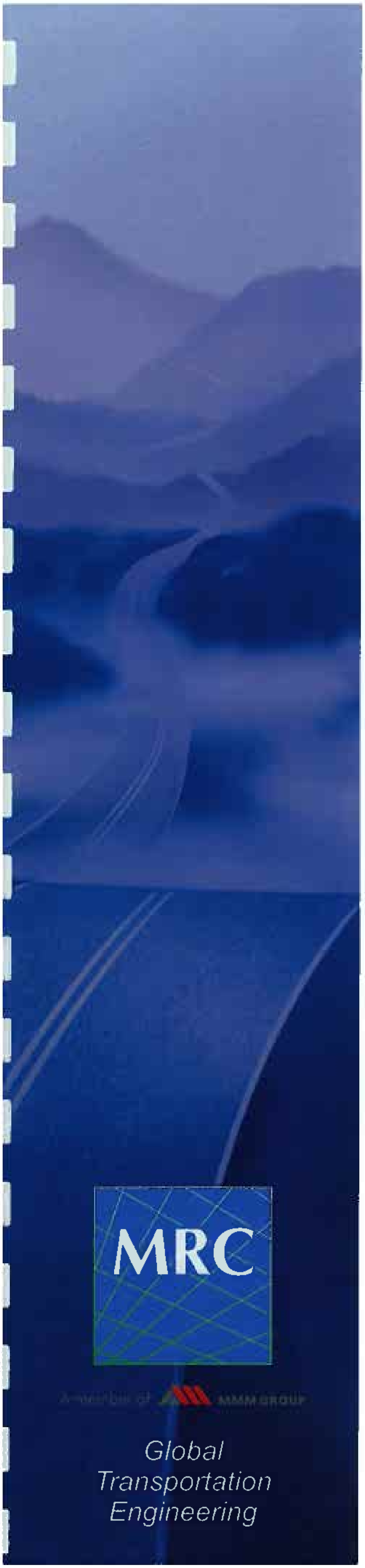
APPENDIX F1

TANSLEY BRIDGE STRUCTURAL EVALUATION REPORT 2009



Halton REGION

Dundas Street (Reg. Rd. 5) Class EA Study Brant Street (Reg. Rd. 18) to Proudfoot Trail

Tansley Bridge
Dundas Street at Bronte Creek
Bridge No. 005109
MTO Site N0. 010-0111

STRUCTURAL EVALUATION REPORT

VOLUME 1

October 2009

Updated on November 2009

STRUCTURAL EVALUATION REPORT

VOLUME 1

TANSLEY BRIDGE

BRIDGE NO. 005109

DUNDAS STREET AT BRONTE CREEK

CITY OF BURLINGTON

REGIONAL MUNICIPALITY OF HALTON

MTO SITE NO. 10-111

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A member of MMM GROUP

October 2009

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APPENDICES

VOLUME 2: DETAILED CALCULATIONS (bound separately)

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1. INTRODUCTION

McCormick Rankin Corporation (MRC), a member of MMM Group, was retained by the Regional Municipality of Halton to undertake a Municipal Class Environmental Assessment (EA) for the planned widening of Dundas Street from the existing four lanes to six lanes. The study limits for the widening are from Guelph Line to Appleby Line. The Tansley Bridge is within the study limits and will also need to be widened to accommodate the planned increase in the number of traffic lanes.

A structural investigation of the bridge is included in the Municipal Class EA to assess the feasibility of bridge widening alternatives, existing bridge needs, and quantity of repairs required for cost analysis of the alternatives. The investigation comprised the structural evaluation and a detailed condition survey. This report focuses on the bridge structural evaluation and also summarizes the findings of the bridge condition survey. Details of the results of the condition survey may be found in the report "Tansley Bridge, Dundas Street at Bronte Creek, Site Number 010-0111, Condition Survey Report" by MRC dated October 2009, which is bound separately.

A Key Plan showing the structure location is provided in Appendix 'A'.

Appendices containing supplementary information such as drawings, photographs, figures, and calculation results, are referenced throughout the text and included in the back of this Report. Details of the structural analysis and calculations for the evaluation are bound separately in Volume 2 of this report.

2. EXISTING CONDITIONS

2.1 Structure Description

The Tansley Bridge, located on Dundas Street at Bronte Creek comprises two independent yet adjacent structures. The original structure was completed in 1948 and comprises a steel deck truss superstructure. The truss deck was modified and a steel girder type bridge added on the north side of the crossing in 1978 to facilitate the widening of Dundas Street from two to the current four lanes of traffic. The two superstructures act independently of each other and are separated by a 25 mm wide longitudinal joint located in the median. In addition, the substructures for each structure are essentially independent of each other.

The entire width, including the truss and girder structures, is 22.250 m. This width includes 0.455 m wide concrete barrier walls with a single parapet rail on the north and south side of the bridge, and 1.220 m wide concrete median comprised of the EBL and WBL deck cantilevers separated by a 25 mm gap. The bridge was constructed normal to the roadway alignment.

2.2 Truss Structure Description

The eastbound lane (EBL) substructure for the truss superstructure was constructed from 1946 to 1947 and the superstructure constructed in 1948. The superstructure comprises three multi-span continuous deck trusses supporting a concrete deck. The four spans are symmetrical about the midspan of the structure, being 45.72 m±; 60.96 m±; 60.96 m±; 45.72 m± from east to west respectively. Approach slabs, each 6.096m long, flank both ends of the bridge.

The steel truss superstructure is composed of three arched trusses spaced at 5.4864 m centres, which vary in depth from 3.81 m at midspans and abutments to 7.62 m at the piers. Floor beams and stringers support the concrete deck. The reinforced concrete deck slab is 190.5 mm thick and the waterproofing and asphalt paving system is approximately 90 mm thick.

The substructure includes three piers and two abutments situated on concrete foundations. Each bent-like pier comprises two solid trapezoidal reinforced concrete shafts connected by an arched concrete panel and founded on spread footings on shale bedrock. Due to the steep valley of Bronte Creek, the piers vary in height from approximately 15.2 m to 27.4 m above the founding rock.

Articulation is provided by three fixed, disc steel casting bearings located at the centre pier, and twelve disc steel cast bearings with pintle type rollers at each of the other piers and at the abutments.

In 1971, the deck was strengthened by additional stringers placed at half-spaces between existing stringers.

The truss superstructure was rehabilitated in 1978, when Dundas Street was widened and the westbound lane (WBL) steel girder structure was constructed. The work in 1978 removed the deck cantilevers, constructed a sidewalk and barrier wall with single rail on the south side, constructed new expansion joints at the abutments, and provided a new raised median with longitudinal joint adjacent to the WBL structure. The structure modification reduced the width of the deck from 16.154 m to 12.345 m, and provided a new concrete deck with asphalt wearing surface and waterproofing. The trusses were essentially maintained as they were originally constructed, but the floor beam cantilevers were cut to suit the current deck width and end floorbeams were replaced.

The bridge was rehabilitated again in 2004. The 2004 rehabilitation replaced the south barrier wall, patched the concrete deck, replaced the asphalt and waterproofing system, and replaced the longitudinal joint seal in the raised median.

The EBL roadway cross-section has a 9.170 m travelled roadway comprising two (2) 3.660 m wide lanes, 0.400 m horizontal clearance from the centre median and 1.450 m right shoulder. A 1.805 m wide sidewalk is located on the south side.

2.3 Steel Girder Structure Description

The WBL structure was constructed in 1978. The superstructure is 9.905 m wide with four continuous spans (50.29 m±; 60.96 m±; 60.96 m±; 50.29 m±). The steel plate girder superstructure has three constant depth girders spaced at 3.5052 m centres, and remains unlinked with the truss bridge.

The girders are not coated, even at the expansion joints, and comprise atmospheric corrosion resistant structural steel. The girders are composite with the concrete deck and an asphalt wearing surface is provided. The span arrangement matched the centreline of bearings of the truss structure at the piers, but the longer exterior spans extend past the abutments of the truss structure.

The substructure includes three piers and two abutments situated on concrete foundations. The pier footings were founded on shale bedrock. The abutment footings were constructed on compacted granular fill and founded on steel H-piles driven to bedrock. Each pier comprises one solid tapered reinforced concrete shaft, founded on spread footing. There are three fixed floating bearings located at the centre pier, and twelve guided expansion floating bearings at each of the other piers and abutments.

The roadway cross-section comprises 9.170 m travelled roadway including two (2) 3.660 m wide lanes, 0.400 m horizontal clearance from the centre median and 1.425 m right shoulder.

The bridge was rehabilitated in 2004 under the same contract that rehabilitated the EBL structure. The 2004 rehabilitation replaced the north barrier wall, patched the concrete deck, and replaced the asphalt and waterproofing system. Other work in the 2004 rehabilitation contract included filling of eroded and washed out areas of the embankments and placing new rip-rap material.

A General Arrangement drawing of the structure is provided in Appendix A and photographs in Appendix B provide general views of the bridge.

2.4 1971, 1977 and 2003 Rehabilitation

In 1971, the structure was rehabilitated by the Region under Contract No. 71-137. Based on record drawings completed by the Department of Highways Ontario, the following rehabilitation was completed:

- Additional stringers were installed
- Stringers were jacked against deck before making connections
- Trimmer beams installed at each manhole (1 at each pier)

In 1977, the structure was widened with a new westbound bridge and the existing deck was replaced by the Region under Contract No. 78-31. Based on record drawings completed by Cole, Sherman & Associates Ltd., the following rehabilitation was completed:

- Removed curb, rail, and part of deck, abutments, wingwalls and floor beams on north side of existing structure
- Constructed substructure for the new plate girder bridge
- Completed construction of the new plate girder superstructure
- Waterproofed and paved the new deck
- Removed curb, rail, remainder of deck and cut floor beams on south side of existing structure
- Conducted a thorough inspection of the bridge after slab removal.
- Replaced all missing and damaged rivets with high strength bolts and 2 washers
- Replaced any excessively corroded or damaged truss or steel deck member
- Cleaned and painted top surface of all floor beams with two coats of Koppers Bitumastic No. 50
- Replaced the deck on the existing structure

In 2003, the structure was rehabilitated by the Region under Contract No. R-1833B-2003. Based on record drawings completed by McCormick Rankin Corporation, the following rehabilitation was completed:

- Removed asphalt and waterproofing
- Removed and salvaged steel beam guide rail on approaches as specified
- Removed existing barrier wall and construct new barrier wall
- Installed new railing for barrier wall
- Removed deteriorated concrete from deck surface. Patched deck surface.
- Patched the deck soffit beneath the longitudinal expansion joint
- Placed rip rap within washed out areas on embankment
- Installed steel beam guide rails on approaches
- Installed seal in longitudinal expansion joint
- Abrasive blast cleaned and waterproofed remaining deck surface
- Placed base course hot mix asphalt and surface course asphalt

2.5 Recent Inspection Results and Reports

The most recent bridge appraisal report was completed in October of 2008. In this report, the consultant noted the following:

- Narrow to medium cracks, spall and delaminations on curb face

- Joints at piers and abutments, observed were: *"Concrete patches, localized spalls, partially covered with sand…West seals leaking, filled with debris"*

- On deck asphalt wearing surface, observed were: *"Localized cracking, minor rutting"*
- Deck soffits exhibited: *"Delamination …narrow stained crack."*
- Light to medium corrosion was observed in stringers, floor beams, top chords, verticals, diagonals, bracing and bottom chords
- One particular diagonal exhibited 20mm deformation to the flange
- Light to moderate rust jacking was also observed on connections with light corrosion
- Structural steel coatings exhibit localized minor breakdown, particularly on the north truss
- Abutment bearings exhibit light to medium corrosion

The bridge appraisal report also made the following 1-5 year rehabilitation recommendations:

- Patch repair abutment walls, ballast walls and wingwalls, piers, and replace expansion joint seals.
- Clean out debris and replace seals at joints over piers and abutments.
- Patch repair concrete for deck soffits near expansion joints.

2.6 2009 Condition Survey Summary

A detailed condition survey of both structures was performed in August 2009 by MRC. Detailed findings from the survey may be found in the Condition Survey Report by MRC, dated October 2009. The condition survey included corrosion potential survey, core samples, sawn asphalt samples, concrete cover measurements, recording of surface deterioration on half of the deck on each structure. The condition survey also included detailed visual inspection of the soffit of the deck, girders, trusses, gussets, and bearings of the WBL and EBL which was facilitated by an underbridge inspection vehicle. Girders, splices, bracing, and connections on the WBL structure were inspected and areas of corrosion noted, including measurement of remaining metal thicknesses by calliper or ultrasonic thickness gauge.

The truss structural steel was inspected in detail. Member sizes were confirmed including configuration of built-up member components (lattice and batten size and spacing, rivets size and spacing, etc.). Particular attention was paid to the gussets of the trusses. The gussets were photographed with scale and measured, and areas of corrosion and/or deformation recorded including condition of coating. Areas of perforations and corrosion were noted and remaining metal thickness measured with an ultrasonic measuring device at visually corroded locations. Furthermore, rivets were sounded at rust jacking locations and missing rivets recorded. Deformation, corrosion, and coating condition of the truss members and bearings were also noted, measured, and photographed.

2.6.1 Deck Condition Survey Summary

A summary of the significant findings from the deck condition survey is as follows:

- Asphalt paving and waterproofing system was generally in good condition on both structures. The asphalt and waterproofing on the deck varied from 46 to 95 mm and averaged 78 mm based on core and sawn asphalt sample measurements. The waterproofing membrane ranged from 3 to 19 mm thick with an average thickness of 8 mm. The bond and performance of the waterproofing was good.

- The deck surface at the sawn sample locations was fair and concrete in cores was generally good.

- The reinforcing steel in the concrete cores was generally in good condition.

- Concrete cover to reinforcing steel on the deck surface ranged from 64 to 103 mm with an average of 77 mm for the top upper layer (transverse) bars.

- The concrete compressive strength of two sample cores was 52 and 64 MPa with an average of 58 MPa.

- The corrosion potential readings were generally low (where waterproofed) with less than 2% of the deck area more negative than -0.35V and 24% of the deck had readings between -0.2 and -0.35V. Conversely, corrosion potential readings on the exposed concrete sidewalk were high with 57% of the sidewalk concrete more negative than -0.35V.

- Chloride tests on cores indicated relatively low levels of chlorides in the concrete, which based on limited test results does not appear to have reached the reinforcing steel in the deck (where waterproofed).

- The air content of the concrete was greater than 3% and specific surface was > 24 mm^2/mm^3, which is adequate, but the spacing factor of the air voids was slightly less than 0.20 mm.

- The deck soffit is generally in good condition with minor random cracking and staining except at the cantilevers adjacent to median longitudinal joint. Numerous areas with spalls and delaminations with exposed severely corroded reinforcing steel were noted on the soffit adjacent to the longitudinal joint in the median. Conversely, the deck cantilevers at the barriers were generally in good condition with minor spalling at the stringers of the truss bridge.

2.6.2 EBL Structure - Truss Components Condition Summary

A summary of the significant findings of the EBL superstructure truss components is as follows:

- The truss members adjacent to the longitudinal joint in the median had numerous areas of coating failure and exposed lightly corroded structural steel.

- The middle and south truss members were generally in good condition with minor and isolated areas of corrosion of the structural steel and few areas of coating failure.

- Seam corrosion and rust jacking was prevalent in the connections of the top chord and members of the truss adjacent to the longitudinal joint at the median. Isolated areas of seam corrosion and rust jacking were also observed at the connections at the piers of the middle and south truss. Corroded areas on gussets on the south truss were previously cleaned and recoated.

- With the exception of deformations due to rust jacking at some locations, no buckling deformation of the gussets was found. In addition, no coating breakdown or cracks in the coating associated with buckling of the gussets was found.

- Seam corrosion with up to 30% section loss was found on some gussets along the flanges of the lower chord members. Up to 58% section loss was found along the seam of gusset L22E on the south gusset of the south truss.

- Some minor perforations up to 25 mm in diameter were found on two gussets at insignificant locations.

- A shallow laminar tear was found at the top of the south gusset of the south truss at the east pier.

- Minor perforations in battens and lower flange of truss members were found at four locations.

- A total of 26 fasteners were either missing or loose with no more than 1 fastener missing or loose at any location.

- "Ripples" between rivets due to crevice corrosion in the built-up members was found at several locations.

- Several wind bracing members were damaged or distorted either as a result of erection or platforms suspended for coating operations.

- The lower flange of the bottom chords of the middle and south truss were deformed due to jacking of the superstructure at the west pier bearings.

- Few coating defects were observed.

- The roller bearings are generally in good condition, but the gaps between the rollers are packed with dirt and debris, which may be affecting their performance.

2.6.3 WBL Structure - Steel Girder Components Condition Summary

A summary of the significant findings of the WBL superstructure structural steel is as follows:

- The north girder is in good condition except for areas of light corrosion on the north face of the web within 300 mm of the bottom flange.

- The middle girder is in good condition, with localized areas of light corrosion.

- The south face (adjacent to the longitudinal joint at the median) of the south girder web plate is in fair condition despite the large amounts of corrosion product and rust flakes. The web in the corroded areas measured between 7.7 mm and 10.7 mm with an average thickness of 9.2 mm.

- There was considerable corrosion on the splice places and nuts and bolts heads of the south girder on the south face (adjacent to the longitudinal joint at the median). However, no bolt heads were missing or severed due to rust jacking.

- Approximately 1 mm section loss was measured on the flanges of the north and middle girder, and only up to 2 mm section loss was measured on the flange of the south girder, despite the significant amount of corrosion product.

- Bracing and diaphragms between the girders was in good condition.

- Bearings were in good to fair condition with light to severe corrosion. The bearings at the west abutment were in the worse condition due to build-up of debris, from the expansion joint seal leaks, on and around the bearings.

2.6.4 Substructure Condition Summary

The abutments are generally in good to fair condition with numerous spalls and delaminations on the ballast walls and bearing seats.

The piers of the WBL (girder) structure are generally in good condition with few areas of cracking and spalling.

The piers of the EBL (truss) structure are generally in fair to poor condition with many large areas of delaminated concrete and exposed corroded reinforcing steel along the full height of the columns and at the bearing seats.

3. ANALYSIS AND EVALUATION ASSUMPTIONS

The original Tansley truss bridge was designed circa 1946, likely using the American Association of State Highway and Transportation Officials (AASHTO) "Standard Specifications for Bridges" 1941. An H20 design vehicle live load was noted on the original Design Drawing D2890-8, Nov.1, 1946, which is provided in Appendix A.

With the structure widened in 1977, the plate girder structure was likely designed using the AASHTO "Standard Specifications for Bridges" 1973, with HS20-44 live load indicated on Design Drawing 1, June 1977, which is provided in Appendix A.

MRC evaluated the superstructure in accordance with the Canadian Highway Bridge Design Code (CHBDC) CAN/CSA S6-06 using Section 5 'Method of Analysis', Section 8 'Concrete Structures', Section 10 'Steel Structures' and Section 14 'Evaluation'.

Tansley Bridge was evaluated as Highway Class A.

Gross section properties were used throughout the analysis for all members, as indicated on the structural drawings provided in Appendix A.

Material properties used in the evaluation were as follows:

1. Concrete in deck: f'_c = 30 MPa, E = 24853 MPa
2. Reinforcing steel: f_y = 414 MPa, E = 200GPa
3. Steel plates in girders: F_y = 350 MPa, E = 200 GPa
4. Steel Truss Members: F_y = 230 MPa (per CHBDC, Clause 14.7.4.2, Table 14.1 – 1946 Unknown), E = 200 GPa

Target reliability indices were determined to be β=3.50 for the truss structure and β=3.00 for the plate girder structure. Dead and live load categories based on β are summarized in Tables 3.1 and 3.2. The dead load categories are defined as:

- D1: structural steel and barriers
- D2: concrete deck, haunch and asphalt overlay

Gusset Plates on Truss Bridge

Average gusset plate thicknesses taken from field measurements were used in the analysis of truss connections. For the determination of the unbraced lengths and, gross and net section areas of the plates, the Whitmore method was used. Gusset plate capacities were determined using the Load and Resistance Factor Rating Method (LRFR), in accordance with CHBDC.

Table 3.1 – Target Reliability Index Summary of Truss Bridge

Element	System Behaviour	Element Behaviour	Inspection Level	Reliability Index, β	α_{D1}	α_{D2}	α_L
Truss Member	S2	E1	INSP2	3.50	1.09	1.18	1.63
Gusset Plate	S2	E1	INSP2	3.50	1.09	1.18	1.63

Table 3.2 – Target Reliability Index Summary of Plate Girder Bridge

Element	System Behaviour	Element Behaviour	Inspection Level	Reliability Index, β	α_{D1}	α_{D2}	α_L
Girder	S2	E3	INSP2	3.00	1.07	1.14	1.49

4. LOADING

The structural drawings were used to determine section properties for self-weight. The deck thicknesses used were 215.9 mm and 190.5 mm for the plate girder and truss bridges, respectively (see Appendix A).

The barriers, concrete sidewalk and curb loads were distributed over the exterior girders / trusses of the bridge.

Standard material densities in accordance with the CHBDC were used.

The total asphalt and waterproofing thickness used was 90 mm for dead load calculations, as per structural drawings found in Appendix A.

Evaluation Level 1, which includes the CL1-625-ONT Truck Load and CL1-625-ONT Lane Load, were applied on the plate girder superstructure.

Evaluation Levels 1, 2 and 3 with vehicle trains in Ontario described in CAN/CSA-S6-06, Annex A14.2 were applied to the truss superstructure.

For the analysis, the design truck was moved longitudinally along the bridge in 1.0 m increments to produce envelopes in the various members.

5. ANALYSIS / MODELLING

The superstructure analyses of the two bridges were each undertaken using SAP2000 Plus Version 14.0.0. 3-D analyses for the truss superstructure and the plate girder superstructure were conducted.

The evaluation calculations were completed in accordance with the applicable CHBDC sections. A summary of the load capacity evaluation for all of the truss members and gussets, for the EBL structure and girders for the WBL structure may be found in Appendix C. Details of the calculations for the structural components of the EBL and WBL structures are bound separately in Volume 2 of this report.

Fully composite girders, comprising the slab and plate girder sections was assumed in the resistance calculations of the plate girder structure. Non-composite main member sections were assumed in the resistance calculations of the truss structure.

An independent evaluation was completed using SAP2000 to confirm the results of the above-noted evaluation calculations.

6. RESULTS

On the basis of the above, results at the critical sections were obtained and summarized in Tables 6.1 to 6.3. The results presented below are based on ULS Combination 1 loading. Truss members and plates are named according to the diagram found in Appendix D.

