling Rating	1172	345.0	-2254.9	-5374.8	0.1880	236.37	1257.59	3.875	7.085	3.875	24.284	2.66	2.98	2.71	1.30	2.98
	1172	345.0			0.1880	236.37	1257.59									
											1.30	2.66	1.30	8.95		3
											1.30	2.66	2.98	2.71		

Is it composite section ? **Yes**

(+) Stress indicates Tension

HNTB	By:
HNTB Corp.	Chkd By:
	Bckchk By:

Load Rating For Girder

Node ID : 1172
Iarsa ID: 345.0 (Station)

Evaulation Factors (for Strength Limit States)
1. Condition Factor ϕ_c = 1.00
2. System Factor ϕ_S = 1.00

	3	4	33	34	35	36	37	38	39	40	41	42	43	44
			1.1 Strength I - 1.25DC + 1.5DW + 1.75LL+I											
Location	Node ID	Iarsa Sta	Top Flange Flexural Bending			Bottom Flange Flexural Bending			Web Shear			Maximum	$M_{\_DL}$	$M_{\_LL}$
		Iarsa	D/C	Ultimate Stress f_u (ksi)	Capacity, F_{nc} or F_{nt} (ksi)	D/C	Ultimate Stress f_u (ksi)	Capacity, F_{nc} or F_{nt} (ksi)	D/C	Ultimate Shear Force, V_u (kips)	Capacity, V_n (kips)	D/C	(k-ft)	(k-ft)
Controlling Rating	1172	345.0	0.522	26.097	50.000	0.742	-37.084	-50.000	0.188	236.370	1257.585	0.74	-2084.45	-1271.00
	1172	345.0												

Is it composite section ? **Yes**

(+) Stress indicates Tension

Load Cases and Load Combination	Live Load Consider			Member Forces from Iarsa				Flange lateral bending stress
		Macro Node No	Iarsa Station	Axial (FX)	Shear (Fz)	Weak Axis Moment (Mz)	Strong Axis Moment (My)	f_l
			(ft)	(kips)	(kips)	(k-ft)	(k-ft)	(ksi)
DC1		1172	345.0	3.7	59.5	1.9	-1775.2	0.18
		1172	345.0	3.7	59.5	1.9	-1775.2	0.18
DC2		1172	345.0	-2.0	11.0	-0.6	-310.3	0.11
		1172	345.0	-2.0	11.0	-0.6	-310.3	0.11
DW		1172	345.0	1.0	1.0	1.0	1.0	0.19
		1172	345.0	1.0	1.0	1.0	1.0	0.19
1.25DC1+1.25DC2+1.5DW		1172	345.0	3.7	89.7	3.2	-2605.3	0.65
		1172	345.0	3.7	89.7	3.2	-2605.3	0.65
LL+I_MaxFX (LL+IM)	HL-93	1172	345.0	1.0	1.0	1.0	1.0	0.19
		1172	345.0	1.0	1.0	1.0	1.0	0.19
LL+I_MINFX (LL+IM)		1172	345.0	1.0	1.0	1.0	1.0	0.19
		1172	345.0	1.0	1.0	1.0	1.0	0.19
LL+I_MaxFZ (LL+IM)		1172	345.0	9.8	21.1	33.8	10.7	6.34
		1172	345.0	9.8	21.1	33.8	10.7	6.34
LL+I_MINFZ (LL+IM)		1172	345.0	-18.4	83.8	-38.0	-989.8	7.13
		1172	345.0	-18.4	83.8	-38.0	-989.8	7.13
LL+I_MaxMY (LL+IM)		1172	345.0	-1.2	2.8	33.0	200.2	6.19
		1172	345.0	-1.2	2.8	33.0	200.2	6.19
LL+I_MINMY (LL+IM)		1172	345.0	-27.3	65.3	-39.3	-1570.1	7.37
		1172	345.0	-27.3	65.3	-39.3	-1570.1	7.37

DC1_Bracing Start		1172	345.0	3.728	59.525	1.9	-1775.192	
DC1_Bracing End		1173	346.000	0.249	62.287	-8.4	-1721.218	
DC2_Bracing Start		1172	345.000	-1.957	11.019	-0.6	-310.263	
DC2_Bracing End		1173	346.000	-1.524	12.199	0.4	-297.187	
DW_Bracing Start		1172	345.000	1.000	1.000	1.0	1.000	
DW_Bracing End		1173	346.000	1.000	1.000	1.0	1.000	
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	345.000	1.000	1.000	1.0	1.000	
LL+I_MaxFX_Bracing End (LL+IM)		1173	346.000	1.000	1.000	1.0	1.000	
LL+I_MINFX_Bracing_Start (LL+IM)		1172	345.000	1.000	1.000	1.0	1.000	
LL+I_MINFX_Bracing_End (LL+IM)		1173	346.000	1.000	1.000	1.0	1.000	
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	345.000	9.763	21.131	33.8	10.711	
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	346.000	-9.035	88.573	-22.4	-789.134	
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	345.000	-18.400	83.822	-38.0	-989.797	
LL+I_MINFZ_Bracing_End (LL+IM)		1173	346.000	10.729	16.095	34.2	-100.220	
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	345.000	-1.152	2.778	33.0	200.235	
LL+I_MaxMY_Bracing_End (LL+IM)		1173	346.000	2.151	10.628	36.3	200.530	
LL+I_MINMY_Bracing_Start (LL+IM)		1172	345.000	-27.346	65.340	-39.3	-1570.087	
LL+I_MINMY_Bracing_End (LL+IM)		1173	346.000	-12.417	60.122	-28.6	-1474.142	
1.25DC+1.5DW_Bracing Start		1172	345.000	3.714	89.681	3.2	-2605.318	
1.25DC+1.5DW_Bracing End		1173	346.000	-0.093	94.607	-8.5	-2521.506	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	345.000	5.464	91.431	4.9	-2603.568	

Load Cases and Load Combination	Live Load Consider	Macro Node No	Iarsa Station	Axial (FX)	Shear (Fz)	Weak Axis Moment (Mz)	Strong Axis Moment (My)	Flange lateral bending stress f_l
			Member Forces from Iarsa					
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	346.000	1.657	96.357	-6.7	-2519.756	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	345.000	5.464	91.431	4.9	-2603.568	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	346.000	1.657	96.357	-6.7	-2519.756	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	345.000	20.799	126.660	62.3	-2586.573	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	346.000	-15.904	249.609	-47.7	-3902.490	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	345.000	-28.485	236.370	-63.4	-4337.463	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	346.000	18.682	122.774	51.4	-2696.891	
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	345.000	1.697	94.543	61.0	-2254.907	
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	346.000	3.670	113.207	55.1	-2170.578	
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	345.000	-44.142	204.026	-65.6	-5352.969	
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	346.000	-21.823	199.820	-58.5	-5101.253	

		Macro Node No	Iarsa Station	Axial (FX)	Shear (Fz)	Weak Axis Moment (Mz)	Strong Axis Moment (My)	fl
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	345.0	5.5	91.4	4.9	-2603.6	0.98
		1172	345.0	5.5	91.4	4.9	-2603.6	0.98
1.25DC+1.5DW+1.75LL+I_MinFX		1172	345.0	5.5	91.4	4.9	-2603.6	0.98
		1172	345.0	5.5	91.4	4.9	-2603.6	0.98
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	345.0	20.8	126.7	62.3	-2586.6	11.74
		1172	345.0	20.8	126.7	62.3	-2586.6	11.74
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	345.0	-28.5	236.4	-63.4	-4337.5	13.13
		1172	345.0	-28.5	236.4	-63.4	-4337.5	13.13
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	345.0	1.7	94.5	61.0	-2254.9	11.49
		1172	345.0	1.7	94.5	61.0	-2254.9	11.49
1.25DC+1.5DW+1.75LL+I_MinMY		1172	345.0	-44.1	204.0	-65.6	-5353.0	13.54
		1172	345.0	-44.1	204.0	-65.6	-5353.0	13.54

Load Cases and Load Combination	Live Load Consider	Macro Node No	Iarsa Station	Axial (FX)	Shear (Fz)	Weak Axis Moment (Mz)	Strong Axis Moment (My)	Flange lateral bending stress f_l
			Member Forces from Iarsa					
			(ft)	(kips)	(kips)	(k-ft)	(k-ft)	(ksi)
DC1		1172	345.0	3.7	59.5	1.9	-1775.2	0.18
		1172	345.0	3.7	59.5	1.9	-1775.2	0.18
DC2		1172	345.0	-2.0	11.0	-0.6	-310.3	0.11
		1172	345.0	-2.0	11.0	-0.6	-310.3	0.11
DW		1172	345.0	1.0	1.0	1.0	1.0	0.19
		1172	345.0	1.0	1.0	1.0	1.0	0.19
DC1+DC2+DW		1172	345.0	2.8	71.5	2.3	-2084.5	0.48
		1172	345.0	2.8	71.5	2.3	-2084.5	0.48

Load Cases and Load Combination	Live Load Consider	Member Forces from larsa						Flange lateral bending stress
		Macro Node No	larsa Station	Axial (FX)	Shear (Fz)	Weak Axis Moment (Mz)	Strong Axis Moment (My)	f_l
LL_MaxFX (LL)	HL-93	1172	345.0	1.0	1.0	1.0	1.0	0.19
		1172	345.0	1.0	1.0	1.0	1.0	0.19
LL_MINFX (LL)		1172	345.0	1.0	1.0	1.0	1.0	0.19
		1172	345.0	1.0	1.0	1.0	1.0	0.19
LL_MaxFZ (LL)		1172	345.0	8.2	17.3	28.3	9.1	5.31
		1172	345.0	8.2	17.3	28.3	9.1	5.31
LL_MINFZ (LL)		1172	345.0	-17.0	69.8	-32.2	-878.4	6.05
		1172	345.0	-17.0	69.8	-32.2	-878.4	6.05
LL_MaxMY (LL)		1172	345.0	-1.4	1.4	28.8	163.5	5.40
		1172	345.0	-1.4	1.4	28.8	163.5	5.40
LL_MINMY (LL)		1172	345.0	-10.8	48.8	-33.3	-1271.0	6.24
		1172	345.0	-10.8	48.8	-33.3	-1271.0	6.24

Load Cases and Load Combination	Live Load Consider		Load Factor					Resistance Factor		Longitudinal Stiffener		Transverse Stiffener			Hybrid factor
								Flexual	Shear	No, of Longitudinal stiffener provided ?	Dist from stiffener to comp. flg	Is transverse stiffener provided?	Transverse Stiffener Spacing	Is end panel or interior panel?	
		Macro Node No	γ_{DC1}	γ_{DC2}	γ_{PL}	γ_{DW}	γ_{LL}	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h
								6.5.4.2	6.5.4.2						6.10.1.10.1
											(in)		(ft)		
DC1		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
DC2		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
DW		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
1.25DC1+1.25DC2+1.5DW		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
LL+I_MaxFX (LL+IM)		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
LL+I_MINFX (LL+IM)		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
LL+I_MaxFZ (LL+IM)		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
LL+I_MINFZ (LL+IM)	HL-93	1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
LL+I_MaxMY (LL+IM)		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
LL+I_MINMY (LL+IM)		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7	0	1.0

DC1_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
DC1_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
DC2_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
DC2_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
DW_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
DW_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MaxFX_Bracing Start (LL+IM)		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MaxFX_Bracing End (LL+IM)		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MINFX_Bracing_Start (LL+IM)		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MINFX_Bracing_End (LL+IM)		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MINFZ_Bracing_Start (LL+IM)	HL-93	1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MINFZ_Bracing_End (LL+IM)		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MaxMY_Bracing_End (LL+IM)		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MINMY_Bracing_Start (LL+IM)		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
LL+I_MINMY_Bracing_End (LL+IM)		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
1.25DC+1.5DW_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
1.25DC+1.5DW_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7	0	1.000
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000

								Resistance Factor		Longitudinal Stiffener		Transverse Stiffener			Hybrid factor
Load Cases and Load Combination	Live Load Consider		Load Factor					Flexual	Shear	No, of Longitudinal stiffener provided ?	Dist from stiffener to comp. flg	Is transverse stiffener provided?	Transverse Stiffener Spacing	Is end panel or interior panel?	
		Macro Node No	Y_{DC1}	Y_{DC2}	Y_{PL}	Y_{DW}	Y_{LL}	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h
								6.5.4.2	6.5.4.2						6.10.1.10.1
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	1.250	1.250	1.750	1.500	1.750	1.00	1.00	0	10000.00	0	7.0	0	1.000

		Macro Node No	YDC1	YDC2	YPL	YDW	YLL	ϕf	ϕv		ds	(Yes =0,No=1)	do	ıterior =0, End=	Rh
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
1.25DC+1.5DW+1.75LL+I_MinFX		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
1.25DC+1.5DW+1.75LL+I_MinMY		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0
		1172	1.25	1.25	1.75	1.50	1.75	1.00	1.00	0	10000.00	0	7.0	0	1.0

								Resistance Factor		Longitudinal Stiffener		Transverse Stiffener			Hybrid factor
Load Cases and Load Combination	Live Load Consider		Load Factor					Flexual	Shear	No, of Longitudinal stiffener provided ?	Dist from stiffener to comp. flg	Is transverse stiffener provided?	Transverse Stiffener Spacing	Is end panel or interior panel?	
		Macro Node No	Y_{DC1}	Y_{DC2}	Y_{PL}	Y_{DW}	Y_{LL}	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h
								6.5.4.2	6.5.4.2						6.10.1.10.1
											(in)		(ft)		
DC1		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
DC2		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
DW		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
DC1+DC2+DW		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0

Load Cases and Load Combination	Live Load Consider		Load Factor					Resistance Factor		Longitudinal Stiffener		Transverse Stiffener			Hybrid factor
								Flexual	Shear	No, of Longitudinal stiffener provided ?	Dist from stiffener to comp. flg	Is transverse stiffener provided?	Transverse Stiffener Spacing	Is end panel or interior panel?	
		Macro Node No	γ_{DC1}	γ_{DC2}	γ_{PL}	γ_{DW}	γ_{LL}	ϕ_f	ϕ_v		d_s	(Yes =0,No=1)	d_o	(Interior =0, End=1)	R_h
								6.5.4.2	6.5.4.2						6.10.1.10.1
LL_MaxFX (LL)		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
LL_MINFX (LL)		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
LL_MaxFZ (LL)		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
LL_MINFZ (LL)	HL-93	1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
LL_MaxMY (LL)		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
LL_MINMY (LL)		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0
		1172	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	10000.00	0	7	0	1.0

Load Cases and Load Combination	Live Load Consider		Material Properties								Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Area of Concrete Deck	Unbacing length	$(LL+I)_{\_long}$+1/3*$(LL+I)_{\_Trans}$ (At Bottom Flange)
			Specified min flg yield strength	Specified web flg yield strength	Specified min yield strength of comp. flg	rebar yield strength	conc deck	Girder	conc deck	Modular Ratio							
		Macro Node No	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f'_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	As	L_b	
			(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)		(in^2)	(in)	(in)	(ft)	(in^2)	(in)	
DC1		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
DC2		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
DW		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
1.25DC1+1.25DC2+1.5DW		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
LL+I_MaxFX (LL+IM)	HL-93	1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
LL+I_MINFX (LL+IM)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
LL+I_MaxFZ (LL+IM)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	2.21
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	2.21
LL+I_MINFZ (LL+IM)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-8.30
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-8.30
LL+I_MaxMY (LL+IM)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	3.02
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	3.02
LL+I_MINMY (LL+IM)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-11.84
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-11.84

DC1_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
DC1_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
DC2_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
DC2_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
DW_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
DW_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MaxFX_Bracing End (LL+IM)		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MINFX_Bracing_Start (LL+IM)		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MINFX_Bracing_End (LL+IM)		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MINFZ_Bracing_End (LL+IM)		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MaxMY_Bracing_End (LL+IM)		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MINMY_Bracing_Start (LL+IM)		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
LL+I_MINMY_Bracing_End (LL+IM)		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	

Load Cases and Load Combination	Live Load Consider		Material Properties								Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Area of Concrete Deck	Unbacing length	(LL+I)_lon g+1/3*(LL+I)_Trans (At Bottom Flange)
			Specified min flg yield strength	Specified web flg yield strength	Specified min yield strength of comp. flg	rebar yield strength	conc deck	Girder	conc deck	Modular Ratio							
		Macro Node No	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	As	L_b	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	50.000	50.000	50.000	60.000	4.000	29000.000	3604.997	8.000	10.197	8.500	1.500	7.792	794.784	84.000	

		Macro Node No	Fyf	Fyw	Fyc	Fy_rebar	fc	E_steel	E_deck	n	Ars	t_deck	h_haunch	beff		Lb	
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-16.78
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-16.78
1.25DC+1.5DW+1.75LL+I_MinFX		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-16.78
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-16.78
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-23.80
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-23.80
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-35.27
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-35.27
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-22.13
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-22.13
1.25DC+1.5DW+1.75LL+I_MinMY		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-41.60
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-41.60
															Max =	**84.0**	

Load Cases and Load Combination	Live Load Consider		Material Properties								Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Area of Concrete Deck	Unbacing length	(LL+I)_lon g+1/3*(LL+I)_Trans (At Bottom Flange)
			Specified min flg yield strength	Specified web flg yield strength	Specified min yield strength of comp. flg	rebar yield strength	conc deck	Girder	conc deck	Modular Ratio							
		Macro Node No	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	As	L_b	
			(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)		(in^2)	(in)	(in)	(ft)	(in^2)	(in)	
DC1		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
DC2		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
DW		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
DC1+DC2+DW		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	

Load Cases and Load Combination	Live Load Consider		Material Properties								Area of deck rebar within effective width	Deck thickness	Haunch thickness	Effective width of the deck	Area of Concrete Deck	Unbacing length	(LL+I)$_{\_long}$+1/3*(LL+I)$_{\_Trans}$ (At Bottom Flange)
			Specified min flg yield strength	Specified web flg yield strength	Specified min yield strength of comp. flg	rebar yield strength	conc deck	Girder	conc deck	Modular Ratio							
		Macro Node No	F_{yf}	F_{yw}	F_{yc}	F_{y_rebar}	f'_c	$E_{\_steel}$	$E_{\_deck}$	n	A_{rs}	$t_{\_deck}$	$h_{\_haunch}$	b_{eff}	As	L_b	
LL_MaxFX (LL)	HL-93	1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
LL_MINFX (LL)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	0.07
LL_MaxFZ (LL)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	1.86
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	1.86
LL_MINFZ (LL)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-7.28
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-7.28
LL_MaxMY (LL)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	2.58
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	2.58
LL_MINMY (LL)		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-9.57
		1172	50.0	50.0	50.0	60.0	4.0	29000.0	3605.0	8.0	10.2	8.5	1.5	7.8	794.8	84.0	-9.57

Load Cases and Load Combination	Live Load Consider		Non-Composite Section																
			Top steel flange width	Top steel flange thk	Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange
		Macro Node No	b_{f_top}	$t_{\_top\ flg}$	$A_{\_st\_top\_flg}$	b_{f_bott}	$t_{\_bott\ flg}$	$A_{\_st\_bott\_flg}$	$D_{\_web}$	$t_{\_web}$	$A_{\_web}$	$A_{\_steel}$	$I_{\_steel}$	Y_T	Y_D	$S_{\_top\_flg}$	$S_{\_bott\_flg}$	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$
			(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)
DC1		1172	16.0	1.750	28.0	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
DC2		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
DW		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
1.25DC1+1.25DC2+1.5DW		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
LL+I_MaxFX (LL+IM)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
LL+I_MINFX (LL+IM)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
LL+I_MaxFZ (LL+IM)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
	HL-93	1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
LL+I_MINFZ (LL+IM)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
LL+I_MaxMY (LL+IM)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
LL+I_MINMY (LL+IM)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0

DC1_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
DC1_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
DC2_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
DC2_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
DW_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
DW_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MaxFX_Bracing Start (LL+IM)		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MaxFX_Bracing End (LL+IM)		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MINFX_Bracing_Start (LL+IM)		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MINFX_Bracing_End (LL+IM)		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MaxFZ_Bracing_End (LL+IM)	HL-93	1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MINFZ_Bracing_End (LL+IM)		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MaxMY_Bracing_End (LL+IM)		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MINMY_Bracing_Start (LL+IM)		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
LL+I_MINMY_Bracing_End (LL+IM)		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000

Load Cases and Load Combination	Live Load Consider		Non-Composite Section																
			Top steel flange width	Top steel flange thk	Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange
		Macro Node No	b_{f_top}	$t_{\_top\ flg}$	$A_{\_st\_top\_flg}$	b_{f_bott}	$t_{\_bott\ flg}$	$A_{\_st\_bott\_flg}$	$D_{\_web}$	$t_{\_web}$	$A_{\_web}$	$A_{\_steel}$	$I_{\_steel}$	Y_T	Y_D	$S_{\_top\_flg}$	$S_{\_bott\_flg}$	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	16.000	1.750	28.000	16.000	1.500	24.000	60.000	0.750	45.000	97.000	62731.612	30.446	32.804	2060.430	1912.309	597.333	512.000

		Macro Node No	bf_top	t_top flg	A_st_top_fl	bf_bott	t_bott flg	A_st_bott_fl	D_web	t_web	A_web	A_steel	I_steel	YT	YD	S_top_flg	S_bott_flg	Iy_top_flg	Iy_bott_flg
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
1.25DC+1.5DW+1.75LL+I_MinFX		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
1.25DC+1.5DW+1.75LL+I_MinMY		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.8	28.0	16.0	1.500	24.0	60.0	0.750	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0

Load Cases and Load Combination	Live Load Consider		Non-Composite Section																
			Top steel flange width	Top steel flange thk	Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange
		Macro Node No	b_{f_top}	$t_{\_top\ flg}$	$A_{\_st\_top\_flg}$	b_{f_bott}	$t_{\_bott\ flg}$	$A_{\_st\_bott\_flg}$	$D_{\_web}$	$t_{\_web}$	$A_{\_web}$	$A_{\_steel}$	$I_{\_steel}$	Y_T	Y_D	$S_{\_top\_flg}$	$S_{\_bott\_flg}$	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$
			(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in)	(in)	(in^2)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^4)	(in^4)
DC1		1172	16.0	1.750	28.0	16.0	1.500	24.0	60.0	0.7500	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
DC2		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
DW		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
DC1+DC2+DW		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0

Load Cases and Load Combination	Live Load Consider		Non-Composite Section																	
			Top steel flange width	Top steel flange thk	Top steel flange area	Bott steel flange width	Bott steel flange thk	Bott steel flange area	Girder Web Depth	Girder Web thk	Girder web area	Total Steel Area	Moment of inertia	CG to Top/Flange	CG to Bott/Flange	Section Modulus about major bending axis		Moment of Inertia of top Flange	Moment of Inertia of bott Flange	
		Macro Node No	b_{f_top}	$t_{top\ flg}$	$A_{st\_top\_flg}$	b_{f_bott}	$t_{bott\ flg}$	$A_{st\_bott\_flg}$	D_{web}	t_{web}	A_{web}	A_{steel}	I_{steel}	Y_T	Y_D	S_{top_flg}	S_{bott_flg}	$I_{y\_top\_flg}$	$I_{y\_bott\_flg}$	
LL_MaxFX (LL)	HL-93	1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
LL_MINFX (LL)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
LL_MaxFZ (LL)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
LL_MINFZ (LL)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
LL_MaxMY (LL)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
LL_MINMY (LL)		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	
		1172	16.0	1.75	28.0	16.0	1.50	24.0	60.0	0.8	45.0	97.0	62731.6	30.4	32.8	2060.4	1912.3	597.3	512.0	

Load Cases and Load Combination	Live Load Consider		Composite Section with Modular Ratio = n (at Positive Moment Region)							Composite Section with Modular Ratio = 3n (at Positive Moment Reigion)						
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
		Macro Node No	$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$	$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
			(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)
DC1		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
DC2		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
DW		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
1.25DC1+1.25DC2+1.5DW		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL+I_MaxFX (LL+IM)	HL-93	1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL+I_MINFX (LL+IM)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL+I_MaxFZ (LL+IM)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL+I_MINFZ (LL+IM)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL+I_MaxMY (LL+IM)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL+I_MINMY (LL+IM)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9

DC1_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
DC1_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
DC2_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
DC2_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
DW_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
DW_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MaxFX_Bracing End (LL+IM)		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MINFX_Bracing_Start (LL+IM)		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MINFX_Bracing_End (LL+IM)		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MINFZ_Bracing_End (LL+IM)		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MaxMY_Bracing_End (LL+IM)		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MINMY_Bracing_Start (LL+IM)		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
LL+I_MINMY_Bracing_End (LL+IM)		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934

Load Cases and Load Combination	Live Load Consider	Composite Section with Modular Ratio = n (at Positive Moment Region)								Composite Section with Modular Ratio = 3n (at Positive Moment Reigion)						
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
		Macro Node No	$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$	$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	199.348	128122.4	21.938	11.938	51.312	10732.618	2496.911	131.116	95755.029	31.066	21.066	42.184	4545.488	2269.934

		Macro Node No	Ac(n)	Ic(n)	Yslabc(n)	Ytc(n)	Ybc(n)	Stc(n)	Sbc(n)	Ac(3n)	Ic(3n)	Yslabc(3n)	Ytc(3n)	Ybc(3n)	Stc(3n)	Sbc(3n)
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
1.25DC+1.5DW+1.75LL+I_MinFX		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
1.25DC+1.5DW+1.75LL+I_MinMY		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9

Load Cases and Load Combination	Live Load Consider	Composite Section with Modular Ratio = n (at Positive Moment Region)								Composite Section with Modular Ratio = 3n (at Positive Moment Reigion)						
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
		Macro Node No	$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$	$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
			(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)	(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)
DC1		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
DC2		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
DW		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
DC1+DC2+DW		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9

Load Cases and Load Combination	Live Load Consider		Composite Section with Modular Ratio = n (at Positive Moment Region)							Composite Section with Modular Ratio = 3n (at Positive Moment Reigion)						
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel	Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel
		Macro Node No	$A_{c(n)}$	$I_{c(n)}$	$Y_{slabc(n)}$	$Y_{tc(n)}$	$Y_{bc(n)}$	$S_{tc(n)}$	$S_{bc(n)}$	$A_{c(3n)}$	$I_{c(3n)}$	$Y_{slabc(3n)}$	$Y_{tc(3n)}$	$Y_{bc(3n)}$	$S_{tc(3n)}$	$S_{bc(3n)}$
LL_MaxFX (LL)	HL-93	1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL_MINFX (LL)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL_MaxFZ (LL)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL_MINFZ (LL)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL_MaxMY (LL)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
LL_MINMY (LL)		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9
		1172	199.3	128122.4	21.9	11.9	51.3	10732.6	2496.9	131.1	95755.0	31.1	21.1	42.2	4545.5	2269.9

Load Cases and Load Combination	Live Load Consider		Composite Section with Modular Ratio = n (at Negative Moment Region)								Check if it is compact composite section for M+ (6.10.6.2.2)					
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Depth of web in compression at the M_p	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤3.76*$(E/F_{yc})^{1/2}$?	Is compact composite section?	
		Macro Node No	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$		D_{cp}	Yes =0, No=1	Yes =0,No=1	Yes =0, No=1		
											(D6.3.2-1)				AASHTO 6.10.6.2.2	
			(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)		(in)					
DC1		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
DC2		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
DW		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
1.25DC1+1.25DC2+1.5DW		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL+I_MaxFX (LL+IM)	HL-93	1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL+I_MINFX (LL+IM)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL+I_MaxFZ (LL+IM)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL+I_MINFZ (LL+IM)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL+I_MaxMY (LL+IM)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL+I_MINMY (LL+IM)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	

DC1_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
DC1_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
DC2_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
DC2_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
DW_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
DW_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MaxFX_Bracing End (LL+IM)		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MINFX_Bracing_Start (LL+IM)		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MINFX_Bracing_End (LL+IM)		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MINFZ_Bracing_End (LL+IM)		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MaxMY_Bracing_End (LL+IM)		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MINMY_Bracing_Start (LL+IM)		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
LL+I_MINMY_Bracing_End (LL+IM)		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	

Load Cases and Load Combination	Live Load Consider		Composite Section with Modular Ratio = n (at Negative Moment Region)								Check if it is compact composite section for M+ (6.10.6.2.2)					
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Depth of web in compression at the M_p	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤3.76*$(E/F_{yc})^{1/2}$?	Is compact composite section?	
		Macro Node No	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$		D_{cp}	Yes =0, No=1	Yes =0,No=1	Yes =0, No=1		
											(D6.3.2-1)				AASHTO 6.10.6.2.2	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	107.197	74820.158	37.003	27.003	36.247	2770.827	2064.165		0.000	0.000	0.000	0.000	compact, follow 6.10.7.1	

		Macro Node No	Ac	Ic	Yslabc	Ytc	Ybc	Stc(n)	Sbc(n)		Dcp	Yes =0, No=1	Yes =0,No=1	Yes =0, No=1		
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinFX		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
1.25DC+1.5DW+1.75LL+I_MinMY		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		-16.9	0.0	0.0	0.0	compact, follow 6.10.7.1	

Load Cases and Load Combination	Live Load Consider		Composite Section with Modular Ratio = n (at Negative Moment Region)								Check if it is compact composite section for M+ (6.10.6.2.2)					
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Depth of web in compression at the M_p	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤3.76*$(E/F_{yc})^{1/2}$?	Is compact composite section?	
		Macro Node No	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$		D_{cp}	Yes =0, No=1	Yes =0,No=1	Yes =0, No=1		
											(D6.3.2-1)				AASHTO 6.10.6.2.2	
			(in^2)	(in^4)	(in)	(in)	(in^3)	(in^3)	(in^3)		(in)					
DC1		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
DC2		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
DW		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
DC1+DC2+DW		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	

Load Cases and Load Combination	Live Load Consider		Composite Section with Modular Ratio = n (at Negative Moment Region)								Check if it is compact composite section for M+ (6.10.6.2.2)					
			Area	Moment of inertia	Distance from CG to top of deck	Distance from CG to top of steel	Distance from CG to bott of steel	Section Modulus to top of steel	Section Modulus to bott of steel		Depth of web in compression at the M_p	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤3.76*$(E/F_{yc})^{1/2}$?	Is compact composite section?	
		Macro Node No	A_c	I_c	Y_{slabc}	Y_{tc}	Y_{bc}	$S_{tc(n)}$	$S_{bc(n)}$		D_{cp}	Yes =0, No=1	Yes =0,No=1	Yes =0, No=1		
											(D6.3.2-1)				AASHTO 6.10.6.2.2	
LL_MaxFX (LL)	HL-93	1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL_MINFX (LL)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL_MaxFZ (LL)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL_MINFZ (LL)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL_MaxMY (LL)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
LL_MINMY (LL)		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	
		1172	107.2	74820.2	37.0	27.0	36.2	2770.8	2064.2		0.0	0.0	0.0	0.0	compact, follow 6.10.7.1	

Load Cases and Load Combination	Live Load Consider		Check if it is compact composite section for M- (6.10.6.2.3)							6.10.1.9 - Web Bend-Buckling Resistance F_{crw} 6.10.1.9.1 without longitudinal stiffeners				
			D_{cp}	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w \le 5.76*(E/F_{yc})^{1/2}$?	Is $I_{yc}/I_{yt} \ge 0.3$?	Is compact composite section?		Sum of Top -flange stress	Sum of Bottom -flange stress	Depth of web in compression	Bend-buckling coefficient	Nominal bend-buckling resistance
		Macro Node No	(D6.3.2-2)	Yes =0,No=1	Yes =0,No=1	Yes =0,No=1				f_top	f_bottom	D_c	k	F_{crw}
								AASHTO 6.10.6.2.2		D6.3.1	D6.3.1	D6.3.1-1	6.10.1.9.1-2	6.10.1.9.1-1
			(in)							(ksi)	(ksi)	(in)		
DC1		1172	40.8	0.0	0.0	0.0	0.0	Compact section		10.38	-11.10	31.2	33.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		10.38	-11.10	31.2	33.3	50.0
DC2		1172	40.8	0.0	0.0	0.0	0.0	Compact section		1.325	-1.822	35.1	26.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		1.33	-1.82	35.1	26.3	50.0
DW		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.01	0.00	10.2	308.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.01	0.00	10.2	308.9	50.0
1.25DC1+1.25DC2+1.5DW		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.64	-16.15	31.7	32.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.64	-16.15	31.7	32.3	50.0
LL+I_MaxFX (LL+IM)	HL-93	1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.00	0.01	43.8	16.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.00	0.01	43.8	16.9	50.0
LL+I_MINFX (LL+IM)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.00	0.01	43.8	16.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.00	0.01	43.8	16.9	50.0
LL+I_MaxFZ (LL+IM)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.04	0.10	44.7	16.2	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.04	0.10	44.7	16.2	50.0
LL+I_MINFZ (LL+IM)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		4.12	-5.93	35.8	25.2	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		4.12	-5.93	35.8	25.2	50.0
LL+I_MaxMY (LL+IM)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		-0.23	0.96	10.5	294.1	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		-0.23	0.96	10.5	294.1	50.0
LL+I_MINMY (LL+IM)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		6.54	-9.38	35.8	25.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		6.54	-9.38	35.8	25.3	50.0

DC1_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		10.4	-11.1	31.191	33.303	50.000
DC1_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		10.0	-10.8	31.296	33.079	50.000
DC2_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		1.325	-1.8	35.114	26.277	50.000
DC2_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		1.273	-1.7	35.045	26.380	50.000
DW_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		0.01	0.00	10.241	308.902	50.000
DW_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		0.01	0.00	10.241	308.902	50.000
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	40.824	0.000	0.000	0.000	0.000	Compact section		0.0	0.0	43.779	16.905	50.000
LL+I_MaxFX_Bracing End (LL+IM)		1173	40.824	0.000	0.000	0.000	0.000	Compact section		0.0	0.0	43.779	16.905	50.000
LL+I_MINFX_Bracing_Start (LL+IM)		1172	40.824	0.000	0.000	0.000	0.000	Compact section		0.0	0.0	43.779	16.905	50.000
LL+I_MINFX_Bracing_End (LL+IM)		1173	40.824	0.000	0.000	0.000	0.000	Compact section		0.0	0.0	43.779	16.905	50.000
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	40.824	0.000	0.000	0.000	0.000	Compact section		0.0	0.1	44.724	16.198	50.000
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	40.824	0.000	0.000	0.000	0.000	Compact section		3.3	-4.7	35.413	25.836	50.000
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	40.824	0.000	0.000	0.000	0.000	Compact section		4.1	-5.9	35.828	25.240	50.000
LL+I_MINFZ_Bracing_End (LL+IM)		1173	40.824	0.000	0.000	0.000	0.000	Compact section		0.5	-0.5	28.521	39.832	50.000
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	40.824	0.000	0.000	0.000	0.000	Compact section		-0.2	1.0	10.496	294.109	50.000
LL+I_MaxMY_Bracing_End (LL+IM)		1173	40.824	0.000	0.000	0.000	0.000	Compact section		-0.2	1.0	9.613	350.592	50.000
LL+I_MINMY_Bracing_Start (LL+IM)		1172	40.824	0.000	0.000	0.000	0.000	Compact section		6.5	-9.4	35.760	25.336	50.000
LL+I_MINMY_Bracing_End (LL+IM)		1173	40.824	0.000	0.000	0.000	0.000	Compact section		6.3	-8.7	35.237	26.094	50.000
1.25DC+1.5DW_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		14.64	-16.15	31.672	32.299	50.000
1.25DC+1.5DW_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		14.14	-15.67	31.750	32.141	50.000
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		14.65	-16.13	31.648	32.348	50.000

6.10.1.9 - Web Bend-Buckling Resistance F_{crw}

Load Cases and Load Combination	Live Load Consider		Check if it is compact composite section for M- (6.10.6.2.3)							6.10.1.9.1 without longitudinal stiffeners				
			D_{cp}	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤ $5.76*(E/F_{yc})^{1/2}$?	Is I_{yc}/I_{yt} ≥ 0.3 ?	Is compact composite section?		Sum of Top -flange stress	Sum of Bottom -flange stress	Depth of web in compression	Bend-buckling coefficient	Nominal bend-buckling resistance
		Macro Node No	(D6.3.2-2)	Yes =0,No=1	Yes =0,No=1	Yes =0,No=1				f_top	f_bottom	D_c	k	F_{crw}
								AASHTO 6.10.6.2.2		D6.3.1	D6.3.1	D6.3.1-1	6.10.1.9.1-2	6.10.1.9.1-1
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	40.824	0.000	0.000	0.000	0.000	Compact section		14.15	-15.65	31.725	32.192	50.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		14.65	-16.13	31.648	32.348	50.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		14.15	-15.65	31.725	32.192	50.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		14.71	-15.97	31.430	32.799	50.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		19.97	-23.85	32.921	29.895	50.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		21.84	-26.52	33.182	29.426	50.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		15.07	-16.52	31.568	32.513	50.000
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		14.24	-14.48	30.383	35.097	50.000
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		13.77	-13.97	30.353	35.168	50.000
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	40.824	0.000	0.000	0.000	0.000	Compact section		26.10	-32.57	33.615	28.674	50.000
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	40.824	0.000	0.000	0.000	0.000	Compact section		25.11	-30.87	33.380	29.079	50.000

		Macro Node No	(D6.3.2-2)	Yes =0,No=1	Yes =0,No=1	Yes =0,No=1				f_top	f_bottom	Dc	k	Fcrw
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.65	-16.46	32.0	31.7	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.65	-16.46	32.0	31.7	50.0
1.25DC+1.5DW+1.75LL+I_MinFX		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.65	-16.46	32.0	31.7	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.65	-16.46	32.0	31.7	50.0
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.71	-19.89	34.9	26.7	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.71	-19.89	34.9	26.7	50.0
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	40.8	0.0	0.0	0.0	0.0	Compact section		21.84	-30.90	35.6	25.6	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		21.84	-30.90	35.6	25.6	50.0
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.24	-18.31	34.1	27.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		14.24	-18.31	34.1	27.9	50.0
1.25DC+1.5DW+1.75LL+I_MinMY		1172	40.8	0.0	0.0	0.0	0.0	Compact section		26.10	-37.08	35.6	25.5	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		26.10	-37.08	35.6	25.5	50.0

Load Cases and Load Combination	Live Load Consider		Check if it is compact composite section for M- (6.10.6.2.3)							6.10.1.9.1 without longitudinal stiffeners				
			D_{cp}	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤ $5.76*(E/F_{yc})^{1/2}$?	Is I_{yc}/I_{yt} ≥ 0.3 ?	Is compact composite section?		Sum of Top -flange stress	Sum of Bottom -flange stress	Depth of web in compression	Bend-buckling coefficient	Nominal bend-buckling resistance
		Macro Node No	(D6.3.2-2)	Yes =0,No=1	Yes =0,No=1	Yes =0,No=1				f_top	f_bottom	D_c	k	F_{crw}
								AASHTO 6.10.6.2.2		D6.3.1	D6.3.1	D6.3.1-1	6.10.1.9.1-2	6.10.1.9.1-1
			(in)							(ksi)	(ksi)	(in)		
DC1		1172	40.8	0.0	0.0	0.0	0.0	Compact section		10.38	-11.10	31.2	33.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		10.38	-11.10	31.2	33.3	50.0
DC2		1172	40.8	0.0	0.0	0.0	0.0	Compact section		1.325	-1.822	35.1	26.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		1.33	-1.82	35.1	26.3	50.0
DW		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.01	0.00	10.2	308.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.01	0.00	10.2	308.9	50.0
DC1+DC2+DW		1172	40.8	0.0	0.0	0.0	0.0	Compact section		11.71	-12.92	31.7	32.3	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		11.71	-12.92	31.7	32.3	50.0

										6.10.1.9 - Web Bend-Buckling Resistance F_{crw}				
			Check if it is compact composite section for M- (6.10.6.2.3)							6.10.1.9.1 without longitudinal stiffeners				
Load Cases and Load Combination	Live Load Consider		D_{cp}	Is flg strength ≤70 ksi ?	Is D/t_w≤150 ?	Is $2D_{cp}/t_w$≤ $5.76*(E/F_{yc})^{1/2}$?	Is I_{yc}/I_{yt} ≥ 0.3 ?	Is compact composite section?		Sum of Top -flange stress	Sum of Bottom -flange stress	Depth of web in compression	Bend-buckling coefficient	Nominal bend-buckling resistance
		Macro Node No	(D6.3.2-2)	Yes =0,No=1	Yes =0,No=1	Yes =0,No=1				f_top	f_bottom	D_c	k	F_{crw}
								AASHTO 6.10.6.2.2		D6.3.1	D6.3.1	D6.3.1-1	6.10.1.9.1-2	6.10.1.9.1-1
LL_MaxFX (LL)	HL-93	1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.004	0.01	43.8	16.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.004	0.01	43.8	16.9	50.0
LL_MINFX (LL)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.004	0.01	43.8	16.9	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.004	0.01	43.8	16.9	50.0
LL_MaxFZ (LL)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.031	0.08	44.9	16.0	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		0.031	0.08	44.9	16.0	50.0
LL_MINFZ (LL)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		3.646	-5.27	35.9	25.2	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		3.646	-5.27	35.9	25.2	50.0
LL_MaxMY (LL)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		-0.190	0.78	10.7	285.4	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		-0.190	0.78	10.7	285.4	50.0
LL_MINMY (LL)		1172	40.8	0.0	0.0	0.0	0.0	Compact section		5.404	-7.49	35.2	26.1	50.0
		1172	40.8	0.0	0.0	0.0	0.0	Compact section		5.404	-7.49	35.2	26.1	50.0

							6.10.1.10.2 - We						
			6.10.1.9.2 with longitudinal stiffeners		Nominal bend-buckling resistance (Use)		R_b without longitudinal stiffener						
Load Cases and Load Combination	Live Load Consider		Bend-buckling coefficient	Nominal bend-buckling resistance			Limiting slenderness ratio for a noncompact web	Full width of compression flg	Thickness of compression flg	α_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b
		Macro Node No	k	F_{crw}	$\mathbf{F_{crw}}$		λ_{rw}	b_{fc}	t_{fc}		Exclude composite in positive flexure with	Composite in positive flexure	("0" means not applicable)
			6.10.1.9.2-1	6.10.1.9.1-1			6.10.1.10.2-4			6.10.1.10.2-5			
					(ksi)			(in)	(in)				
DC1		1172	33.3	50.0	50.0		137.3	16.0	1.5	1.9	1.000	1.0	1.0
		1172	33.3	50.0	50.0		137.3	16.0	1.5	1.9	1.000	1.0	1.0
DC2		1172	26.3	50.0	50.0		137.3	16.0	1.5	2.2	1.000	1.0	1.0
		1172	26.3	50.0	50.0		137.3	16.0	1.5	2.2	1.000	1.0	1.0
DW		1172	308.9	50.0	50.0		137.3	16.0	1.8	0.5	1.000	1.0	1.0
		1172	308.9	50.0	50.0		137.3	16.0	1.8	0.5	1.000	1.0	1.0
1.25DC1+1.25DC2+1.5DW		1172	32.3	50.0	50.0		137.3	16.0	1.5	2.0	1.000	1.0	1.0
		1172	32.3	50.0	50.0		137.3	16.0	1.5	2.0	1.000	1.0	1.0
LL+I_MaxFX (LL+IM)	HL-93	1172	16.9	50.0	50.0		137.3	16.0	1.8	2.3	1.000	1.0	1.0
		1172	16.9	50.0	50.0		137.3	16.0	1.8	2.3	1.000	1.0	1.0
LL+I_MINFX (LL+IM)		1172	16.9	50.0	50.0		137.3	16.0	1.8	2.3	1.000	1.0	1.0
		1172	16.9	50.0	50.0		137.3	16.0	1.8	2.3	1.000	1.0	1.0
LL+I_MaxFZ (LL+IM)		1172	16.2	50.0	50.0		137.3	16.0	1.8	2.4	1.000	1.0	1.0
		1172	16.2	50.0	50.0		137.3	16.0	1.8	2.4	1.000	1.0	1.0
LL+I_MINFZ (LL+IM)		1172	25.2	50.0	50.0		137.3	16.0	1.5	2.2	1.000	1.0	1.0
		1172	25.2	50.0	50.0		137.3	16.0	1.5	2.2	1.000	1.0	1.0
LL+I_MaxMY (LL+IM)		1172	294.1	50.0	50.0		137.3	16.0	1.8	0.6	1.000	1.0	1.0
		1172	294.1	50.0	50.0		137.3	16.0	1.8	0.6	1.000	1.0	1.0
LL+I_MINMY (LL+IM)		1172	25.3	50.0	50.0		137.3	16.0	1.5	2.2	1.000	1.0	1.0
		1172	25.3	50.0	50.0		137.3	16.0	1.5	2.2	1.000	1.0	1.0

DC1_Bracing Start		1172	33.303	50.000	50.000		137.274	16.000	1.500	1.949	1.000	1.000	1.000
DC1_Bracing End		1173	33.079	50.000	50.000		137.274	16.000	1.500	1.956	1.000	1.000	1.000
DC2_Bracing Start		1172	26.277	50.000	50.000		137.274	16.000	1.500	2.195	1.000	1.000	1.000
DC2_Bracing End		1173	26.380	50.000	50.000		137.274	16.000	1.500	2.190	1.000	1.000	1.000
DW_Bracing Start		1172	308.902	50.000	50.000		137.274	16.000	1.750	0.549	1.000	1.000	1.000
DW_Bracing End		1173	308.902	50.000	50.000		137.274	16.000	1.750	0.549	1.000	1.000	1.000
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	16.905	50.000	50.000		137.274	16.000	1.750	2.345	1.000	1.000	1.000
LL+I_MaxFX_Bracing End (LL+IM)		1173	16.905	50.000	50.000		137.274	16.000	1.750	2.345	1.000	1.000	1.000
LL+I_MINFX_Bracing_Start (LL+IM)		1172	16.905	50.000	50.000		137.274	16.000	1.750	2.345	1.000	1.000	1.000
LL+I_MINFX_Bracing_End (LL+IM)		1173	16.905	50.000	50.000		137.274	16.000	1.750	2.345	1.000	1.000	1.000
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	16.198	50.000	50.000		137.274	16.000	1.750	2.396	1.000	1.000	1.000
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	25.836	50.000	50.000		137.274	16.000	1.500	2.213	1.000	1.000	1.000
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	25.240	50.000	50.000		137.274	16.000	1.500	2.239	1.000	1.000	1.000
LL+I_MINFZ_Bracing_End (LL+IM)		1173	39.832	50.000	50.000		137.274	16.000	1.500	1.783	1.000	1.000	1.000
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	294.109	50.000	50.000		137.274	16.000	1.750	0.562	1.000	1.000	1.000
LL+I_MaxMY_Bracing_End (LL+IM)		1173	350.592	50.000	50.000		137.274	16.000	1.750	0.515	1.000	1.000	1.000
LL+I_MINMY_Bracing_Start (LL+IM)		1172	25.336	50.000	50.000		137.274	16.000	1.500	2.235	1.000	1.000	1.000
LL+I_MINMY_Bracing_End (LL+IM)		1173	26.094	50.000	50.000		137.274	16.000	1.500	2.202	1.000	1.000	1.000
1.25DC+1.5DW_Bracing Start		1172	32.299	50.000	50.000		137.274	16.000	1.500	1.980	1.000	1.000	1.000
1.25DC+1.5DW_Bracing End		1173	32.141	50.000	50.000		137.274	16.000	1.500	1.984	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	32.348	50.000	50.000		137.274	16.000	1.500	1.978	1.000	1.000	1.000

							6.10.1.10.2 - W						
Load Cases and Load Combination	Live Load Consider		6.10.1.9.2 with longitudinal stiffeners		Nominal bend-buckling resistance (Use)		R_b without longitudinal stiffener						
			Bend-buckling coefficient	Nominal bend-buckling resistance			Limiting slenderness ratio for a noncompact web	Full width of compression flg	Thickness of compression flg	a_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b
		Macro Node No	k	F_{crw}	$\mathbf{F_{crw}}$		λ_{rw}	b_{fc}	t_{fc}		Exclude composite in positive flexure with	Composite in positive flexure	("0" means not applicable)
			6.10.1.9.2-1	6.10.1.9.1-1			6.10.1.10.2-4			6.10.1.10.2-5			
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	32.192	50.000	50.000		137.274	16.000	1.500	1.983	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	32.348	50.000	50.000		137.274	16.000	1.500	1.978	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	32.192	50.000	50.000		137.274	16.000	1.500	1.983	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	32.799	50.000	50.000		137.274	16.000	1.500	1.964	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	29.895	50.000	50.000		137.274	16.000	1.500	2.058	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	29.426	50.000	50.000		137.274	16.000	1.500	2.074	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	32.513	50.000	50.000		137.274	16.000	1.500	1.973	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	35.097	50.000	50.000		137.274	16.000	1.500	1.899	1.000	1.000	1.000
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	35.168	50.000	50.000		137.274	16.000	1.500	1.897	1.000	1.000	1.000
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	28.674	50.000	50.000		137.274	16.000	1.500	2.101	1.000	1.000	1.000
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	29.079	50.000	50.000		137.274	16.000	1.500	2.086	1.000	1.000	1.000

		Macro Node No	k	Fcrw	Fcrw		λ_{rw}	bfc	tfc		Rb	Rb	Rb
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	31.7	50.0	50.0		137.3	16.0	1.500	2.0	1.000	1.0	1.0
		1172	31.7	50.0	50.0		137.3	16.0	1.500	2.0	1.000	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MinFX		1172	31.7	50.0	50.0		137.3	16.0	1.500	2.0	1.000	1.0	1.0
		1172	31.7	50.0	50.0		137.3	16.0	1.500	2.0	1.000	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	26.7	50.0	50.0		137.3	16.0	1.500	2.2	1.000	1.0	1.0
		1172	26.7	50.0	50.0		137.3	16.0	1.500	2.2	1.000	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	25.6	50.0	50.0		137.3	16.0	1.500	2.2	1.000	1.0	1.0
		1172	25.6	50.0	50.0		137.3	16.0	1.500	2.2	1.000	1.0	1.0
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	27.9	50.0	50.0		137.3	16.0	1.500	2.1	1.000	1.0	1.0
		1172	27.9	50.0	50.0		137.3	16.0	1.500	2.1	1.000	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MinMY		1172	25.5	50.0	50.0		137.3	16.0	1.500	2.2	1.000	1.0	1.0
		1172	25.5	50.0	50.0		137.3	16.0	1.500	2.2	1.000	1.0	1.0

							6.10.1.10.2 - W						
Load Cases and Load Combination	Live Load Consider		6.10.1.9.2 with longitudinal stiffeners		Nominal bend-buckling resistance (Use)		R_b without longitudinal stiffener						
			Bend-buckling coefficient	Nominal bend-buckling resistance			Limiting slenderness ratio for a noncompact web	Full width of compression flg	Thickness of compression flg	a_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b
		Macro Node No	k	F_{crw}	$\mathbf{F_{crw}}$		Y_{rw}	b_{fc}	t_{fc}		Exclude composite in positive flexure with	Composite in positive flexure	("0" means not applicable)
			6.10.1.9.2-1	6.10.1.9.1-1			6.10.1.10.2-4			6.10.1.10.2-5			
					(ksi)								
DC1		1172	33.3	50.0	50.0								
		1172	33.3	50.0	50.0								
DC2		1172	26.3	50.0	50.0								
		1172	26.3	50.0	50.0								
DW		1172	308.9	50.0	50.0								
		1172	308.9	50.0	50.0								
DC1+DC2+DW		1172	32.3	50.0	50.0								
		1172	32.3	50.0	50.0								