Table 6.1 – Steel Plate Girders, ULS 1 Evaluation Level 1 Results

Region	Live Load Capacity Factor, F[1]		Location
Span 1 or 4	$M_r(+) / M_f(+)$	2.80	North Exterior Girder – 19.05 m away from nearest abutment
	V_r / V_f	2.49	North Exterior Girder – Near East or West Abutment
Pier 1 or 3	$M_r(-) / M_f(-)$	3.77	North Exterior Girder – 50.292 m away from nearest abutment
	V_r / V_f	3.54	North Exterior Girder – Near Pier 1 or 3
Span 2 or 3	$M_r(+) / M_f(+)$	3.19	North Exterior Girder – 80.772 m away from nearest abutment

[1] Footnote: A "Live Load Capacity Factor" greater than or equal to 1.0 is desirable
M_r (-) is defined as the factored negative flexural resistance
M_f (-) is defined as the factored applied negative bending moment
M_r (+) is defined as the factored positive flexural resistance
M_f (+) is defined as the factored applied positive bending moment
V_r is defined as the factored shear resistance
V_f is defined as the factored applied shear

Table 6.2 – Arched Truss Members, ULS 1 Evaluation Level 1 Results

Region	Live Load Capacity Factor, F[1]		Location[2]
Span 1 or 4	C_r / C_f	1.30	Center Truss – Vertical U10-L10 {12WF45}
	C_r / C_f	1.25	Center Truss – Vertical U12-L12 {12WF53}
	C_r / C_f	1.15	Center Truss – Diagonal U3-L2 {2-10C20}
	T_r / T_f	2.09	Center Truss – Diagonal U3-L4 {2-8C13.75}
	C_r / C_f	2.41	Center Truss – Top Chord U3-U5 {2-15C40 + 2-PL14 x 3/8}
	C_r / C_f	2.03	Center Truss – Bottom Chord L10-L12 {2-15C50 + 2-PL14 x 1/2}
	T_r / T_f	1.90	Center Truss – Bottom Chord L4-L6 {2-15C50}
Span 2 or 3	C_r / C_f	1.26	Center Truss – Vertical U26-L26 {12WF45}
	C_r / C_f	1.26	Center Truss – Diagonal U27-L28 {2-15C40}
	T_r / T_f	2.26	Center Truss – Diagonal U27-L26 {12WF65}
	C_r / C_f	2.33	Center Truss – Top Chord U21-U23 {2-15C40}
	C_r / C_f	2.15	Center Truss – Bottom Chord L12-L14 {2-15C50}
	T_r / T_f	2.09	Center Truss – Bottom Chord L18-L20 {2-15C45}
Deck	M_r / M_f^+	2.08	End Floorbeam {21 WF 62}
	M_r / M_f^-	1.93	End Floorbeam {21 WF 62}
	M_r / M_f^+	1.11	Original Stringers {16 WF 50}
	V_r / V_f	3.46	End Floorbeam {21 WF 62}
	V_r / V_f	2.35	Original Stringers {16 WF 50}

Table 6.3 – Arched Truss Gusset Plates, ULS 1 Evaluation Level 1 Results

Region	Live Load Capacity Factor, F[1]		Location[2]
Span 1 or 4	C_r / C_f	0.81	Center Truss - Gusset Plate L0
	C_r / C_f	0.61	Center Truss - Gusset Plate L2
	C_r / C_f	0.51	Center Truss - Gusset Plate U3
	C_r / C_f	0.69	Center Truss - Gusset Plate U5
	C_r / C_f	0.51	Center Truss - Gusset Plate U7
	C_r / C_f	0.65	Center Truss - Gusset Plate U9
Span 2 or 3	C_r / C_f	0.77	Center Truss - Gusset Plate L22
	C_r / C_f	0.95	Center Truss - Gusset Plate U13
	C_r / C_f	0.88	Center Truss - Gusset Plate U15
	C_r / C_f	0.53	Center Truss - Gusset Plate U17
	C_r / C_f	0.67	Center Truss - Gusset Plate U19
	C_r / C_f	0.74	Center Truss - Gusset Plate U21
	C_r / C_f	0.51	Center Truss - Gusset Plate U23

[1] Footnote: A "Live Load Capacity Factor" greater than or equal to 1.0 is desirable
C_r is defined as the factored compressive resistance
C_f is defined as the factored applied compressive axial load
T_r is defined as the factored tensile resistance
T_f is defined as the factored applied tensile axial load

[2] Footnote: See truss diagrams in Appendix D

Table 6.3 reveals that many gusset plates do not satisfy current CHBDC requirements and need to be strengthened. Deficient gusset plates on all three trusses are tabulated in Appendix C and clearly indicated in the diagrams found in Appendix D. In its current state, load limit postings on the EBL truss bridge are required in accordance with CAN/CSA S6-06, Clause 14.17. Table 6.4 summarizes the recommended posting weights for Evaluation Levels 1-3, determined using the lowest F values for each evaluation, and a gross vehicle weight of 625 kN.

Table 6.4 – EBL Truss Superstructure, Bridge Posting

Evaluation Level	Minimum F	Posting Value, P	Posted Weight Limit, PW (tonnes)
1	0.51	0.050	31
2	0.55	0.039	25
3	0.65	0.025	16

Barrier Wall

The barrier wall currently in use was designed according to OHBDC 1991, Highway Class A. These PL-2 barriers were installed in 2003. Using information gathered from the Bi-Annual Bridge Appraisal in 2006 and the Condition Survey in 2009, it was determined that PL-2 barriers on both north and south sides are in good condition and still satisfy barrier performance level requirements in CAN/CSA-S6-06, Clause 12.4.

7. CONCLUSIONS

The results of the evaluation indicate theoretical compressive buckling in the unstiffened gusset plates along many of the top diagonal member connections and a few at the bottom diagonal member connections. The results of the structural analysis indicate posted load limits are warranted for the structure.

The EBL structure has provided over fifty (50) years of service. Based on MRC's detailed inspection of the structure, the load capacity evaluation results for gusset plates in Section 6 are not reflected in the truss structure's historical performance. The gusset plates are generally in fair condition and there are no visible signs of distortion due to load, or cracking in the coating due to flexing of the substrate.

The composition of traffic (percentage of trucks) and the truck loadings is not anticipated to change within the next 5 years. In addition, MRC recognizes some conservative assumptions made in both the evaluation of the truss and the current Engineering practice adopted to determine the compressive buckling strength of gusset plates.

While our observations and the historical performance of the structure do not reflect the results of the structural analyses, which may be conservative, we cannot ignore the magnitude of the reduction in load capacity indicated by the load capacity calculations. Therefore, it is recommended that all deficient gusset plates (see Appendix D) be stiffened on all three trusses on an urgent basis, within six months. If strengthening the gussets is not feasible within six months, then triple posted load limits corresponding to 31, 25, and 16 tonnes on the EBL (truss) structure are recommended for public safety reasons, until the gussets can be strengthened.

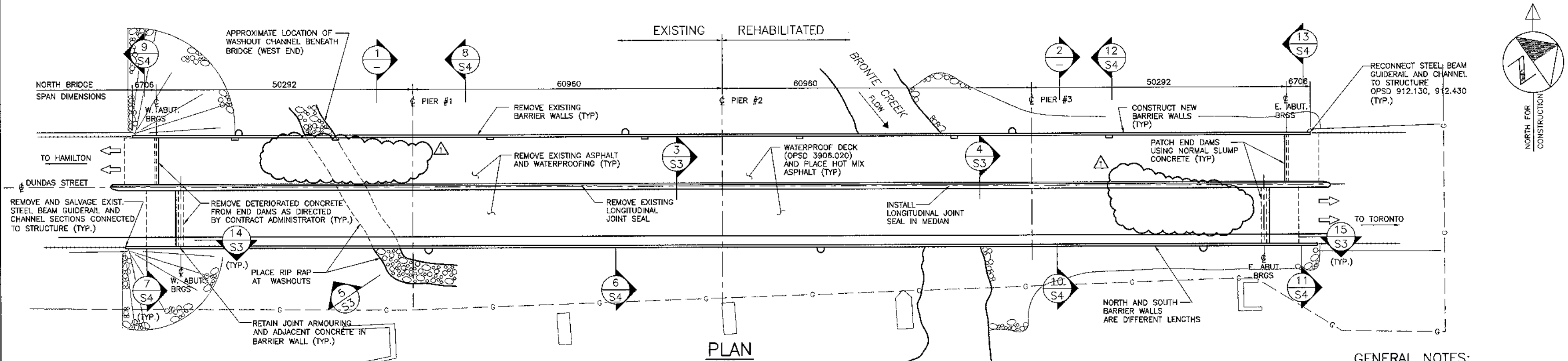
Elimination of the longitudinal joint and existing median is considered necessary for some widening alternatives to allow traffic to cross the joint. The response of the structures to load was also evaluated to determine the feasibility of rigidly connecting the decks of the two structures to eliminate the longitudinal joint and differential deflections of the two structures at the joint. A separate structural model linking the decks of the two structures indicated that eliminating the gap joint is feasible, provided the gussets are strengthened to meet current live load conditions.

In summary, the structural evaluation found that the WBL girder structure has adequate load capacity and may be incorporated into the widening of Dundas Street. However, the EBL truss structure will need to be strengthened to meet current load conditions and loads imposed by widening Dundas Street. In addition, the reserve capacity of some of the structural members (diagonals and chords) of the truss bridge is low. Therefore, ongoing deterioration (corrosion) of the truss structure may warrant strengthening of the members, in addition to the current urgent strengthening of the gussets required, within the next 15 to 25 years.

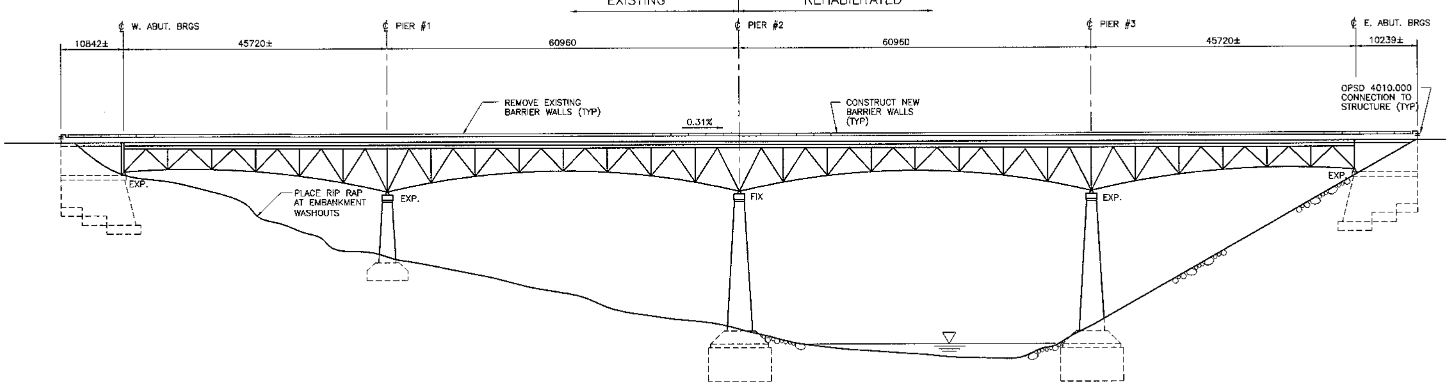
APPENDIX ‘A’
KEY PLAN & STRUCTURAL DRAWINGS

Tansley Bridge, Dundas Street at Bronte Creek
1.12 km East of Appleby Line

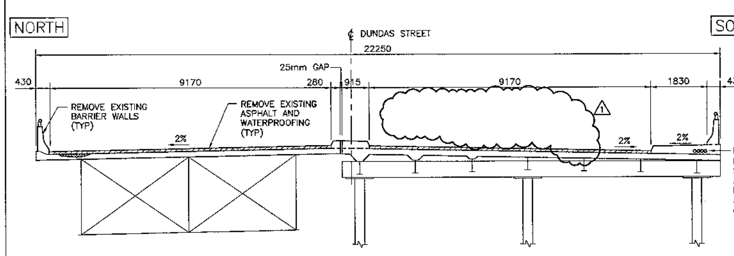
KEY PLAN
N.T.S.



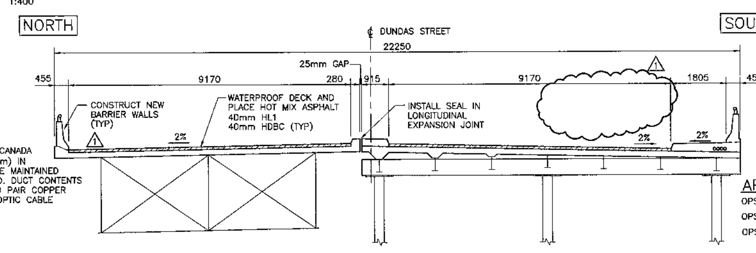
PLAN
1:400



ELEVATION (SOUTH BRIDGE)
1:400



SECTION 1 EXISTING
1:75



SECTION 2 REHABILITATED
1:75

GENERAL NOTES:

1. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS OF THE CONTRACT.
2. CLASS OF CONCRETE : ____ 30MPa
3. REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH PREFIX C DENOTE COATED BARS. BAR MARKS WITH PREFIX S DENOTE STAINLESS STEEL BARS. STAINLESS REINFORCING SHALL BE TYPE 316 LN (YIELD 420 MPa).
4. CLEAR COVER TO REINFORCING STEEL : 70 ± 20 mm
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE EXISTING WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
6. DESIGN CODE AND LOADING OHBDC 1991, CLASS A.
7. UNLESS SHOWN OTHERWISE, TENSION LAP LENGTHS SHALL BE CLASS B.

   HOOKS AND BENDS FOR REINFORCING STEEL SHALL BE DETAILED ACCORDING TO OHBDC 91. UNLESS SHOWN OTHERWISE, THE FOLLOWING SHALL APPLY:

   a.) STANDARD HOOKS WITH MINIMUM BEND DIAMETERS SHALL BE USED FOR STIRRUPS AND TIES, ACCORDING TO CLAUSE 8-14.1

   b.) OTHER BARS SHALL HAVE STANDARD HOOKS WITH BEND DIAMETERS ACCORDING TO CLAUSE C8-14.1
8. SAWCUTS AT LIMITS OF REMOVAL SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS (UNLESS OTHERWISE NOTED.)
9. EPOXY GROUT FOR DOWELS SHALL BE FROM THE MTO'S DESIGNATED SOURCES MANUAL AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

LIST OF DRAWINGS

S1.	GENERAL ARRANGEMENT
S2.	CONSTRUCTION STAGING
S3.	SECTIONS AND DETAILS I
S4.	SECTIONS AND DETAILS II
S5.	NORTH BARRIER WALL
S6.	SOUTH BARRIER WALL
S7.	RAILING FOR BARRIER WALL
TS1	TRAFFIC STAGING–STAGE 1A
TS2	TRAFFIC STAGING–STAGE 1B
TS3	TRAFFIC STAGING–STAGE 2A
TS4	TRAFFIC STAGING–STAGE 2B
TS5	TRAFFIC STAGING–STAGE 3

APPLICABLE STANDARD DRAWINGS

OPSD 3906.020	BRIDGE DECK WATERPROOFING
OPSD 4010.000	GUIDE RAIL AND CHANNEL ANCHORAGE
OPSD 912.130	STEEL BEAM STEEL POST WITH WOODEN OFFSET BLOCK ASSEMBLY INSTALLATION – SINGLE RAIL
OPSD 912.401	STEEL BEAM STRUCTURE CONNECTION COMPONENT – RAIL AND CHANNEL
OPSD 912.430	STEEL BEAM STRUCTURE CONNECTION

Notes

LICENSED PROFESSIONAL ENGINEER J. J. WERNER PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER C. G. CRESPI PROVINCE OF ONTARIO

Nº	Date	By	REVISIONS	MANU	CAD
1	06/02/27	CGC	AS CONSTRUCTED		

Design	JJW	Ch'kd	CGC	Date DEC. 20, 2002
Drawn	AM	Ch'kd	JJW	
Scale	AS SHOWN			References

Field Notes REGION BOOK

APPROVALS
Municipal
Regional
Director, Engineering Services
Manager, Design Services

MRC McCORMICK RANKIN CORPORATION

Halton

TITLE
GENERAL ARRANGEMENT
DUNDAS STREET BRIDGE
OVER BRONTE CREEK
STRUCTURE REHABILITATION

Consultant File Nº 4879 | R. B- 11383
CONTRACT Nº R–1833B–2003 | Drawing Nº SHEET S1 OF S7

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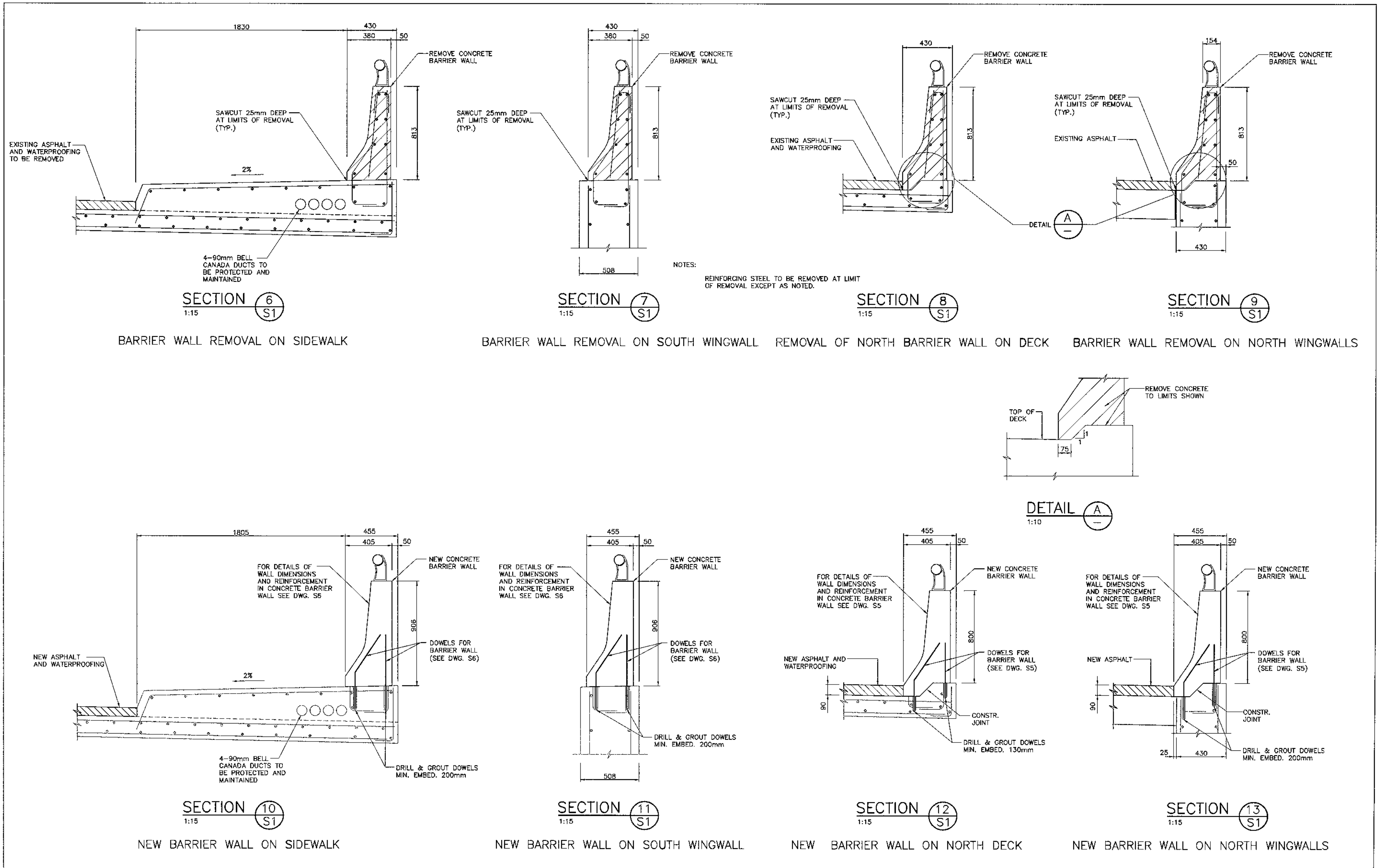
DRAWN BY: ALAN MASON
MODIFIED: 06/12/31 13:03:49
DATE PLOTTED: 2002/12/20 10:52:12

R–1833B–2003 SHEET S1 OF S7

B- 11383



Notes

1	06/02/27	CGC	AS CONSTRUCTED			
Nº	Date	By	REVISIONS		MANU	CAD
Design	JJW	Ch'kd	CGC	Date DEC. 20, 2002		
Drawn	EU	Ch'kd	JJW			
Scale AS SHOWN				References		

Licensed Professional Engineer — J. J. WERNER — Province of Ontario

Licensed Professional Engineer — C. G. CRESPI — Province of Ontario

Field Notes — REGION BOOK

APPROVALS

Municipal

Regional

Director, Engineering Services

Manager, Design Services

MRC McCORMICK RANKIN CORPORATION

Halton

TITLE

SECTIONS AND DETAILS II
DUNDAS STREET BRIDGE
OVER BRONTE CREEK
STRUCTURE REHABILITATION

Consultant File Nº 4879 | Reg B- 11386

CONTRACT Nº R-1833B-2003 | Drawing Nº SHEET S4 OF S7

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DRAWN BY: John D.L. Goodwin MODIFIED: 2002/12/19 15:24:57 DATE PLOTTED: 2002/12/20 10:53:12

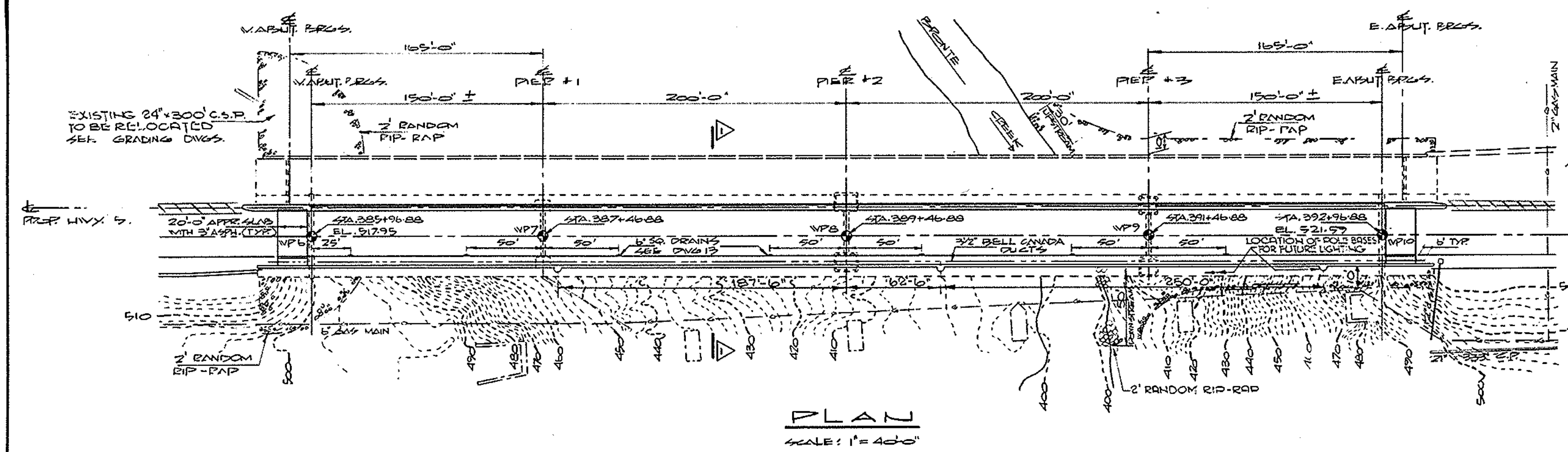
R-1833B-2003 SHEET S4 OF S7

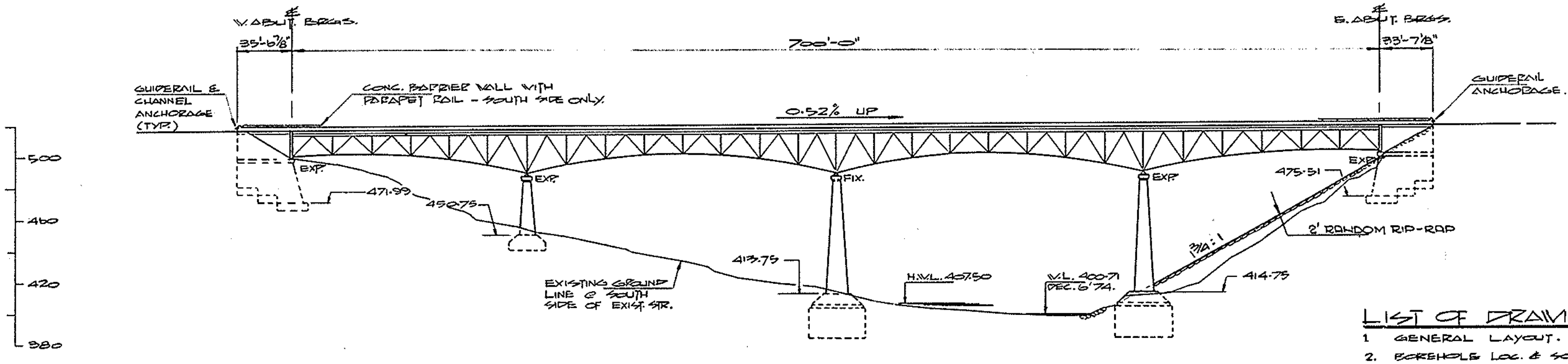
B- 11386

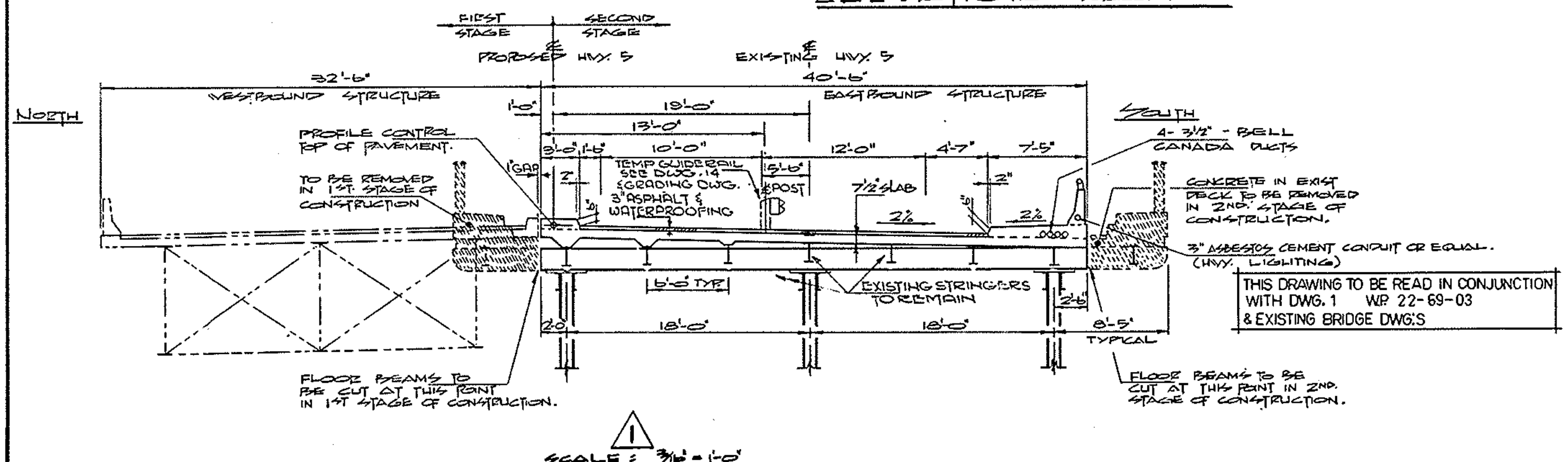
DIST. 4
CONT No 78-31
WP No 22-69-01

TANSLEY BRIDGE OVER BRONTE CREEK
(DECK REPLACEMENT)
GENERAL LAYOUT

SHEET 34







THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG. 1 WP 22-69-03 & EXISTING BRIDGE DWG'S

GENERAL NOTES.