Load Cases and Load Combination	Live Load Consider	Macro Node No	6.10.1.9.2 with longitudinal stiffeners: Bend-buckling coefficient	6.10.1.9.2 with longitudinal stiffeners: Nominal bend-buckling resistance	Nominal bend-buckling resistance (Use)
			k	F_{crw}	$\mathbf{F_{crw}}$
			6.10.1.9.2-1	6.10.1.9.1-1	
LL_MaxFX (LL)	HL-93	1172	16.9	50.0	50.0
		1172	16.9	50.0	50.0
LL_MINFX (LL)		1172	16.9	50.0	50.0
		1172	16.9	50.0	50.0
LL_MaxFZ (LL)		1172	16.0	50.0	50.0
		1172	16.0	50.0	50.0
LL_MINFZ (LL)		1172	25.2	50.0	50.0
		1172	25.2	50.0	50.0
LL_MaxMY (LL)		1172	285.4	50.0	50.0
		1172	285.4	50.0	50.0
LL_MINMY (LL)		1172	26.1	50.0	50.0
		1172	26.1	50.0	50.0

6.10.1.10.2 - We

Load Cases and Load Combination	R_b without longitudinal stiffener: Limiting slenderness ratio for a noncompact web	Full width of compression flg	Thickness of compression flg	α_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b
	λ_{rw}	b_{fc}	t_{fc}		Exclude composite in positive flexure with	Composite in positive flexure	("0" means not applicable)
	6.10.1.10.2-4			6.10.1.10.2-5			
	λ_{rw}	bfc	tfc		Rb	Rb	Rb
LL_MaxFX (LL)	137.3	16.0	1.500	2.0	1.000	1.0	1.0
	137.3	16.0	1.500	2.0	1.000	1.0	1.0
LL_MINFX (LL)	137.3	16.0	1.500	2.0	1.000	1.0	1.0
	137.3	16.0	1.500	2.0	1.000	1.0	1.0
LL_MaxFZ (LL)	137.3	16.0	1.500	2.2	1.000	1.0	1.0
	137.3	16.0	1.500	2.2	1.000	1.0	1.0
LL_MINFZ (LL)	137.3	16.0	1.500	2.2	1.000	1.0	1.0
	137.3	16.0	1.500	2.2	1.000	1.0	1.0
LL_MaxMY (LL)	137.3	16.0	1.500	2.1	1.000	1.0	1.0
	137.3	16.0	1.500	2.1	1.000	1.0	1.0
LL_MINMY (LL)	137.3	16.0	1.500	2.2	1.000	1.0	1.0
	137.3	16.0	1.500	2.2	1.000	1.0	1.0

Load Cases and Load Combination	Live Load Consider	Macro Node No	ɘb Load-Shedding Factor R_b – R_b with longitudinal stiffener: Bend-buckling coefficient	Is $D/t_w \le 0.95(Ek/F_{yc})^{1/2}$?	Is $2D_c/t_w \le \lambda_{rw}$?	α_{wc}	α_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	R_{b_final}: Web Load-Shedding Factor R_b	6.10.7 - Flexural Resistance -Composite Sections in Positive Flexure – 6.10.7.1 - Flexural Resistance - Composite Compact Section in Positive Flexure: Apply ?	Dist from T/deck to comp sect NA	Plastic Moment	Nominal flexural resistance	6.10.7.2 - Flexural Resistance - Composite Non Compact Section in Positive Flexure: Apply ?	Dist from T/deck to comp sect NA	$D_p \le 0.42 D_t$?	Nominal flexural resistance of compression flange	Nominal flexural resistance of tension flange	Comp Section in Postive Flexure: D6.2.2-2
			k	Yes =0, No=1	Yes =0,No=1	(For positive Moment)	(for others)	Exclude composite in positive flexure	Composite in positive flexure	("0" means not applicable)	Use	Yes =0, No=1	D_p	M_p	M_n	Yes =0, No=1	D_p	Yes=OK, No=NG	F_{nc}	F_{nt}	My
						6.10.1.10.2-6	6.10.1.10.2-5							D6.1	6.10.7.1.2			6.10.7.3-1	6.10.7.2.2-1	6.10.7.2.2-2	D6.2.2-2
														(k-ft)	(k-ft)				(ksi)	(ksi)	(k-ft)
DC1		1172	33.3	0.0	0.0	0.93	1.95	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	33.3	0.0	0.0	0.93	1.95	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
DC2		1172	26.3	0.0	0.0	1.05	2.19	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	26.3	0.0	0.0	1.05	2.19	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
DW		1172	308.9	0.0	0.0	0.28	0.55	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	308.9	0.0	0.0	0.28	0.55	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
1.25DC1+1.25DC2+1.5DW		1172	32.3	0.0	0.0	0.95	1.98	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	32.3	0.0	0.0	0.95	1.98	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
LL+I_MaxFX (LL+IM)		1172	16.9	0.0	0.0	1.21	2.35	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	16.9	0.0	0.0	1.21	2.35	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
LL+I_MINFX (LL+IM)		1172	16.9	0.0	0.0	1.21	2.35	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	16.9	0.0	0.0	1.21	2.35	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
LL+I_MaxFZ (LL+IM)		1172	16.2	0.0	0.0	1.24	2.40	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
	HL-93	1172	16.2	0.0	0.0	1.24	2.40	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
LL+I_MINFZ (LL+IM)		1172	25.2	0.0	0.0	1.07	2.24	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	25.2	0.0	0.0	1.07	2.24	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
LL+I_MaxMY (LL+IM)		1172	294.1	0.0	0.0	0.29	0.56	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	294.1	0.0	0.0	0.29	0.56	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
LL+I_MINMY (LL+IM)		1172	25.3	0.0	0.0	1.07	2.24	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	
		1172	25.3	0.0	0.0	1.07	2.24	1.000	1.000	0.000	1.000	0	11.8	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	

DC1_Bracing Start		1172	33.303	0.000	0.000	0.93	1.95	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
DC1_Bracing End		1173	33.079	0.000	0.000	0.93	1.96	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
DC2_Bracing Start		1172	26.277	0.000	0.000	1.05	2.19	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
DC2_Bracing End		1173	26.380	0.000	0.000	1.05	2.19	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
DW_Bracing Start		1172	308.902	0.000	0.000	0.28	0.55	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
DW_Bracing End		1173	308.902	0.000	0.000	0.28	0.55	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MaxFX_Bracing Start (LL+IM)		1172	16.905	0.000	0.000	1.21	2.35	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MaxFX_Bracing End (LL+IM)		1173	16.905	0.000	0.000	1.21	2.35	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MINFX_Bracing_Start (LL+IM)		1172	16.905	0.000	0.000	1.21	2.35	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MINFX_Bracing_End (LL+IM)		1173	16.905	0.000	0.000	1.21	2.35	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	16.198	0.000	0.000	1.24	2.40	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MaxFZ_Bracing_End (LL+IM)	HL-93	1173	25.836	0.000	0.000	1.06	2.21	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	25.240	0.000	0.000	1.07	2.24	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MINFZ_Bracing_End (LL+IM)		1173	39.832	0.000	0.000	0.85	1.78	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	294.109	0.000	0.000	0.29	0.56	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MaxMY_Bracing_End (LL+IM)		1173	350.592	0.000	0.000	0.27	0.51	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MINMY_Bracing_Start (LL+IM)		1172	25.336	0.000	0.000	1.07	2.24	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
LL+I_MINMY_Bracing_End (LL+IM)		1173	26.094	0.000	0.000	1.05	2.20	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW_Bracing Start		1172	32.299	0.000	0.000	0.95	1.98	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW_Bracing End		1173	32.141	0.000	0.000	0.95	1.98	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	32.348	0.000	0.000	0.94	1.98	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	

Load Cases and Load Combination	Live Load Consider		...eb Load-Shedding Factor R_b — R_b with longitudinal stiffener									R_{b_final}	6.10.7 - Flexural Resistance -Composite Sections in Positive Flexure — 6.10.7.1 - Flexural Resistance - Composite Compact Section in Positive Flexure				6.10.7.2 - Flexural Resistance - Composite Non Compact Section in Positive Flexure					Comp Section in Postive Flexure
			Bend-buckling coefficient	Is $D/t_w \le 0.95(Ek/F_{yc})^{1/2}$?	Is $2D_c/t_w \le \lambda_{rw}$?	α_{wc}	α_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Apply ?	Dist from T/deck to comp sect NA	Plastic Moment	Nominal flexural resistance	Apply ?	Dist from T/deck to comp sect NA	$D_p \le 0.42\ D_t$?	Nominal flexural resistance of compression flange	Nominal flexural resistance of tension flange	D6.2.2-2
		Macro Node No	k	Yes =0, No=1	Yes =0,No=1	(For positive Moment)	(for others)	Exclude composite in positive flexure	Composite in positive flexure	("0" means not applicable)	Use	Yes =0, No=1	D_p	M_p	M_n	Yes =0, No=1	D_p	Yes=OK, No=NG	F_{nc}	F_{nt}	My
						6.10.1.10.2-6	6.10.1.10.2-5							D6.1	6.10.7.1.2			6.10.7.3-1	6.10.7.2.2-1	6.10.7.2.2-2	D6.2.2-2
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	32.192	0.000	0.000	0.95	1.98	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	32.348	0.000	0.000	0.94	1.98	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	32.192	0.000	0.000	0.95	1.98	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	32.799	0.000	0.000	0.94	1.96	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	29.895	0.000	0.000	0.98	2.06	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	29.426	0.000	0.000	0.99	2.07	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	32.513	0.000	0.000	0.94	1.97	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	35.097	0.000	0.000	0.91	1.90	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	35.168	0.000	0.000	0.91	1.90	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	28.674	0.000	0.000	1.00	2.10	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	29.079	0.000	0.000	1.00	2.09	1.000	1.000	0.000	1.000	0	11.750	13573.9	12794.8	1.000	N/A	N/A	50.000	50.000	

		Macro Node No	k	es =0, No=	s =0,No	α_{wc}	α_{wc}	Rb	Rb	Rb	Rb_final	Yes =0, No=1	Dp	Mp	Mn	Yes =0, No=	Dp	es=OK, No=N	Fnc	Fnt	My
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
1.25DC+1.5DW+1.75LL+I_MinFX		1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	26.7	0.0	0.0	1.04	2.18	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	26.7	0.0	0.0	1.04	2.18	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	25.6	0.0	0.0	1.06	2.22	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	25.6	0.0	0.0	1.06	2.22	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	27.9	0.0	0.0	1.02	2.13	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	27.9	0.0	0.0	1.02	2.13	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
1.25DC+1.5DW+1.75LL+I_MinMY		1172	25.5	0.0	0.0	1.06	2.23	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	25.5	0.0	0.0	1.06	2.23	1.000	1.000	0.000	1.000	0	-5.1	13573.9	12794.8	1.0	N/A	N/A	50.0	50.0	11159.0

Load Cases and Load Combination	Live Load Consider		...eb Load-Shedding Factor R_b — R_b with longitudinal stiffener									R_{b_final}	6.10.7 - Flexural Resistance -Composite Sections in Positive Flexure — 6.10.7.1 - Flexural Resistance - Composite Compact Section in Positive Flexure				6.10.7.2 - Flexural Resistance - Composite Non Compact Section in Positive Flexure					Comp Section in Postive Flexure
			Bend-buckling coefficient	Is $D/t_w \le 0.95(Ek/F_{yc})^{1/2}$?	Is $2D_c/t_w \le \lambda_{rw}$?	α_{wc}	α_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Apply ?	Dist from T/deck to comp sect NA	Plastic Moment	Nominal flexural resistance	Apply ?	Dist from T/deck to comp sect NA	$D_p \le 0.42\ D_t$?	Nominal flexural resistance of compression flange	Nominal flexural resistance of tension flange	D6.2.2-2
		Macro Node No	k	Yes =0, No=1	Yes =0,No=1	(For positive Moment)	(for others)	Exclude composite in positive flexure	Composite in positive flexure	("0" means not applicable)	Use	Yes =0, No=1	D_p	M_p	M_n	Yes =0, No=1	D_p	Yes=OK, No=NG	F_{nc}	F_{nt}	My
						6.10.1.10.2-6	6.10.1.10.2-5							D6.1	6.10.7.1.2			6.10.7.3-1	6.10.7.2.2-1	6.10.7.2.2-2	D6.2.2-2
DC1		1172																			
		1172																			
DC2		1172																			
		1172																			
DW		1172																			
		1172																			
DC1+DC2+DW		1172																			
		1172																			

Load Cases and Load Combination	Live Load Consider		...eb Load-Shedding Factor R_b — R_b with longitudinal stiffener								R_{b_final}		6.10.7 - Flexural Resistance -Composite Sections in Positive Flexure — 6.10.7.1 - Flexural Resistance - Composite Compact Section in Positive Flexure					6.10.7.2 - Flexural Resistance - Composite Non Compact Section in Positive Flexure					Comp Section in Postive Flexure
			Bend-buckling coefficient	Is $D/t_w \le 0.95(Ek/F_{yc})^{1/2}$?	Is $2D_c/t_w \le \lambda_{rw}$?	a_{wc}	a_{wc}	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b	Web Load-Shedding Factor R_b		Apply ?	Dist from T/deck to comp sect NA	Plastic Moment	Nominal flexural resistance		Apply ?	Dist from T/deck to comp sect NA	$D_p \le 0.42 D_t$?	Nominal flexural resistance of compression flange	Nominal flexural resistance of tension flange	D6.2.2-2
		Macro Node No	k	Yes =0, No=1	Yes =0,No=1	(For positive Moment)	(for others)	Exclude composite in positive flexure	Composite in positive flexure	("0" means not applicable)	Use		Yes =0, No=1	D_p	M_p	M_n		Yes =0, No=1	D_p	Yes=OK, No=NG	F_{nc}	F_{nt}	My
						6.10.1.10.2-6	6.10.1.10.2-5								D6.1	6.10.7.1.2				6.10.7.3-1	6.10.7.2.2-1	6.10.7.2.2-2	D6.2.2-2
			k	es =0, No=	s =0,No	a_{wc}	a_{wc}	Rb	Rb	Rb	Rb_final		Yes =0, No=1	Dp	Mp	Mn		Yes =0, No=	Dp	es=OK, No=N	Fnc	Fnt	My
LL_MaxFX (LL)	HL-93	1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
LL_MINFX (LL)		1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	31.7	0.0	0.0	0.95	2.00	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
LL_MaxFZ (LL)		1172	26.7	0.0	0.0	1.04	2.18	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	26.7	0.0	0.0	1.04	2.18	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
LL_MINFZ (LL)		1172	25.6	0.0	0.0	1.06	2.22	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	25.6	0.0	0.0	1.06	2.22	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
LL_MaxMY (LL)		1172	27.9	0.0	0.0	1.02	2.13	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	27.9	0.0	0.0	1.02	2.13	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
LL_MINMY (LL)		1172	25.5	0.0	0.0	1.06	2.23	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0
		1172	25.5	0.0	0.0	1.06	2.23	1.000	1.000	0.000	1.000	0.0	0	-5.1	13573.9	12794.8	0.0	1.0	N/A	N/A	50.0	50.0	11159.0

			6.10.8 - Flexural Resistance -Composite Sections in Negative Flexure and Noncomposite Sections																		**Comp Section in Negative Flexure**
			6.10.8.2.2 - Compression Flange Flexural Restance due to Local Buckling						6.10.8.2.3 - Compression Flange Flexure Resistance due to Lateral Torsional Buckling											6.10.8.3 - Tension-Flg Flexural Resistance	
Load Cases and Load Combination	Live Load Consider		Slenderness ratio for the compression flange		Slenderness ratio for a noncompact flange	Compression-flange at the onset of nominal yielding, incuding residual stress	Local buckling resistance of comp flg		Effective radius of gyration for lateral torsional buckling			Stress in the compression flange at brace pt w/ small force due to factored loading	Moment gradient modifier	Elastic lateral torsional buckling stress	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	**F_{nc_final}**	Nominal Flexural Resistance of Tension Flange	D6.2.2-2
		Macro Node No	λ_f	λ_{pf}	λ_{rf}	F_{yr}	F_{nc}		r_t	L_p	L_r	f_1/f_2	C_b	F_{cr}	F_{nc} (For $L_b \le L_p$)	F_{nc} (For $L_p \le L_b \le L_r$)	F_{nc} (For $L_p \ge L_r$)	F_{nc}		F_{nt}	M_{yc}
			6.10.8.2.2-3	6.10.8.2.2-4	6.10.8.2.2-5		6.10.8.2.2-1 or 2		6.10.8.2.3-9	6.10.8.2.3-4	6.10.8.2.3-5		6.10.8.2.3-6 or 7	6.10.8.2.3-8	6.10.8.2.3-1	6.10.8.2.3-1	6.10.8.2.3-1			6.10.8.3-1	D6.2.2-2
						(ksi)	(ksi)		(in)	(in)	(in)				(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(k-ft)
DC1		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.6	362.9	1.0	1.0	661.3	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.6	362.9	1.0	1.0	661.3	50.0	50.0	50.0	50.0	50.0	50.0	
DC2		1172	5.3	9.2	16.1	35.0	50.0		4.0	95.2	357.4	1.0	1.0	646.5	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	5.3	9.2	16.1	35.0	50.0		4.0	95.2	357.4	1.0	1.0	646.5	50.0	50.0	50.0	50.0	50.0	50.0	
DW		1172	4.6	9.2	16.1	35.0	50.0		4.4	106.5	399.8	1.0	1.0	792.8	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	4.6	9.2	16.1	35.0	50.0		4.4	106.5	399.8	1.0	1.0	792.8	50.0	50.0	50.0	50.0	50.0	50.0	
1.25DC1+1.25DC2+1.5DW		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.5	362.2	1.0	1.0	659.5	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.5	362.2	1.0	1.0	659.5	50.0	50.0	50.0	50.0	50.0	50.0	
LL+I_MaxFX (LL+IM)	HL-93	1172	4.6	9.2	16.1	35.0	50.0		3.9	94.3	354.1	1.0	1.0	622.1	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	4.6	9.2	16.1	35.0	50.0		3.9	94.3	354.1	1.0	1.0	622.1	50.0	50.0	50.0	50.0	50.0	50.0	
LL+I_MINFX (LL+IM)		1172	4.6	9.2	16.1	35.0	50.0		3.9	94.3	354.1	1.0	1.0	622.1	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	4.6	9.2	16.1	35.0	50.0		3.9	94.3	354.1	1.0	1.0	622.1	50.0	50.0	50.0	50.0	50.0	50.0	
LL+I_MaxFZ (LL+IM)		1172	4.6	9.2	16.1	35.0	50.0		3.9	94.0	353.1	0.0	1.8	1096.2	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	4.6	9.2	16.1	35.0	50.0		3.9	94.0	353.1	0.0	1.8	1096.2	50.0	50.0	50.0	50.0	50.0	50.0	
LL+I_MINFZ (LL+IM)		1172	5.3	9.2	16.1	35.0	50.0		3.9	94.9	356.4	0.1	1.7	1050.1	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	5.3	9.2	16.1	35.0	50.0		3.9	94.9	356.4	0.1	1.7	1050.1	50.0	50.0	50.0	50.0	50.0	50.0	
LL+I_MaxMY (LL+IM)		1172	4.6	9.2	16.1	35.0	50.0		4.4	106.4	399.4	0.9	1.0	817.5	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	4.6	9.2	16.1	35.0	50.0		4.4	106.4	399.4	0.9	1.0	817.5	50.0	50.0	50.0	50.0	50.0	50.0	
LL+I_MINMY (LL+IM)		1172	5.3	9.2	16.1	35.0	50.0		3.9	94.9	356.5	0.9	1.0	652.6	50.0	50.0	50.0	50.0	50.0	50.0	
		1172	5.3	9.2	16.1	35.0	50.0		3.9	94.9	356.5	0.9	1.0	652.6	50.0	50.0	50.0	50.0	50.0	50.0	

DC1_Bracing Start		1172	5.333	9.152	16.120	35.000	50.000		4.013	96.639	362.9	0.973
DC1_Bracing End		1173	5.333	9.152	16.120	35.000	50.000		4.011	96.599	362.7	
DC2_Bracing Start		1172	5.333	9.152	16.120	35.000	50.000		3.952	95.182	357.4	0.956
DC2_Bracing End		1173	5.333	9.152	16.120	35.000	50.000		3.953	95.207	357.5	
DW_Bracing Start		1172	4.571	9.152	16.120	35.000	50.000		4.421	106.474	399.8	1.000
DW_Bracing End		1173	4.571	9.152	16.120	35.000	50.000		4.421	106.474	399.8	
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172	4.571	9.152	16.120	35.000	50.000		3.916	94.319	354.1	1.000
LL+I_MaxFX_Bracing End (LL+IM)		1173	4.571	9.152	16.120	35.000	50.000		3.916	94.319	354.1	
LL+I_MINFX_Bracing_Start (LL+IM)		1172	4.571	9.152	16.120	35.000	50.000		3.916	94.319	354.1	1.000
LL+I_MINFX_Bracing_End (LL+IM)		1173	4.571	9.152	16.120	35.000	50.000		3.916	94.319	354.1	
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172	4.571	9.152	16.120	35.000	50.000		3.905	94.034	353.1	-0.022
LL+I_MaxFZ_Bracing_End (LL+IM)		1173	5.333	9.152	16.120	35.000	50.000		3.948	95.074	357.0	
LL+I_MINFZ_Bracing_Start (LL+IM)		1172	5.333	9.152	16.120	35.000	50.000		3.941	94.924	356.4	0.081
LL+I_MINFZ_Bracing_End (LL+IM)		1173	5.333	9.152	16.120	35.000	50.000		4.056	97.669	366.7	
LL+I_MaxMY_Bracing_Start (LL+IM)		1172	4.571	9.152	16.120	35.000	50.000		4.416	106.363	399.4	0.929
LL+I_MaxMY_Bracing_End (LL+IM)		1173	4.571	9.152	16.120	35.000	50.000		4.432	106.749	400.8	
LL+I_MINMY_Bracing_Start (LL+IM)		1172	5.333	9.152	16.120	35.000	50.000		3.943	94.948	356.5	0.926
LL+I_MINMY_Bracing_End (LL+IM)		1173	5.333	9.152	16.120	35.000	50.000		3.950	95.137	357.2	
1.25DC+1.5DW_Bracing Start		1172	5.333	9.152	16.120	35.000	50.000		4.005	96.456	362.2	0.970
1.25DC+1.5DW_Bracing End		1173	5.333	9.152	16.120	35.000	50.000		4.004	96.427	362.1	
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172	5.333	9.152	16.120	35.000	50.000		4.006	96.465	362.2	0.970

Load Cases and Load Combination	Live Load Consider		6.10.8 - Flexural Resistance -Composite Sections in Negative Flexure and Noncomposite Sections — 6.10.8.2.2 - Compression Flange Flexural Restance due to Local Buckling: Slenderness ratio for the compression flange		Slenderness ratio for a noncompact flange	Compression-flange at the onset of nominal yielding, incuding residual stress	Local buckling resistance of comp flg		6.10.8.2.3 - Compression Flange Flexure Resistance due to Lateral Torsional Buckling: Effective radius of gyration for lateral torsional buckling			Stress in the compression flange at brace pt w/ small force due to factored loading	Moment gradient modifier	Elastic lateral torsional buckling stress	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	F_{nc_final}	6.10.8.3 - Tension-Flg Flexural Resistance: Nominal Flexural Resistance of Tension Flange	Comp Section in Negative Flexure: D6.2.2-2
		Macro Node No	λ_f	λ_{pf}	λ_{rf}	F_{yr}	F_{nc}		r_t	L_p	L_r	f_1/f_2	C_b	F_{cr}	F_{nc} (For $L_b \le L_p$)	F_{nc} (For $L_p \le L_b \le L_r$)	F_{nc} (For $L_p \ge L_r$)	F_{nc}		F_{nt}	M_{yc}
			6.10.8.2.2-3	6.10.8.2.2-4	6.10.8.2.2-5		6.10.8.2.2-1 or 2		6.10.8.2.3-9	6.10.8.2.3-4	6.10.8.2.3-5		6.10.8.2.3-6 or 7	6.10.8.2.3-8	6.10.8.2.3-1	6.10.8.2.3-1	6.10.8.2.3-1			6.10.8.3-1	D6.2.2-2
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173	5.333	9.152	16.120	35.000	50.000		4.004	96.436	362.1										
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172	5.333	9.152	16.120	35.000	50.000		4.006	96.465	362.2	0.970									
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173	5.333	9.152	16.120	35.000	50.000		4.004	96.436	362.1										
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172	5.333	9.152	16.120	35.000	50.000		4.009	96.548	362.5	0.670									
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173	5.333	9.152	16.120	35.000	50.000		3.986	95.988	360.4										
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172	5.333	9.152	16.120	35.000	50.000		3.982	95.891	360.1	0.623									
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173	5.333	9.152	16.120	35.000	50.000		4.007	96.496	362.3										
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172	5.333	9.152	16.120	35.000	50.000		4.026	96.947	364.0	0.965									
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173	5.333	9.152	16.120	35.000	50.000		4.026	96.959	364.1										
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172	5.333	9.152	16.120	35.000	50.000		3.975	95.731	359.5	0.948									
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173	5.333	9.152	16.120	35.000	50.000		3.979	95.818	359.8										

		Macro Node No	λf	λpf	λrf	Fyr	Fnc		rt	Lp	Lr	f1/f2	Cb	Fcr	Fnc (For Lb ≤ Lp)	Fnc (For Lp ≤ Lb ≤ Lr	Fnc (For Lp ≥ Lr)	F_{nc}	F_{nc_final}	F_{nt}	M_{yc}
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	5.3	9.2	16.1	35.0	50.0		4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
1.25DC+1.5DW+1.75LL+I_MinFX		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0		4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	5.3	9.2	16.1	35.0	50.0		4.0	95.3	357.7	0.7	1.18	749.9	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0		4.0	95.3	357.7	0.7	1.18	749.9	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	5.3	9.2	16.1	35.0	50.0		3.9	95.0	356.8	0.6	1.21	765.6	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0		3.9	95.0	356.8	0.6	1.21	765.6	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	5.3	9.2	16.1	35.0	50.0		4.0	95.6	358.8	1.0	1.02	649.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0		4.0	95.6	358.8	1.0	1.02	649.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
1.25DC+1.5DW+1.75LL+I_MinMY		1172	5.3	9.2	16.1	35.0	50.0		3.9	95.0	356.7	0.9	1.02	646.4	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0		3.9	95.0	356.7	0.9	1.02	646.4	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
									Min =	**95.0**	356.7										

Load Cases and Load Combination	Live Load Consider		6.10.8 - Flexural Resistance -Composite Sections in Negative Flexure and Noncomposite Sections — 6.10.8.2.2 - Compression Flange Flexural Restance due to Local Buckling: Slenderness ratio for the compression flange		Slenderness ratio for a noncompact flange	Compression-flange at the onset of nominal yielding, incuding residual stress	Local buckling resistance of comp flg		6.10.8.2.3 - Compression Flange Flexure Resistance due to Lateral Torsional Buckling: Effective radius of gyration for lateral torsional buckling			Stress in the compression flange at brace pt w/ small force due to factored loading	Moment gradient modifier	Elastic lateral torsional buckling stress	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	F_{nc_final}	6.10.8.3 - Tension-Flg Flexural Resistance: Nominal Flexural Resistance of Tension Flange	Comp Section in Negative Flexure: D6.2.2-2
		Macro Node No	λ_f	λ_{pf}	λ_{rf}	F_{yr}	F_{nc}		r_t	L_p	L_r	f_1/f_2	C_b	F_{cr}	F_{nc} (For $L_b \le L_p$)	F_{nc} (For $L_p \le L_b \le L_r$)	F_{nc} (For $L_p \ge L_r$)	F_{nc}		F_{nt}	M_{yc}
			6.10.8.2.2-3	6.10.8.2.2-4	6.10.8.2.2-5		6.10.8.2.2-1 or 2		6.10.8.2.3-9	6.10.8.2.3-4	6.10.8.2.3-5		6.10.8.2.3-6 or 7	6.10.8.2.3-8	6.10.8.2.3-1	6.10.8.2.3-1	6.10.8.2.3-1			6.10.8.3-1	D6.2.2-2
DC1		1172																			
		1172																			
DC2		1172																			
		1172																			
DW		1172																			
		1172																			
DC1+DC2+DW		1172																			
		1172						1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0

Load Cases and Load Combination	Live Load Consider		6.10.8 - Flexural Resistance -Composite Sections in Negative Flexure and Noncomposite Sections																		Comp Section in Negative Flexure
			6.10.8.2.2 - Compression Flange Flexural Restance due to Local Buckling						6.10.8.2.3 - Compression Flange Flexure Resistance due to Lateral Torsional Buckling											6.10.8.3 - Tension-Flg Flexural Resistance	
			Slenderness ratio for the compression flange		Slenderness ratio for a noncompact flange	Compression-flange at the onset of nominal yielding, incuding residual stress	Local buckling resistance of comp flg		Effective radius of gyration for lateral torsional buckling			Stress in the compression flange at brace pt w/ small force due to factored loading	Moment gradient modifier	Elastic lateral torsional buckling stress	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	Lateral Torsional Buckling Resistance	F_{nc_final}	Nominal Flexural Resistance of Tension Flange	D6.2.2-2
		Macro Node No	λ_f	λ_{pf}	λ_{rf}	F_{yr}	F_{nc}		r_t	L_p	L_r	f_1/f_2	C_b	F_{cr}	F_{nc} (For $L_b \le L_p$)	F_{nc} (For $L_p \le L_b \le L_r$)	F_{nc} (For $L_p \ge L_r$)	F_{nc}		F_{nt}	M_{yc}
			6.10.8.2.2-3	6.10.8.2.2-4	6.10.8.2.2-5		6.10.8.2.2-1 or 2		6.10.8.2.3-9	6.10.8.2.3-4	6.10.8.2.3-5		6.10.8.2.3-6 or 7	6.10.8.2.3-8	6.10.8.2.3-1	6.10.8.2.3-1	6.10.8.2.3-1			6.10.8.3-1	D6.2.2-2
			λf	λpf	λrf	Fyr	Fnc	**Revise ratio r_1**	rt	Lp	Lr	f1/f2	Cb	Fcr	Fnc (For Lb ≤ Lp)	Fnc (For Lp ≤ Lb ≤ Lr)	Fnc (For Lp ≥ Lr)	F_{nc}	F_{nc_final}	F_{nt}	M_{yc}
LL_MaxFX (LL)	HL-93	1172	5.3	9.2	16.1	35.0	50.0	13.033	4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0	13.033	4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
LL_MINFX (LL)		1172	5.3	9.2	16.1	35.0	50.0	13.033	4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0	13.033	4.0	96.3	361.8	1.0	1.01	658.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
LL_MaxFZ (LL)		1172	5.3	9.2	16.1	35.0	50.0	12.781	4.0	95.3	357.7	0.7	1.18	749.9	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0	12.781	4.0	95.3	357.7	0.7	1.18	749.9	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
LL_MINFZ (LL)		1172	5.3	9.2	16.1	35.0	50.0	1.671	3.9	95.0	356.8	0.6	1.21	765.6	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0	1.671	3.9	95.0	356.8	0.6	1.21	765.6	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
LL_MaxMY (LL)		1172	5.3	9.2	16.1	35.0	50.0	51.570	4.0	95.6	358.8	1.0	1.02	649.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0	51.570	4.0	95.6	358.8	1.0	1.02	649.0	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
LL_MINMY (LL)		1172	5.3	9.2	16.1	35.0	50.0	1.300	3.9	95.0	356.7	0.9	1.02	646.4	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
		1172	5.3	9.2	16.1	35.0	50.0	1.300	3.9	95.0	356.7	0.9	1.02	646.4	50.0	50.0	50.0	50.0	50.0	50.0	8427.9
								1.300													

Load Cases and Load Combination	Live Load Consider		Flexural Resistance		Rating Factor for Flexure $RF_{flexural}$			Shear Resistance									
								Plastic Shear Force	Unstiffened Web			Stiffener Web				$\phi_v V_{n\_use}$	Rating Factor for Shear RF_{shear}
			Flexural Resistance for Compression Flange $\phi_f F_{nc}$	Flexural Resistance for Tension Flange $\phi_f F_{nt}$	$RF=(\phi_c\phi_s\phi F_n-Y_{DC}f_{DC}-Y_{DW}f_{DW}-Y_{PL}f_{PL}-Y_{TU}f_{TU})/(Y_{LL}f_{LL})$				Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	Nominal Shear Resistance	Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	End Panel Nominal Shear Resistance	Interior Panel Nominal Shear Resistance		$RF=(\phi_c\phi_s\phi V_n-Y_{DC}V_{DC}-Y_{DW}V_{DW}-Y_{PL}V_{PL}-Y_{TU}V_{TU})/(Y_{LL}V_{LL})$
		Macro Node No	$\phi_f F_{nc}$	$\phi_f F_{nt}$	Top Flange	Bottom Flange		V_p	k	C	V_n	k	C	V_{n_end}	$V_{n\_interior}$		
								6.10.9.2-2	C6.10.9.2	6.10.9.3.2-4 to 6	6.10.9.2-1	C6.10.9.3.2-7	6.10.9.3.2-4 to 6	6.10.9.2-1	6.10.9.2-1		
								(kips)						(kips)	(kips)	(kips)	
DC1		1172	50.0	50.0				1305.0	5.0	0.71	928.4	7.6	0.926	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
DC2		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
DW		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
1.25DC1+1.25DC2+1.5DW		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
LL+I_MaxFX (LL+IM)	HL-93	1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
LL+I_MINFX (LL+IM)		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
LL+I_MaxFZ (LL+IM)		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
LL+I_MINFZ (LL+IM)		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
LL+I_MaxMY (LL+IM)		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
LL+I_MINMY (LL+IM)		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	
		1172	50.0	50.0				1305.0	5.0	0.7	928.4	7.6	0.9	1209.1	1257.6	1257.6	

DC1_Bracing Start		1172
DC1_Bracing End		1173
DC2_Bracing Start		1172
DC2_Bracing End		1173
DW_Bracing Start		1172
DW_Bracing End		1173
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172
LL+I_MaxFX_Bracing End (LL+IM)		1173
LL+I_MINFX_Bracing_Start (LL+IM)		1172
LL+I_MINFX_Bracing_End (LL+IM)		1173
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172
LL+I_MaxFZ_Bracing_End (LL+IM)		1173
LL+I_MINFZ_Bracing_Start (LL+IM)		1172
LL+I_MINFZ_Bracing_End (LL+IM)		1173
LL+I_MaxMY_Bracing_Start (LL+IM)		1172
LL+I_MaxMY_Bracing_End (LL+IM)		1173
LL+I_MINMY_Bracing_Start (LL+IM)		1172
LL+I_MINMY_Bracing_End (LL+IM)		1173
1.25DC+1.5DW_Bracing Start		1172
1.25DC+1.5DW_Bracing End		1173
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172

Load Cases and Load Combination	Live Load Consider		**Flexural Resistance**		**Rating Factor for Flexure $RF_{flexural}$**			Shear Resistance									Rating Factor for Shear RF_{shear}
								Plastic Shear Force	Unstiffened Web			Stiffener Web				$\phi_v V_{n\_use}$	
			Flexural Resistance for Compression Flange $\phi_f F_{nc}$	Flexural Resistance for Tension Flange $\phi_f F_{nt}$	$RF=(\phi_c\phi_s\phi F_n-Y_{DC}f_{DC}-Y_{DW}f_{DW}-Y_{PL}f_{PL}-Y_{TU}f_{TU})/(Y_{LL}f_{LL})$				Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	Nominal Shear Resistance	Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	End Panel Nominal Shear Resistance	Interior Panel Nominal Shear Resistance		$RF=(\phi_c\phi_s\phi V_n-Y_{DC}V_{DC}-Y_{DW}V_{DW}-Y_{PL}V_{PL}-Y_{TU}V_{TU})/(Y_{LL}V_{LL})$
		Macro Node No	$\phi_f F_{nc}$	$\phi_f F_{nt}$	Top Flange	Bottom Flange		V_p	k	C	V_n	k	C	V_{n_end}	$V_{n\_interior}$		
								6.10.9.2-2	C6.10.9.2	6.10.9.3.2-4 to 6	6.10.9.2-1	C6.10.9.3.2-7	6.10.9.3.2-4 to 6	6.10.9.2-1	6.10.9.2-1		
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173															
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172															
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173															
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172															
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173															
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172															
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173															
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172															
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173															
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172															
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173															

		Macro Node No	$\phi_f F_{nc}$	$\phi_f F_{nt}$	$RF_{\_Top\_Flg}$	$RF_{\_Bottom\_Flg}$	$M_{c\ (Based\ on\ Fnc)}$	Vp	k	C	Vn	k	C	Vn_end	Vn_interior	V_n_final	$RF_{\_Shear}$
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	50.0	50.0	5182.71	100.00	8427.9	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	667.37
		1172	50.0	50.0	5182.71	100.00	8427.9	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	667.37
1.25DC+1.5DW+1.75LL+I_MinFX		1172	50.0	50.0	5182.71	100.00	8600.7	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	667.37
		1172	50.0	50.0	5182.71	100.00	8600.7	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	667.37
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	50.0	50.0	546.06	100.00	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	31.58
		1172	50.0	50.0	546.06	100.00	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	31.58
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	50.0	50.0	4.91	2.31	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	7.96
		1172	50.0	50.0	4.91	2.31	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	7.96
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	50.0	50.0	100.00	100.00	8607.3	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	240.20
		1172	50.0	50.0	100.00	100.00	8607.3	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	240.20
1.25DC+1.5DW+1.75LL+I_MinMY		1172	50.0	50.0	3.087	1.62	8571.2	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	10.21
		1172	50.0	50.0	3.09	1.623	8571.2	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	10.21

Load Cases and Load Combination	Live Load Consider		**Flexural Resistance**		**Rating Factor for Flexure $RF_{flexural}$**			Shear Resistance									Rating Factor for Shear RF_{shear}	
								Plastic Shear Force	Unstiffened Web			Stiffener Web				$\phi_v V_{n\_use}$		
			Flexural Resistance for Compression Flange $\phi_f F_{nc}$	Flexural Resistance for Tension Flange $\phi_f F_{nt}$	$RF=(\phi_c\phi_s\phi F_n-Y_{DC}f_{DC}-Y_{DW}f_{DW}-Y_{PL}f_{PL}-Y_{TU}f_{TU})/(Y_{LL}f_{LL})$				Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	Nominal Shear Resistance	Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	End Panel Nominal Shear Resistance	Interior Panel Nominal Shear Resistance		$RF=(\phi_c\phi_s\phi V_n-Y_{DC}V_{DC}-Y_{DW}V_{DW}-Y_{PL}V_{PL}-Y_{TU}V_{TU})/(Y_{LL}V_{LL})$	
		Macro Node No	$\phi_f F_{nc}$	$\phi_f F_{nt}$	Top Flange	Bottom Flange		V_p	k	C	V_n	k	C	V_{n_end}	$V_{n\_interior}$			
								6.10.9.2-2	C6.10.9.2	6.10.9.3.2-4 to 6	6.10.9.2-1	C6.10.9.3.2-7	6.10.9.3.2-4 to 6	6.10.9.2-1	6.10.9.2-1			
DC1		1172																
		1172																
DC2		1172																
		1172																
DW		1172																
		1172																
DC1+DC2+DW		1172																
		1172	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0

Load Cases and Load Combination	Live Load Consider		**Flexural Resistance**		**Rating Factor for Flexure $RF_{\_flexural}$**			Shear Resistance: Plastic Shear Force	Shear Resistance: Unstiffened Web			Shear Resistance: Stiffener Web				Shear Resistance: $\phi_v V_{n\_use}$	Rating Factor for Shear $RF_{\_shear}$	
			Flexural Resistance for Compression Flange $\phi_f F_{nc}$	Flexural Resistance for Tension Flange $\phi_f F_{nt}$	$RF=(\phi_c\phi_s\phi F_n-Y_{DC}f_{DC}-Y_{DW}f_{DW}-Y_{PL}f_{PL}-Y_{TU}f_{TU})/(Y_{LL}f_{LL})$				Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	Nominal Shear Resistance	Shear Buckling Coefficient	Ratio of the shear-bucking resistance to shear yield strength	End Panel Nominal Shear Resistance	Interior Panel Nominal Shear Resistance		$RF=(\phi_c\phi_s\phi V_n-Y_{DC}V_{DC}-Y_{DW}V_{DW}-Y_{PL}V_{PL}-Y_{TU}V_{TU})/(Y_{LL}V_{LL})$	
		Macro Node No	$\phi_f F_{nc}$	$\phi_f F_{nt}$	Top Flange	Bottom Flange		V_p	k	C	V_n	k	C	V_{n_end}	$V_{n\_interior}$			
								6.10.9.2-2	C6.10.9.2	6.10.9.3.2-4 to 6	6.10.9.2-1	C6.10.9.3.2-7	6.10.9.3.2-4 to 6	6.10.9.2-1	6.10.9.2-1			
			$\phi_f F_{nc}$	$\phi_f F_{nt}$	$LF1_{\_Top\_Flg}$	$LF1_{\_Bottom\_Flg}$	M_c (Based on Fnc)	Vp	k	C	Vn	k	C	Vn_end	Vn_interior	V_n_final	$LF1_{\_Shear}$	$LF1_{\_min}$
LL_MaxFX (LL)	HL-93	1172	50.0	50.0	9821.57	100.00	8427.9	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	1186.04	100.00
		1172	50.0	50.0	9821.57	100.00	8427.9	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	1186.04	100.00
LL_MINFX (LL)		1172	50.0	50.0	9821.57	100.00	8600.7	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	1186.04	100.00
		1172	50.0	50.0	9821.57	100.00	8600.7	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	1186.04	100.00
LL_MaxFZ (LL)		1172	50.0	50.0	1246.17	100.00	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	68.54	68.54
		1172	50.0	50.0	1246.17	100.00	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	68.54	68.54
LL_MINFZ (LL)		1172	50.0	50.0	10.50	5.09	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	16.98	5.09
		1172	50.0	50.0	10.50	5.09	8601.4	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	16.98	5.09
LL_MaxMY (LL)		1172	50.0	50.0	100.00	100.00	8607.3	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	864.64	100.00
		1172	50.0	50.0	100.00	100.00	8607.3	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	864.64	100.00
LL_MINMY (LL)		1172	50.0	50.0	7.08	3.88	8571.2	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	24.28	3.88
		1172	50.0	50.0	7.08	3.88	8571.2	1305.0	5.0	0.7	928.4	7.6	0.926	1209.1	1257.6	1257.6	24.28	3.88
					7.085	3.875											24.284	3.875

Load Cases and Load Combination	Live Load Consider	Macro Node No	D_n	A_{fn}	$\beta = 2D_nt_w/A_{fn}$	ρ	$R_h = (12+\beta(3\rho-\rho^3))/(12+2\beta)$
			6.10.1.10.1	6.10.1.10.1	6.10.1.10.1-2	6.10.1.10.1	6.10.1.10.1-1
			(in)	(in^2)			
DC1		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
DC2		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
DW		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
1.25DC1+1.25DC2+1.5DW		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL+I_MaxFX (LL+IM)	HL-93	1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL+I_MINFX (LL+IM)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL+I_MaxFZ (LL+IM)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL+I_MINFZ (LL+IM)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL+I_MaxMY (LL+IM)		1172	31.3	24.0	1.957	1.0	1.0
		1172	31.3	24.0	1.957	1.0	1.0
LL+I_MINMY (LL+IM)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0

DC1_Bracing Start		1172
DC1_Bracing End		1173
DC2_Bracing Start		1172
DC2_Bracing End		1173
DW_Bracing Start		1172
DW_Bracing End		1173
LL+I_MaxFX_Bracing Start (LL+IM)	HL-93	1172
LL+I_MaxFX_Bracing End (LL+IM)		1173
LL+I_MINFX_Bracing_Start (LL+IM)		1172
LL+I_MINFX_Bracing_End (LL+IM)		1173
LL+I_MaxFZ_Bracing_Start (LL+IM)		1172
LL+I_MaxFZ_Bracing_End (LL+IM)		1173
LL+I_MINFZ_Bracing_Start (LL+IM)		1172
LL+I_MINFZ_Bracing_End (LL+IM)		1173
LL+I_MaxMY_Bracing_Start (LL+IM)		1172
LL+I_MaxMY_Bracing_End (LL+IM)		1173
LL+I_MINMY_Bracing_Start (LL+IM)		1172
LL+I_MINMY_Bracing_End (LL+IM)		1173
1.25DC+1.5DW_Bracing Start		1172
1.25DC+1.5DW_Bracing End		1173
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_Start		1172

Load Cases and Load Combination	Live Load Consider	Macro Node No	D_n	A_{fn}	$\beta = 2D_nt_w/A_{fn}$	ρ	$R_h = (12+\beta(3\rho-\rho^3))/(12+2\beta)$
			6.10.1.10.1	6.10.1.10.1	6.10.1.10.1-2	6.10.1.10.1	6.10.1.10.1-1
1.25DC+1.5DW+1.75LL+I_MaxFX_Bracing_End	HL-93	1173					
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_Start		1172					
1.25DC+1.5DW+1.75LL+I_MinFX_Bracing_End		1173					
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_Start		1172					
1.25DC+1.5DW+1.75LL+I_MaxFZ_Bracing_End		1173					
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing Start		1172					
1.25DC+1.5DW+1.75LL+I_MinFZ_Bracing End		1173					
1.25DC+1.5DW+1.75LL+I_MaxMY_Bracing Start		1172					
1.25DC+1.5DW+1.75PL+I_MaxMY_Bracing End		1173					
1.25DC+1.5DW+1.75PL+I_MinMY_Bracing Start		1172					
1.25DC+1.5DW+1.75LL+I_MinMY_Bracing End		1173					

Load Cases and Load Combination	Live Load Consider	Macro Node No	D_n	A_{fn}	$\beta = 2D_nt_w/A_{fn}$	ρ	R_h
1.25DC+1.5DW+1.75LL+I_MaxFX	HL-93 for Inventory Rating	1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MinFX		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MaxFZ		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MinFZ		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
1.25DC+1.5DW+1.2Tu+1.75LL+I_MaxMY		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
1.25DC+1.5DW+1.75LL+I_MinMY		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0

Load Cases and Load Combination	Live Load Consider	Macro Node No	D_n	A_{fn}	$\beta = 2D_nt_w/A_{fn}$	ρ	$R_h = (12+\beta(3\rho-\rho^3))/(12+2\beta)$
			6.10.1.10.1	6.10.1.10.1	6.10.1.10.1-2	6.10.1.10.1	6.10.1.10.1-1
DC1		1172					
		1172					
DC2		1172					
		1172					
DW		1172					
		1172					
DC1+DC2+DW		1172					
		1172					

Load Cases and Load Combination	Live Load Consider	Macro Node No	D_n	A_{fn}	$\beta = 2D_nt_w/A_{fn}$	ρ	$R_h = (12+\beta(3\rho-\rho^3))/(12+2\beta)$
			6.10.1.10.1	6.10.1.10.1	6.10.1.10.1-2	6.10.1.10.1	6.10.1.10.1-1
			D_n	A_{fn}	$\beta = 2D_nt_w/A_{fn}$	ρ	R_h
LL_MaxFX (LL)	HL-93	1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL_MINFX (LL)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL_MaxFZ (LL)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL_MINFZ (LL)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL_MaxMY (LL)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0
LL_MINMY (LL)		1172	28.7	28.0	1.537	1.0	1.0
		1172	28.7	28.0	1.537	1.0	1.0

Appendix 3

Redundancy Analysis Comparisons

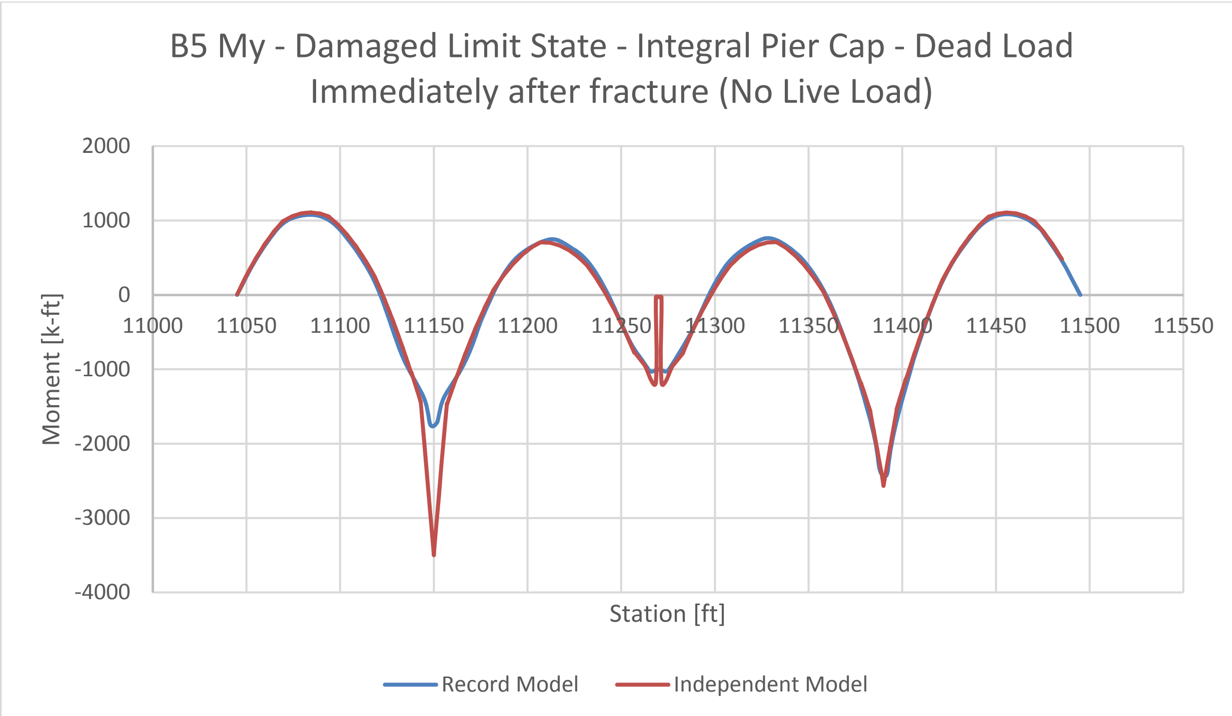


Figure 1: Moment in Girder B-5 at damaged limit state (pier 2 cap beam) immediately after fracture

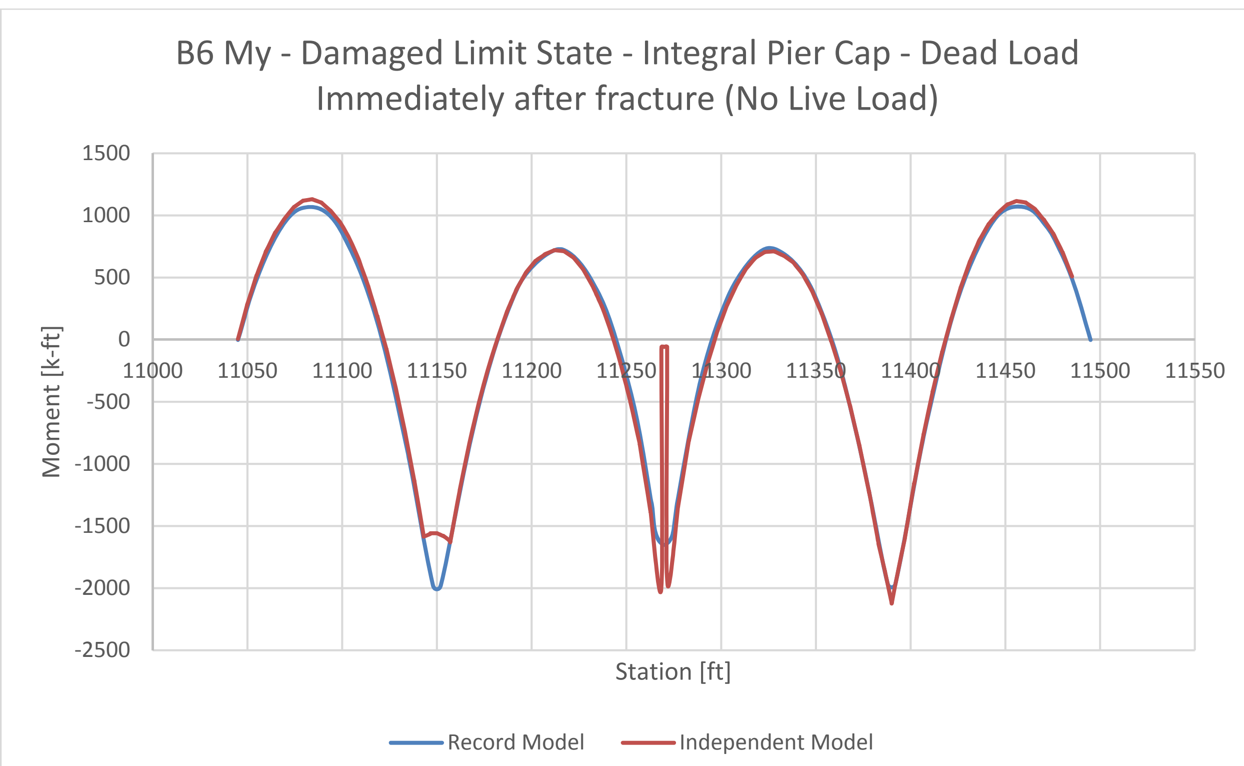


Figure 2: Moment in Girder B-6 at damaged limit state (pier 2 cap beam) immediately after fracture