CLASS OF CONCRETE.

DECK SLAB, CURB & SIDEWALK	4000 P.S.I.
CONCRETE BARRIER WALL	4000 P.S.I.
APPROACH SLABS	3000 P.S.I.
REMAINDER	3000 P.S.I.

CLEAR COVER ON REINFORCING STEEL.

FOOTING AND ABUTMENTS		3"
DECK SLAB	TOP	2"
	BOTTOM	1½"
APPROACH SLAB OR AS NOTED.		2"

REINFORCING STEEL SHALL BE C.S.A. G.30 SERIES, GRADE 60 MINIMUM.

CONCRETE QUANTITIES

CONC. QUANTITIES ARE LISTED BELOW FOR THE APPROPRIATE CONC. LUMP SUM TENDER ITEMS.

1. CONCRETE IN ABUTMENTS — 14 CU.YD.
2. CONCRETE IN DECK — 1035 CU.YD.
3. CONCRETE IN BARRIER WALL — 9 CU.YD.
4. CONCRETE IN RETAINING WALLS — 13 CU.YD.
4. CONCRETE IN APPROACH SLABS — 49 CU.YD.

STRUCTURAL STEEL QUANTITIES

TOTAL — 12 TONS

SEQUENCE OF CONSTRUCTION

1ST. STAGE

① ERECT TEMPORARY GUIDERAIL AT THE NORTH SIDE OF EXISTING DECK. REMOVE PART OF EXISTING CONCRETE IN BRIDGE DECK, ABUTMENTS, WINGWALLS AND PART OF FLOOR BEAMS AS SHOWN IN △.

② CONSTRUCT SUBSTRUCTURE FOR THE NEW STRUCTURE.

③ COMPLETE THE CONSTRUCTION OF THE NEW STRUCTURE.

④ WATERPROOF AND PAVE THE NEW STRUCTURE DECK.

⑤ ERECT TEMPORARY GUIDERAIL AT THE SOUTH SIDE OF THE NEW STRUCTURE AND DIVERT TRAFFIC OVER NEW STRUCTURE.

2ND. STAGE

⑥ REMOVE THE REMAINDER OF SLAB, CURB, SOUTH RAIL AND CUT FLOOR BEAMS ON EXISTING STRUCTURE.

⑦ OBTAIN ELEVATIONS AS NOTED ON DWG. 5

⑧ CONDUCT A THROUGH INSPECTION OF THE BRIDGE FOLLOWING REMOVAL OF THE CONCRETE SLAB. ALL MISSING AND VISIBLY DAMAGED RIVETS ARE TO BE REPLACED WITH HIGH STRENGTH BOLTS AND TWO WASHERS. EACH RIVET REMOVED MUST BE IMMEDIATELY REPLACED WITH A HIGH STRENGTH BOLT. ANY TRUSS OR STEEL DECK MEMBER FOUND TO BE EXCESSIVELY CORRODED OR DAMAGED SHOULD BE REPLACED, UPON OBTAINING APPROVAL FROM THE STRUCTURAL OFFICE OF THE M.T.C. PRIOR TO THE PLACING OF FORMWORK, THE TOP SURFACE OF ALL FLOOR BEAMS SHOULD BE THOROUGHLY CLEANED AND PAINTED WITH TWO COATS OF KOPPERS BITUMASTIC Nº 50 IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

LIST OF DRAWINGS

1. GENERAL LAYOUT.
2. BOREHOLE LOC. & SOIL STRATA. SEE W.P. 22-69-03
3. ABUTMENTS & RETAINING WALLS.
4. STRUCTURAL STEEL DETAILS.
5. SCREED ELEVATIONS.
6. DECK DETAILS.
7. DECK REINFORCEMENT.
8. BARRIER WALL WITH SIDEWALK.
9. STEEL RAILING (SINGLE TUBE).
10. 20 FT. APPROACH SLAB.
11. EXPANSION JOINTS.
12. AS CONSTRUCTED ELEV. & DIM.
13. STANDARD DETAILS I.
14. STANDARD DETAILS II.
15. ELECTRICAL EMBEDDED WORK.
16. GROUNDING OF BRIDGE STRUCTURE.
17. ELECTRICAL EMBEDDED WORK, STANDARD DETAILS.

CONSTRUCTION SEQUENCE CONTINUED:

⑨ PROCEED WITH DECK REPLACEMENT AS SHOWN IN △

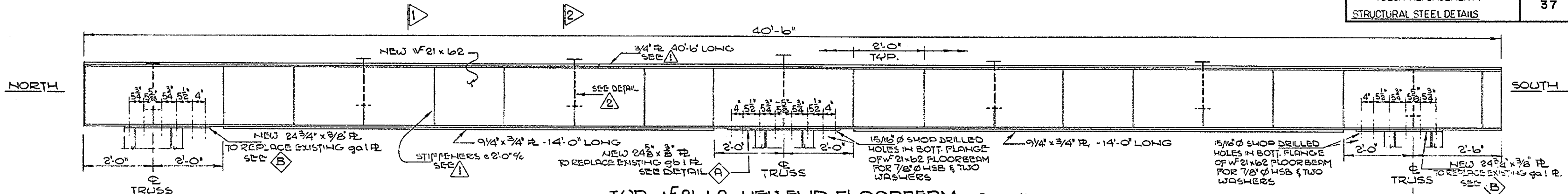
G. AL-RAZI

FOR REDUCED PLAN
USE SCALE BELOW
3 INCHES ON ORIGINAL PLAN

REVISIONS		
DATE	BY	DESCRIPTION

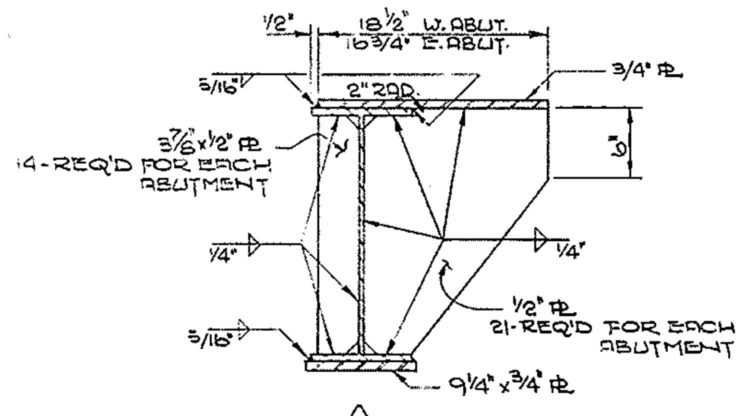
DESIGN	CHECKED	LOADING HS20-44	DATE June 77
DRAWING	CHECKED	SITE No 10-111	DWG 1

CONT No 78-31 WP No 22-69-01	
TANSLEY BRIDGE OVER BRONTE CREEK (DECK REPLACEMENT) STRUCTURAL STEEL DETAILS	SHEET 37



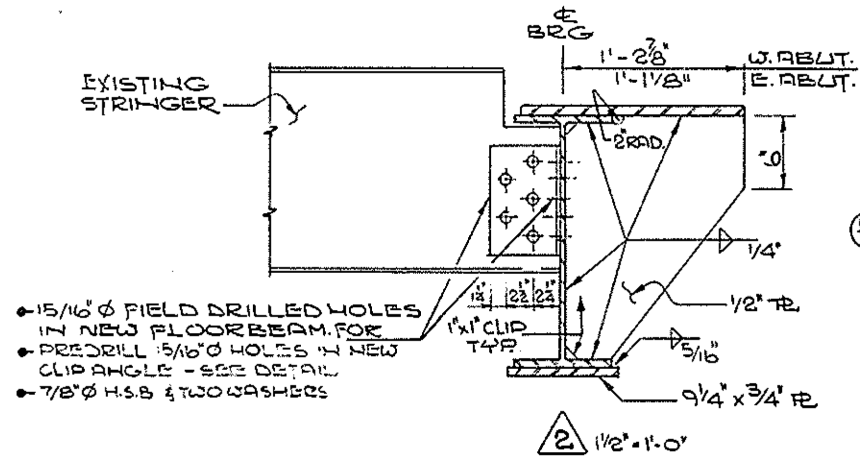
TYP. WF 21x62 NEW END FLOORBEAM 2-REQ'D

SCALE: 3/4" = 1'-0"



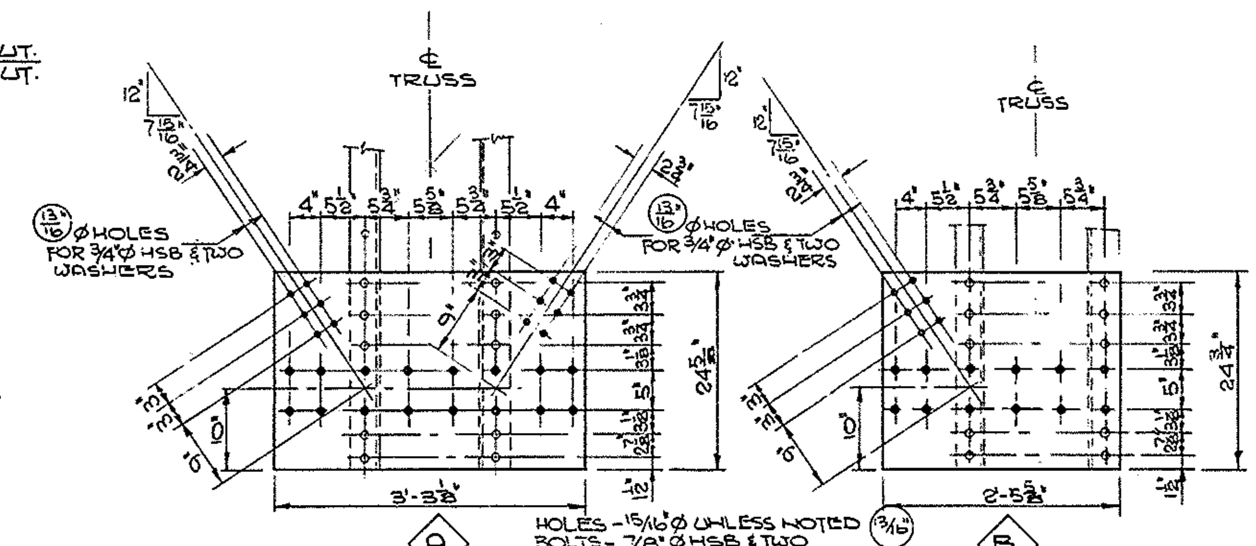
1 1 1/2" = 1'-0"

TYP. BETWEEN STRINGERS



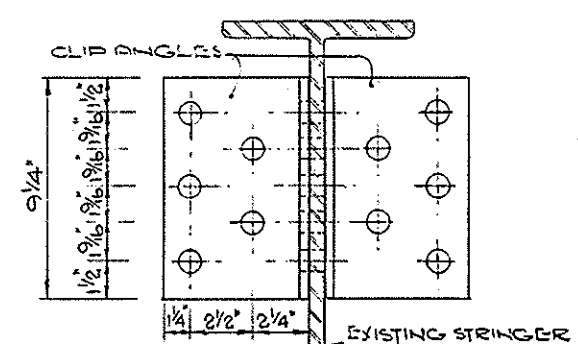
2 1 1/2" = 1'-0"

TYP. AT STRINGERS



A 1" = 1'-0"
24 5/8" x 3/8" x 3'-3 3/8" ℞ - 2-REQ'D

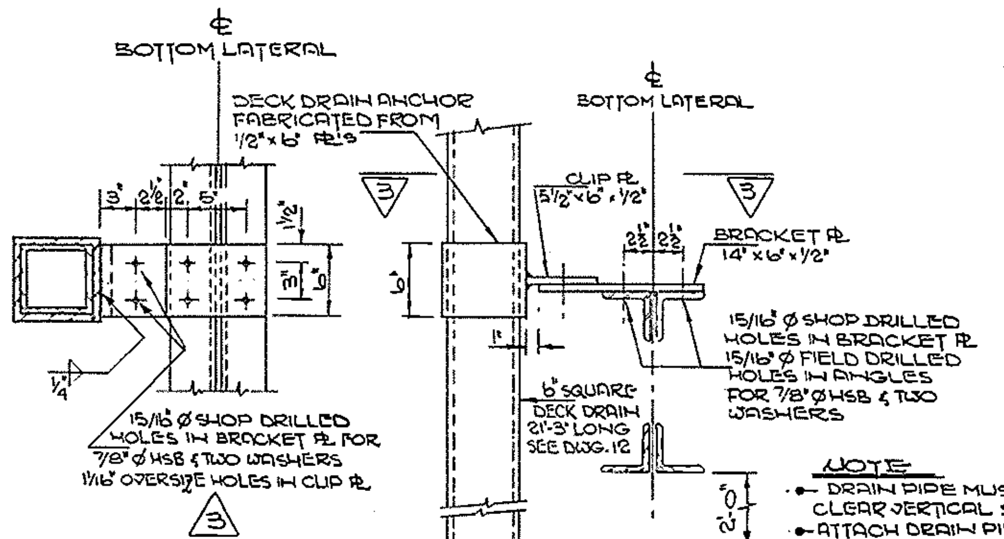
B 1" = 1'-0"
24 3/4" x 3/8" x 2'-5 5/8" ℞ 4-REQ'D



6" x 6" x 3/8" L - 9 1/4" LONG CLIP ANGLE DETAIL
28-REQ'D
SCALE: 3" = 1'-0"

NOTES:

1. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST C.S.A. SPECIFICATIONS G40.21 GRADE 44T.
2. ALL WELDING SHALL CONFORM TO THE LOW HYDROGEN CLASSIFICATION REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY SPECIFICATIONS.
3. BOLTED CONNECTIONS SHALL BE MADE WITH 7/8" Ø BOLTS UNLESS NOTED AND SHALL BE OF CORROSION RESISTING STEEL MEETING THE PHYSICAL REQUIREMENTS OF ASTM STANDARD A325 FOR HIGH STRENGTH BOLTS (FRICTION TYPE CONNECTIONS - TYPE 3). TWO WASHERS SHALL BE USED WITH EACH BOLT, ONE UNDER THE HEAD OF THE BOLT AND THE OTHER UNDER THE NUT.
4. INACCESSIBLE SURFACES OF NEW STEEL AT ABUTMENTS SHALL BE PAINTED WITH TWO COATS OF KOPPERS BITUMASTIC No. 50 IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
5. THE CONTRACTOR SHALL PROVIDE AND REMOVE ALL TEMPORARY BRACING REQUIRED DURING THE REMOVAL OF THE EXISTING END FLOORBEAMS AND THE INSTALLATION OF THE NEW FLOORBEAMS.
6. SHOP PAINTING SHALL BE DONE IN ACCORDANCE WITH MTC FORM 912A



ELEVATION

NOTE
- DRAIN PIPE MUST BE OFFSET SUFFICIENTLY TO CLEAR VERTICAL SWAY BRACING.
- ATTACH DRAIN PIPE TO BOTTOM LATERAL OF TRUSS AS SHOWN.
- ALL MATERIAL TO BE OF G40.21 44T UNLESS NOTED

TYP. DETAILS OF DECK DRAIN CONNECTIONS TO SWAY BRACING

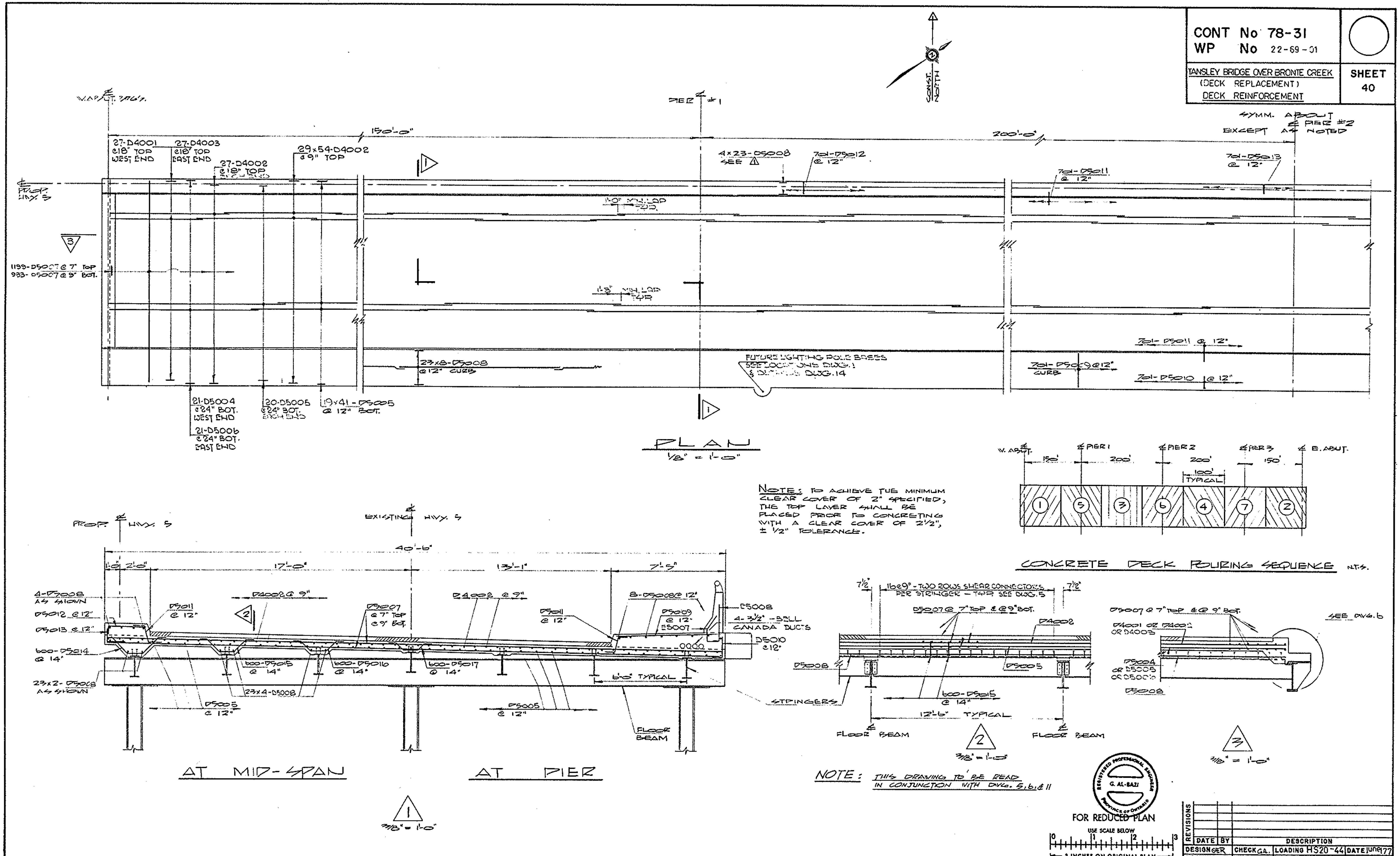
SCALE: 1 1/2" = 1'-0"