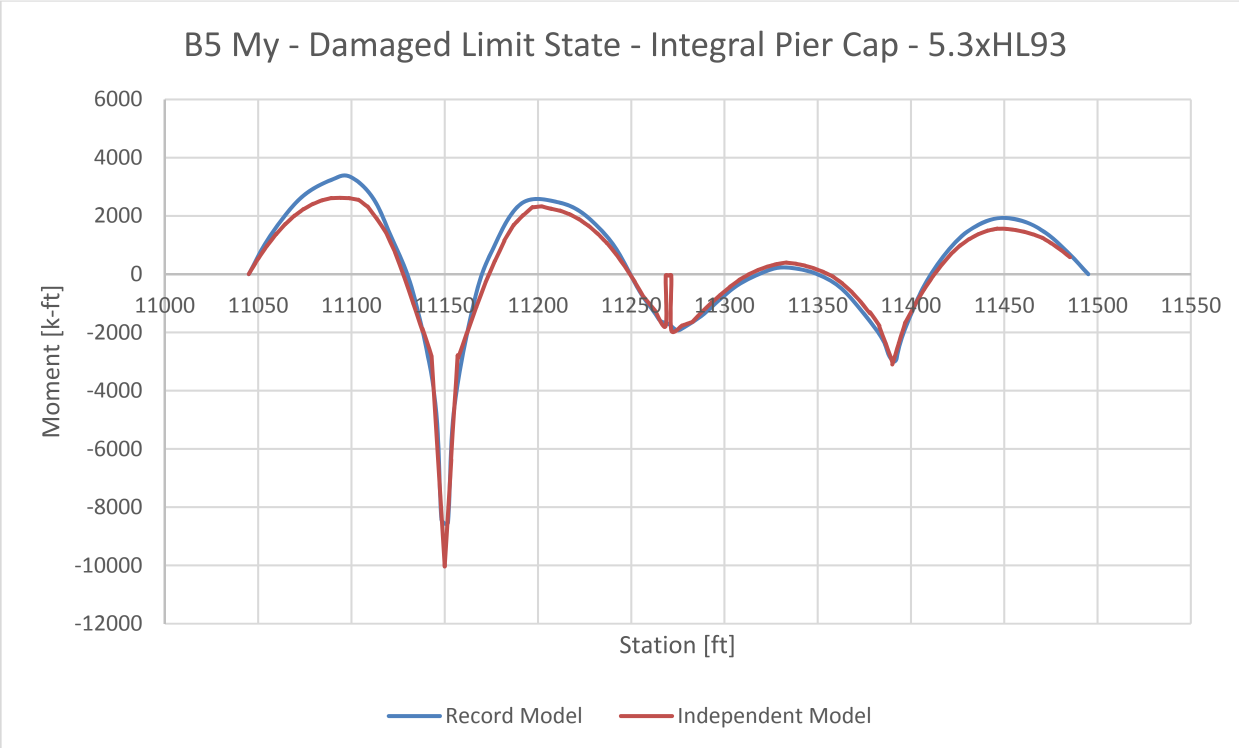


Figure 3: Moment in girder B-5 at damaged limit state (pier 2 cap beam) 5.3xHL93

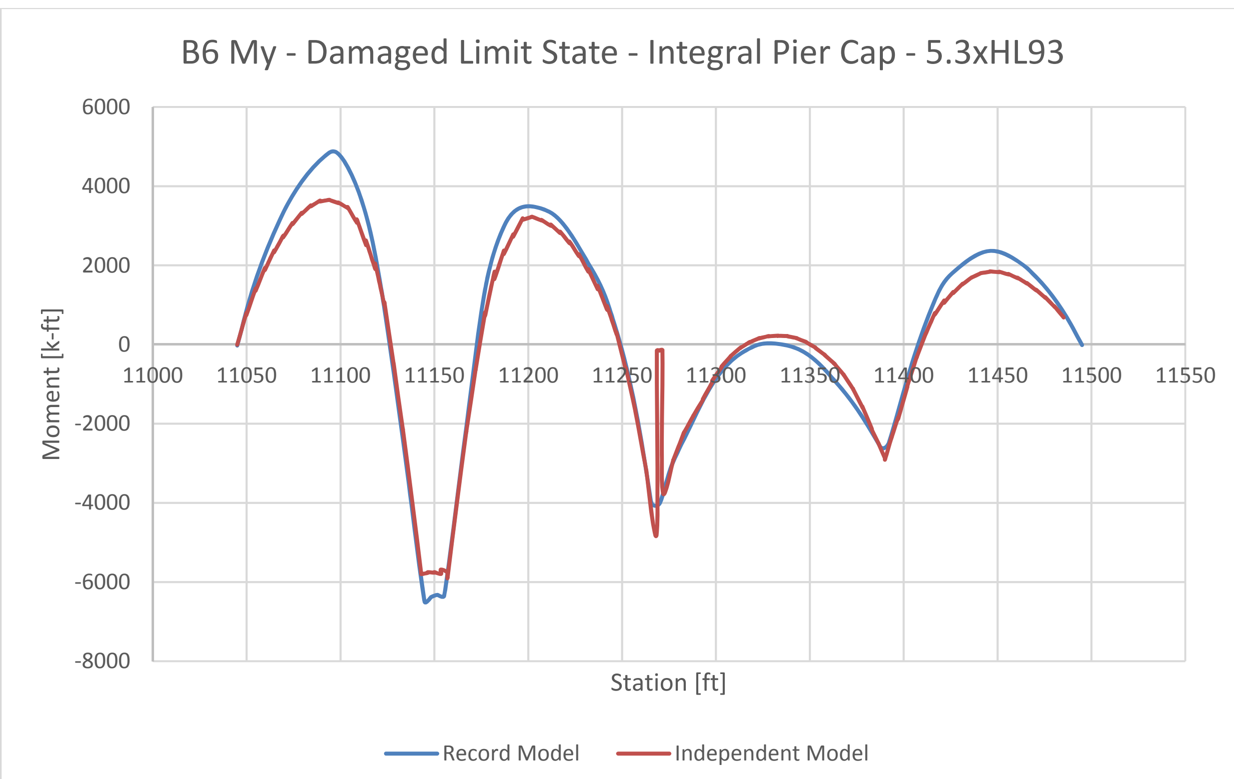


Figure 4: Moment in girder B-6 at damaged limit state (pier 2 cap beam) 5.3xHL93

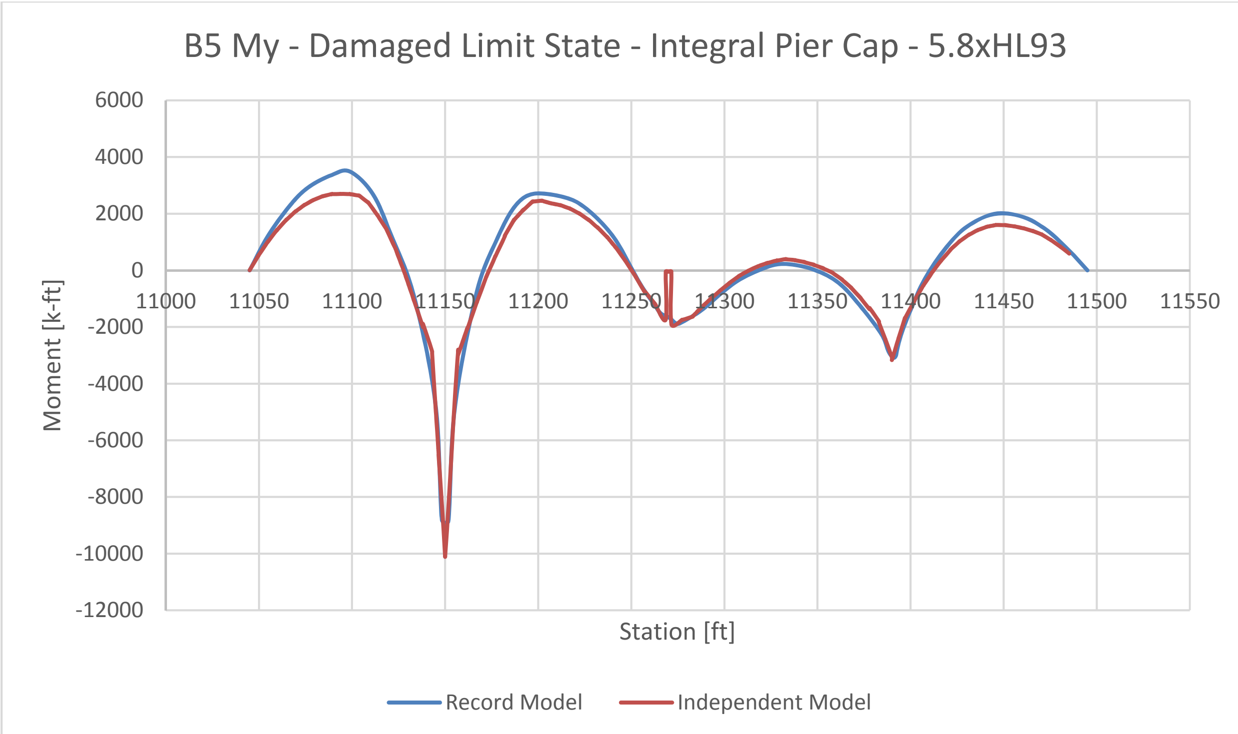


Figure 5: Moment in girder B-5 at damaged limit state (pier 2 cap beam) 5.8xHL93

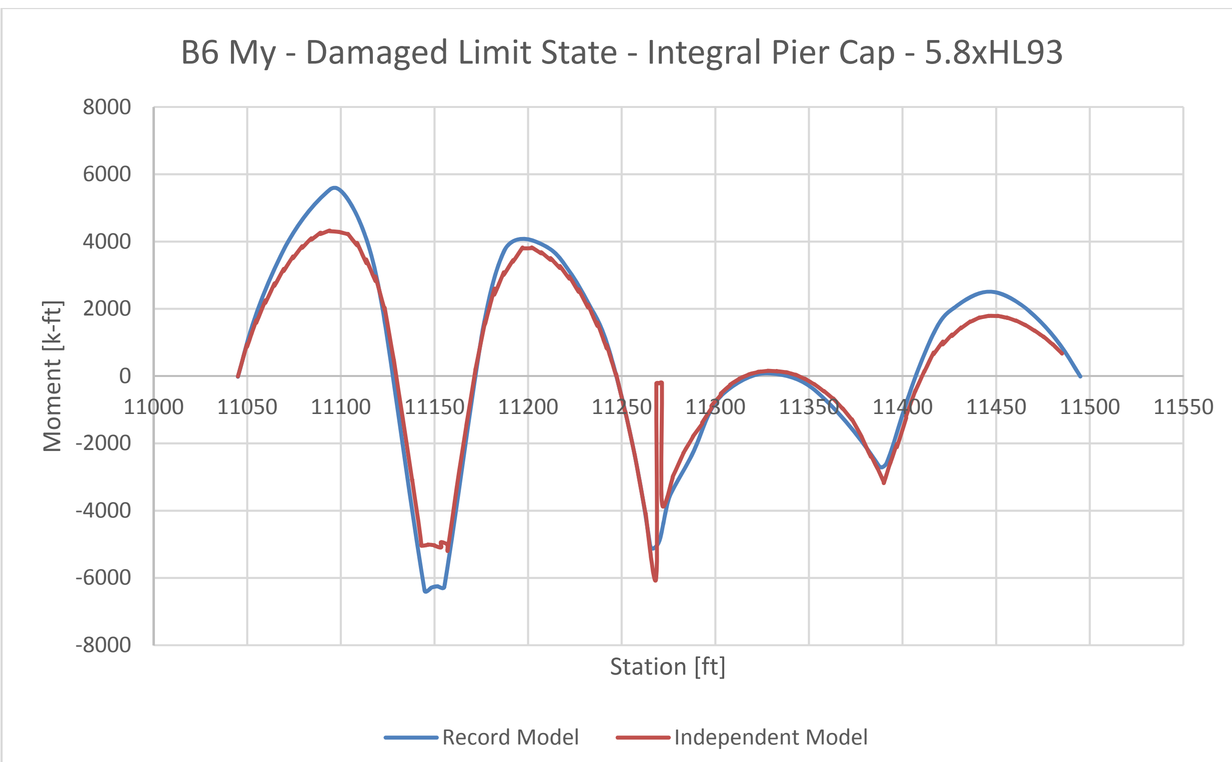


Figure 6: Moment in girder B-6 at damaged limit state (pier 2 cap beam) 5.8xHL93

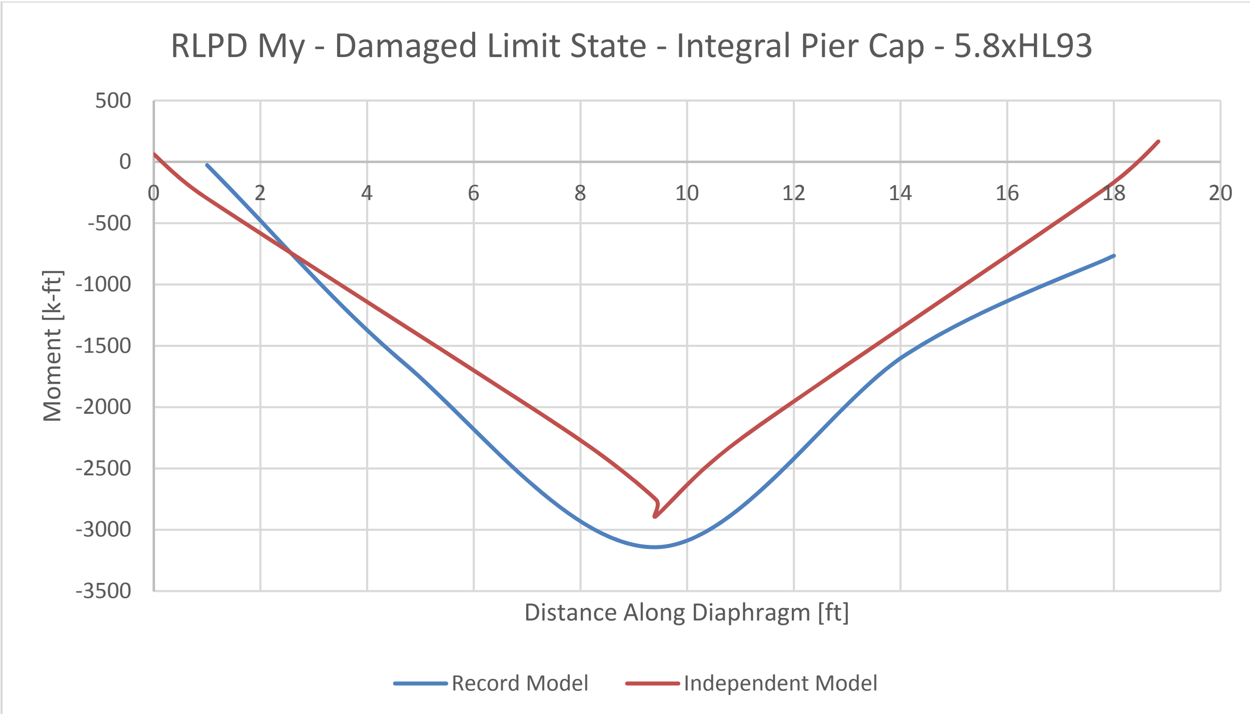


Figure 7: Moment in Redundant Load Path Diaphragm at damaged limit state (pier 2 cap beam) 5.8xHL93

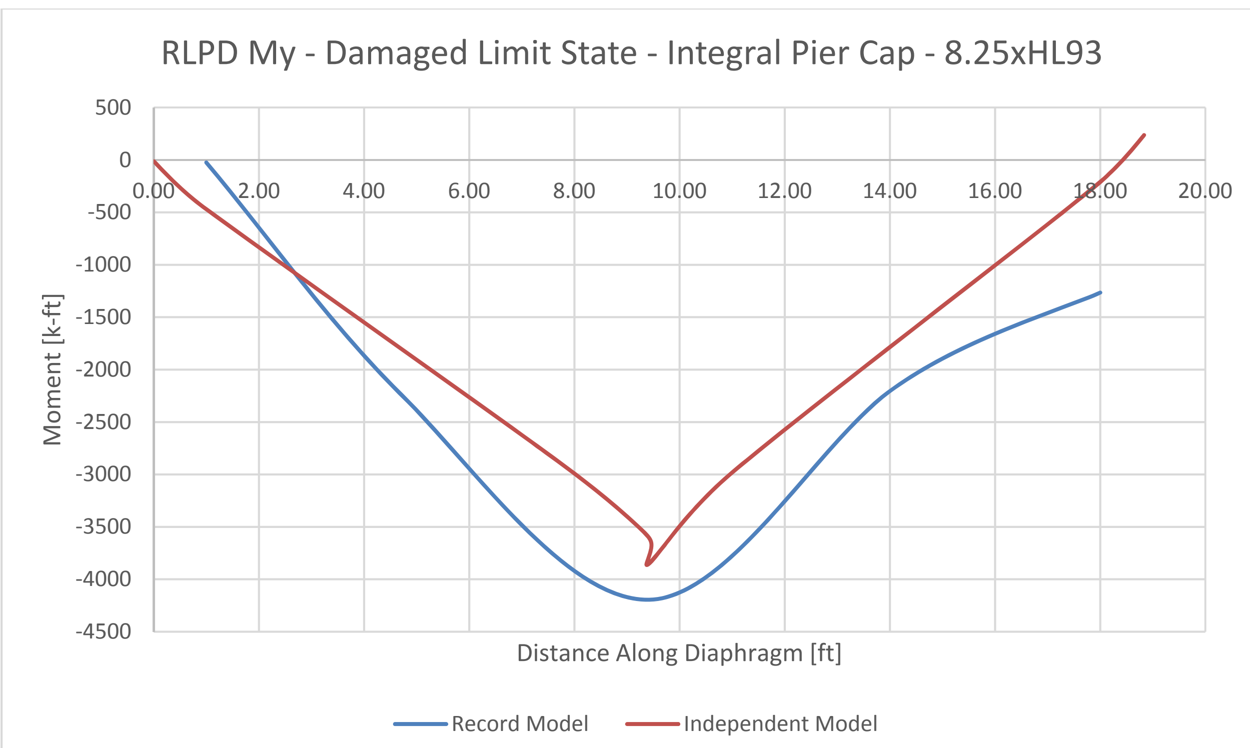


Figure 8: Moment in Redundant Load Path Diaphragm at damaged limit state (pier 2 cap beam) 8.25xHL93

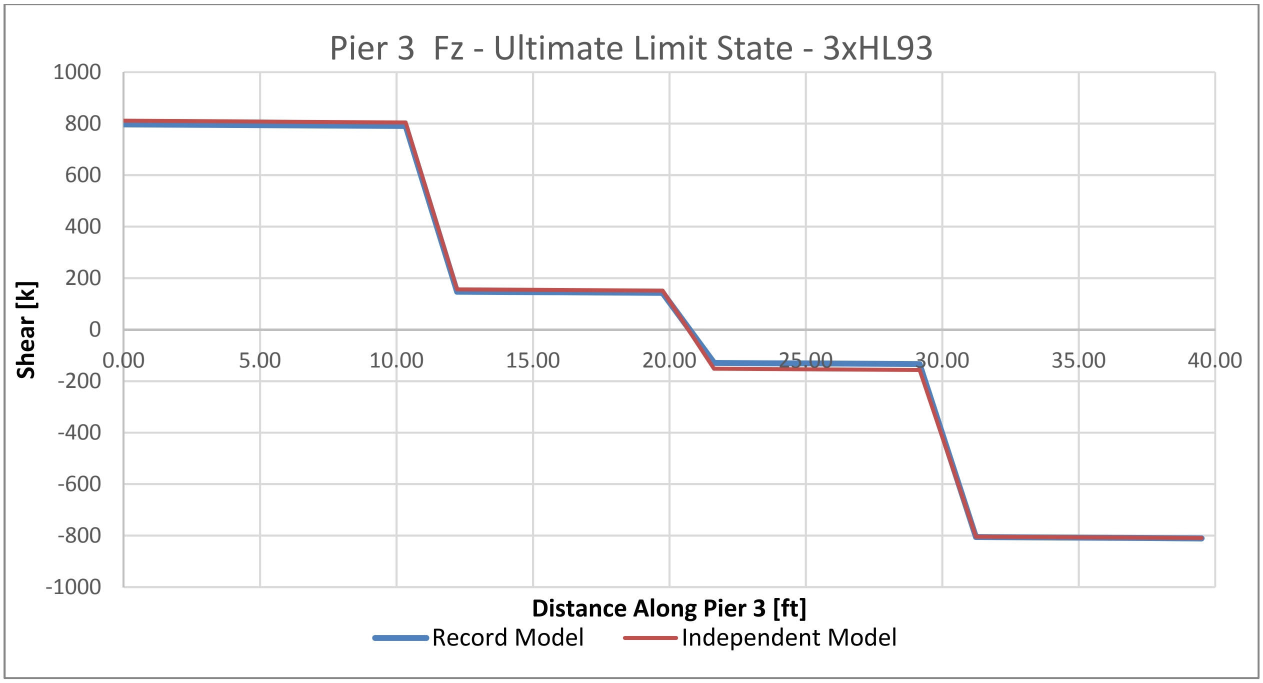


Figure 9: Shear in Pier 3 at ultimate limit state. 3xHL93

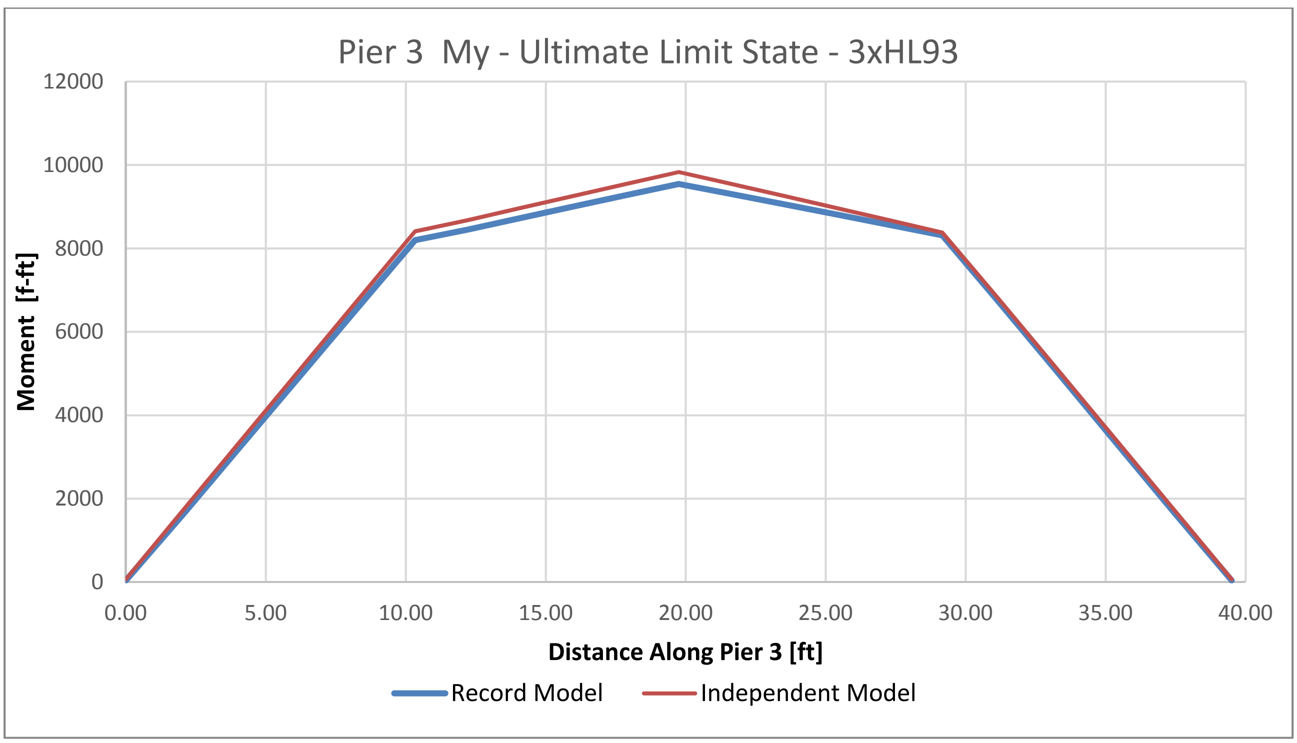


Figure 10: Moment in Pier 3 at ultimate limit state. 3xHL93

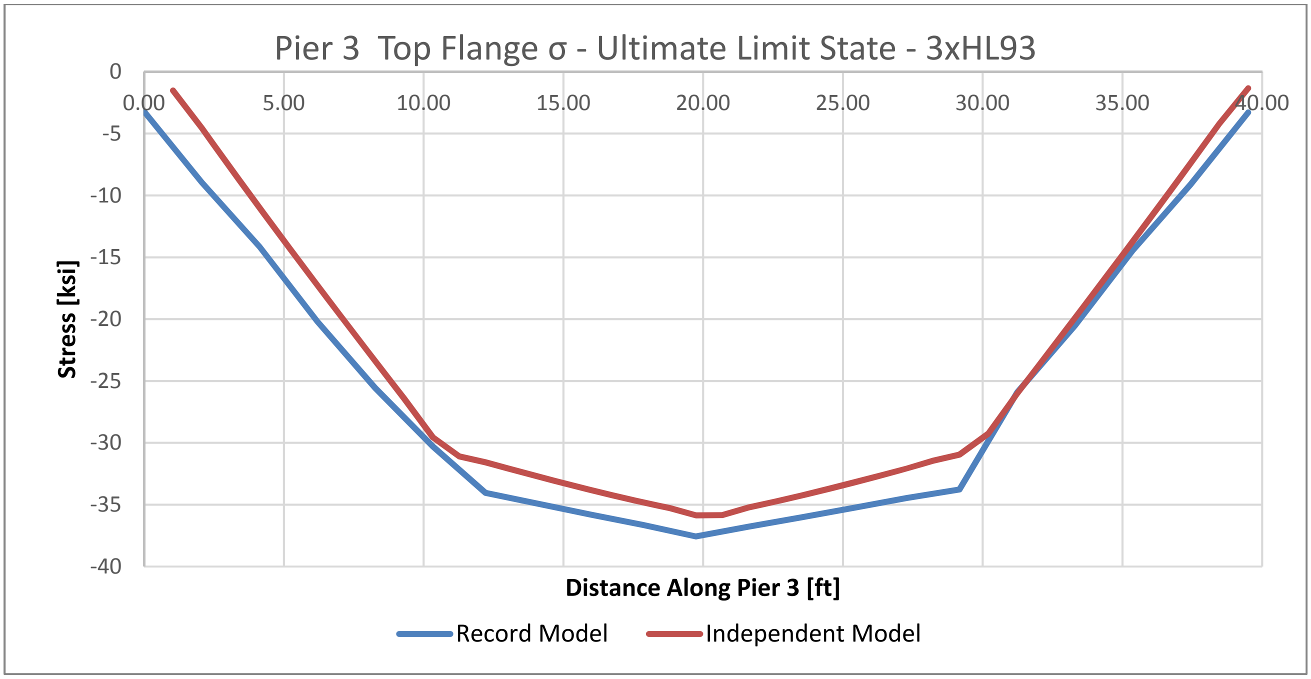


Figure 11: Stress in Pier 3 Top Flange at ultimate limit state. 3xHL93

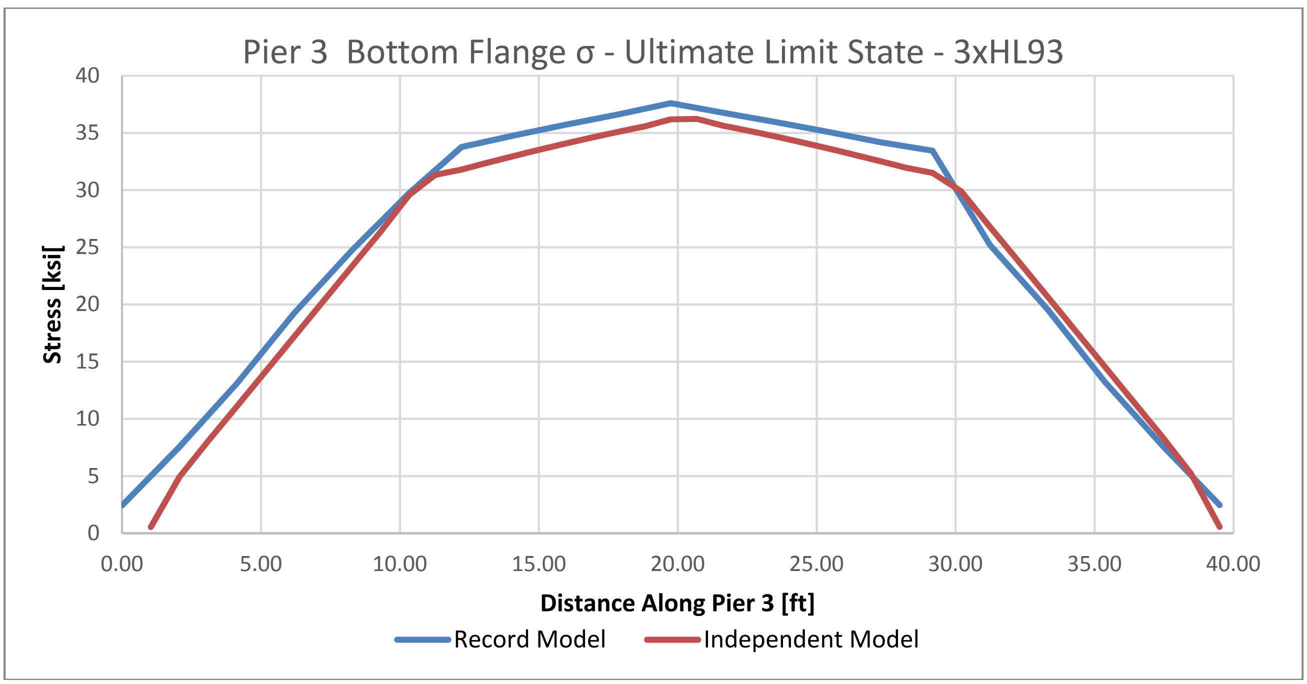


Figure 12: Stress in Pier 3 Bottom Flange at ultimate limit state. 3xHL93

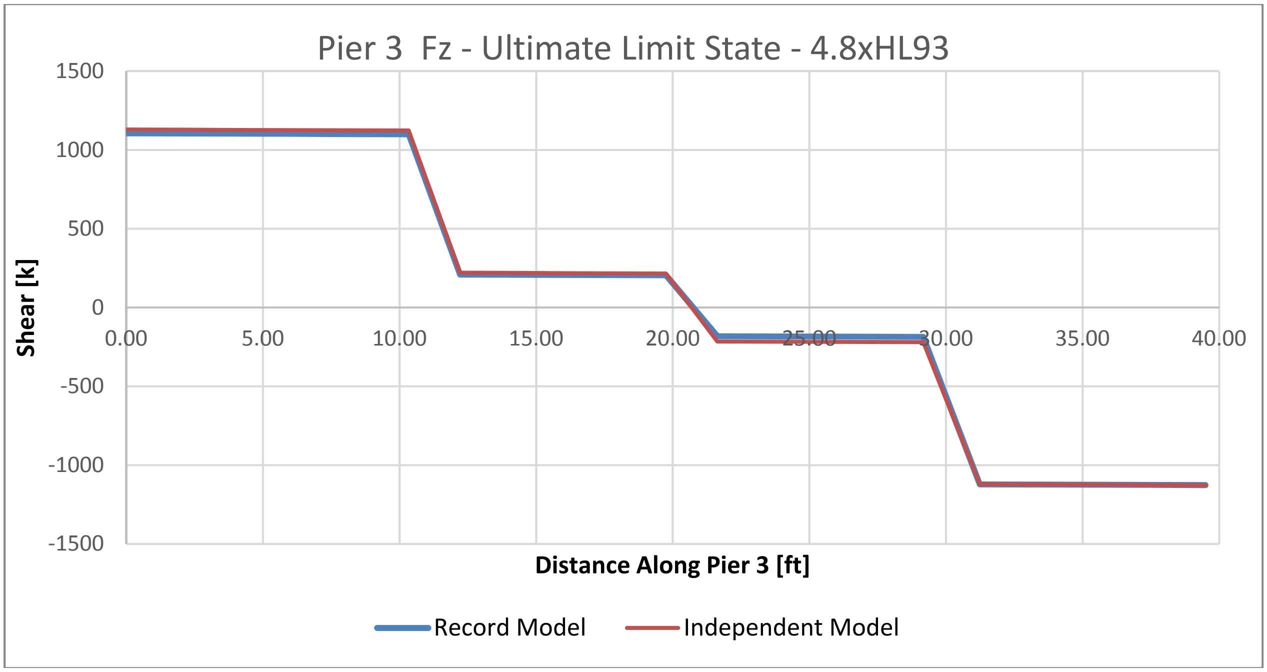


Figure 13: Shear in Pier 3 at ultimate limit state. 4.8xHL93

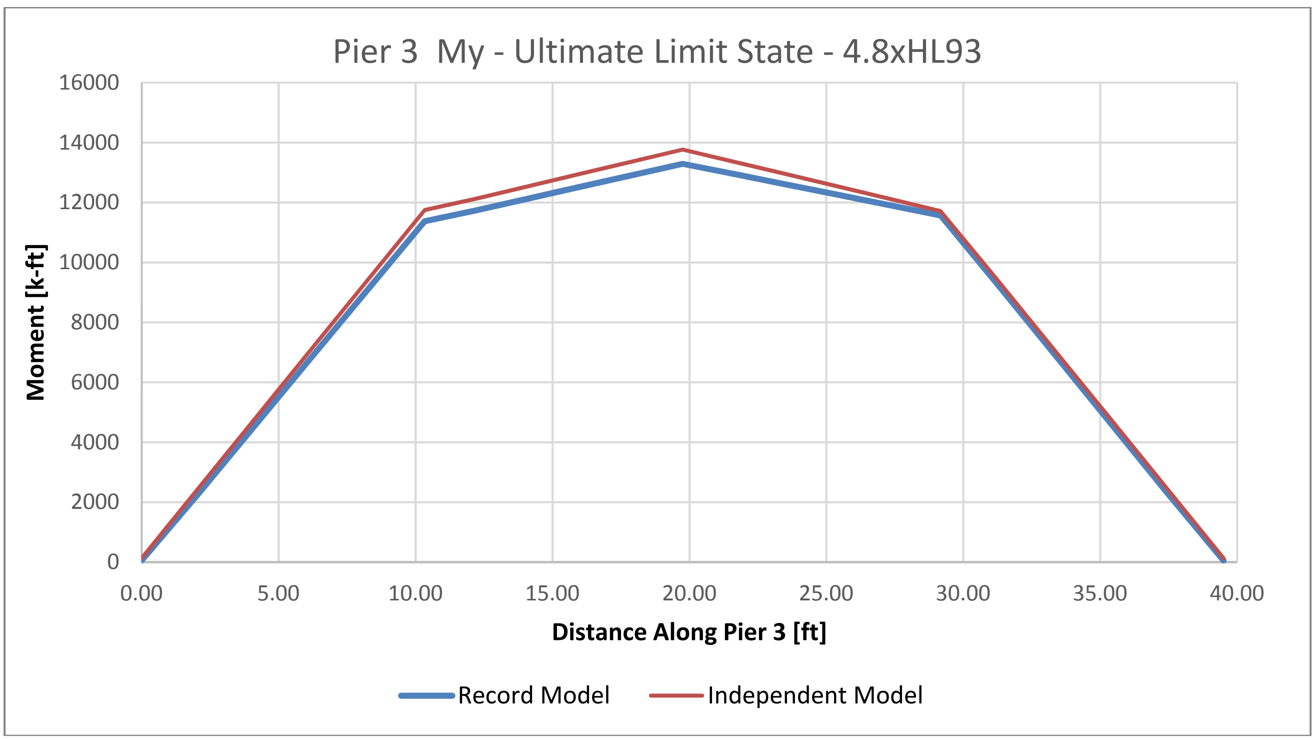


Figure 14: Moment in Pier 3 at ultimate limit state. 4.8xHL93

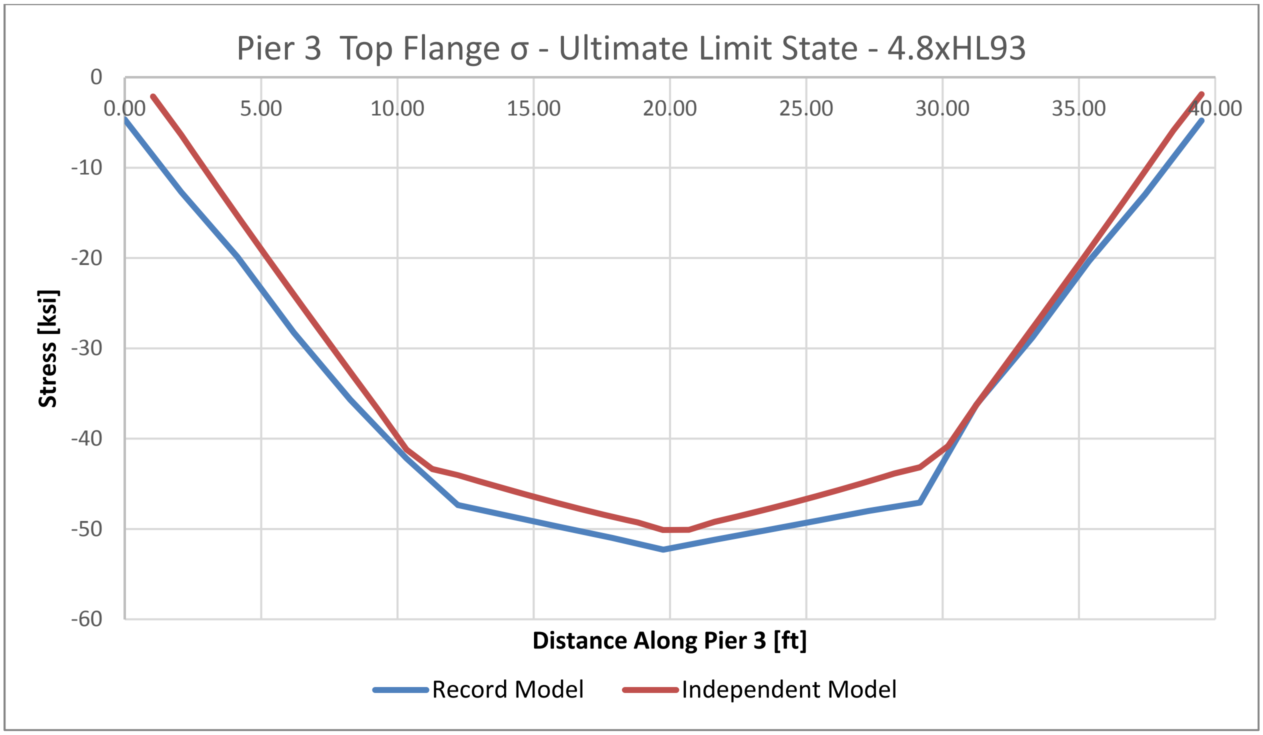


Figure 15: Stress in Pier 3 Top Flange at ultimate limit state. 4.8xHL93

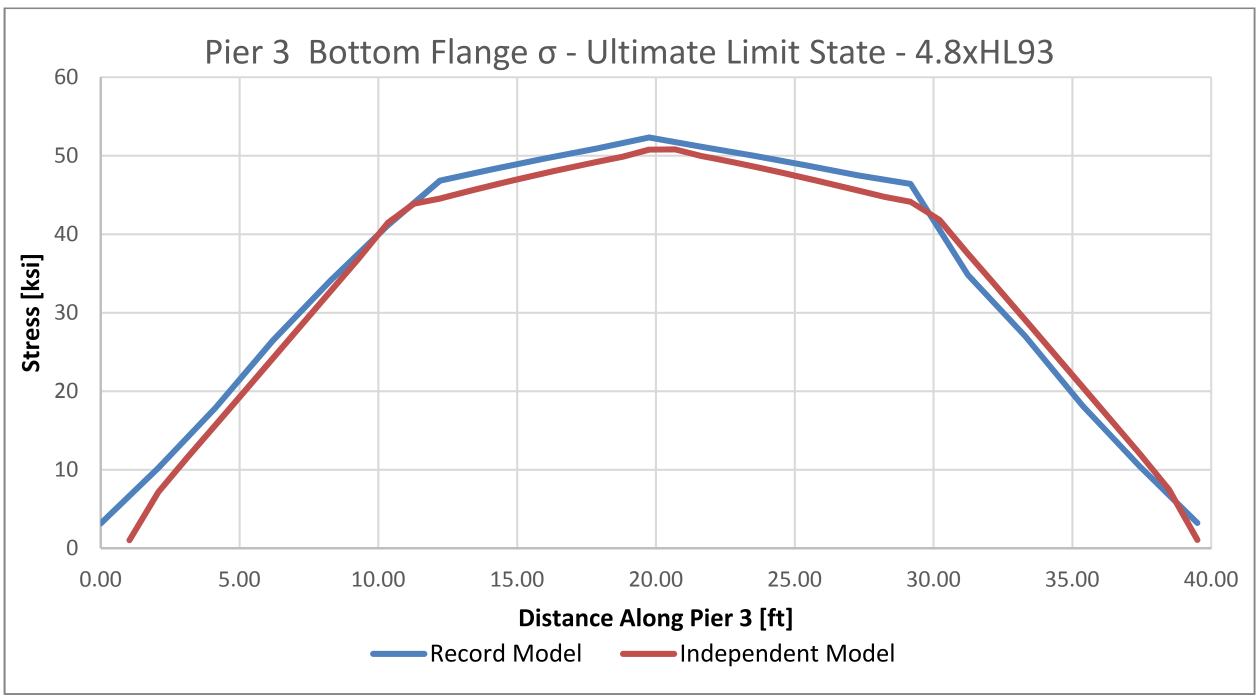


Figure 16: Stress in Pier 3 Bottom Flange at ultimate limit state. 4.8xHL93

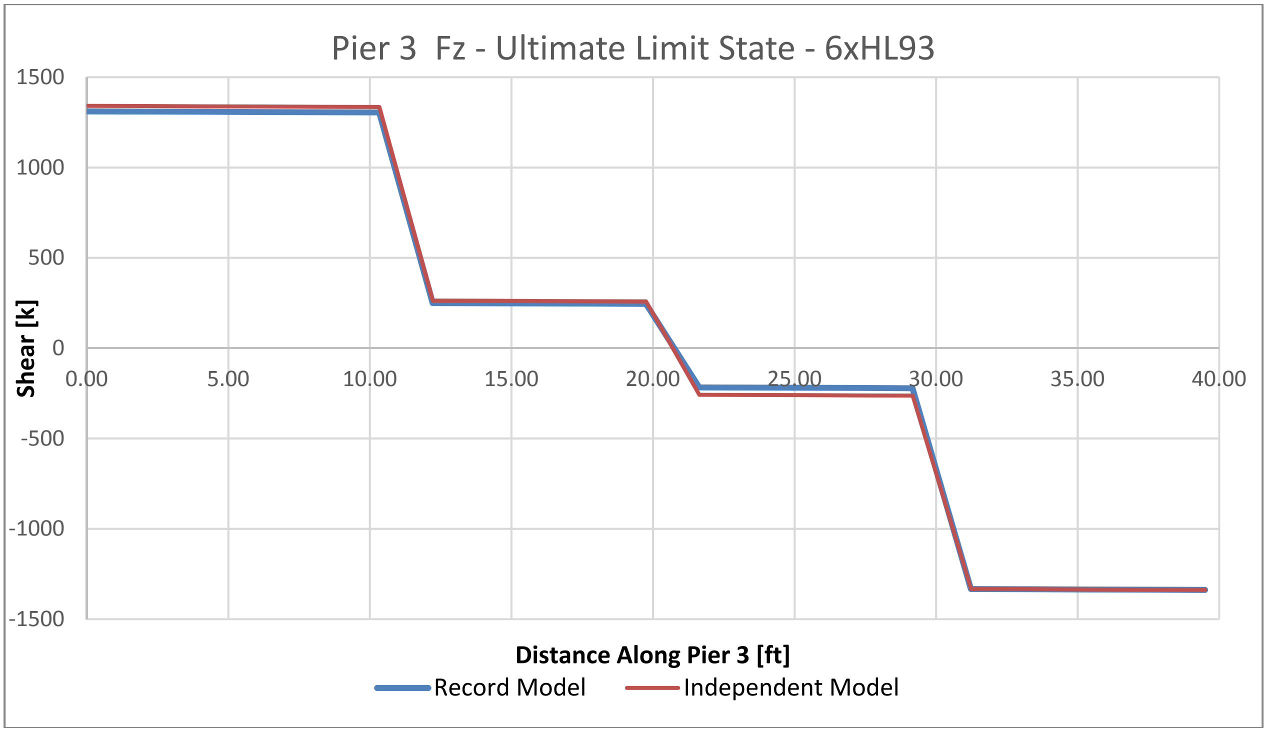


Figure 17: Shear in Pier 3 at ultimate limit state. 6xHL93

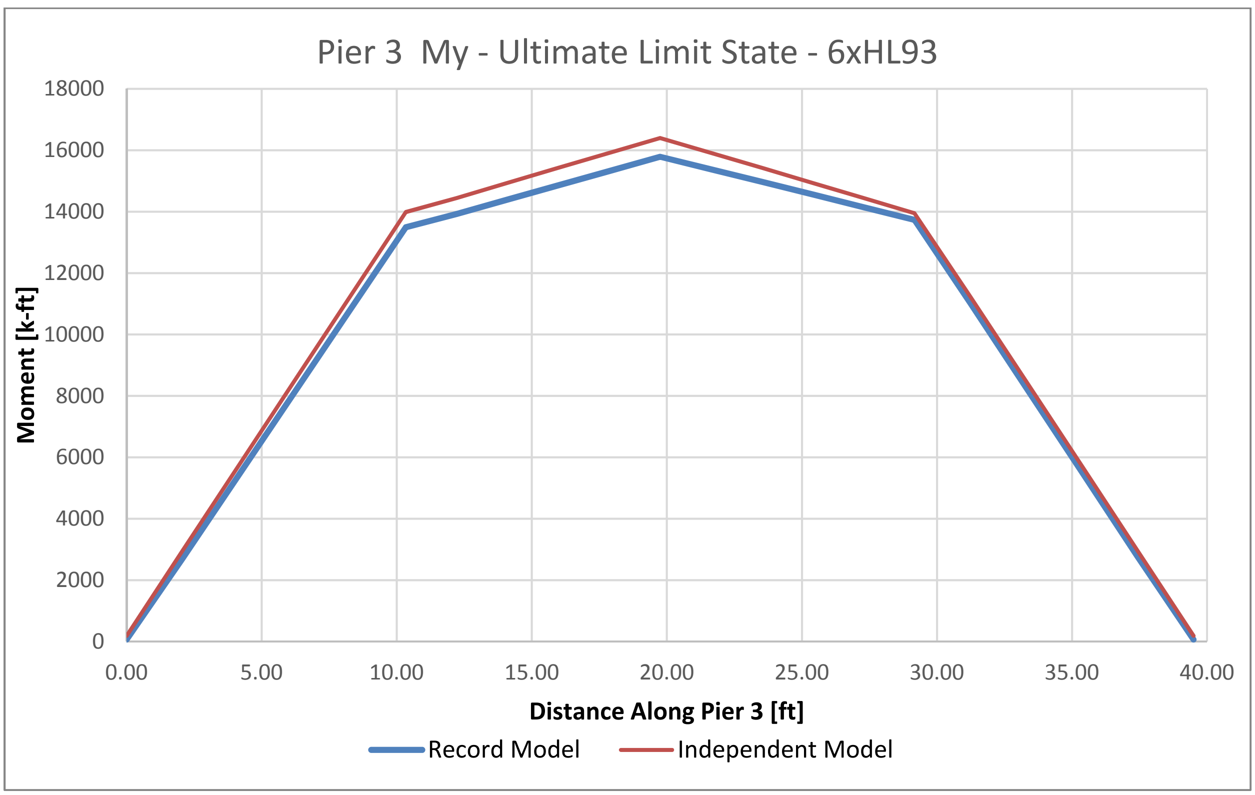


Figure 18: Moment in Pier 3 at ultimate limit state. 6xHL93

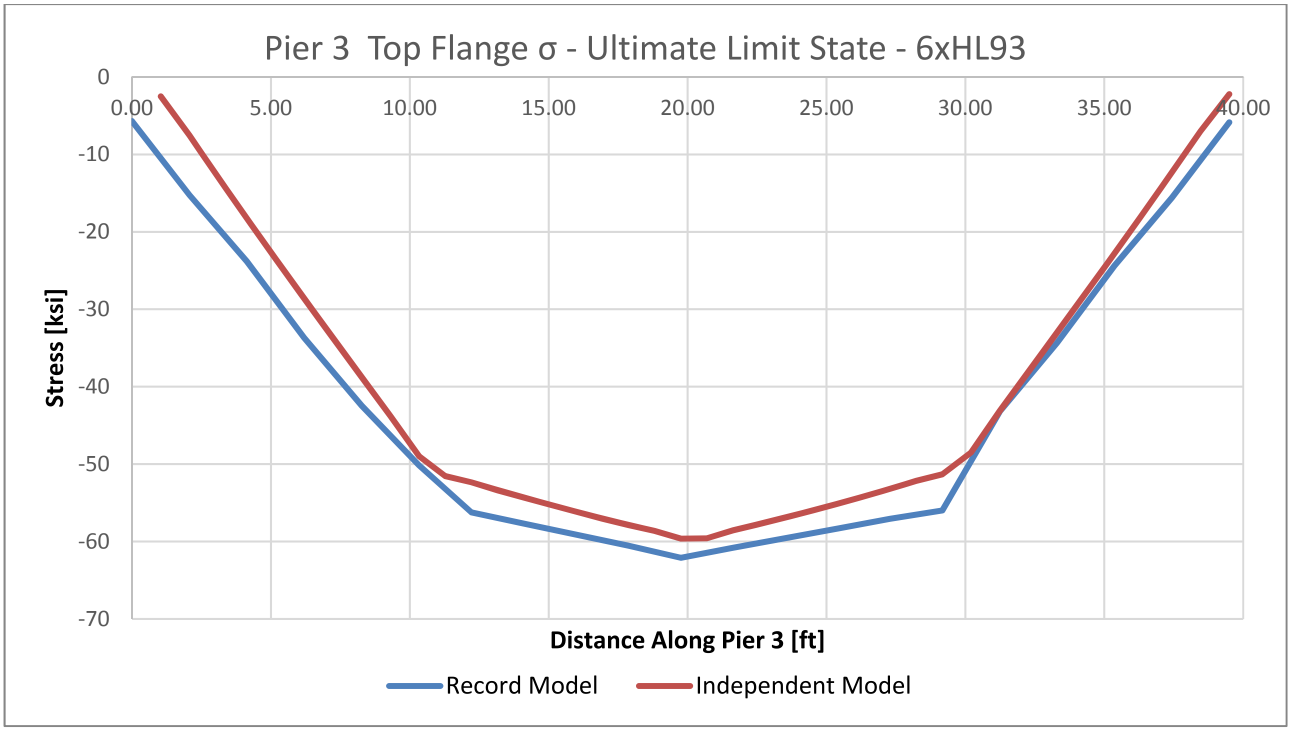