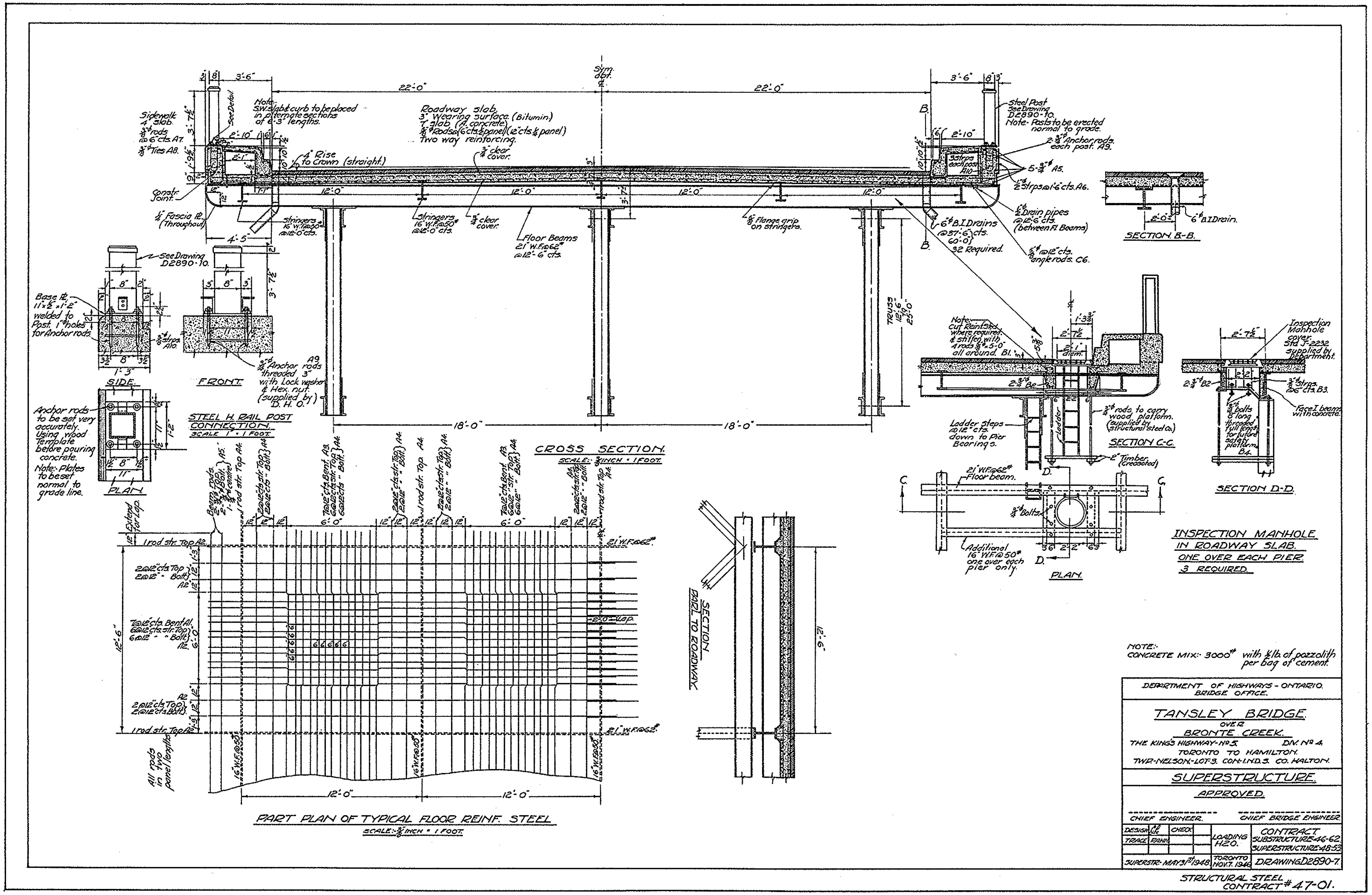
G. AL-BAZI

FOR REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

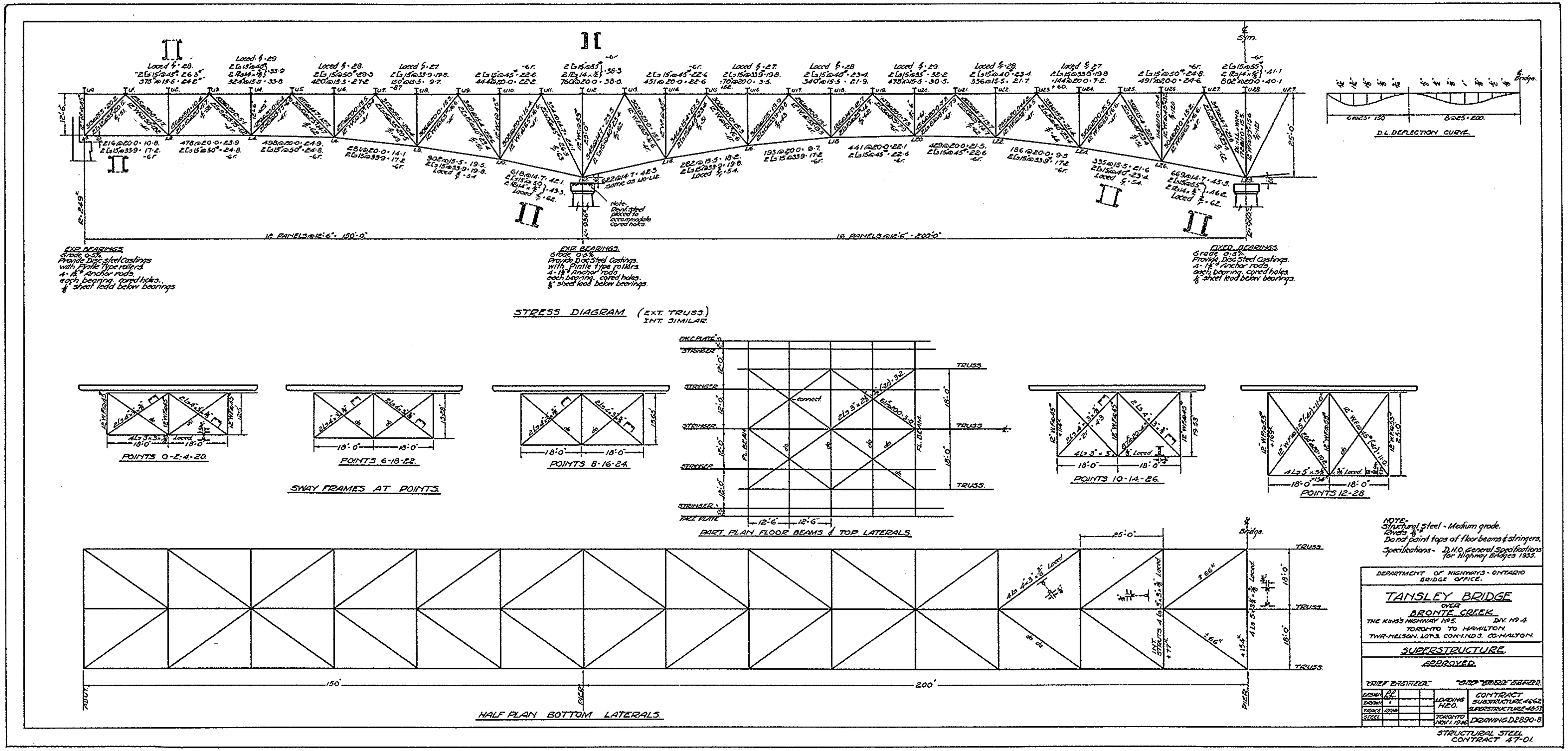
REVISIONS		
DATE	BY	DESCRIPTION

DESIGN GER	CHECK GA.	LOADING HS 20-44	DATE June 77
DRAWING E A	CHECK GER	SITE No 10-111	DWG 4

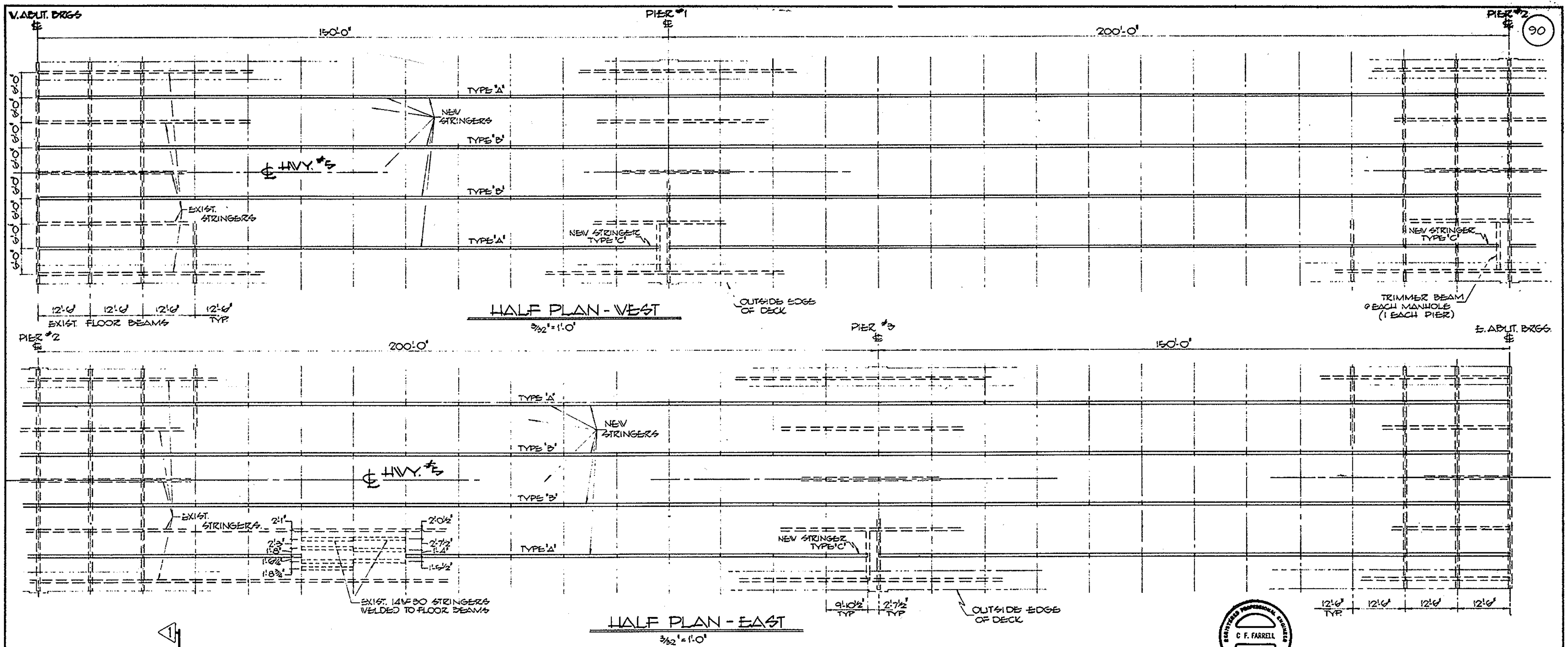

CONT No 78-31
WP No 22-69-01
TANSLEY BRIDGE OVER BRONTE CREEK
(DECK REPLACEMENT)
DECK REINFORCEMENT
SHEET 40
CONST. NORTH
W. ABUT. ℄ BRG.
PIER ℄ #1
SYMM. ABOUT ℄ PIER #2 EXCEPT AS NOTED
150'-0"
200'-0"
27-D4001 @18" TOP WEST END
27-D4003 @18" TOP EAST END
27-D4002 @18" TOP
29x54-D4002 @9" TOP
4x23-D5008 SEE
701-D5012 @ 12"
701-D5011 @ 12"
701-D5013 @ 12"
℄ PROP. HWY. 5
1199-D5007 @ 7" TOP
933-D5007 @ 9" BOT.
1'-0" MIN. LAP
1'-3" MIN. LAP
23x8-D5008 @12" CURB
FUTURE LIGHTING POLE BASES
701-D5011 @ 12"
701-D5009 @12" CURB
701-D5010 @ 12"
21-D5004 @24" BOT. WEST END
21-D5006 @24" BOT. EAST END
20-D5005 @24" BOT.
19x41-D5005 @ 12" BOT.
PLAN
1/8" = 1'-0"
NOTE: TO ACHIEVE THE MINIMUM CLEAR COVER OF 2" SPECIFIED, THE TOP LAYER SHALL BE PLACED PRIOR TO CONCRETING WITH A CLEAR COVER OF 2½", ± ½" TOLERANCE.
W. ABUT.
℄ PIER 1
℄ PIER 2
℄ PIER 3
℄ E. ABUT.
150'
200'
200'
100' TYPICAL
150'
1 5 3 6 4 7 2
CONCRETE DECK POURING SEQUENCE N.T.S.
PROP. ℄ HWY. 5
EXISTING ℄ HWY. 5
40'-6"
1'-0" 2'-0"
17'-0"
13'-1"
7'-5"
4-D5008 AS SHOWN
D5012 @12"
D5013 @ 12"
600-D5014 @ 14"
23x2-D5008 AS SHOWN
D5011 @ 12"
D4002 @ 9"
D5007 @ 7" TOP @ 9" BOT.
D4002 @ 9"
600-D5015 @ 14"
600-D5016 @ 14"
600-D5017 @ 14"
23x4-D5008
D5005 @ 12"
D5005 @ 12"
D5011 @ 12"
8-D5008 @ 12"
D5009 @ 12"
D5007
D5008
4-3½" - BELL CANADA DUCTS
D5010 @12"
6'-0" TYPICAL
FLOOR BEAM
AT MID-SPAN
AT PIER
1
3/8" = 1'-0"
7½"
16@9" - TWO ROWS SHEAR CONNECTORS PER STRINGER - TYP. SEE DWG. 5
7½"
D5007 @ 7" TOP & @ 9" BOT.
D4002
D5008
D5005
STRINGERS
600-D5015 @ 14"
12'-6" TYPICAL
℄ FLOOR BEAM
℄ FLOOR BEAM
2
3/8" = 1'-0"
D5007 @ 7" TOP & @ 9" BOT.
D4001 OR D4002 OR D4003
D5004 OR D5005 OR D5006
D5008
SEE DWG. 6
3
3/8" = 1'-0"
NOTE: THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG. 5, 6 & 11
G. AL-BAZI
FOR REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN
REVISIONS
DATE BY DESCRIPTION
DESIGN GER CHECK G.A. LOADING HS20-44 DATE June 1977
DRAWING CHECK GER SITE No 10-111 DWG 7

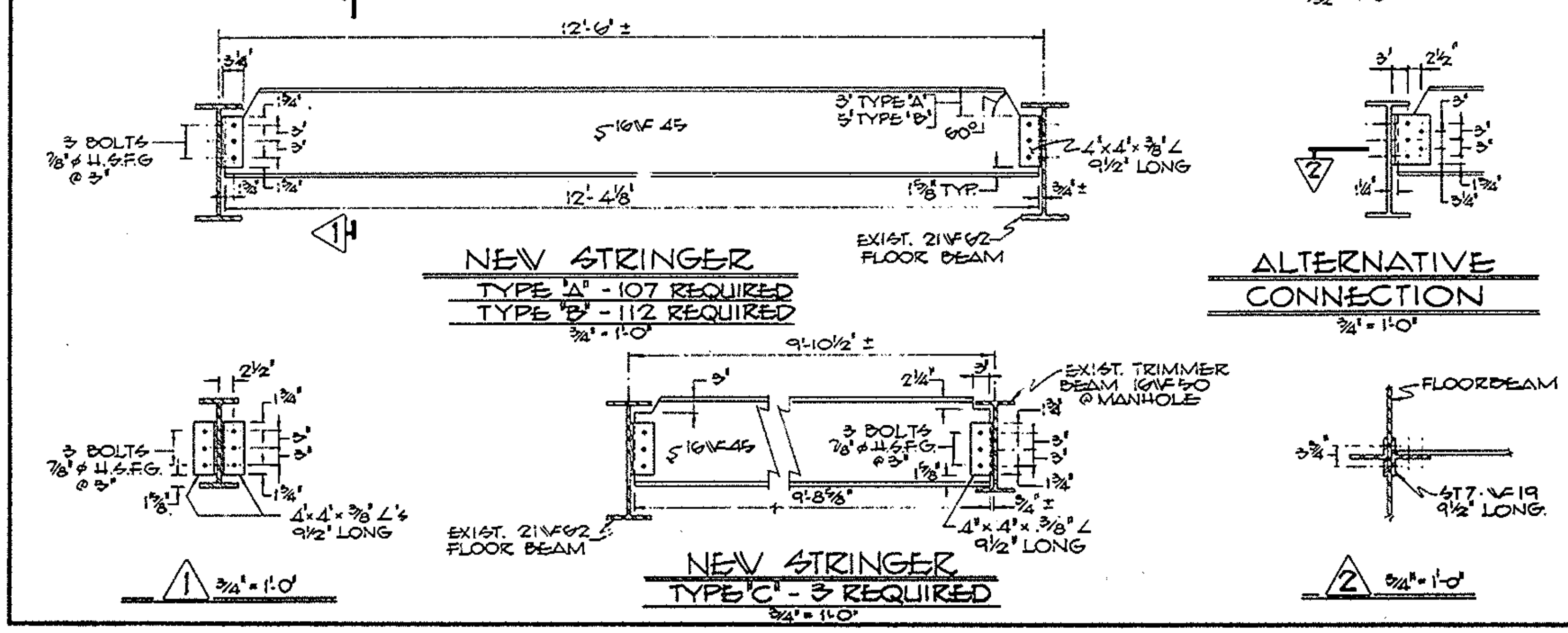


CROSS SECTION.
SCALE: 3/8 INCH = 1 FOOT.
Sym. abt. ℄
22'-0"
22'-0"
3'-6"
Sidewalk 4" slab. 3/8"φ rods @6" cts. A7. 3/8"φ Ties A8.
Note: S.W. slab & curb to be placed in alternate sections of 6'-3" lengths.
See Detail
4" Rise to Crown (straight.)
Roadway slab. 3" Wearing surface (Bitumin.) 7" slab (R. concrete) 5/8"φ Rods (6 cts. & panel) (12" cts. & panel) Two way reinforcing.
3/4" clear cover.
Constr. Joint.
1/2" Fascia ℙ (Throughout)
Stringers 16" W.F.@50# @12'-0" cts.
Floor Beams 21" W.F.@62# @12'-6" cts.
5/8" Flange grip on stringers.
12'-0"
18'-0"
TRUSS 12'-6" 25'-0"
Steel Post See Drawing D2890-10. Note - Posts to be erected normal to grade.
2-3/4"φ Anchor rods each post. A9.
5-3/4"φ A5.
3/8"φ Strps @1'-6" cts. A6.
6"φ Drain pipes @12'-6" cts. (between Fl. Beams)
6"φ B.I. Drains @37'-6" cts. 60'-0" 32 Required.
5/8"φ @12" cts. angle rods. C6.
SECTION B-B.
6"φ B.I. Drain.
See Drawing D2890-10.
Base ℙ 11 x 3/4 x 1'-2" welded to Post. 1" holes for Anchor rods.
SIDE.
FRONT.
3/4"φ Anchor rods threaded 3" with Lock washer & Hex. nut. (supplied by) D.H.O. A9
PLAN.
Anchor rods to be set very accurately. Using wood Template before pouring concrete. Note: Plates to be set normal to grade line.
STEEL H. RAIL POST CONNECTION. SCALE 1" = 1 FOOT.
Note: Cut Reinf. Std. where required & stiffen with 4 rods 5/8"φ x 5'-0" all around. B1.
3/4"φ rods to carry wood platform. (supplied by Structural Steel Co.)
Ladder steps @12" cts. down to Pier Bearings.
2" Timber (creosoted)
SECTION C-C.
21" W.F.@62# Floor beam.
3/4"φ Bolts.
Additional 16" W.F.@50# one over each pier only.
PLAN.
Inspection Manhole cover Std. 3"-2232 supplied by Department.
3/4"φ Strps. @6" cts. B3.
Face I beams with concrete.
SECTION D-D.
INSPECTION MANHOLE IN ROADWAY SLAB. ONE OVER EACH PIER 3 REQUIRED.
SECTION PARL. TO ROADWAY.
12'-6"
PART PLAN OF TYPICAL FLOOR REINF. STEEL
SCALE: 3/8 INCH = 1 FOOT.
All rods in two panel lengths
1 rod str. Top A2.
2@12" cts. Top 2@12" " Bott.
7@12" cts. Bent A1. 6@12" cts. str. Top 6@12" " Bott.
2'-0" Lap.
16" W.F.@50#
21" W.F.@62#
12'-0"
NOTE: CONCRETE MIX: 3000# with 1/4 lb. of pozzolith per bag of cement.
DEPARTMENT OF HIGHWAYS - ONTARIO. BRIDGE OFFICE.
TANSLEY BRIDGE OVER BRONTE CREEK.
THE KINGS HIGHWAY - No 5. DIV. No 4. TORONTO TO HAMILTON. TWP. NELSON - LOT 3. CON. 1 N.D.S. CO. HALTON.
SUPERSTRUCTURE.
APPROVED.
CHIEF ENGINEER.
CHIEF BRIDGE ENGINEER.
DESIGN
CHECK
TRACE
LOADING H20.
CONTRACT. SUBSTRUCTURE 46-62 SUPERSTRUCTURE 48-53
SUPERSTR. MAY 31st 1948.
TORONTO NOV. 7. 1946
DRAWING D2890-7.
STRUCTURAL STEEL CONTRACT # 47-01.



STRESS DIAGRAM (EXT. TRUSS.) INT. SIMILAR.
D.L. DEFLECTION CURVE.
EXP. BEARINGS
FIXED BEARINGS
SWAY FRAMES AT POINTS.
POINTS 0-2-4-20.
POINTS 6-18-22.
POINTS 8-16-24.
POINTS 10-14-26.
POINTS 12-28.
PART PLAN FLOOR BEAMS & TOP LATERALS.
HALF PLAN BOTTOM LATERALS.
NOTE-
Structural steel - Medium grade.
Do not paint tops of floor beams & stringers.
Specifications - D.H.O. General Specifications for Highway Bridges 1933.
DEPARTMENT OF HIGHWAYS - ONTARIO
BRIDGE OFFICE.
TANSLEY BRIDGE
OVER
BRONTE CREEK
THE KING'S HIGHWAY Nº5. DIV. Nº4.
TORONTO TO HAMILTON
TWP.-NELSON, LOTS, CON.1 N.D.S. CO.-HALTON.
SUPERSTRUCTURE.
APPROVED
CHIEF ENGINEER.
CHIEF BRIDGE ENGINEER.
LOADING H20.
CONTRACT SUBSTRUCTURE 4662 SUPERSTRUCTURE 4653
TORONTO NOV. 1, 1946.
DRAWING D2890-8
STRUCTURAL STEEL CONTRACT 47-01.





NOTES:

- ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF C.S.A. STANDARD SPECIFICATION G40.12 OR A.S.T.M. A36
- BOLTED CONNECTIONS SHALL BE MADE WITH 7/8" DIA. BOLTS MEETING THE REQUIREMENTS OF A.S.T.M. A-325 SPECIFICATION FOR H.T.S. BOLTS.
- ALL BOLT HOLES TO BE 15/16" DIA.
- STRINGERS TO BE JACKED AGAINST DECK BEFORE MAKING CONNECTIONS.
- HOLES AT ONE END OF STRINGER TO BE DRILLED ON SITE, TO ALLOW FOR ANY DISCREPANCY IN FLOORBEAM SPACING.

TOTAL WEIGHT OF STRUCTURAL STEEL IN STRINGERS AND CONNECTIONS = 66 TONS

- ALTERNATIVE STRINGER/FLOORBEAM CONNECTIONS WILL BE CONSIDERED, SUBJECT TO APPROVAL BY THE ENGINEER.

C. F. FARRELL

FOR REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

REVISIONS	DATE	BY	DESCRIPTION

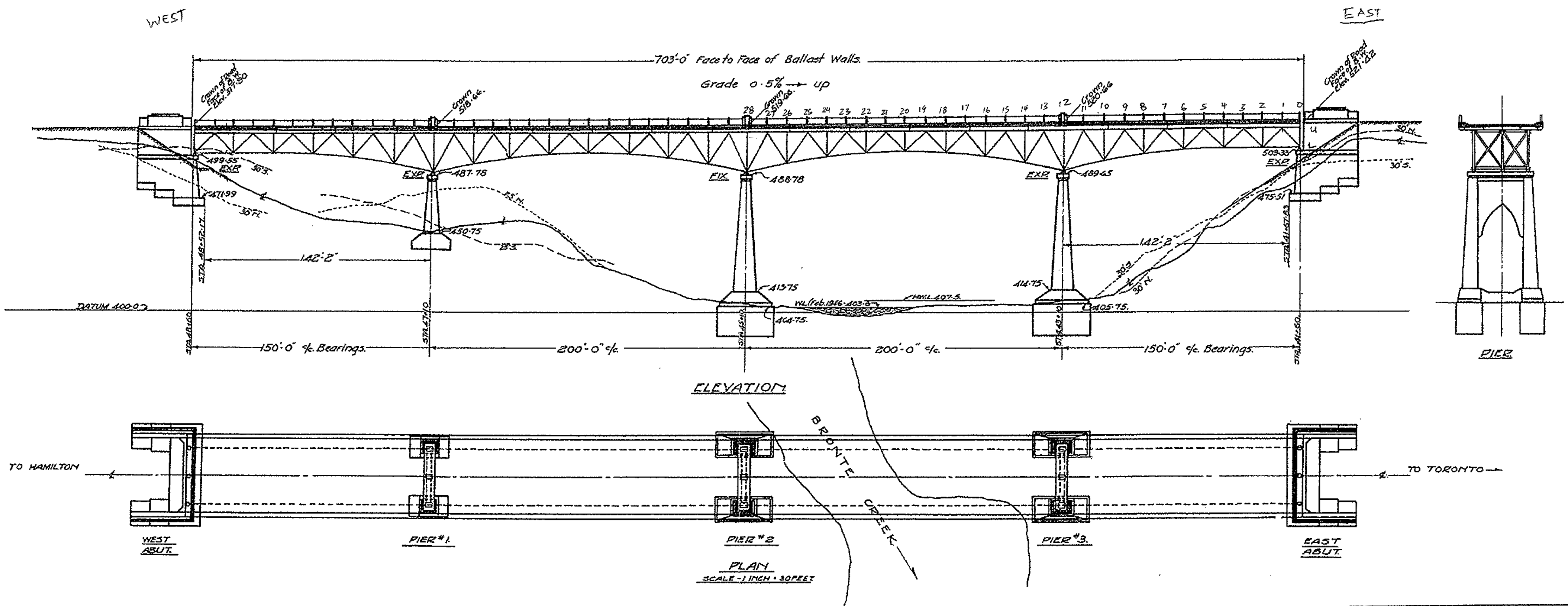
DEPARTMENT OF HIGHWAYS ONTARIO
BRIDGE OFFICE

ADDITIONAL STRINGERS FOR TANSLEY BRIDGE OVER BRONTE CREEK
STAGE I

KING'S HIGHWAY No. 5 — DIST. No. 4
CO. HALTON — TOWN OF BURLINGTON
TWP. — LOT 3 — CON. I.N.D.S.

STRUCTURAL STEEL DETAILS

APPROVED	BRIDGE ENGINEER	SITE No. 10-111	W.P. No. 22-69-02
DESIGN C.F.F.	CHECK P.O.L.	CONTRACT No.	71-137
DRAWING G.T.	CHECK C.F.F.	DRAWING No.	D-6866-2
DATE JULY 71	LOADING HS20-44		



NOTE FOR DIVISION ENGINEER
Work on this structure must not be commenced until monuments to fix control points have been erected and checked by the engineer.

NOTE FOR CONTRACTOR
Structure to be built in accordance with D.H.O. General Specifications for Highway Bridges 1935 Form Nº 9 and the special instructions as given in the information to bidders sheet, additional copies of which may be obtained from the Division engineer.

CONCRETE MIX:-
FOOTINGS - 2500# } with 1 lb. of pozzolith
OTHER CONCRETE: 3000# } per bag of cement.

DEPARTMENT OF HIGHWAYS - ONTARIO.
BRIDGE OFFICE.

TANSLEY BRIDGE

OVER

BRONTE CREEK.

THE KING'S HIGHWAY Nº 5. DIV. Nº 4.

TORONTO TO HAMILTON.

TWP.-NELSON. LOT 3. CON. I N.D.S. CO.-HALTON.

GENERAL PLAN.

APPROVED

CHIEF ENGINEER. CHIEF BRIDGE ENGINEER.

DESIGN	LOCH			LOADING H20.	CONTRACT. SUBSTRUCTURE. 46-62. SUPERSTRUCTURE.
TRACE	RANY				
				TORONTO JULY 2 1946	DRAWING D~~2890-1~~

1337-22-1

APPENDIX ‘B’
SITE PHOTOGRAPHS

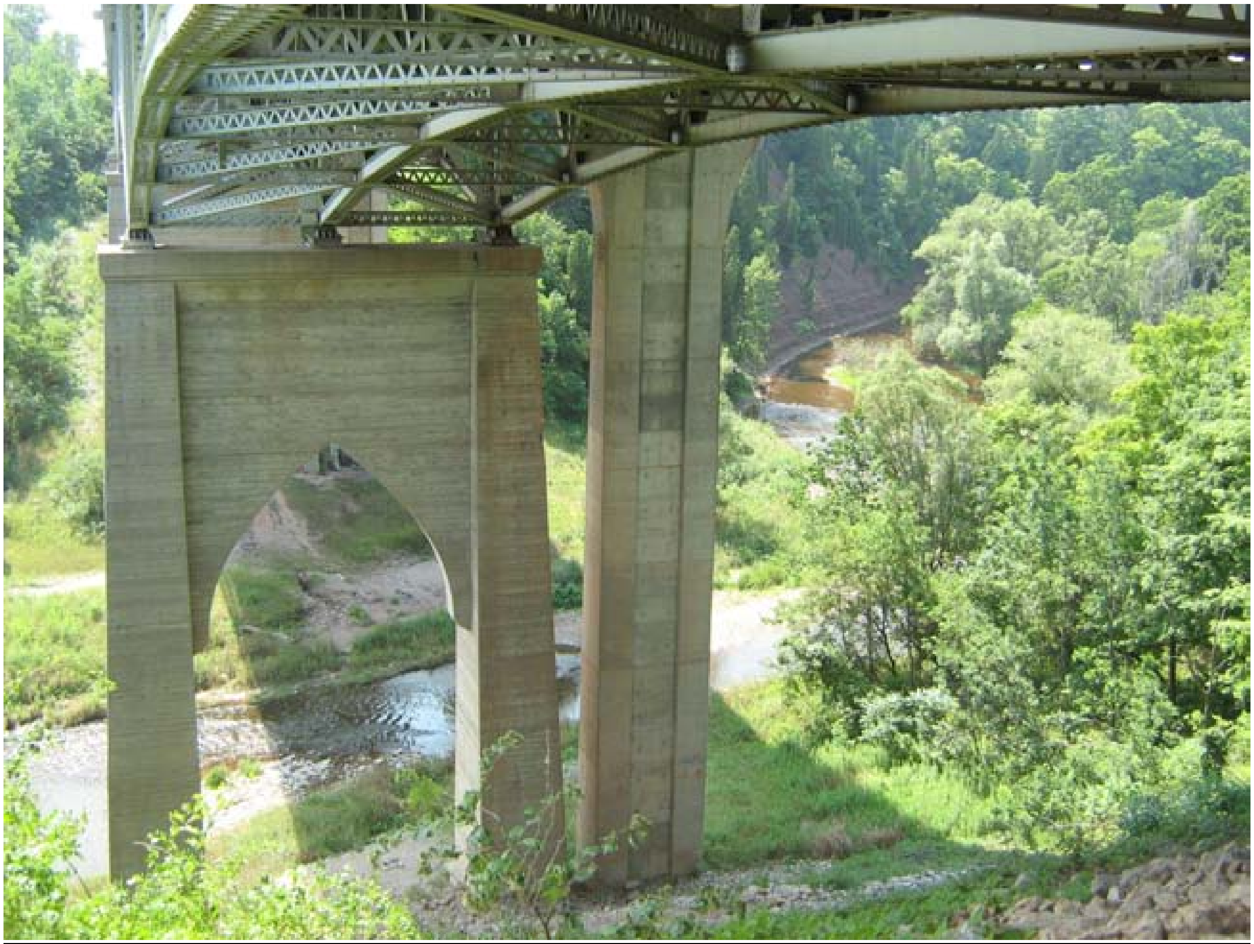
DECK LAYOUT

SIDEWALK AND BARRIER

TRUSS BRIDGE: ELEVATION VIEW

GIRDER BRIDGE: ELEVATION VIEW

UNDERSIDE VIEW



Left: Bridge pier for truss structure
Right: Bridge pier for girder structure

TANSLEY BRIDGE PIERS

TRUSS SUPERSTRUCTURE: CROSS-FRAMES

TRUSS SUPERSTRUCTURE: BOTTOM CHORD AND BRACING

TYPICAL TOP GUSSET PLATE

TYPICAL BOTTOM GUSSET PLATE

APPENDIX ‘C’
CALCULATION SUMMARIES

TABLE C1 - LOAD CAPACITY EVALUATION - TANSLEY BRIDGE OVER BRONTE CREEK
STEEL GIRDERS & CONCRETE DECK, COMPOSITE SECTION

Notes:

1. Load rating method is referenced to CSA - S6 - 06, Section 14.
2. Evaluation procedure: ULS method.
3. Highway Class A (as per CSA-S6-06 Clause 1.4.2.2)
4. Evaluation Level 1 (Vehicle trains)
5. Assume concrete deck is poured all at once.
5. Inspection Level considered: "INSP2".
6. A concrete deck overlay with a nominal thickness of 76.2mm is considered.
7. Target reliability index from Table 14.6.
8. Dead load factors from Table 14.7.
9. Live load factors are from Table 14.12.
10. Resistance adjustment factor from Table 14.15.
11. Live load capacity factor as per Clause 14.15.2.1.
12. Material strength: F_y = 350 MPa (F_y) for structural steel
f'_c = 27.6 MPa for concrete deck
f_y = 414 MPa for reinforcement

Elt. #	Element - Force Effect	Effect	Target reliability index				Dead load						Live Load							Resistance		LL
		Units	Syst	Elem	Insp	Beta	Unfact. loads		Load factors		Fact. loads		Lat.	Type	Unfact	Unfact	DLA	Load	Fact L	Fact	Adjust	Capacity
			Behav	Behav	Level		D1	D2	D1	D2	D1	D2	Distr.	span	Lane	Truck		factor	incl DLA	Resist	Fact	Factor
1	Exterior Span, North Exterior Girder - Positive Moment Near or at Midspan	Mmax (+) [kN.m]	S2	E3	INSP2	3.00	1837	3231	1.07	1.14	1966	3683	static	All	1411	3411	0.25	1.49	6353	24443	0.96	2.80
2	Interior Span, North Exterior Girder - Positive Moment at Midspan	Mmax (+) [kN.m]	S2	E3	INSP2	3.00	1375	2282	1.07	1.14	1471	2602	static	All	1458	3265	0.25	1.49	6081	24443	0.96	3.19
3	North Exterior Girder - Negative Moment at Pier 1 or 3 Support	Mmax (-) [kN.m]	S2	E3	INSP2	3.00	-4500	-7839	1.07	1.14	-4816	-8937	static	All	-2315	-2961	0.25	1.49	-6979	-41763	0.96	3.77
4	North Exterior Girder - Web Shear at Pier Supports (outside face)	Vmax [kN]	S2	E3	INSP2	3.00	435	653	1.07	1.14	466	745	static	All	215	451	0.25	1.49	858	4127	1.03	3.54
5	North Exterior Girder - Web Shear at Abutment Supports	Vmax [kN]	S2	E3	INSP2	3.00	213	317	1.07	1.14	228	361	static	All	113	348	0.25	1.49	648	2203	1.00	2.49
																			Governing LL Capacity Factor			2.49

TABLE XX - LOAD CAPACITY EVALUATION - TANSLEY BRIDGE OVER BRONTE CREEK
STEEL TRUSS BRIDGE - STRINGERS & FLOORBEAMS

Notes:

1. Load rating method is referenced to CSA - S6 - 06, Section 14.
2. Evaluation procedure: ULS method.
3. Highway Class A (as per CSA-S6-06 Clause 1.4.2.2)
4. Evaluation Level 1 (Vehicle trains)
5. Assume concrete deck is poured all at once.
6. Inspection Level considered: "INSP2".
7. A concrete deck overlay with a nominal thickness of 76.2mm is considered.
8. Target reliability index from Table 14.6.
9. Dead load factors from Table 14.7.
10. Live load factors are from Table 14.12.
11. Resistance adjustment factor from Table 14.15.
12. Live load capacity factor as per Clause 14.15.2.1.
13. Material strengths:
    F_y = 230 MPa for original structural steel
    F_y = 300 MPa for new structural steel
    f'_c = 27.6 MPa for concrete deck

	NAME	DATE
EVALUATOR	KWS	10/28/09
CHECKER		

Elt. #	Element - Force Effect	Effect Units	Target reliability index				Dead load									Live Load					Resistance		LL Capacity Factor
			Syst Behav	Elem Behav	Insp Level	Beta	Unfact. loads D1	Unfact. loads D2	Unfact. loads D3	Load factors D1	Load factors D2	Fact. loads D1	Fact. loads D2	Lat. Distr.	Type span	Unfact Lane	Unfact Truck	DLA	Load factor	Fact L incl DLA	Fact Resist	Adjust Fact	
1	Floorbeams - Maximum Positive Moment (End floorbeam govern)	Mmax (+) [kN.m]	S2	E3	INSP2	3.00	3	13	0	1.07	1.14	2.7	14.8	static	All	12	103	0.30	1.49	199	408	1.06	2.08
2	Floorbeams - Maximum Negative Moment (End floorbeam govern)	Mmax (-)]kN.m]	S2	E3	INSP2	3.00	-8	-45	0	1.07	1.14	-8.7	-51.6	static	All	-17	-99	0.30	1.49	-192	-408	1.06	1.93
3	Stringers - Maximum Positive Moment (Old stringers govern)	Mmax (+) [kN.m]	S3	E3	INSP2	2.75	6	24	0	1.06	1.12	6.3	26.5	static	All	9	134	0.30	1.42	247	307	1.00	1.11
4	Floorbeams - Web Shear (End floorbeam govern)	Vmax [kN]	S2	E3	INSP2	3.00	5	32	0	1.07	1.14	5.1	36.3	static	All	16	93	0.30	1.49	180	645	1.03	3.46
5	Stringers - Web Shear (Old stringers govern)	Vmax]kN]	S3	E3	INSP2	2.75	6	25	0	1.06	1.12	6.6	27.8	static	All	9	103	0.30	1.42	189	466	1.03	2.35
																			Governing LL Capacity Factor				1.11

DL1: Steel, 15% contingency and barriers
DL2: CIP Deck, Haunch and Overlay

W.O. 7108.300
Tansley Bridge Over Bronte Creek
Truss Bridge

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	0.81	Compressive buckling @ end of Member U1-L0	-901	-1019	-1709	1.01	Assume L_2=235mm	no	0.080	50.3
L2E	0.61	Compressive buckling @ end of Member U3-L2	-388	-802	-868	1.01		no	0.060	37.4
L4E	2.16	Compressive buckling @ end of Member U5-L4	198	-595	-1078	1.01		no	0.219	
L6E	1.07	Compressive buckling @ end of Member U5-L6	-525	-714	-1274	1.01		no	0.107	
L8E	2.17	Compressive buckling @ end of Member U7-L8	-963	-896	-2880	1.01		no	0.221	
L10E	1.08	Compressive buckling @ end of Member U9-L10	-1178	-975	-2208	1.01		no	0.108	
L12E	1.66	Compressive buckling @ end of Member U11-L12	-1258	-1033	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.168	
L14E	1.97	Compressive buckling @ end of Member U15-L14	-1127	-981	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.199	
L16E	1.75	Compressive buckling @ end of Member U17-L16	-900	-937	-2512	1.01		no	0.177	
L18E	2.00	Compressive buckling @ end of Member U19-L18	-456	-813	-2058	1.01		no	0.202	
L20E	2.54	Compressive buckling @ end of Member U21-L20	174	-571	-1264	1.01		no	0.259	
L22E	0.77	Compressive buckling @ end of Member U21-L22	-499	-793	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.076	47.7
L24E	1.28	Compressive buckling @ end of Member U23-L24	-931	-936	-2104	1.01		no	0.128	
L26E	1.43	Compressive buckling @ end of Member U25-L26	-1144	-1000	-2544	1.01		no	0.144	
L28	1.12	Compressive buckling @ end of Member U27-L28	-1217	-1052	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.113	

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.08	Compressive buckling @ end of Member U1-L0	-901	-1019	-1978	1.01		no	0.108	
U3E	**0.51**	Compressive buckling @ end of Member U3-L2	-388	-802	-786	1.01		no	0.049	30.8
U5E	**0.69**	Compressive buckling @ end of Member U5-L6	-525	-714	-1010	1.01		no	0.068	42.8
U7E	**0.51**	Compressive buckling @ end of Member U7-L8	-963	-896	-1406	1.01		no	0.050	31.0
U9E	**0.65**	Compressive buckling @ end of Member U9-L10	-1178	-975	-1798	1.01	Effective width = 762.0mm	no	0.064	40.3
U11E	1.13	Compressive buckling @ end of Member U11-L12	-1258	-1033	-2400	1.01	Effective width = 616.9mm	yes	0.113	
U13E	**0.95**	Compressive buckling @ end of Member U13-L12	-1218	-1023	-2170	1.01		yes	0.095	59.4
U15E	**0.88**	Compressive buckling @ end of Member U15-L14	-1127	-981	-1974	1.01		no	0.088	55.0
U17E	**0.53**	Compressive buckling @ end of Member U17-L16	-900	-937	-1382	1.01		no	0.052	32.3
U19E	**0.67**	Compressive buckling @ end of Member U19-L18	-456	-813	-990	1.01		no	0.066	41.2
U21E	**0.74**	Compressive buckling @ end of Member U21-L22	-499	-793	-1076	1.01		no	0.073	45.9
U23E	**0.51**	Compressive buckling @ end of Member U23-L24	-931	-936	-1394	1.01		no	0.050	31.0
U25E	1.24	Compressive buckling @ end of Member U25-L26	-1144	-1000	-2356	1.01		no	0.124	
U27E	**0.83**	Compressive buckling @ end of Member U27-L28	-1217	-1052	-2073	1.01	Effective width = 495.88mm	yes	0.083	51.8

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	**0.89**	Compressive buckling @ end of Member U1-L0	-901	-925	-1709	1.01	Assume L_2=235mm	no	0.064	40.0
L2E	**0.67**	Compressive buckling @ end of Member U3-L2	-388	-735	-868	1.01		no	0.047	29.5
L4E	2.30	Compressive buckling @ end of Member U5-L4	198	-559	-1078	1.01		no	0.169	
L6E	1.12	Compressive buckling @ end of Member U5-L6	-525	-681	-1274	1.01		no	0.081	
L8E	2.36	Compressive buckling @ end of Member U7-L8	-963	-823	-2880	1.01		no	0.173	
L10E	1.19	Compressive buckling @ end of Member U9-L10	-1178	-881	-2208	1.01		no	0.086	
L12E	1.83	Compressive buckling @ end of Member U11-L12	-1258	-935	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.134	
L14E	2.18	Compressive buckling @ end of Member U15-L14	-1127	-884	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.160	
L16E	1.93	Compressive buckling @ end of Member U17-L16	-900	-848	-2512	1.01		no	0.141	
L18E	2.18	Compressive buckling @ end of Member U19-L18	-456	-744	-2058	1.01		no	0.160	
L20E	2.71	Compressive buckling @ end of Member U21-L20	174	-535	-1264	1.01		no	0.199	
L22E	**0.84**	Compressive buckling @ end of Member U21-L22	-499	-728	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.060	37.5
L24E	1.41	Compressive buckling @ end of Member U23-L24	-931	-849	-2104	1.01		no	0.102	
L26E	1.58	Compressive buckling @ end of Member U25-L26	-1144	-901	-2544	1.01		no	0.115	
L28	1.24	Compressive buckling @ end of Member U27-L28	-1217	-950	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.090	

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.19	Compressive buckling @ end of Member U1-L0	-901	-925	-1978	1.01		no	0.086	
U3E	0.55	Compressive buckling @ end of Member U3-L2	-388	-735	-786	1.01		no	0.039	24.2
U5E	0.73	Compressive buckling @ end of Member U5-L6	-525	-681	-1010	1.01		no	0.052	32.3
U7E	0.56	Compressive buckling @ end of Member U7-L8	-963	-823	-1406	1.01		no	0.039	24.3
U9E	0.72	Compressive buckling @ end of Member U9-L10	-1178	-881	-1798	1.01	Effective width = 762.0mm	no	0.051	32.2
U11E	1.25	Compressive buckling @ end of Member U11-L12	-1258	-935	-2400	1.01	Effective width = 616.9mm	yes	0.090	
U13E	1.05	Compressive buckling @ end of Member U13-L12	-1218	-926	-2170	1.01		yes	0.076	
U15E	0.98	Compressive buckling @ end of Member U15-L14	-1127	-883	-1974	1.01		no	0.071	44.1
U17E	0.59	Compressive buckling @ end of Member U17-L16	-900	-848	-1382	1.01		no	0.041	25.7
U19E	0.73	Compressive buckling @ end of Member U19-L18	-456	-744	-990	1.01		no	0.052	32.5
U21E	0.81	Compressive buckling @ end of Member U21-L22	-499	-728	-1076	1.01		no	0.058	36.1
U23E	0.56	Compressive buckling @ end of Member U23-L24	-931	-849	-1394	1.01		no	0.040	24.7
U25E	1.37	Compressive buckling @ end of Member U25-L26	-1144	-901	-2356	1.01		no	0.100	
U27E	0.92	Compressive buckling @ end of Member U27-L28	-1217	-950	-2073	1.01	Effective width = 495.88mm	yes	0.066	41.5

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.04	Compressive buckling @ end of Member U1-L0	-901	-795	-1709	1.01	Assume L_2=235mm	no	0.042	
L2E	**0.78**	Compressive buckling @ end of Member U3-L2	-388	-628	-868	1.01		no	0.031	19.3
L4E	2.62	Compressive buckling @ end of Member U5-L4	198	-491	-1078	1.01		no	0.107	
L6E	1.28	Compressive buckling @ end of Member U5-L6	-525	-597	-1274	1.01		no	0.051	
L8E	2.76	Compressive buckling @ end of Member U7-L8	-963	-704	-2880	1.01		no	0.113	
L10E	1.42	Compressive buckling @ end of Member U9-L10	-1178	-740	-2208	1.01		no	0.057	
L12E	2.20	Compressive buckling @ end of Member U11-L12	-1258	-778	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.090	
L14E	2.60	Compressive buckling @ end of Member U15-L14	-1127	-742	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.106	
L16E	2.27	Compressive buckling @ end of Member U17-L16	-900	-721	-2512	1.01		no	0.093	
L18E	2.54	Compressive buckling @ end of Member U19-L18	-456	-638	-2058	1.01		no	0.104	
L20E	3.08	Compressive buckling @ end of Member U21-L20	174	-471	-1264	1.01		no	0.126	
L22E	**0.98**	Compressive buckling @ end of Member U21-L22	-499	-625	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.039	24.4
L24E	1.65	Compressive buckling @ end of Member U23-L24	-931	-722	-2104	1.01		no	0.067	
L26E	1.89	Compressive buckling @ end of Member U25-L26	-1144	-753	-2544	1.01		no	0.077	
L28	1.51	Compressive buckling @ end of Member U27-L28	-1217	-785	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.061	