Figure 19: Stress in Pier 3 Top Flange at ultimate limit state. 6xHL93

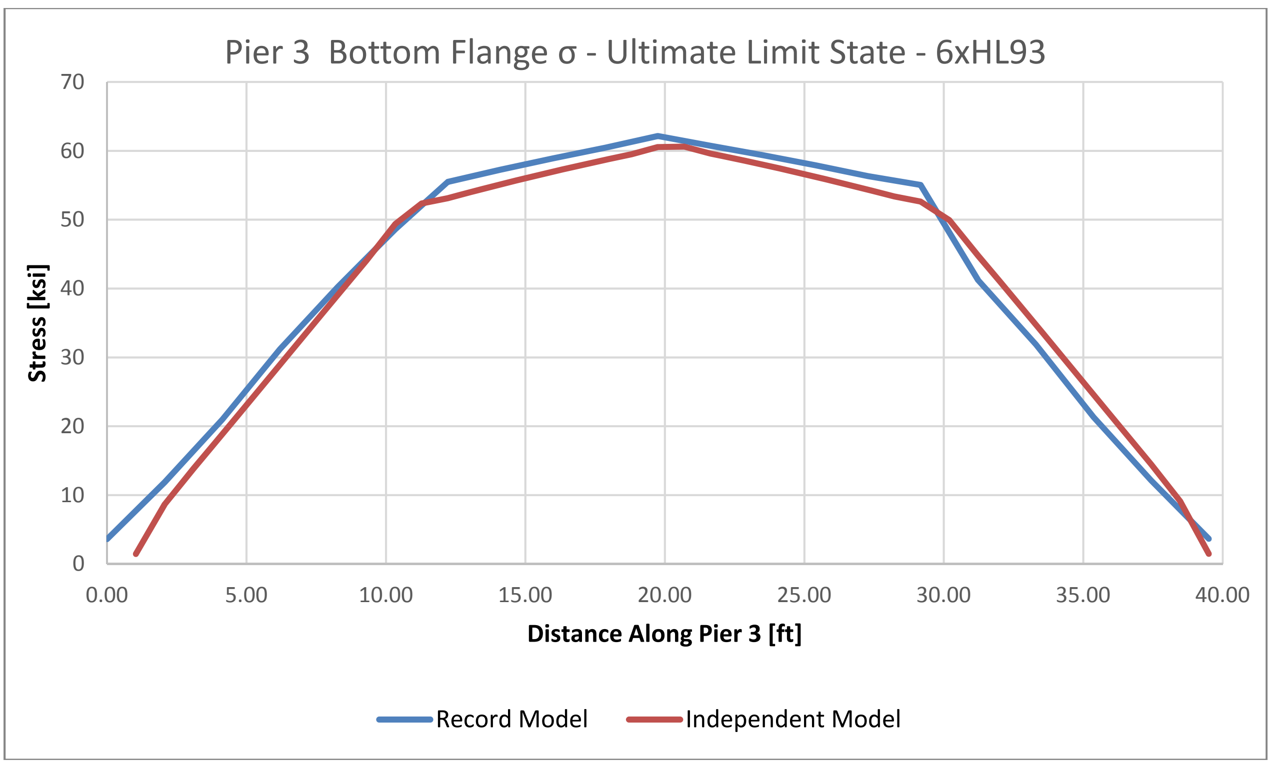


Figure 20: Stress in Pier 3 Bottom Flange at ultimate limit state. 6xHL93

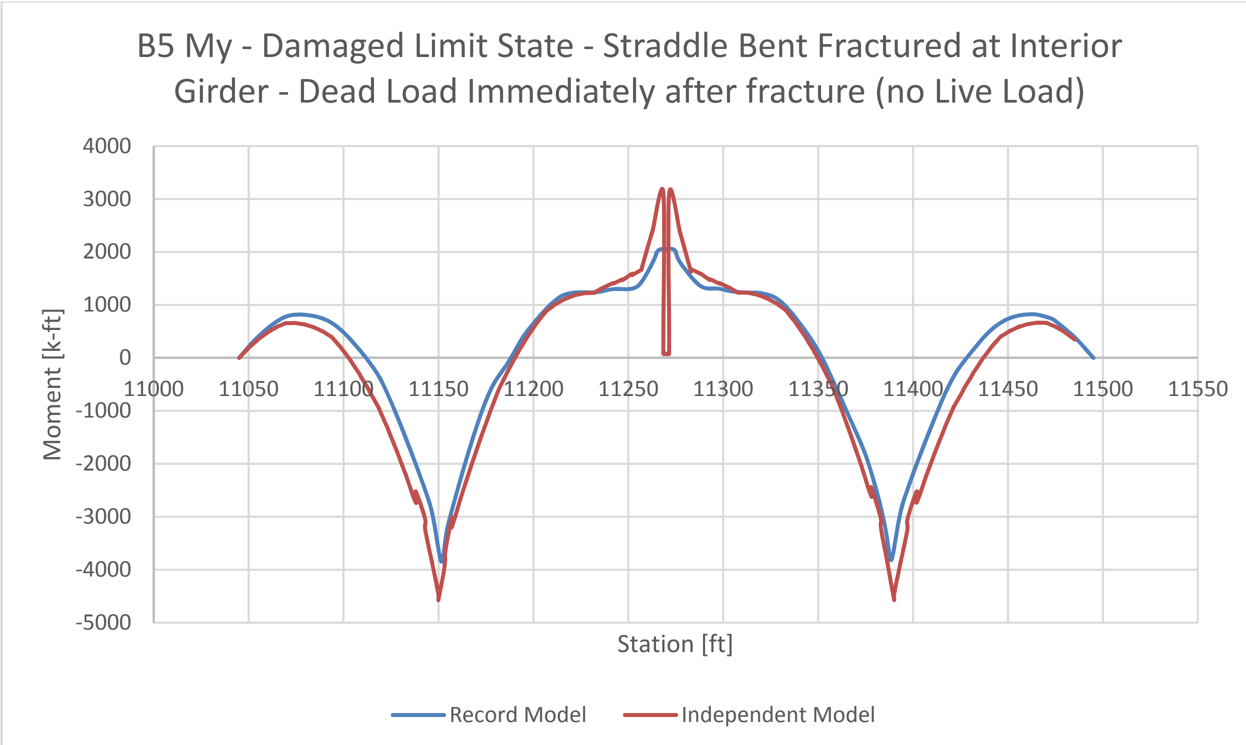


Figure 21: Moment in girder B-5 at damaged limit state (pier 3 at interior girder) immediately after fracture

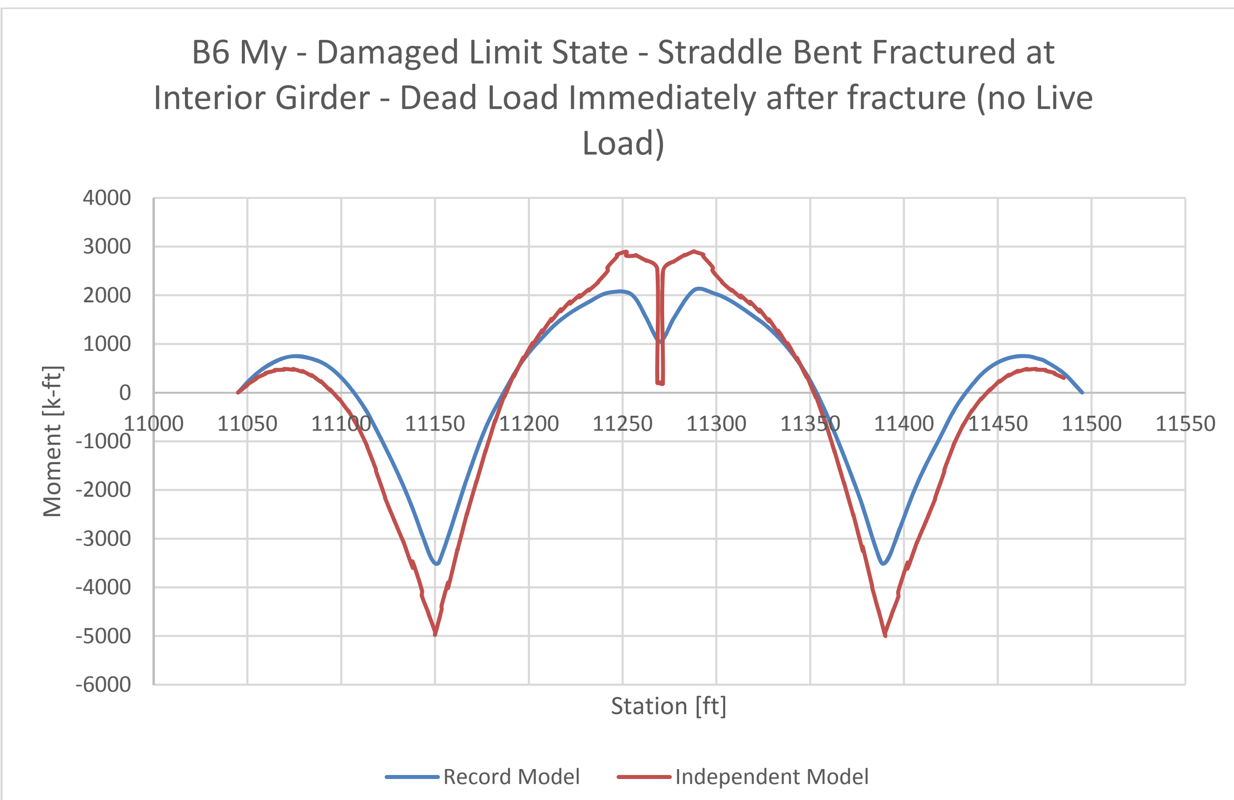


Figure 22: Moment in girder B-6 at damaged limit state (pier 3 at interior girder) immediately after fracture

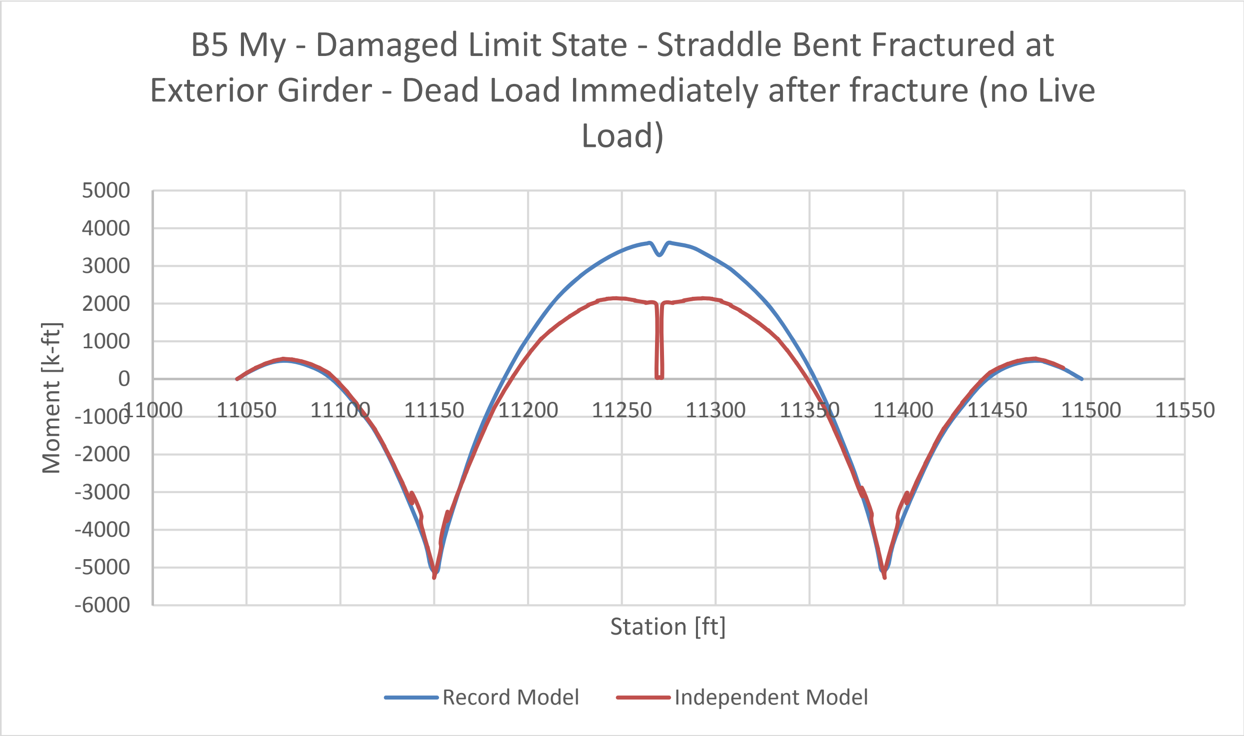


Figure 23: Moment in girder B-5 at damaged limit state (pier 3 at exterior girder) immediately after fracture

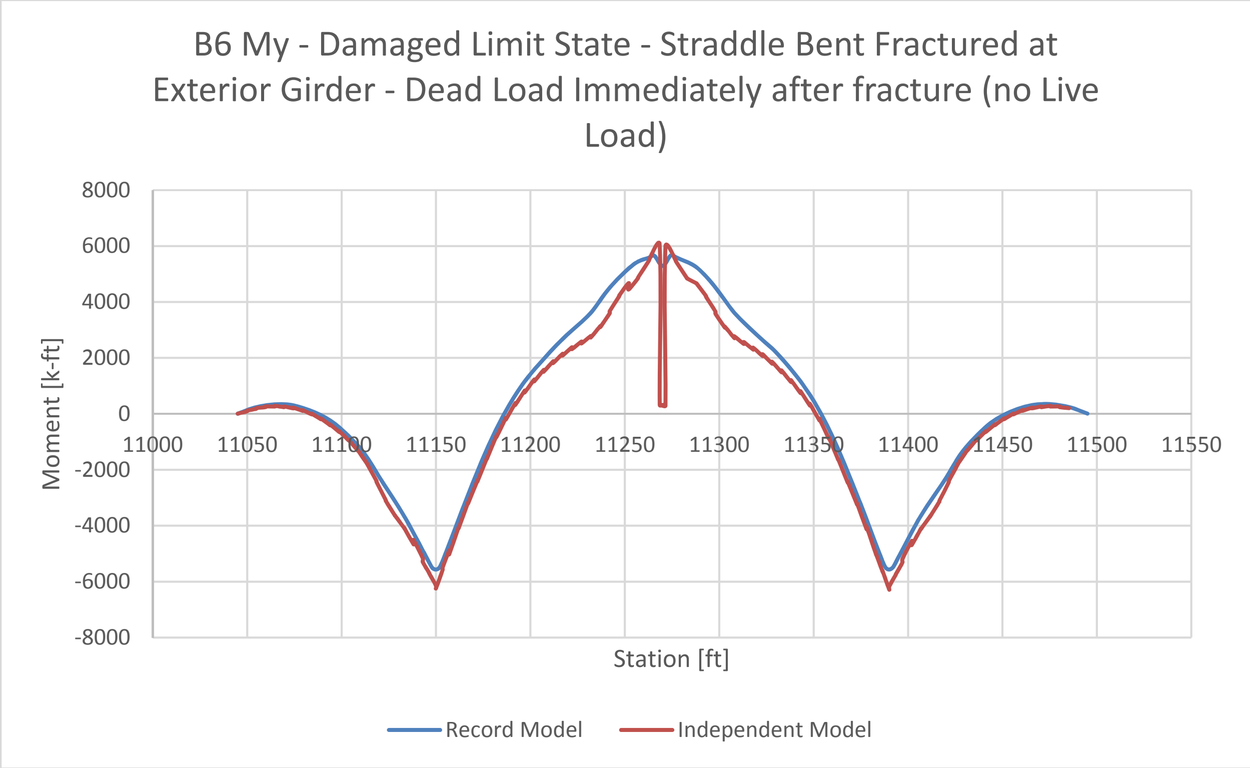


Figure 24: Moment in girder B-6 at damaged limit state (pier 3 at exterior girder) immediately after fracture

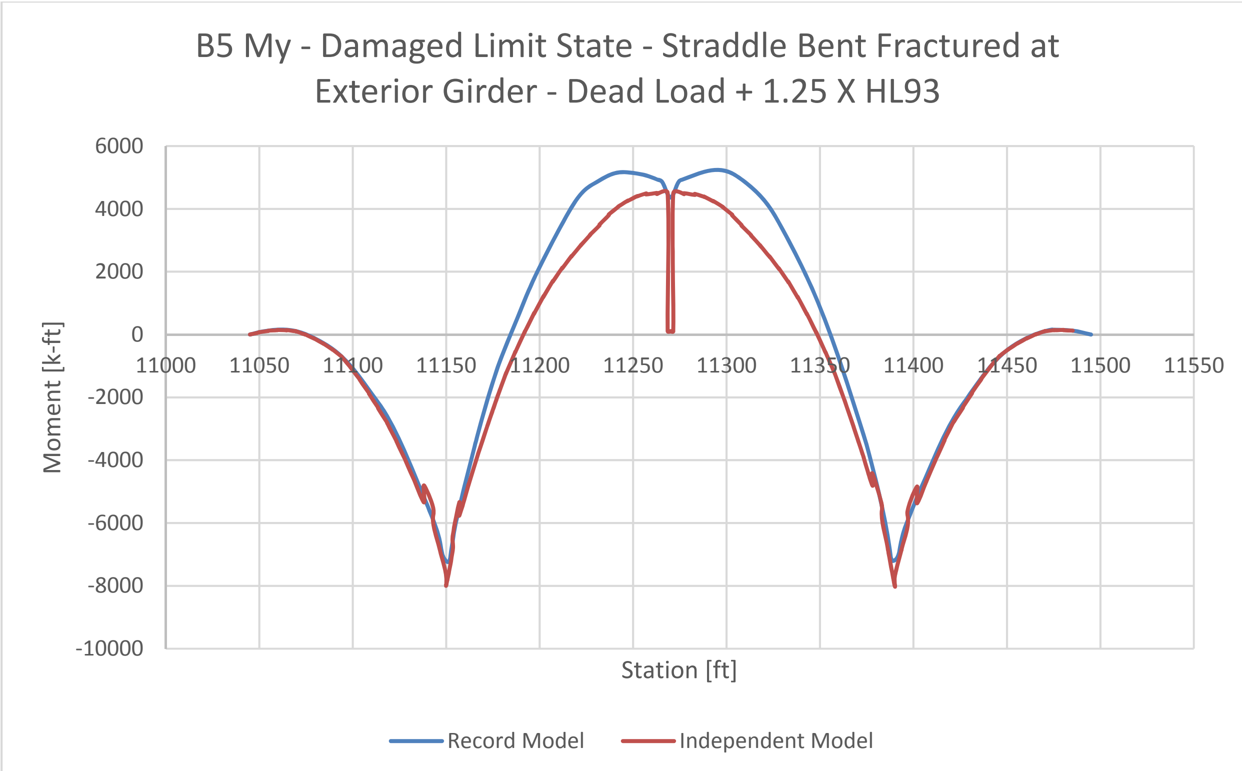


Figure 25: Moment in girder B-5 at damaged limit state (pier 3 at exterior girder) 1.25xHL93

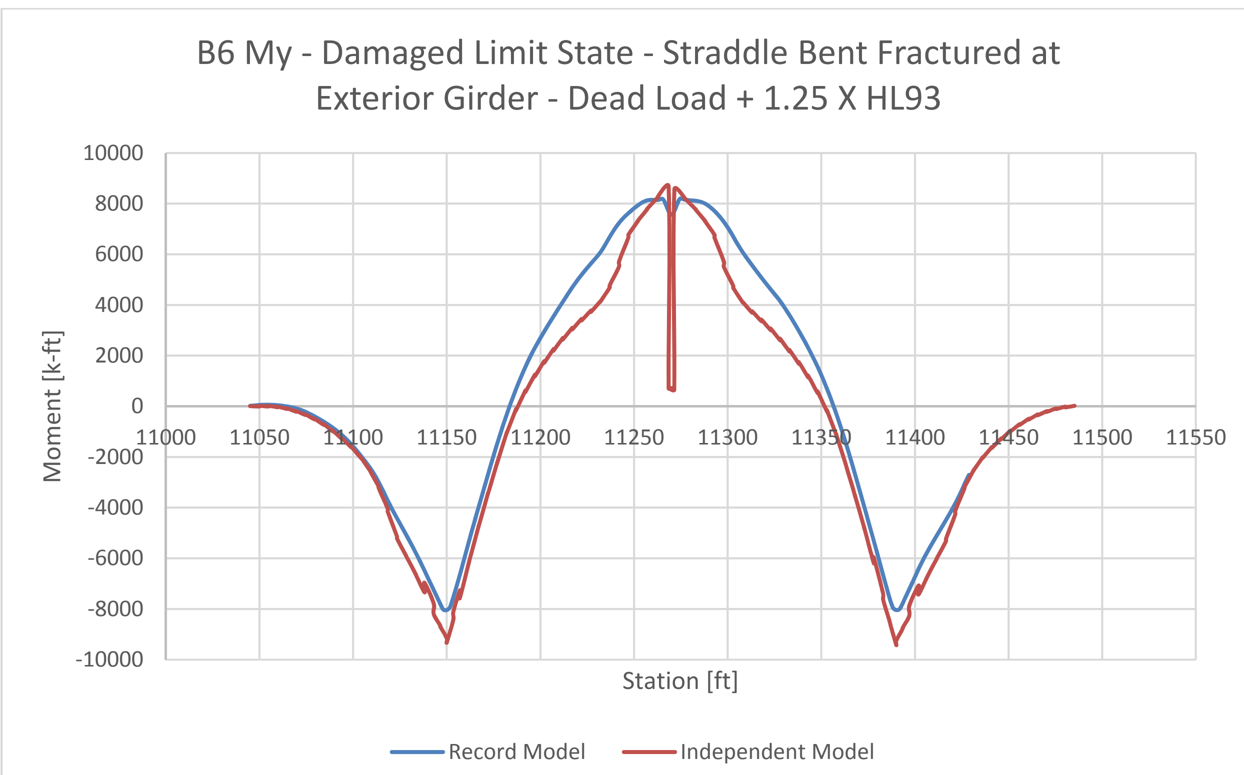
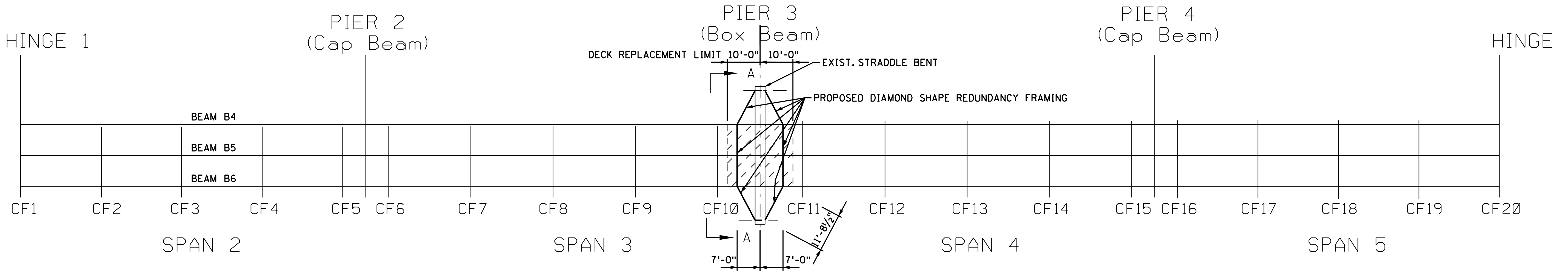


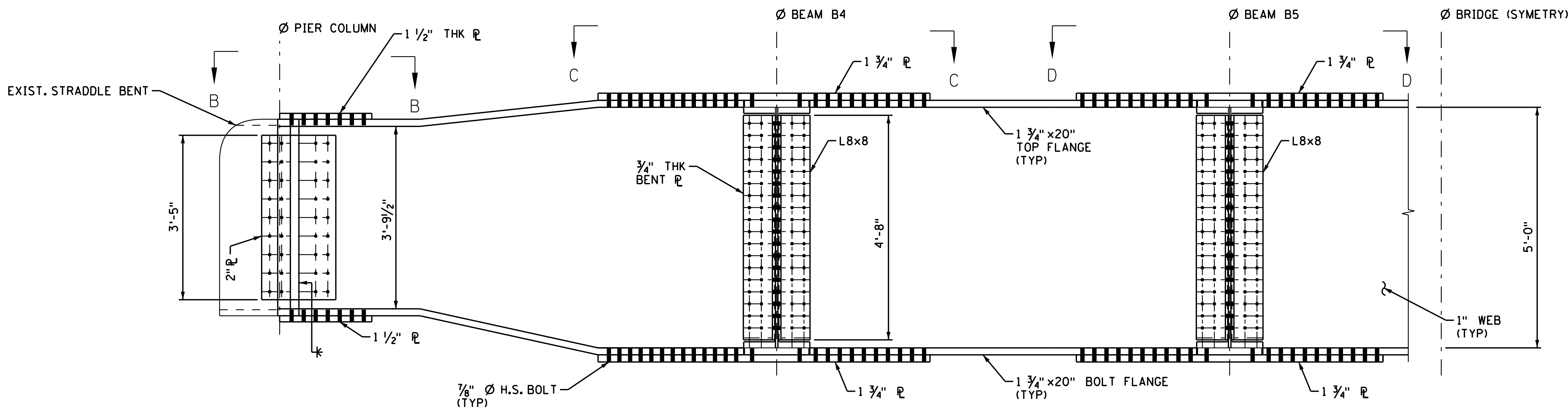
Figure 26:Moment in girder B-6 at damaged limit state (pier 3 at exterior girder) 1.25xHL93