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.38	Compressive buckling @ end of Member U1-L0	-901	-795	-1978	1.01		no	0.056	
U3E	**0.65**	Compressive buckling @ end of Member U3-L2	-388	-628	-786	1.01		no	0.025	15.9
U5E	**0.83**	Compressive buckling @ end of Member U5-L6	-525	-597	-1010	1.01		no	0.033	20.6
U7E	**0.65**	Compressive buckling @ end of Member U7-L8	-963	-704	-1406	1.01		no	0.025	15.9
U9E	**0.86**	Compressive buckling @ end of Member U9-L10	-1178	-740	-1798	1.01	Effective width = 762.0mm	no	0.034	21.4
U11E	1.50	Compressive buckling @ end of Member U11-L12	-1258	-778	-2400	1.01	Effective width = 616.9mm	yes	0.061	
U13E	1.26	Compressive buckling @ end of Member U13-L12	-1218	-773	-2170	1.01		yes	0.051	
U15E	**0.98**	Compressive buckling @ end of Member U15-L14	-1127	-884	-1974	1.01		no	0.039	24.5
U17E	**0.69**	Compressive buckling @ end of Member U17-L16	-900	-721	-1382	1.01		no	0.027	16.9
U19E	**0.85**	Compressive buckling @ end of Member U19-L18	-456	-638	-990	1.01		no	0.034	21.2
U21E	**0.94**	Compressive buckling @ end of Member U21-L22	-499	-625	-1076	1.01		no	0.038	23.5
U23E	**0.66**	Compressive buckling @ end of Member U23-L24	-931	-722	-1394	1.01		no	0.026	16.2
U25E	1.64	Compressive buckling @ end of Member U25-L26	-1144	-753	-2356	1.01		no	0.067	
U27E	1.12	Compressive buckling @ end of Member U27-L28	-1217	-785	-2073	1.01	Effective width = 495.88mm	yes	0.045	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	**0.94**	Compressive buckling @ end of Member U1-L0	-726	-1067	-1709	1.01	Assume L_2=235mm	no	0.094	58
L2E	**0.82**	Compressive buckling @ end of Member U3-L2	-285	-720	-868	1.01		no	0.082	51
L4E	3.40	Compressive buckling @ end of Member U5-L4	219	-384	-1078	1.01		no	0.347	
L6E	1.54	Compressive buckling @ end of Member U5-L6	-383	-588	-1274	1.01		no	0.155	
L8E	2.37	Compressive buckling @ end of Member U7-L8	-763	-906	-2880	1.01		no	0.241	
L10E	1.31	Compressive buckling @ end of Member U9-L10	-892	-1019	-2208	1.01		no	0.132	
L12E	2.14	Compressive buckling @ end of Member U11-L12	-850	-990	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.217	
L14E	2.21	Compressive buckling @ end of Member U15-L14	-822	-1011	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.225	
L16E	1.98	Compressive buckling @ end of Member U17-L16	-681	-936	-2512	1.01		no	0.201	
L18E	2.54	Compressive buckling @ end of Member U19-L18	-314	-695	-2058	1.01		no	0.258	
L20E	3.98	Compressive buckling @ end of Member U21-L20	189	-368	-1264	1.01		no	0.407	
L22E	1.12	Compressive buckling @ end of Member U21-L22	-345	-685	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.112	
L24E	1.53	Compressive buckling @ end of Member U23-L24	-699	-930	-2104	1.01		no	0.155	
L26E	1.74	Compressive buckling @ end of Member U25-L26	-826	-1001	-2544	1.01		no	0.176	
L28	1.66	Compressive buckling @ end of Member U27-L28	-795	-967	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.168	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.19	Compressive buckling @ end of Member U1-L0	-726	-1067	-1978	1.01		no	0.120	
U3E	**0.71**	Compressive buckling @ end of Member U3-L2	-285	-720	-786	1.01		no	0.070	44
U5E	1.08	Compressive buckling @ end of Member U5-L6	-383	-588	-1010	1.01		no	0.109	
U7E	**0.73**	Compressive buckling @ end of Member U7-L8	-763	-906	-1406	1.01		no	0.072	45
U9E	**0.91**	Compressive buckling @ end of Member U9-L10	-892	-1019	-1798	1.01	Effective width = 762.0mm	no	0.090	57
U11E	1.59	Compressive buckling @ end of Member U11-L12	-850	-990	-2400	1.01	Effective width = 616.9mm	yes	0.161	
U13E	1.42	Compressive buckling @ end of Member U13-L12	-801	-976	-2170	1.01		yes	0.144	
U15E	1.16	Compressive buckling @ end of Member U15-L14	-822	-1011	-1974	1.01		no	0.116	
U17E	**0.76**	Compressive buckling @ end of Member U17-L16	-681	-936	-1382	1.01		no	0.076	47
U19E	**0.99**	Compressive buckling @ end of Member U19-L18	-314	-695	-990	1.01		no	0.099	62
U21E	1.08	Compressive buckling @ end of Member U21-L22	-345	-685	-1076	1.01		no	0.109	
U23E	**0.76**	Compressive buckling @ end of Member U23-L24	-699	-930	-1394	1.01		no	0.076	47
U25E	1.55	Compressive buckling @ end of Member U25-L26	-826	-1001	-2356	1.01		no	0.157	
U27E	1.34	Compressive buckling @ end of Member U27-L28	-795	-967	-2073	1.01	Effective width = 495.88mm	yes	0.135	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.06	Compressive buckling @ end of Member U1-L0	-726	-940	-1709	1.01	Assume L_2=235mm	no	0.077	
L2E	0.92	Compressive buckling @ end of Member U3-L2	-285	-645	-868	1.01		no	0.066	41
L4E	3.71	Compressive buckling @ end of Member U5-L4	219	-353	-1078	1.01		no	0.273	
L6E	1.62	Compressive buckling @ end of Member U5-L6	-383	-557	-1274	1.01		no	0.118	
L8E	2.66	Compressive buckling @ end of Member U7-L8	-763	-808	-2880	1.01		no	0.195	
L10E	1.50	Compressive buckling @ end of Member U9-L10	-892	-892	-2208	1.01		no	0.109	
L12E	2.46	Compressive buckling @ end of Member U11-L12	-850	-862	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.181	
L14E	2.53	Compressive buckling @ end of Member U15-L14	-822	-883	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.186	
L16E	2.25	Compressive buckling @ end of Member U17-L16	-681	-825	-2512	1.01		no	0.165	
L18E	2.84	Compressive buckling @ end of Member U19-L18	-314	-622	-2058	1.01		no	0.209	
L20E	4.35	Compressive buckling @ end of Member U21-L20	189	-337	-1264	1.01		no	0.321	
L22E	1.25	Compressive buckling @ end of Member U21-L22	-345	-613	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.090	
L24E	1.74	Compressive buckling @ end of Member U23-L24	-699	-820	-2104	1.01		no	0.127	
L26E	2.00	Compressive buckling @ end of Member U25-L26	-826	-874	-2544	1.01		no	0.146	
L28	1.91	Compressive buckling @ end of Member U27-L28	-795	-841	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.139	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.35	Compressive buckling @ end of Member U1-L0	-726	-940	-1978	1.01		no	0.098	
U3E	**0.79**	Compressive buckling @ end of Member U3-L2	-285	-645	-786	1.01		no	0.056	35
U5E	1.14	Compressive buckling @ end of Member U5-L6	-383	-557	-1010	1.01		no	0.083	
U7E	**0.81**	Compressive buckling @ end of Member U7-L8	-763	-808	-1406	1.01		no	0.058	36
U9E	1.04	Compressive buckling @ end of Member U9-L10	-892	-892	-1798	1.01	Effective width = 762.0mm	no	0.075	
U11E	1.83	Compressive buckling @ end of Member U11-L12	-850	-862	-2400	1.01	Effective width = 616.9mm	yes	0.133	
U13E	1.64	Compressive buckling @ end of Member U13-L12	-801	-849	-2170	1.01		yes	0.119	
U15E	1.33	Compressive buckling @ end of Member U15-L14	-822	-883	-1974	1.01		no	0.096	
U17E	**0.87**	Compressive buckling @ end of Member U17-L16	-681	-825	-1382	1.01		no	0.062	39
U19E	1.10	Compressive buckling @ end of Member U19-L18	-314	-622	-990	1.01		no	0.080	
U21E	1.21	Compressive buckling @ end of Member U21-L22	-345	-613	-1076	1.01		no	0.088	
U23E	**0.87**	Compressive buckling @ end of Member U23-L24	-699	-820	-1394	1.01		no	0.062	39
U25E	1.78	Compressive buckling @ end of Member U25-L26	-826	-874	-2356	1.01		no	0.130	
U27E	1.54	Compressive buckling @ end of Member U27-L28	-795	-841	-2073	1.01	Effective width = 495.88mm	yes	0.112	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.40	Compressive buckling @ end of Member U1-L0	-726	-714	-1709	1.01	Assume L_2=235mm	no	0.057	
L2E	1.16	Compressive buckling @ end of Member U3-L2	-285	-509	-868	1.01		no	0.047	
L4E	4.48	Compressive buckling @ end of Member U5-L4	219	-292	-1078	1.01		no	0.184	
L6E	1.98	Compressive buckling @ end of Member U5-L6	-383	-457	-1274	1.01		no	0.081	
L8E	3.44	Compressive buckling @ end of Member U7-L8	-763	-624	-2880	1.01		no	0.141	
L10E	2.01	Compressive buckling @ end of Member U9-L10	-892	-666	-2208	1.01		no	0.082	
L12E	3.32	Compressive buckling @ end of Member U11-L12	-850	-639	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.136	
L14E	3.39	Compressive buckling @ end of Member U15-L14	-822	-659	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.139	
L16E	2.95	Compressive buckling @ end of Member U17-L16	-681	-629	-2512	1.01		no	0.121	
L18E	3.58	Compressive buckling @ end of Member U19-L18	-314	-492	-2058	1.01		no	0.147	
L20E	5.28	Compressive buckling @ end of Member U21-L20	189	-278	-1264	1.01		no	0.217	
L22E	1.57	Compressive buckling @ end of Member U21-L22	-345	-487	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.064	
L24E	2.28	Compressive buckling @ end of Member U23-L24	-699	-626	-2104	1.01		no	0.093	
L26E	2.67	Compressive buckling @ end of Member U25-L26	-826	-653	-2544	1.01		no	0.109	
L28	2.56	Compressive buckling @ end of Member U27-L28	-795	-627	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.105	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.78	Compressive buckling @ end of Member U1-L0	-726	-714	-1978	1.01		no	0.072	
U3E	1.00	Compressive buckling @ end of Member U3-L2	-285	-509	-786	1.01		no	0.040	25
U5E	1.39	Compressive buckling @ end of Member U5-L6	-383	-457	-1010	1.01		no	0.056	
U7E	1.05	Compressive buckling @ end of Member U7-L8	-763	-624	-1406	1.01		no	0.042	
U9E	1.39	Compressive buckling @ end of Member U9-L10	-892	-666	-1798	1.01	Effective width = 762.0mm	no	0.056	
U11E	2.46	Compressive buckling @ end of Member U11-L12	-850	-639	-2400	1.01	Effective width = 616.9mm	yes	0.101	
U13E	2.20	Compressive buckling @ end of Member U13-L12	-801	-632	-2170	1.01		yes	0.090	
U15E	1.78	Compressive buckling @ end of Member U15-L14	-822	-659	-1974	1.01		no	0.072	
U17E	1.14	Compressive buckling @ end of Member U17-L16	-681	-629	-1382	1.01		no	0.046	
U19E	1.39	Compressive buckling @ end of Member U19-L18	-314	-492	-990	1.01		no	0.056	
U21E	1.52	Compressive buckling @ end of Member U21-L22	-345	-487	-1076	1.01		no	0.062	
U23E	1.13	Compressive buckling @ end of Member U23-L24	-699	-626	-1394	1.01		no	0.046	
U25E	2.38	Compressive buckling @ end of Member U25-L26	-826	-653	-2356	1.01		no	0.097	
U27E	2.07	Compressive buckling @ end of Member U27-L28	-795	-627	-2073	1.01	Effective width = 495.88mm	yes	0.084	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	**0.90**	Compressive buckling @ end of Member U1-L0	-1029	-778	-1709	1.01	Assume L_2=235mm	no	0.089	56
L2E	**0.85**	Compressive buckling @ end of Member U3-L2	-424	-529	-868	1.01		no	0.085	53
L4E	5.44	Compressive buckling @ end of Member U3-L4	146	-227	-1078	1.01		no	0.557	
L6E	1.95	Compressive buckling @ end of Member U5-L6	-489	-409	-1274	1.01		no	0.198	
L8E	2.87	Compressive buckling @ end of Member U7-L8	-996	-667	-2880	1.01		no	0.292	
L10E	1.34	Compressive buckling @ end of Member U9-L10	-1222	-752	-2208	1.01		no	0.135	
L12E	2.42	Compressive buckling @ end of Member U11-L12	-1253	-710	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.246	
L14E	2.54	Compressive buckling @ end of Member U15-L14	-1165	-744	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.259	
L16E	2.32	Compressive buckling @ end of Member U17-L16	-929	-694	-2512	1.01		no	0.236	
L18E	3.26	Compressive buckling @ end of Member U19-L18	-436	-504	-2058	1.01		no	0.333	
L20E	5.20	Compressive buckling @ end of Member U19-L20	171	-279	-1264	1.01		no	0.532	
L22E	1.29	Compressive buckling @ end of Member U21-L22	-474	-491	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.130	
L24E	1.71	Compressive buckling @ end of Member U23-L24	-957	-683	-2104	1.01		no	0.173	
L26E	1.90	Compressive buckling @ end of Member U25-L26	-1177	-732	-2544	1.01		no	0.193	
L28	1.73	Compressive buckling @ end of Member U27-L28	-1213	-687	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.175	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:

$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.24	Compressive buckling @ end of Member U1-L0	-1029	-778	-1978	1.01		no	0.125	
U3E	0.70	Compressive buckling @ end of Member U3-L2	-424	-529	-786	1.01		no	0.069	43
U5E	1.30	Compressive buckling @ end of Member U5-L6	-489	-409	-1010	1.01		no	0.131	
U7E	0.64	Compressive buckling @ end of Member U7-L8	-996	-667	-1406	1.01		no	0.063	39
U9E	0.79	Compressive buckling @ end of Member U9-L10	-1222	-752	-1798	1.01	Effective width = 762.0mm	no	0.078	49
U11E	1.65	Compressive buckling @ end of Member U11-L12	-1253	-710	-2400	1.01	Effective width = 616.9mm	yes	0.167	
U13E	1.41	Compressive buckling @ end of Member U13-L12	-1212	-697	-2170	1.01		yes	0.142	
U15E	1.11	Compressive buckling @ end of Member U15-L14	-1165	-744	-1974	1.01		no	0.112	
U17E	0.67	Compressive buckling @ end of Member U17-L16	-929	-694	-1382	1.01		no	0.066	41
U19E	1.12	Compressive buckling @ end of Member U19-L18	-436	-504	-990	1.01		no	0.112	
U21E	1.25	Compressive buckling @ end of Member U21-L22	-474	-491	-1076	1.01		no	0.125	
U23E	0.66	Compressive buckling @ end of Member U23-L24	-957	-683	-1394	1.01		no	0.065	41
U25E	1.64	Compressive buckling @ end of Member U25-L26	-1177	-732	-2356	1.01		no	0.166	
U27E	1.28	Compressive buckling @ end of Member U27-L28	-1213	-687	-2073	1.01	Effective width = 495.88mm	yes	0.129	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.00	Compressive buckling @ end of Member U1-L0	-1029	-694	-1709	1.01	Assume L_2=235mm	no	0.072	
L2E	0.96	Compressive buckling @ end of Member U3-L2	-424	-471	-868	1.01		no	0.069	43
L4E	5.75	Compressive buckling @ end of Member U3-L4	146	-215	-1078	1.01		no	0.425	
L6E	2.08	Compressive buckling @ end of Member U5-L6	-489	-384	-1274	1.01		no	0.152	
L8E	3.21	Compressive buckling @ end of Member U7-L8	-996	-595	-2880	1.01		no	0.236	
L10E	1.52	Compressive buckling @ end of Member U9-L10	-1222	-663	-2208	1.01		no	0.111	
L12E	2.73	Compressive buckling @ end of Member U11-L12	-1253	-629	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.201	
L14E	2.89	Compressive buckling @ end of Member U15-L14	-1165	-654	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.212	
L16E	2.62	Compressive buckling @ end of Member U17-L16	-929	-615	-2512	1.01		no	0.192	
L18E	3.65	Compressive buckling @ end of Member U19-L18	-436	-450	-2058	1.01		no	0.269	
L20E	5.85	Compressive buckling @ end of Member U19-L20	171	-247	-1264	1.01		no	0.433	
L22E	1.44	Compressive buckling @ end of Member U21-L22	-474	-439	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.105	
L24E	1.93	Compressive buckling @ end of Member U23-L24	-957	-606	-2104	1.01		no	0.141	
L26E	2.16	Compressive buckling @ end of Member U25-L26	-1177	-645	-2544	1.01		no	0.158	
L28	1.95	Compressive buckling @ end of Member U27-L28	-1213	-608	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.143	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.40	Compressive buckling @ end of Member U1-L0	-1029	-694	-1978	1.01		no	0.101	
U3E	**0.79**	Compressive buckling @ end of Member U3-L2	-424	-471	-786	1.01		no	0.056	35
U5E	1.38	Compressive buckling @ end of Member U5-L6	-489	-384	-1010	1.01		no	0.100	
U7E	**0.71**	Compressive buckling @ end of Member U7-L8	-996	-595	-1406	1.01		no	0.051	32
U9E	**0.90**	Compressive buckling @ end of Member U9-L10	-1222	-663	-1798	1.01	Effective width = 762.0mm	no	0.064	40
U11E	1.86	Compressive buckling @ end of Member U11-L12	-1253	-629	-2400	1.01	Effective width = 616.9mm	yes	0.136	
U13E	1.59	Compressive buckling @ end of Member U13-L12	-1212	-618	-2170	1.01		yes	0.116	
U15E	1.27	Compressive buckling @ end of Member U15-L14	-1165	-654	-1974	1.01		no	0.092	
U17E	**0.76**	Compressive buckling @ end of Member U17-L16	-929	-615	-1382	1.01		no	0.054	34
U19E	1.25	Compressive buckling @ end of Member U19-L18	-436	-450	-990	1.01		no	0.091	
U21E	1.39	Compressive buckling @ end of Member U21-L22	-474	-439	-1076	1.01		no	0.101	
U23E	**0.74**	Compressive buckling @ end of Member U23-L24	-957	-606	-1394	1.01		no	0.053	33
U25E	1.87	Compressive buckling @ end of Member U25-L26	-1177	-645	-2356	1.01		no	0.136	
U27E	1.45	Compressive buckling @ end of Member U27-L28	-1213	-608	-2073	1.01	Effective width = 495.88mm	yes	0.105	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.28	Compressive buckling @ end of Member U1-L0	-1029	-543	-1709	1.01	Assume L_2=235mm	no	0.052	
L2E	1.24	Compressive buckling @ end of Member U3-L2	-424	-365	-868	1.01		no	0.050	
L4E	6.62	Compressive buckling @ end of Member U3-L4	146	-187	-1078	1.01		no	0.273	
L6E	2.54	Compressive buckling @ end of Member U5-L6	-489	-313	-1274	1.01		no	0.104	
L8E	4.27	Compressive buckling @ end of Member U7-L8	-996	-448	-2880	1.01		no	0.176	
L10E	2.02	Compressive buckling @ end of Member U9-L10	-1222	-499	-2208	1.01		no	0.082	
L12E	3.47	Compressive buckling @ end of Member U11-L12	-1253	-495	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.142	
L14E	3.60	Compressive buckling @ end of Member U15-L14	-1165	-526	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.148	
L16E	3.38	Compressive buckling @ end of Member U17-L16	-929	-476	-2512	1.01		no	0.139	
L18E	4.74	Compressive buckling @ end of Member U19-L18	-436	-347	-2058	1.01		no	0.195	
L20E	7.46	Compressive buckling @ end of Member U19-L20	171	-194	-1264	1.01		no	0.307	
L22E	1.87	Compressive buckling @ end of Member U21-L22	-474	-340	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.076	
L24E	2.61	Compressive buckling @ end of Member U23-L24	-957	-448	-2104	1.01		no	0.107	
L26E	2.76	Compressive buckling @ end of Member U25-L26	-1177	-504	-2544	1.01		no	0.113	
L28	2.40	Compressive buckling @ end of Member U27-L28	-1213	-493	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.098	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.78	Compressive buckling @ end of Member U1-L0	-1029	-543	-1978	1.01		no	0.073	
U3E	1.01	Compressive buckling @ end of Member U3-L2	-424	-365	-786	1.01		no	0.041	
U5E	1.69	Compressive buckling @ end of Member U5-L6	-489	-313	-1010	1.01		no	0.069	
U7E	**0.95**	Compressive buckling @ end of Member U7-L8	-996	-448	-1406	1.01		no	0.038	24
U9E	1.19	Compressive buckling @ end of Member U9-L10	-1222	-499	-1798	1.01	Effective width = 762.0mm	no	0.048	
U11E	2.37	Compressive buckling @ end of Member U11-L12	-1253	-495	-2400	1.01	Effective width = 616.9mm	yes	0.097	
U13E	1.95	Compressive buckling @ end of Member U13-L12	-1212	-501	-2170	1.01		yes	0.080	
U15E	1.58	Compressive buckling @ end of Member U15-L14	-1165	-526	-1974	1.01		no	0.064	
U17E	**0.98**	Compressive buckling @ end of Member U17-L16	-929	-476	-1382	1.01		no	0.039	25
U19E	1.63	Compressive buckling @ end of Member U19-L18	-436	-347	-990	1.01		no	0.066	
U21E	1.80	Compressive buckling @ end of Member U21-L22	-474	-340	-1076	1.01		no	0.073	
U23E	1.01	Compressive buckling @ end of Member U23-L24	-957	-448	-1394	1.01		no	0.040	
U25E	2.39	Compressive buckling @ end of Member U25-L26	-1177	-504	-2356	1.01		no	0.097	
U27E	1.79	Compressive buckling @ end of Member U27-L28	-1213	-493	-2073	1.01	Effective width = 495.88mm	yes	0.073	