Appendix 4

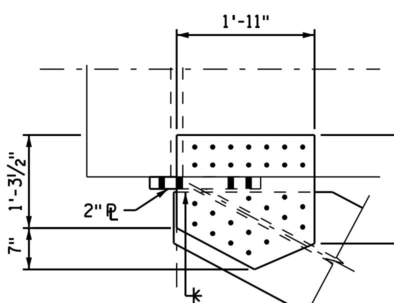
Proposed Redundancy Repairs



FRAMING PLAN



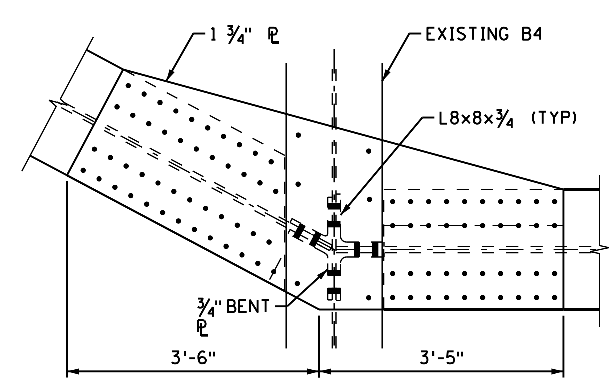
SECTION A-A
(NO OF BOLTS AS SHOWN)



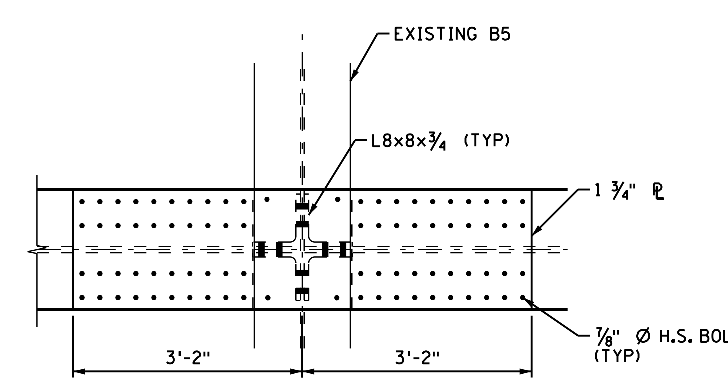
VIEW B
(NO OF H.S. BOLTS AS SHOWN)

NOTES:

1. ALL STEEL TO BE fy' = 50 ksi
2. ALL BOLTS TO BE ⅞" Ø H.S. ASTM A325 BOLTS



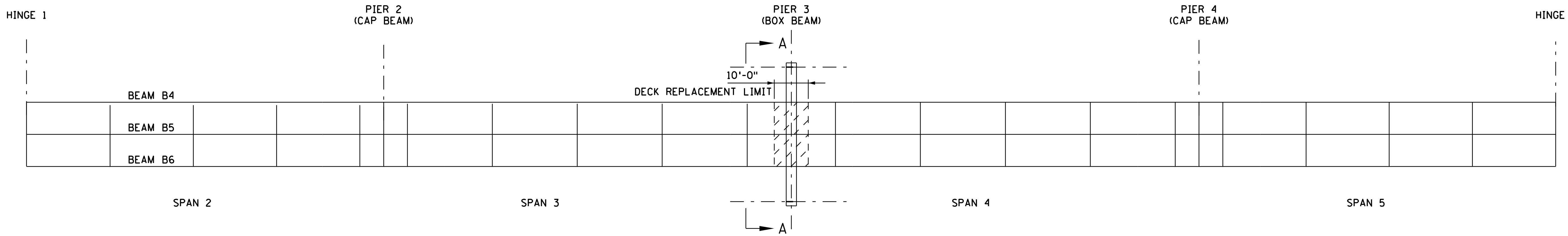
VIEW C



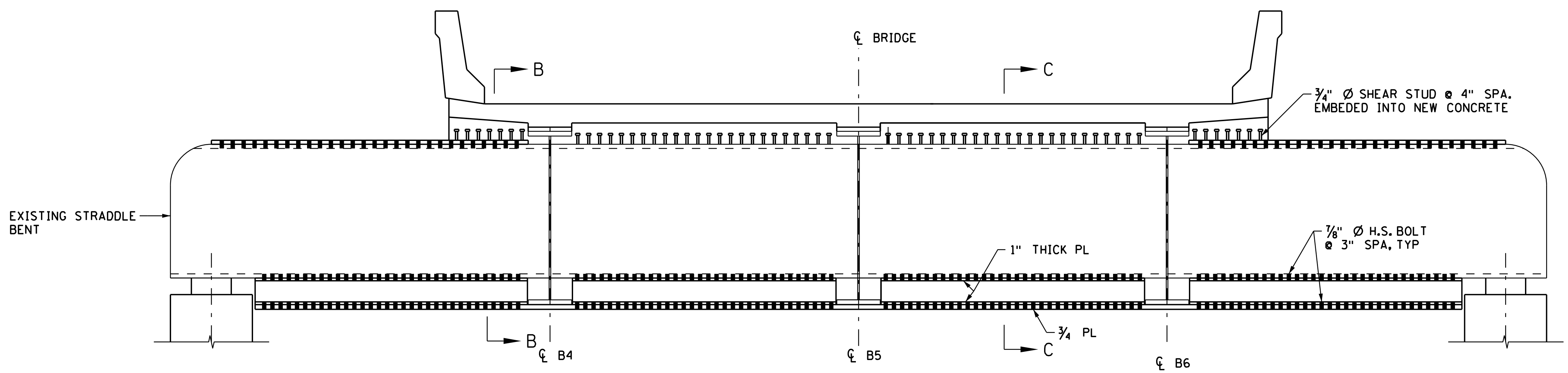
VIEW D

HNTB	CERTIFIED BY ______ LICENSED PROFESSIONAL ENGINEER DATE NAME: LIC. NO. ______	TITLE: ALTERNATE PATH FRAMING REDUNDANCY OPTION 1	DES: DR: APPROVED: CHK: CHK: SHEET NO. OF SHEETS	BRIDGE NO. 69102

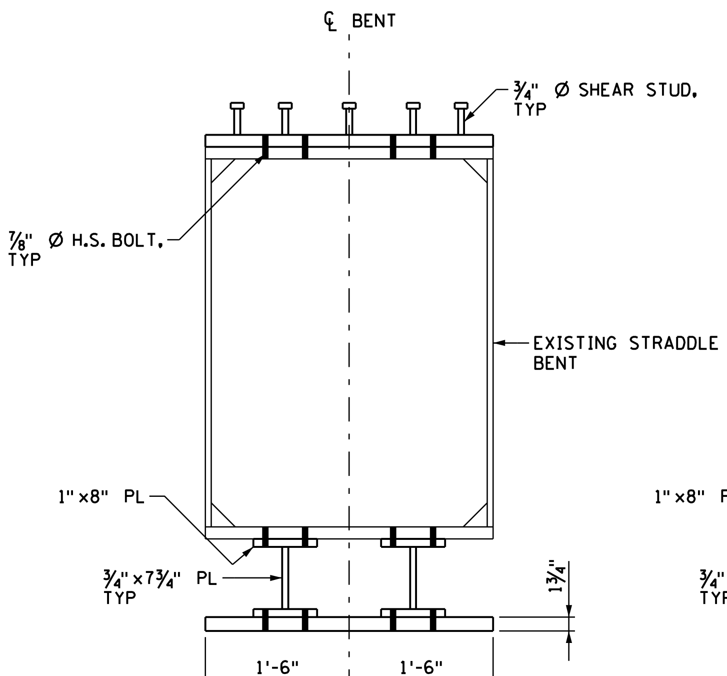
8/11/2017 b69102.S001.dgn



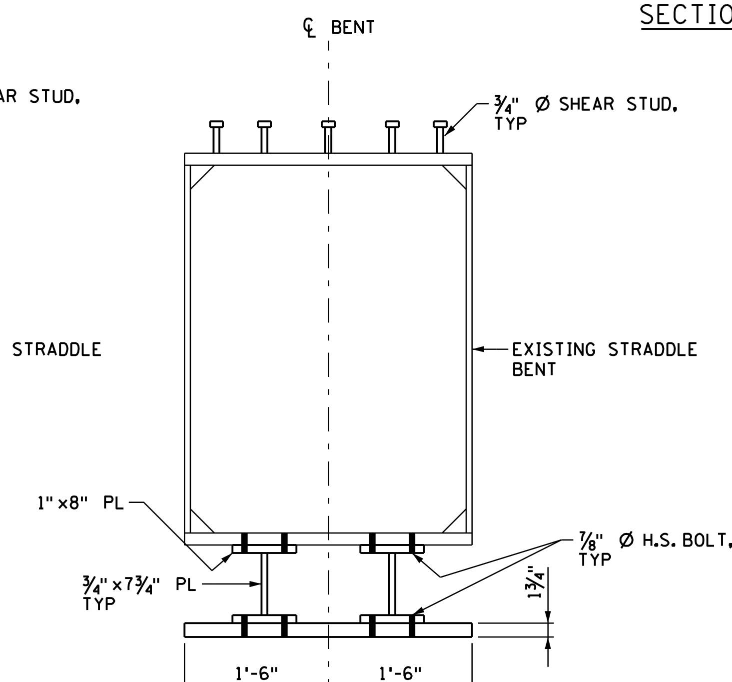
FRAMING PLAN



SECTION A-A



SECTION B-B



SECTION C-C

NOTES:

1. ALL CONCRETE TO BE fc' = 4 ksi
2. ALL STEEL TO BE Fy = 50 ksi
3. ALL BOLTS TO BE 7/8" Ø H.S. ASTM A325 BOLTS.

HNTB	CERTIFIED BY ____ LICENSED PROFESSIONAL ENGINEER ____ DATE NAME: LIC. NO. ____	TITLE: MEMEBER REDUNDANCY OPTION 2	DES: DR: APPROVED: CHK: CHK: SHEET NO. OF SHEETS	BRIDGE NO. 69102

8/11/2017
b69102.S002.dgn

Appendix 5

Scoping Level Cost Estimate of Repairs

1.0 PROJECT

Sponsor (Lead Agency):	MnDOT
Design Organization (Sponsor or Consultant):	HNTB
Estimator:	Steven Schantzen
Estimator's Organization:	HNTB
Project Location (County):	St. Louis
Date of Estimate Submittal:	August 18, 2017
Anticipated Contract Method:	Design Bid Build
Start of Construction:	1st Quarter 2018
Anticipated Mid-Point of Construction:	2018
Estimating Processing Software:	Excel
Design Development (%, or level of design developed):	Conceptual Level
Project Identification No.	SP 6937-102 T.H. US2

2.0 PURPOSE

The purpose of this document is to provide a basis of estimate for the rehabilitation of fracture critical bridges in Duluth, MN and provide a conceptual cost estimate for two alternative designs.

The following estimates were grouped into general cost categories as listed below. For future iterations, the estimate will utilize MNDOT bid items.

- Erosion Control
- Maintenance of Traffic
- Striping
- Bridge Deck Demolition
- Structural Steel
- Bridge Deck Concrete
- Concrete Rail
- Rebar

The Basis of Estimate (BOE) Report defines the estimate parameters, scope of work, estimate structure, assumptions and exclusions. Separate reports may be developed if new alternatives are evaluated during the review process. As the design develops and advances, it is recommended the cost estimate be updated with new information to understand potential impacts or savings to the project.

3.0 SCOPE & PARAMETERS

Summary of Key elements:

Hazardous Materials:	None – Excluded and not anticipated
Wetlands Issues:	None, Excluded

Archeological Impacts:	None, Excluded
Native American (Tribal) Issues:	None, Excluded

3.1 Erosion Control

A lump sum allowance of $5,000 was assumed for each alternative. This cost would include temporary and permanent erosion control means and methods.

3.2 Maintenance of Traffic

The cost for maintenance of traffic was calculated by the number of working days multiplied by $750/day. This would include setting up, maintaining, and removing detours while bridge rehabilitation is occurring.

3.3 Striping

A lump sum allowance of $1,000 was assumed for restriping portions of the bridge deck that will be removed and replaced during bridge rehabilitation.

3.4 Bridge Deck Demolition

Portions of the bridge deck will be removed over Pier 3 to complete steel repairs. It was assumed that the bridge deck will be removed to 10' past the centerline of pier (20' total) on both sides for alternative 1 and 5' past the centerline of pier (10' total) on both sides for alternative 2. The cost includes protecting the roadway under the bridge, demolition of the bridge deck and concrete rail and hauling away rubble.

3.5 Structural Steel

Structural steel is assumed to be fabricated at a MNDOT approved fabricator and shipped to the project site. Gusset plates and connection angles are assumed to be fully drilled and attached to redundancy girders. The connection angles will be used as a template to drill holes in the existing steel. A similar method will be used in alternative 2. To complete bolting of the steel in alternative 2, an access hole will have to be cut in the side of the straddle bent. It was assumed that this access hole will have a cover plate bolted over the opening after all steel work is complete.

In conversations with design staff, it has been noted that shoring will be required for alternative 2. To compensate for this cost we have included a lump sum allowance of $15,000.

3.6 Bridge Deck Concrete

Cost for replacement of the concrete deck is included in this item. A full depth deck was assumed rather than the cast in place deck with overlay that is currently in place.

3.7 Concrete Rail

Cost for replacement of the concrete rail is included in this item

3.8 Rebar

Rebar for bridge deck and concrete rail is included in this item. All rebar is assumed to be epoxy coated.

4.0 DESIGN BASIS

It is understood that the current design is at a preliminary/conceptual level. Elements of the project have not yet been fully detailed and designed, therefore estimating assumptions were utilized when required to generate the quantities and costs. Minnesota Department of Transportation (MnDOT) standards and specifications were utilized for reference where applicable. The documents provided for use in the preparation of the estimate include concept level drawings.

5.0 PLANNING BASIS

The project is expected to be delivered by a design/bid/build contract method. The contract is tentatively expected to be awarded in the first quarter of 2018 with work completed by the end of 2018.

Access for work associated with this bridge will require the bridge to be closed as well as the ramp from Michigan Ave to I-35 southbound. It is expected that the contractor will stage cranes and areal lifts between the bridge and I-35W. Access will also be required on top of the existing bridge.

6.0 COST BASIS

Where details were missing or not available, assumptions were made and documented to progress the estimate. In certain scenarios where quantities and/or responsible assumptions were not viable, allowances were used to serve as place holders for known cost. As design progresses and details/scope advance, the estimate should be adjusted and the allowance dollars re-defined as hard cost.

Prices are calculated in 2017 dollars. All rates are taken from prevailing wages or estimator experience.

Current Year Dollars	Estimate is priced utilizing 2017 dollars
Labor Rates & Burden	Labor rates are based off of St. Louis County
Overtime	No overtime has been included
Standard Shift Assumption	Mon-Fri 40 hours / week
Bonds and Insurances	Bonds & Insurances are included at 1.5% of construction
Overhead and Profit	Overhead and Profit is included at 15%
Material Tax Rate	7.0%
Escalation	Labor rates have been escalated by 2.5%
Unallocated Contingency	No contingency is included. Assumed to be added at the project level
Mobilization	No mobilization is included. Assumed to be added at the project level
Maintenance of Traffic	$750 per working day
Betterments (or potentials)	NA
Warranties	NA
Right of Way / Easements	Not Included

7.0 ALLOWANCES

The following items have been assigned a lump sum allowance

- Erosion control was given a value of $5,000
- Striping was given an allowance of $1,000
- Bonds and insurance was calculated at 1.5%
- Shoring was given a value of $15,000 for option 2, no shoring is assumed to be required for option 1

8.0 ASSUMPTIONS

The following assumptions have been made in this estimate:

- Materials needed for construction are readily available
- All work can be completed as listed above

9.0 EXCLUSIONS

The following items were not included in the pricing of the work and are thereby excluded from the estimate:

- Archeological finds and/or any delays caused by them
- Hazardous materials or contaminated materials due to asbestos, lead, or soils
- 3rd party utility impacts
- Right of way, special permits, or easement costs
- Unforeseen conditions due to geotechnical investigations
- Special environmental considerations or mitigation
- Mobilization. This is understood to be carried at the project level
- Escalation to mid-point of construction
- Contingency

10.0 RISKS

A general risk occurs because of the preliminary stage of design. The estimate should be updated as design progresses.

11.0 ATTACHMENTS

Attachment A: Estimate

Attachment B: Takeoffs

Estimate

Minnesota Department of Transportation
Bridge 69102
Fracture Critical Bridges
Option 1 - Diamond Shape Redundancy Frame
Cost Estimate

	No. Each	Unit	Qty	Unit Cost	Extended Amount
Erosion Control	**1**	**LS**		**$ 5,000.00**	**$ 5,000.00**
MOT	**1**	**LS**		**$ 12,750.00**	**$ 12,750.00**
Striping	**1**	**LS**		**$ 1,000.00**	**$ 1,000.00**
Demo Deck	**1**	**LS**		**$ 5,356.00**	**$ 5,356.00**
Sawcutting	1		52	$ 3.00	*$ 156.00*
Labor Foreman	*1*		*16*	*$ 66.00*	*$ 1,056.00*
Laborers	*1*		*16*	*$ 65.00*	*$ 1,040.00*
Bobcat & Breaker	*1*		*16*	*$ 55.00*	*$ 880.00*
Manlift	*1*		*16*	*$ 40.00*	$ 640.00
Operator	*1*		*16*	*$ 74.00*	*$ 1,184.00*
Dump Truck & Operator	*1*		*4*	*$ 100.00*	*$ 400.00*
Structural Steel	***57232***	**LBS**		**$ 2.34**	**$ 133,822.32**
Furnish Steel	57232			*$ 1.50*	*$ 85,848.32*
Hardware	1			*$ 7,160.00*	*$ 7,160.00*
45 Ton RT Crane	*1*		*74*	*$ 100.00*	$ 7,400.00
Manlift	*1*		*74*	*$ 40.00*	$ 2,960.00
Ironworker	*2*		*74*	*$ 75.00*	$ 11,100.00
Ironworker Foreman	*1*		*74*	*$ 76.00*	$ 5,624.00
Crane Operator	*1*		*74*	*$ 75.00*	$ 5,550.00
Oiler	*1*		*74*	*$ 70.00*	$ 5,180.00
Mag Drill, Bits	*1*			$ 3,000.00	$ 3,000.00
Bridge Deck Concrete	***14***	**CY**		**$ 1,722.86**	**$ 24,120.00**
Carpenter Foreman	*1*		*30*	*$ 76.00*	$ 2,280.00
Carpenter	*3*		*30*	*$ 75.00*	$ 6,750.00
Crane Operator	*1*		*30*	*$ 75.00*	$ 2,250.00
Oiler	*1*		*30*	*$ 70.00*	$ 2,100.00
45 Ton RT Crane	*1*		*30*	*$ 100.00*	$ 3,000.00
Manlift	*1*		*30*	*$ 40.00*	$ 1,200.00
Concrete	*14*			*$ 110.00*	$ 1,540.00
Tools, Forming Material	*1*			*$ 5,000.00*	$ 5,000.00
Concrete Railing	***40***	**LF**		**$ 361.75**	**$ 14,470.00**
Carpenter Foreman	*1*		*20*	*$ 76.00*	$ 1,520.00
Carpenter	*3*		*20*	*$ 75.00*	$ 4,500.00
Crane Operator	*1*		*20*	*$ 75.00*	$ 1,500.00
Oiler	*1*		*20*	*$ 70.00*	$ 1,400.00
45 Ton RT Crane	*1*		*20*	*$ 100.00*	$ 2,000.00
Concrete	*5*			*$ 110.00*	$ 550.00
Tools, Forming Material	*1*			*$ 3,000.00*	$ 3,000.00
Rebar	***2775***	**LBS**		**$ 1.31**	**$ 3,642.50**
Ironworker Foreman	*1*		8	*$ 75.00*	$ 600.00
Ironworker	*1*		8	*$ 75.00*	$ 600.00
Rebar	*2775*			$ 0.70	$ 1,942.50
General Contractor Support	*1*			*$ 500.00*	$ 500.00
Bonds and Insurance					**$ 3,002.41**
Labor Escalation (2.5%)					**$ 1,326.25**
Overhead Profit					**$ 30,474.48**
Option 1 Summary					**$ 233,637.72**

Minnesota Department of Transportation
Bridge 69102
Fracture Critical Bridges
Option 2 - Member Redundancy
Cost Estimate

	No. Each	Unit	Qty	Unit Cost	Extended Amount
Erosion Control	**1**	**LS**		**$ 5,000.00**	**$ 5,000.00**
MOT	**1**	**LS**		**$ 12,000.00**	**$ 12,000.00**
Striping	**1**	**LS**		**$ 1,000.00**	**$ 1,000.00**
Demo Deck	**1**	**LS**		**$ 4,056.00**	**$ 4,056.00**
Sawcutting	1		52	$ 3.00	*$ 156.00*
Labor Foreman	*1*		*12*	*$ 66.00*	*$ 792.00*
Laborers	*1*		*12*	*$ 65.00*	*$ 780.00*
Bobcat & Breaker	*1*		*12*	*$ 55.00*	*$ 660.00*
Manlift	*1*		*12*	*$ 40.00*	$ 480.00
Operator	*1*		*12*	*$ 74.00*	*$ 888.00*
Dump Truck & Operator	*1*		*3*	*$ 100.00*	*$ 300.00*
Structural Steel	***15006***	**LBS**		**$ 5.51**	**$ 82,657.64**
Furnish Steel	15006			*$ 1.50*	*$ 22,508.64*
Hardware	1			*$ 3,200.00*	*$ 3,200.00*
45 Ton RT Crane	*1*		*74*	*$ 100.00*	$ 7,400.00
Manlift	*1*		*74*	*$ 40.00*	$ 2,960.00
Ironworker	*2*		*74*	*$ 75.00*	$ 11,100.00
Ironworker Foreman	*1*		*74*	*$ 76.00*	$ 5,624.00
Crane Operator	*1*		*74*	*$ 75.00*	$ 5,550.00
Oiler	*1*		*74*	*$ 70.00*	$ 5,180.00
Mag Drill, Bits	*1*			$ 3,000.00	$ 3,000.00
Studs	*310*			$ 1.00	$ 310.00
Ironworker	*1*		10	$ 75.00	$ 75.00
Welder & Generator	*1*			$ 750.00	$ 750.00
Install Shoring	*1*			$ 15,000.00	$ 15,000.00
Bridge Deck Concrete	***7***	**CY**		**$ 2,365.43**	**$ 16,558.00**
Carpenter Foreman	*1*		*18*	*$ 76.00*	$ 1,368.00
Carpenter	*3*		*18*	*$ 75.00*	$ 4,050.00
Crane Operator	*1*		*18*	*$ 75.00*	$ 1,350.00
Oiler	*1*		*18*	*$ 70.00*	$ 1,260.00
45 Ton RT Crane	*1*		*18*	*$ 100.00*	$ 1,800.00
Manlift	*1*		*74*	*$ 40.00*	$ 2,960.00
Concrete	*7*			*$ 110.00*	$ 770.00
Tools, Forming Material	*1*			*$ 3,000.00*	$ 3,000.00
Concrete Railing	***40***	**LF**		**$ 279.85**	**$ 11,194.00**
Carpenter Foreman	*1*		*14*	*$ 76.00*	$ 1,064.00
Carpenter	*3*		*14*	*$ 75.00*	$ 3,150.00
Crane Operator	*1*		*14*	*$ 75.00*	$ 1,050.00
Oiler	*1*		*14*	*$ 70.00*	$ 980.00
45 Ton RT Crane	*1*		*14*	*$ 100.00*	$ 1,400.00
Concrete	*5*			*$ 110.00*	$ 550.00
Tools, Forming Material	*1*			*$ 3,000.00*	$ 3,000.00
Rebar	***2775***	**LBS**		**$ 0.81**	**$ 2,240.00**
Ironworker Foreman	*1*		6	*$ 75.00*	$ 450.00
Ironworker	*1*		6	*$ 75.00*	$ 450.00
Rebar	*1200*			$ 0.70	$ 840.00
General Contractor Support	*1*			*$ 500.00*	$ 500.00
Bonds and Insurance					**$ 2,020.58**
Labor Escalation (2.5%)					**$ 1,129.03**
Overhead & Profit (15%)	***1***				**$ 20,678.29**
Option 2 Summary					**$ 158,533.54**

Quantity Takeoffs

Minnesota Department of Transportation
Bridge 69102
Fracture Critical Bridges
Option 1 - Diamond Shape Redundancy Frame

Steel Takeoff

	Quantity	Length	Height	Thickness	Steel Density	Weight
Description	(EA)	(FT)	(FT)	(FT)	(LBS/CF)	LBS
Outside Bracing						
Web Part A	4	2	3.75	0.08	490	1176
Web Part B	4	4.83	4.38	0.08	490	3317
Web Part C	4	3.5	5	0.08	490	2744
Top and Bottom Flange	8	10.33	1.67	0.15	490	10144
Plate A	4	2	3.42	0.17	490	2279
Vertical Angle at B4 & B6	16	4.67	1.33	0.06	490	2922
Plate B	8	2	1.5	0.13	490	1529
Plate C	8	7	1.67	0.15	490	6874
Inside Bracing						
Web	4	9.33	5	0.08	490	7315
Top and Bottom Flange	8	9.33	1.67	0.15	490	9162
Vertical Angle at B5	8	4.67	1.33	0.06	490	1461
Flange Splice Plate	4	6.33	1.67	0.15	490	3108
Misc. Plates (10%)						5203
					Total	57232

Minnesota Department of Transportation
Bridge 69102
Fracture Critical Bridges
Option 2 - Member Redundancy

Steel Takeoff

Description	Quantity (EA)	Length (FT)	Height (FT)	Thickness (FT)	Steel Density (LBS/CF)	Weight LBS
I - Section						
Top and Bottom Flange	4	37.5	0.67	0.08	490	3939.6
Web	2	37.5	0.65	0.06	490	1433.25
Bottom Plate	1	37.5	3	0.15	490	8268.75
Misc. Plates (10%)	1					1364.16
					Total	15005.76

	Long. Row EA	Horz Row EA	Total EA
Shear Studs	62	5	310