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN					MN	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up		kN		kN		kN		kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	Factor	Capacity
					C	5		5		5								Factor					Factor
U0 - L0	VERTICAL	12 WF 45			3854	-15.2	1.09	-53.6	1.18	-22.7	1.18	-106.6	1.63	-642.4	-748.9	-1232	1.01	1.77	12.0	0.0	1859	1.01	165.24
U2 - L2	VERTICAL	12 WF 45			3855	-17.9	1.09	-76.1	1.18	-24.8	1.18	-138.6	1.63	-499.7	-638.3	-1232	1.01	2.21	120.2	0.0	1859	1.01	16.78
U4 - L4	VERTICAL	12 WF 45			3856	-24.4	1.09	-83.1	1.18	-25.0	1.18	-154.1	1.63	-508.6	-662.7	-1232	1.01	2.14	124.2	0.0	1859	1.01	16.37
U6 - L6	VERTICAL	12 WF 45			3857	-20.2	1.09	-72.2	1.18	-21.4	1.18	-132.5	1.63	-497.7	-630.2	-1173	1.01	2.11	149.2	16.7	1859	1.01	13.47
U8 - L8	VERTICAL	12 WF 45			3858	-24.0	1.09	-84.2	1.18	-25.6	1.18	-155.7	1.63	-495.1	-650.8	-1006	1.01	1.74	135.0	0.0	1859	1.01	15.06
U10 - L10	VERTICAL	12 WF 45			3859	-27.6	1.09	-90.9	1.18	-29.7	1.18	-172.4	1.63	-465.7	-638.1	-769	1.01	1.30	95.8	0.0	1859	1.01	21.41
U12 - L12	VERTICAL	12 WF 53			3860	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-533.2	-785.9	-911	1.01	1.25	3.4	0.0	2207	1.01	722.41
U1 - L0	DIAGONAL	2-12C35			3798	-201.4	1.09	-440.9	1.18	-136.4	1.18	-900.9	1.63	-1019.4	-1920.3	-2392	1.01	1.49	163.7	0.0	2893	1.01	23.35
U1 - L2	DIAGONAL	12 WF 50			3799	149.4	1.09	267.0	1.18	68.9	1.18	559.2	1.63	-282.7	0.0	-983	1.01	5.49	668.1	1227.3	2071	1.01	2.29
U3 - L2	DIAGONAL	2-10C20			3800	-83.6	1.09	-190.7	1.18	-60.5	1.18	-387.6	1.63	-802.4	-1189.9	-1298	1.01	1.15	223.2	0.0	1652	1.01	9.21
U3 - L4	DIAGONAL	2-8C13.75			3801	33.6	1.09	14.0	1.18	-6.5	1.18	45.4	1.63	-495.7	-450.3	-797	1.01	1.71	526.3	571.7	1133	1.01	2.09
U5 - L4	DIAGONAL	2-8C13.75			3802	62.4	1.09	92.5	1.18	17.9	1.18	198.3	1.63	-595.4	-397.1	-797	1.01	1.68	408.5	606.8	1133	1.01	2.32
U5 - L6	DIAGONAL	2-10C25			3803	-109.8	1.09	-261.3	1.18	-82.3	1.18	-525.1	1.63	-714.4	-1239.5	-1577	1.01	1.49	348.3	0.0	2076	1.01	7.53
U7 - L6	DIAGONAL	12 WF 53			3804	183.9	1.09	335.3	1.18	84.1	1.18	695.3	1.63	-404.8	0.0	-1306	1.01	4.98	609.4	1304.8	2207	1.01	2.52
U7 - L8	DIAGONAL	2-15C35			3805	-216.8	1.09	-475.3	1.18	-140.9	1.18	-963.4	1.63	-895.6	-1859.0	-2497	1.01	1.74	176.6	0.0	2884	1.01	21.95
U9 - L8	DIAGONAL	12 WF 65			3806	244.7	1.09	467.7	1.18	123.3	1.18	964.1	1.63	-266.2	0.0	-1744	1.01	10.24	708.0	1672.1	2688	1.01	2.47
U9 - L10	DIAGONAL	2-15C45			3807	-268.3	1.09	-579.4	1.18	-171.2	1.18	-1178.1	1.63	-974.6	-2152.7	-3041	1.01	1.94	81.9	0.0	3713	1.01	60.17
U11 - L10	DIAGONAL	12 WF 65			3808	269.7	1.09	511.7	1.18	143.0	1.18	1066.5	1.63	-142.8	0.0	-1530	1.01	18.29	717.3	1783.8	2688	1.01	2.30
U11 - L12	DIAGONAL	2-15C45			3809	-291.2	1.09	-610.3	1.18	-186.4	1.18	-1257.5	1.63	-1032.9	-2290.4	-2804	1.01	1.52	7.5	0.0	3713	1.01	663.76
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3763	9.9	1.09	23.4	1.18	8.5	1.18	48.5	1.63	-30.2	0.0	-3414	1.01	115.79	202.9	251.4	3713	1.01	18.24
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		3885	-234.7	1.09	-475.7	1.18	-136.2	1.18	-977.9	1.63	-932.3	-1910.2	-3414	1.01	2.65	213.3	0.0	3713	1.01	22.16
					3886	-228.0	1.09	-459.0	1.18	-129.2	1.18	-942.7	1.63	-899.3	-1842.0	-3414	1.01	2.79	184.8	0.0	3713	1.01	25.39
U3 - U5	TOP CHORD	2-15C40	LACED L/R=29	2-PLs14x3/8	3887	-309.1	1.09	-603.8	1.18	-167.4	1.18	-1247.0	1.63	-1281.3	-2528.2	-4333	1.01	2.44	438.2	0.0	4779	1.01	13.86
					3888	-318.7	1.09	-624.1	1.18	-173.1	1.18	-1288.1	1.63	-1283.9	-2572.0	-4333	1.01	2.41	394.6	0.0	4779	1.01	15.50
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		3889	-197.6	1.09	-380.2	1.18	-104.2	1.18	-786.9	1.63	-1187.0	-1973.9	-3789	1.01	2.56	632.1	0.0	4128	1.01	7.84
					3890	-219.8	1.09	-427.3	1.18	-118.4	1.18	-883.5	1.63	-1145.0	-2028.5	-3789	1.01	2.57	558.8	0.0	4128	1.01	9.04
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		3891	43.8	1.09	97.3	1.18	26.5	1.18	193.8	1.63	-757.9	-564.1	-2593	1.01	3.71	716.0	909.8	2810	1.01	3.69
					3892	11.1	1.09	28.6	1.18	5.7	1.18	52.5	1.63	-748.1	-695.6	-2593	1.01	3.57	660.6	713.1	2810	1.01	4.22
U9 - U11	TOP CHORD	2-15C45		-6r	3893	311.7	1.09	630.8	1.18	174.3	1.18	1289.8	1.63	-286.2	0.0	-3414	1.01	16.55	731.3	2021.1	3713	1.01	3.36
					3894	292.2	1.09	589.2	1.18	160.6	1.18	1203.3	1.63	-293.4	0.0	-3414	1.01	15.85	718.1	1921.4	3713	1.01	3.55
U11 - U13	TOP CHORD	2-15C55	2-PLs14X1/2"	-6r	3762	572.0	1.09	1137.2	1.18	320.7	1.18	2343.8	1.63	-252.3	0.0	-5855	1.01	32.73	718.7	3062.5	6516	1.01	5.90
L0 - L2	BOT CHORD	2-15C33.9		-6r	3770	140.8	1.09	311.8	1.18	96.5	1.18	635.2	1.63	-128.6	0.0	-2283	1.01	22.88	720.7	1356.0	2810	1.01	3.06
L2 - L4	BOT CHORD	2-15C50		-6r	3771	340.8	1.09	696.7	1.18	197.7	1.18	1426.9	1.63	-447.3	0.0	-3260	1.01	10.55	1414.3	2841.1	4128	1.01	1.94
L4 - L6	BOT CHORD	2-15C50		-6r	3774	310.3	1.09	617.4	1.18	170.8	1.18	1268.3	1.63	-743.2	0.0	-3260	1.01	6.14	1525.2	2793.5	4128	1.01	1.90
L6 - L8	BOT CHORD	2-15C33.9		-6r	3775	65.1	1.09	125.1	1.18	34.1	1.18	258.8	1.63	-787.9	-529.1	-2280	1.01	3.25	999.5	1258.4	2810	1.01	2.58
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		3776	-171.0	1.09	-351.0	1.18	-98.6	1.18	-717.0	1.63	-729.6	-1446.6	-2273	1.01	2.16	469.0	0.0	2810	1.01	7.58
L10 - L12	BOT CHORD	2-15C50	LACED L/R=62	2-PLs14x1/2 *	3777	-395.6	1.09	-803.4	1.18	-229.6	1.18	-1650.2	1.63	-814.9	-2465.1	-3273	1.01	2.03	206.0	0.0	4128	1.01	28.24

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	MN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			3860	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-533.2	-785.9	-911	1.01	1.25	3.4	0.0	2207	1.01	722.41
U14-L14	VERTICAL	12 WF 45			3861	-28.5	1.09	-93.6	1.18	-30.4	1.18	-177.4	1.63	-474.4	-651.9	-769	1.01	1.26	99.1	0.0	1859	1.01	20.74
U16-L16	VERTICAL	12 WF 45			3862	-25.4	1.09	-86.6	1.18	-26.3	1.18	-160.9	1.63	-495.6	-656.5	-1006	1.01	1.72	133.4	0.0	1859	1.01	15.28
U18-L18	VERTICAL	12 WF 45			3863	-21.5	1.09	-77.5	1.18	-23.1	1.18	-142.1	1.63	-499.6	-641.8	-1173	1.01	2.09	147.5	5.4	1859	1.01	13.69
U20-L20	VERTICAL	12 WF 45			3864	-25.3	1.09	-86.0	1.18	-26.1	1.18	-159.8	1.63	-508.8	-668.7	-1232	1.01	2.13	121.4	0.0	1859	1.01	16.78
U22-L22	VERTICAL	12 WF 45			3865	-21.8	1.09	-78.3	1.18	-23.4	1.18	-143.7	1.63	-503.5	-647.2	-1173	1.01	2.07	145.6	1.9	1859	1.01	13.89
U24-L24	VERTICAL	12 WF 45			3866	-25.6	1.09	-87.2	1.18	-26.4	1.18	-162.0	1.63	-500.5	-662.5	-1006	1.01	1.71	128.5	0.0	1859	1.01	15.87
U26-L26	VERTICAL	12 WF 45			3867	-28.8	1.09	-92.8	1.18	-30.2	1.18	-176.6	1.63	-477.9	-654.4	-769	1.01	1.26	92.6	0.0	1859	1.01	22.19
U28-L28	VERTICAL	12 WF 53			3868	-33.4	1.09	-108.9	1.18	-41.4	1.18	-213.8	1.63	-516.4	-730.2	-911	1.01	1.37	0.3	0.0	2207	1.01	7096.92
U13-L12	DIAGONAL	2-15C40			3810	-287.3	1.09	-587.1	1.18	-179.8	1.18	-1218.1	1.63	-1022.6	-2240.8	-2518	1.01	1.30	78.6	0.0	3299	1.01	57.90
U13-L14	DIAGONAL	12 WF 65			3811	261.5	1.09	487.6	1.18	136.2	1.18	1021.1	1.63	-148.3	0.0	-1530	1.01	17.30	716.6	1737.6	2688	1.01	2.36
U15-L14	DIAGONAL	2-15C40			3812	-259.9	1.09	-551.4	1.18	-163.3	1.18	-1126.6	1.63	-981.3	-2107.9	-2722	1.01	1.65	119.5	0.0	3299	1.01	37.31
U15-L16	DIAGONAL	12 WF 65			3813	232.7	1.09	438.2	1.18	115.0	1.18	906.5	1.63	-264.1	0.0	-1744	1.01	10.10	723.9	1630.5	2688	1.01	2.50
U17-L16	DIAGONAL	2-15C33.9			3814	-203.6	1.09	-442.6	1.18	-131.7	1.18	-899.5	1.63	-937.1	-1836.6	-2437	1.01	1.67	171.7	0.0	2810	1.01	21.77
U17-L18	DIAGONAL	12 WF 53			3815	168.5	1.09	300.7	1.18	74.4	1.18	626.3	1.63	-388.2	0.0	-1306	1.01	5.01	668.8	1295.0	2207	1.01	2.40
U19-L18	DIAGONAL	2-10C25			3816	-97.4	1.09	-225.1	1.18	-71.6	1.18	-456.3	1.63	-812.7	-1269.0	-1577	1.01	1.40	319.2	0.0	2076	1.01	8.00
U19-L20	DIAGONAL	2-8C18.75			3817	47.1	1.09	54.5	1.18	6.5	1.18	123.3	1.63	-554.0	-430.7	-1050	1.01	2.14	535.2	658.4	1556	1.01	2.71
U21-L20	DIAGONAL	2-8C18.75			3818	58.7	1.09	79.9	1.18	13.4	1.18	174.1	1.63	-570.9	-396.8	-1050	1.01	2.16	518.4	692.5	1556	1.01	2.70
U21-L22	DIAGONAL	2-10C25			3819	-102.8	1.09	-249.4	1.18	-78.3	1.18	-498.8	1.63	-792.9	-1291.7	-1577	1.01	1.38	330.3	0.0	2076	1.01	7.86
U23-L22	DIAGONAL	12 WF 58			3820	172.6	1.09	321.8	1.18	80.3	1.18	662.6	1.63	-392.7	0.0	-1435	1.01	5.38	661.7	1324.3	2404	1.01	2.67
U23-L24	DIAGONAL	2-15C40			3821	-205.9	1.09	-461.5	1.18	-137.0	1.18	-930.7	1.63	-935.8	-1866.6	-2839	1.01	2.07	169.5	0.0	3299	1.01	25.15
U25-L24	DIAGONAL	12 WF 65			3822	240.0	1.09	451.0	1.18	118.6	1.18	933.6	1.63	-251.0	0.0	-1744	1.01	10.74	732.4	1666.0	2688	1.01	2.43
U25-L26	DIAGONAL	2-15C40			3823	-259.1	1.09	-563.3	1.18	-166.6	1.18	-1143.7	1.63	-999.6	-2143.3	-2722	1.01	1.61	96.0	0.0	3299	1.01	46.61
U27-L26	DIAGONAL	12 WF 65			3824	267.4	1.09	491.9	1.18	137.2	1.18	1033.8	1.63	-140.9	0.0	-1530	1.01	18.30	742.3	1776.1	2688	1.01	2.26
U27-L28	DIAGONAL	2-15C40			3825	-282.1	1.09	-590.1	1.18	-180.5	1.18	-1216.8	1.63	-1052.0	-2268.8	-2518	1.01	1.26	64.4	0.0	3299	1.01	70.58
U11 - U13	TOP CHORD	2-15C55	2-PLs14x1/2	-6r	3764	571.9	1.09	1136.4	1.18	320.4	1.18	2342.3	1.63	-250.6	0.0	-5855	1.01	32.95	711.5	3053.9	6516	1.01	5.96
U13 - U15	TOP CHORD	2-15C45		-6r	3895	306.5	1.09	611.7	1.18	166.8	1.18	1252.8	1.63	-247.6	0.0	-3414	1.01	18.98	526.1	1778.9	3713	1.01	4.75
					3896	324.3	1.09	649.3	1.18	179.1	1.18	1331.0	1.63	-234.9	0.0	-3414	1.01	20.34	540.7	1871.6	3713	1.01	4.47
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		3897	43.4	1.09	80.4	1.18	19.8	1.18	165.5	1.63	-602.8	-437.3	-2593	1.01	4.62	481.2	646.7	2810	1.01	5.55
					3898	75.9	1.09	147.7	1.18	40.0	1.18	304.2	1.63	-598.3	-294.1	-2593	1.01	4.89	521.4	825.5	2810	1.01	4.86
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		3899	-163.1	1.09	-332.6	1.18	-92.5	1.18	-679.4	1.63	-1017.7	-1697.1	-3037	1.01	2.35	397.3	0.0	3299	1.01	10.10
					3900	-144.0	1.09	-294.2	1.18	-81.0	1.18	-599.7	1.63	-1034.8	-1634.6	-3037	1.01	2.38	452.4	0.0	3299	1.01	8.69
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		3901	-243.6	1.09	-486.6	1.18	-134.6	1.18	-998.6	1.63	-1236.0	-2234.6	-4165	1.01	2.60	391.3	0.0	4542	1.01	14.28
					3902	-244.8	1.09	-490.1	1.18	-135.6	1.18	-1005.2	1.63	-1240.3	-2245.5	-4165	1.01	2.58	343.1	0.0	4542	1.01	16.30
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		3903	-132.7	1.09	-263.1	1.18	-72.6	1.18	-540.8	1.63	-1063.5	-1604.3	-3037	1.01	2.38	570.0	29.3	3299	1.01	6.79
					3904	-154.1	1.09	-308.3	1.18	-86.1	1.18	-633.4	1.63	-1044.0	-1677.4	-3037	1.01	2.33	506.5	0.0	3299	1.01	7.83
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		3905	95.3	1.09	198.1	1.18	53.8	1.18	401.1	1.63	-641.0	-239.9	-2593	1.01	4.71	658.4	1059.5	2810	1.01	3.70
					3906	63.8	1.09	131.9	1.18	33.8	1.18	265.0	1.63	-649.4	-384.4	-2593	1.01	4.44	624.1	889.1	2810	1.01	4.12
U25 - U27	TOP CHORD	2-15C50		-6r	3883	353.3	1.09	715.4	1.18	197.0	1.18	1461.7	1.63	-254.8	0.0	-3789	1.01	20.75	681.1	2142.8	4128	1.01	3.97
					3884	334.1	1.09	674.9	1.18	183.8	1.18	1377.3	1.63	-281.4	0.0	-3789	1.01	18.49	679.4	2056.7	4128	1.01	4.11
U27 - U29	TOP CHORD	2-15C55	2-PLs14X3/8	-6r	3765	604.6	1.09	1202.9	1.18	338.1	1.18	2477.4	1.63	-191.9	0.0	-5497	1.01	41.85	669.5	3146.8	6022	1.01	5.38
													1.63										
L12 - L14	BOT CHORD	2-15C50	LACED L/R=62	2-PLs14X1/2 *	3778	-406.4	1.09	-814.0	1.18	-232.7	1.18	-1678.1	1.63	-735.8	-2413.8	-3227	1.01	2.15	176.7	0.0	4128	1.01	33.09
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		3779	-194.7	1.09	-387.7	1.18	-108.9	1.18	-798.2	1.63	-505.2	-1303.4	-2273	1.01	2.96	391.6	0.0	2810	1.01	9.29
L16- L18	BOT CHORD	2-15C33.9		-6r	3780	12.8	1.09	37.8	1.18	9.7	1.18	70.0	1.63	-551.1	-481.1	-2280	1.01	4.31	831.1	901.1	2810	1.01	3.33
L18 - L20	BOT CHORD	2-15C45		-6r	3781	216.6	1.09	449.4	1.18	123.3	1.18	911.9	1.63	-623.9	0.0	-2954	1.01	6.24	1357.0	2269.0	3713	1.01	2.09
L20 - L22	BOT CHORD	2-15C45		-6r	3782	210.6	1.09	431.5	1.18	118.5	1.18	878.5	1.63	-728.0	0.0	-2954	1.01	5.31	1370.1	2248.6	3713	1.01	2.10
L22 - L24	BOT CHORD	2-15C33.9		-6r	3783	0.6	1.09	0.4	1.18	-0.8	1.18	0.2	1.63	-690.5	-690.3	-2280	1.01	3.33	835.6	835.8	2810	1.01	3.40
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		3784	-220.4	1.09	-451.7	1.18	-126.9	1.18	-923.0	1.63	-601.1	-1524.2	-2634	1.01	2.89	369.2	0.0	3299	1.01	11.53
L26 - L28	BOT CHORD	2-15C55	LACED L/R=62	2-PLs14x1/2 *	3785	-413.8	1.09	-839.8	1.18	-239.3	1.18	-1724.4	1.63	-696.8	-2421.1	-3527	1.01	2.64	143.1	0.0	4542	1.01	44.12

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2, asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-15.2	1.09	-53.6	1.18	-22.7	1.18	-106.6	-315.3	-394.1	-24.4	-450.9	1.63	-642.4	-748.9	-1232	1.01	1.77	10.4	0.0	1859	1.01	190.95
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-17.9	1.09	-76.1	1.18	-24.8	1.18	-138.6	-245.2	-306.5	-19.1	-350.9	1.63	-499.7	-638.3	-1232	1.01	2.21	117.9	0.0	1859	1.01	17.10
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-24.4	1.09	-83.1	1.18	-25.0	1.18	-154.1	-249.6	-312.0	-19.0	-356.5	1.63	-508.6	-662.7	-1232	1.01	2.14	116.1	0.0	1859	1.01	17.50
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-20.2	1.09	-72.2	1.18	-21.4	1.18	-132.5	-244.3	-305.4	-17.3	-346.7	1.63	-497.7	-630.2	-1173	1.01	2.11	138.6	6.1	1859	1.01	14.50
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-24.0	1.09	-84.2	1.18	-25.6	1.18	-155.7	-242.9	-303.7	-20.3	-349.8	1.63	-495.0	-650.7	-1006	1.01	1.74	126.9	0.0	1859	1.01	16.03
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-27.6	1.09	-90.9	1.18	-29.7	1.18	-172.4	-227.7	-284.6	-21.9	-332.6	1.63	-464.0	-636.3	-769	1.01	**1.30**	95.7	0.0	1859	1.01	21.42
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	-260.2	-325.2	-41.9	-407.7	1.63	-530.1	-782.9	-911	1.01	1.26	2.9	0.0	2207	1.01	864.79
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-201.4	1.09	-440.9	1.18	-136.4	1.18	-900.9	-454.2	-567.7	-153.9	-843.1	1.63	-925.3	-1826.2	-2392	1.01	1.64	136.6	0.0	2893	1.01	27.98
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	149.4	1.09	267.0	1.18	68.9	1.18	559.2	-138.7	-173.4	-48.6	-260.2	1.63	-282.7	0.0	-983	1.01	5.49	590.7	1149.9	2071	1.01	**2.59**
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-83.6	1.09	-190.7	1.18	-60.5	1.18	-387.6	-360.6	-450.7	-98.1	-630.2	1.63	-734.7	-1122.2	-1298	1.01	**1.26**	223.2	0.0	1652	1.01	9.21
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	33.6	1.09	14.0	1.18	-6.5	1.18	45.4	-243.3	-304.1	-53.0	-403.6	1.63	-495.7	-450.3	-797	1.01	1.71	474.2	519.6	1133	1.01	2.32
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	62.4	1.09	92.5	1.18	17.9	1.18	198.3	-274.1	-342.6	-31.5	-408.8	1.63	-558.5	-360.1	-797	1.01	1.80	401.5	599.8	1133	1.01	2.36
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-109.8	1.09	-261.3	1.18	-82.3	1.18	-525.1	-334.1	-417.6	-78.5	-563.6	1.63	-680.7	-1205.8	-1577	1.01	1.57	324.0	0.0	2076	1.01	8.09
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	183.9	1.09	335.3	1.18	84.1	1.18	695.3	-192.6	-240.7	33.7	-196.2	1.63	-392.4	0.0	-1306	1.01	5.13	555.2	1250.6	2207	1.01	2.76
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-216.8	1.09	-475.3	1.18	-140.9	1.18	-963.4	-403.8	-504.7	-125.1	-730.5	1.63	-822.7	-1786.0	-2497	1.01	1.90	174.0	0.0	2884	1.01	22.28
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	244.7	1.09	467.7	1.18	123.3	1.18	964.1	-130.6	-163.3	22.5	-133.7	1.63	-266.2	0.0	-1744	1.01	10.24	627.3	1591.5	2688	1.01	2.79
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-268.3	1.09	-579.4	1.18	-171.2	1.18	-1178.1	-432.6	-540.7	-147.9	-805.2	1.63	-881.4	-2059.5	-3041	1.01	2.15	81.9	0.0	3713	1.01	60.17
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	269.7	1.09	511.7	1.18	143.0	1.18	1066.5	-69.8	-87.3	4.9	-83.0	1.63	-142.3	0.0	-1530	1.01	18.35	629.1	1695.7	2688	1.01	2.62
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-291.2	1.09	-610.3	1.18	-186.4	1.18	-1257.5	-459.0	-573.8	-152.6	-847.3	1.63	-935.2	-2192.7	-2804	1.01	1.68	6.4	0.0	3713	1.01	787.90
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	9.9	1.09	23.4	1.18	8.5	1.18	48.5	-5.7	-7.1	-13.1	-28.7	1.63	-28.7	0.0	-3414	1.01	121.77	195.4	243.9	3713	1.01	18.95
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-234.7	1.09	-475.7	1.18	-136.2	1.18	-977.9	-407.3	-509.1	-102.9	-698.9	1.63	-829.8	-1807.7	-3414	1.01	2.98	178.0	0.0	3713	1.01	26.56
									-228.0	1.09	-459.0	1.18	-129.2	1.18	-942.7	-392.4	-490.5	-56.0	-603.0	1.63	-799.5	-1742.2	-3414	1.01	3.13	154.3	0.0	3713	1.01	30.42
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-309.1**	1.09	-603.8	1.18	-167.4	1.18	**-1247.0**	**-568.5**	**-710.6**	-131.9	-956.3	**1.63**	**-1158.2**	**-2405.2**	**-4333**	**1.01**	**2.70**	**365.7**	**0.0**	**4779**	**1.01**	**16.61**
									-318.7	1.09	-624.1	1.18	-173.1	1.18	-1288.1	-569.4	-711.7	-108.7	-919.6	1.63	-1160.1	-2448.1	-4333	1.01	2.66	329.4	0.0	4779	1.01	18.56
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-197.6	1.09	-380.2	1.18	-104.2	1.18	-786.9	-534.1	-667.6	-115.3	-884.5	1.63	-1088.2	-1875.1	-3789	1.01	2.79	527.6	0.0	4128	1.01	9.39
									-219.8	1.09	-427.3	1.18	-118.4	1.18	-883.5	-518.7	-648.4	-116.4	-866.1	1.63	-1056.9	-1940.4	-3789	1.01	2.79	466.5	0.0	4128	1.01	10.83
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.8	1.09	97.3	1.18	26.5	1.18	193.8	-340.9	-426.2	-61.0	-544.0	1.63	-694.7	-500.9	-2593	1.01	4.05	597.6	791.4	2810	1.01	4.42
									11.1	1.09	28.6	1.18	5.7	1.18	52.5	-336.8	-421.0	-85.6	-578.7	1.63	-686.3	-633.8	-2593	1.01	3.89	551.5	604.0	2810	1.01	5.05
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	311.7	1.09	630.8	1.18	174.3	1.18	1289.8	-140.5	-175.6	-1.1	-184.9	1.63	-286.2	0.0	-3414	1.01	16.55	609.5	1899.2	3713	1.01	4.04
									292.2	1.09	589.2	1.18	160.6	1.18	1203.3	-144.0	-180.0	-36.3	-247.0	1.63	-293.4	0.0	-3414	1.01	15.85	598.4	1801.8	3713	1.01	4.26
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**572.0**	1.09	1137.2	1.18	320.7	1.18	**2343.8**	**-103.4**	**-129.3**	58.6	-39.3	**1.63**	**-210.7**	**0.0**	**-5855**	**1.01**	**39.19**	**597.3**	**2941.1**	**6516**	**1.01**	**7.09**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	140.8	1.09	311.8	1.18	96.5	1.18	635.2	-47.4	-59.3	-33.4	-116.3	1.63	-116.3	0.0	-2283	1.01	25.29	654.2	1289.4	2810	1.01	3.37
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	340.8	1.09	696.7	1.18	197.7	1.18	1426.9	-167.1	-208.9	-114.2	-404.1	1.63	-404.1	0.0	-3260	1.01	11.68	1265.5	2692.4	4128	1.01	**2.17**
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	310.3	1.09	617.4	1.18	170.8	1.18	1268.3	-280.2	-350.2	-187.4	-670.7	1.63	-670.7	0.0	-3260	1.01	6.80	1373.1	2641.4	4128	1.01	**2.11**
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	65.1	1.09	125.1	1.18	34.1	1.18	258.8	-295.8	-369.8	-199.6	-711.1	1.63	-711.1	-452.2	-2280	1.01	3.60	908.9	1167.7	2810	1.01	2.84
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-171.0	1.09	-351.0	1.18	-98.6	1.18	-717.0	-272.7	-340.9	-186.1	-658.9	1.63	-658.9	-1375.9	-2273	1.01	2.40	456.6	0.0	2810	1.01	7.79
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-395.6**	1.09	-803.4	1.18	-229.6	1.18	**-1650.2**	**-280.7**	**-350.9**	-231.6	-743.5	**1.63**	**-743.5**	**-2393.7**	**-3273**	**1.01**	2.23	**184.4**	**0.0**	**4128**	**1.01**	**31.56**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN

Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2, asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	-260.2	-325.2	-41.9	-407.7	1.63	-530.1	-782.9	-911	1.01	1.26	2.9	0.0	2207	1.01	864.79
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-28.5	1.09	-93.6	1.18	-30.4	1.18	-177.4	-232.1	-290.1	-23.5	-340.9	1.63	-472.9	-650.4	-769	1.01	1.27	99.0	0.0	1859	1.01	20.75
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.4	1.09	-86.6	1.18	-26.3	1.18	-160.9	-243.2	-304.0	-20.4	-350.3	1.63	-495.4	-656.4	-1006	1.01	1.73	125.5	0.0	1859	1.01	16.24
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.5	1.09	-77.5	1.18	-23.1	1.18	-142.1	-245.2	-306.5	-17.1	-347.7	1.63	-499.6	-641.8	-1173	1.01	2.09	137.7	0.0	1859	1.01	14.67
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-25.3	1.09	-86.0	1.18	-26.1	1.18	-159.8	-249.7	-312.2	-18.6	-355.9	1.63	-508.8	-668.7	-1232	1.01	2.13	113.5	0.0	1859	1.01	17.95
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.8	1.09	-78.3	1.18	-23.4	1.18	-143.7	-247.1	-308.9	-17.5	-350.8	1.63	-503.5	-647.2	-1173	1.01	2.07	135.6	0.0	1859	1.01	14.91
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.6	1.09	-87.2	1.18	-26.4	1.18	-162.0	-245.6	-306.9	-19.6	-352.2	1.63	-500.3	-662.3	-1006	1.01	1.71	121.7	0.0	1859	1.01	16.77
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-28.8	1.09	-92.8	1.18	-30.2	1.18	-176.6	-233.8	-292.3	-22.6	-341.8	1.63	-476.4	-653.0	-769	1.01	1.26	92.4	0.0	1859	1.01	22.24
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-33.4	1.09	-108.9	1.18	-41.4	1.18	-213.8	-253.0	-316.2	-38.1	-392.0	1.63	-515.4	-729.2	-911	1.01	1.37	0.3	0.0	2207	1.01	7744.72
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-287.3	1.09	-587.1	1.18	-179.8	1.18	-1218.1	-454.5	-568.1	-163.7	-859.5	1.63	-926.0	-2144.1	-2518	1.01	1.43	65.6	0.0	3299	1.01	69.31
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	261.5	1.09	487.6	1.18	136.2	1.18	1021.1	-72.6	-90.7	-20.2	-127.6	1.63	-147.9	0.0	-1530	1.01	17.35	628.5	1649.6	2688	1.01	2.69
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.9	1.09	-551.4	1.18	-163.3	1.18	-1126.6	-433.8	-542.2	-160.2	-826.8	1.63	-883.8	-2010.5	-2722	1.01	1.84	99.8	0.0	3299	1.01	44.67
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	232.7	1.09	438.2	1.18	115.0	1.18	906.5	-129.6	-162.1	-21.3	-203.7	1.63	-264.1	0.0	-1744	1.01	10.10	635.3	1541.9	2688	1.01	2.85
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-203.6	1.09	-442.6	1.18	-131.7	1.18	-899.5	-416.2	-520.2	-139.4	-769.9	1.63	-848.0	-1747.5	-2437	1.01	1.84	164.8	0.0	2810	1.01	22.67
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	168.5	1.09	300.7	1.18	74.4	1.18	626.3	-185.0	-231.2	-22.2	-277.4	1.63	-376.9	0.0	-1306	1.01	5.16	591.1	1217.3	2207	1.01	2.71
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-97.4	1.09	-225.1	1.18	-71.6	1.18	-456.3	-365.4	-456.7	-93.6	-629.0	1.63	-744.4	-1200.7	-1577	1.01	1.53	297.3	0.0	2076	1.01	8.59
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	47.1	1.09	54.5	1.18	6.5	1.18	123.3	-255.4	-319.3	-22.6	-370.0	1.63	-520.4	-397.2	-1050	1.01	2.27	481.0	604.2	1556	1.01	3.01
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	58.7	1.09	79.9	1.18	13.4	1.18	174.1	-262.7	-328.4	-20.6	-376.2	1.63	-535.2	-361.1	-1050	1.01	2.31	467.1	641.2	1556	1.01	2.99
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-102.8	1.09	-249.4	1.18	-78.3	1.18	-498.8	-357.3	-446.6	-61.4	-566.0	1.63	-728.0	-1226.8	-1577	1.01	1.50	307.1	0.0	2076	1.01	8.45
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	172.6	1.09	321.8	1.18	80.3	1.18	662.6	-187.4	-234.3	3.6	-238.5	1.63	-381.8	0.0	-1435	1.01	5.53	586.6	1249.2	2404	1.01	3.01
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-205.9	1.09	-461.5	1.18	-137.0	1.18	-930.7	-416.7	-520.9	-111.4	-724.9	1.63	-849.0	-1779.7	-2839	1.01	2.28	167.5	0.0	3299	1.01	25.44
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	240.0	1.09	451.0	1.18	118.6	1.18	933.6	-123.2	-154.0	-7.9	-173.5	1.63	-251.0	0.0	-1744	1.01	10.74	644.2	1577.8	2688	1.01	2.76
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.1	1.09	-563.3	1.18	-166.6	1.18	-1143.7	-442.3	-552.8	-145.6	-814.1	1.63	-901.1	-2044.8	-2722	1.01	1.78	82.4	0.0	3299	1.01	54.32
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	267.4	1.09	491.9	1.18	137.2	1.18	1033.8	-68.5	-85.6	-18.7	-119.9	1.63	-139.6	0.0	-1530	1.01	18.47	651.0	1684.8	2688	1.01	2.58
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-282.1	1.09	-590.1	1.18	-180.5	1.18	-1216.8	-466.2	-582.7	-164.3	-875.7	1.63	-949.9	-2166.7	-2518	1.01	1.40	54.8	0.0	3299	1.01	82.98
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**571.9**	1.09	1136.4	1.18	320.4	1.18	**2342.3**	**-102.7**	**-128.4**	35.7	-75.8	**1.63**	**-209.3**	**0.0**	-5855	1.01	39.44	**590.5**	**2932.9**	6516	1.01	7.18
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	306.5	1.09	611.7	1.18	166.8	1.18	1252.8	-121.5	-151.9	28.8	-111.6	1.63	-247.6	0.0	-3414	1.01	18.98	444.9	1697.8	3713	1.01	5.61
									324.3	1.09	649.3	1.18	179.1	1.18	1331.0	-115.3	-144.1	28.8	-103.5	1.63	-234.9	0.0	-3414	1.01	20.34	458.3	1789.2	3713	1.01	5.28
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	43.4	1.09	80.4	1.18	19.8	1.18	165.5	-286.4	-358.0	-47.8	-451.4	1.63	-583.5	-418.0	-2593	1.01	4.77	408.8	574.3	2810	1.01	6.54
									75.9	1.09	147.7	1.18	40.0	1.18	304.2	-281.6	-352.0	-2.8	-371.8	1.63	-573.8	-269.6	-2593	1.01	5.09	443.4	747.6	2810	1.01	5.71
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-163.1	1.09	-332.6	1.18	-92.5	1.18	-679.4	-456.2	-570.2	-102.7	-762.4	1.63	-929.5	-1608.9	-3037	1.01	2.57	337.7	0.0	3299	1.01	11.88
									-144.0	1.09	-294.2	1.18	-81.0	1.18	-599.7	-465.1	-581.3	-72.0	-723.8	1.63	-947.6	-1547.3	-3037	1.01	2.60	384.5	0.0	3299	1.01	10.22
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-243.6	1.09	-486.6	1.18	-134.6	1.18	-998.6	-556.3	-695.3	-126.3	-931.3	1.63	-1133.4	-2132.0	-4165	1.01	2.83	326.9	0.0	4542	1.01	17.09
									-244.8	1.09	-490.1	1.18	-135.6	1.18	-1005.2	-557.0	-696.2	-119.4	-921.0	1.63	-1134.8	-2140.0	-4165	1.01	2.82	286.6	0.0	4542	1.01	19.51
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-132.7	1.09	-263.1	1.18	-72.6	1.18	-540.8	-477.8	-597.2	-90.6	-770.6	1.63	-973.5	-1514.2	-3037	1.01	2.60	476.2	0.0	3299	1.01	8.13
									-154.1	1.09	-308.3	1.18	-86.1	1.18	-633.4	-469.6	-587.0	-110.3	-792.2	1.63	-956.9	-1590.3	-3037	1.01	2.54	423.1	0.0	3299	1.01	9.37
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	95.3	1.09	198.1	1.18	53.8	1.18	401.1	-298.9	-373.6	-27.7	-434.9	1.63	-609.0	-207.9	-2593	1.01	4.96	549.9	951.0	2810	1.01	4.43
									63.8	1.09	131.9	1.18	33.8	1.18	265.0	-306.3	-382.9	-67.6	-509.6	1.63	-624.1	-359.1	-2593	1.01	4.62	521.0	786.0	2810	1.01	4.94
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	353.3	1.09	715.4	1.18	197.0	1.18	1461.7	-125.1	-156.3	39.1	-99.4	1.63	-254.8	0.0	-3789	1.01	20.75	568.3	2030.0	4128	1.01	4.76
									334.1	1.09	674.9	1.18	183.8	1.18	1377.3	-138.1	-172.6	-3.6	-186.0	1.63	-281.4	0.0	-3789	1.01	18.49	566.2	1943.5	4128	1.01	4.93
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**604.6**	1.09	1202.9	1.18	338.1	1.18	**2477.4**	**-80.1**	**-100.1**	79.2	24.7	**1.63** 1.63	**-163.2**	**0.0**	-5497	1.01	49.19	**556.5**	**3033.9**	6022	1.01	6.48
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-406.4**	1.09	-814.0	1.18	-232.7	1.18	**-1678.1**	**-238.6**	**-298.2**	-226.9	-681.0	**1.63**	**-681.0**	**-2359.0**	-3227	1.01	2.32	**167.0**	**0.0**	4128	1.01	35.02
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-194.7	1.09	-387.7	1.18	-108.9	1.18	-798.2	-209.9	-262.4	-109.1	-451.6	1.63	-451.6	-1249.8	-2273	1.01	3.32	391.5	0.0	2810	1.01	9.29
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	12.8	1.09	37.8	1.18	9.7	1.18	70.0	-220.3	-275.4	-130.8	-500.6	1.63	-500.6	-430.6	-2280	1.01	4.74	777.6	847.6	2810	1.01	3.56
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	216.6	1.09	449.4	1.18	123.3	1.18	911.9	-201.7	-252.2	-193.1	-577.9	1.63	-577.9	0.0	-2954	1.01	6.74	1226.0	2138.0	3713	1.01	2.32
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	210.6	1.09	431.5	1.18	118.5	1.18	878.5	-242.3	-302.9	-214.5	-665.7	1.63	-665.7	0.0	-2954	1.01	5.80	1237.9	2116.3	3713	1.01	2.32
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	0.6	1.09	0.4	1.18	-0.8	1.18	0.2	-258.2	-322.7	-176.4	-624.2	1.63	-624.2	-623.9	-2280	1.01	3.69	780.6	780.8	2810	1.01	3.64
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-220.4	1.09	-451.7	1.18	-126.9	1.18	-923.0	-240.4	-300.4	-138.6	-539.4	1.63	-539.4	-1462.4	-2634	1.01	3.22	369.2	0.0	3299	1.01	11.53
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-413.8	1.09	-839.8	1.18	-239.3	1.18	-1724.4	-242.5	-303.1	-198.8	-640.3	1.63	-640.3	**-2364.7**	-3527	1.01	2.87	121.7	**0.0**	4542	1.01	51.86

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	$P_{f,DL}$ kN	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-15.2	1.09	-53.6	1.18	-22.7	1.18	-106.6	1.63	-642.4	-748.9	-1232	1.01	1.77	-106.6	3.9	4.9	-24.4	-34.6	1.63	8.0	0.0	1859	1.01	247.29
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-17.9	1.09	-76.1	1.18	-24.8	1.18	-138.6	1.63	-499.7	-638.3	-1232	1.01	2.21	-138.6	46.1	57.6	-19.1	29.0	1.63	93.9	0.0	1859	1.01	21.47
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-24.4	1.09	-83.1	1.18	-25.0	1.18	-154.1	1.63	-507.5	-661.6	-1232	1.01	2.15	-154.1	38.8	48.5	-19.0	19.6	1.63	79.1	0.0	1859	1.01	25.70
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-20.2	1.09	-72.2	1.18	-21.4	1.18	-132.5	1.63	-497.3	-629.8	-1173	1.01	2.12	-132.5	47.2	59.0	-17.3	33.5	1.63	96.2	0.0	1859	1.01	20.89
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-24.0	1.09	-84.2	1.18	-25.6	1.18	-155.7	1.63	-494.1	-649.8	-1006	1.01	1.74	-155.7	43.3	54.1	-20.3	23.4	1.63	88.2	0.0	1859	1.01	23.06
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-27.6	1.09	-90.9	1.18	-29.7	1.18	-172.4	1.63	-463.6	-636.0	-769	1.01	1.30	-172.4	35.6	44.5	-21.9	10.7	1.63	72.5	0.0	1859	1.01	28.29
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-525.9	-778.6	-911	1.01	1.27	-252.7	0.9	1.2	-41.9	-67.2	1.63	1.9	0.0	2207	1.01	1293.00
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-201.4	1.09	-440.9	1.18	-136.4	1.18	-900.9	1.63	-795.2	-1696.1	-2392	1.01	1.90	-900.9	44.8	56.0	-153.9	-192.5	1.63	91.3	0.0	2893	1.01	41.88
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	149.4	1.09	267.0	1.18	68.9	1.18	559.2	1.63	-282.7	0.0	-983	1.01	5.49	559.2	237.4	296.8	-48.6	230.4	1.63	483.8	1042.9	2071	1.01	3.17
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-83.6	1.09	-190.7	1.18	-60.5	1.18	-387.6	1.63	-628.1	-1015.6	-1298	1.01	1.47	-387.6	109.5	136.9	-98.1	-17.1	1.63	223.2	0.0	1652	1.01	9.21
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	33.6	1.09	14.0	1.18	-6.5	1.18	45.4	1.63	-464.0	-418.6	-797	1.01	1.83	45.4	194.3	242.9	-53.0	167.0	1.63	395.9	441.3	1133	1.01	2.78
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	62.4	1.09	92.5	1.18	17.9	1.18	198.3	1.63	-491.3	-293.0	-797	1.01	2.04	198.3	173.6	217.0	-31.5	175.0	1.63	353.7	552.0	1133	1.01	2.68
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-109.8	1.09	-261.3	1.18	-82.3	1.18	-525.1	1.63	-597.3	-1122.4	-1577	1.01	1.79	-525.1	138.2	172.7	-78.5	52.2	1.63	281.6	0.0	2076	1.01	9.31
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	183.9	1.09	335.3	1.18	84.1	1.18	695.3	1.63	-358.2	0.0	-1306	1.01	5.63	695.3	228.0	285.0	33.7	352.3	1.63	464.6	1159.9	2207	1.01	3.30
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-216.8	1.09	-475.3	1.18	-140.9	1.18	-963.4	1.63	-703.9	-1667.2	-2497	1.01	2.21	-963.4	78.6	98.3	-125.1	-101.5	1.63	160.1	0.0	2884	1.01	24.21
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	244.7	1.09	467.7	1.18	123.3	1.18	964.1	1.63	-250.7	0.0	-1744	1.01	10.87	964.1	251.5	314.3	22.5	364.6	1.63	512.4	1476.5	2688	1.01	3.42
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-268.3	1.09	-579.4	1.18	-171.2	1.18	-1178.1	1.63	-740.2	-1918.4	-3041	1.01	2.56	-1178.1	40.2	50.3	-147.9	-188.7	1.63	81.9	0.0	3713	1.01	60.17
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	269.7	1.09	511.7	1.18	143.0	1.18	1066.5	1.63	-141.8	0.0	-1530	1.01	18.42	1066.5	250.5	313.2	4.9	334.7	1.63	510.5	1577.0	2688	1.01	3.23
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-291.2	1.09	-610.3	1.18	-186.4	1.18	-1257.5	1.63	-778.0	-2035.5	-2804	1.01	2.02	-1257.5	2.2	2.7	-152.6	-245.9	1.63	4.4	0.0	3713	1.01	1125.69
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	9.9	1.09	23.4	1.18	8.5	1.18	48.5	1.63	-26.2	0.0	-3414	1.01	133.25	48.5	90.4	113.1	-13.1	96.7	1.63	184.3	232.7	3713	1.01	20.09
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-234.7	1.09	-475.7	1.18	-136.2	1.18	-977.9	1.63	-639.5	-1617.4	-3414	1.01	3.86	-977.9	58.4	73.0	-102.9	-91.6	1.63	119.0	0.0	3713	1.01	39.73
									-228.0	1.09	-459.0	1.18	-129.2	1.18	-942.7	1.63	-613.6	-1556.3	-3414	1.01	4.08	-942.7	50.6	63.2	-56.0	-25.3	1.63	103.1	0.0	3713	1.01	45.52
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-309.1**	1.09	-603.8	1.18	-167.4	1.18	**-1247.0**	**1.63**	**-877.9**	**-2124.8**	**-4333**	**1.01**	**3.56**	**-1247.0**	**120.0**	**150.0**	-131.9	-58.6	**1.63**	**244.4**	**0.0**	**4779**	**1.01**	**24.85**
									-318.7	1.09	-624.1	1.18	-173.1	1.18	-1288.1	1.63	-871.3	-2159.3	-4333	1.01	3.54	-1288.1	108.0	135.0	-108.7	-36.3	1.63	220.1	0.0	4779	1.01	27.78
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-197.6	1.09	-380.2	1.18	-104.2	1.18	-786.9	1.63	-822.8	-1609.7	-3789	1.01	3.69	-786.9	173.1	216.4	-115.3	37.7	1.63	352.7	0.0	4128	1.01	14.05
									-219.8	1.09	-427.3	1.18	-118.4	1.18	-883.5	1.63	-806.0	-1689.5	-3789	1.01	3.65	-883.5	153.0	191.3	-116.4	9.8	1.63	311.8	0.0	4128	1.01	16.21
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.8	1.09	97.3	1.18	26.5	1.18	193.8	1.63	-535.7	-341.9	-2593	1.01	5.25	193.8	196.0	245.0	-61.0	156.2	1.63	399.3	593.1	2810	1.01	6.62
									11.1	1.09	28.6	1.18	5.7	1.18	52.5	1.63	-534.6	-482.1	-2593	1.01	5.00	52.5	180.9	226.2	-85.6	96.5	1.63	368.7	421.2	2810	1.01	7.56
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	311.7	1.09	630.8	1.18	174.3	1.18	1289.8	1.63	-256.0	0.0	-3414	1.01	18.51	1289.8	199.6	249.5	-1.1	258.5	1.63	406.7	1696.5	3713	1.01	6.05
									292.2	1.09	589.2	1.18	160.6	1.18	1203.3	1.63	-265.0	0.0	-3414	1.01	17.55	1203.3	196.1	245.1	-36.3	196.4	1.63	399.5	1602.8	3713	1.01	6.38
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**572.0**	1.09	1137.2	1.18	320.7	1.18	**2343.8**	**1.63**	**-140.9**	**0.0**	**-5855**	**1.01**	**58.59**	**2343.8**	**195.2**	**244.0**	58.6	350.1	**1.63**	**397.8**	**2741.6**	**6516**	**1.01**	**10.65**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	140.8	1.09	311.8	1.18	96.5	1.18	635.2	1.63	-95.8	0.0	-2283	1.01	30.70	635.2	275.9	344.9	-33.4	305.3	1.63	562.2	1197.4	2810	1.01	3.92
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	340.8	1.09	696.7	1.18	197.7	1.18	1426.9	1.63	-331.8	0.0	-3260	1.01	14.23	1426.9	472.4	590.5	-114.2	429.8	1.63	962.5	2389.4	4128	1.01	2.85
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	310.3	1.09	617.4	1.18	170.8	1.18	1268.3	1.63	-549.4	0.0	-3260	1.01	8.30	1268.3	508.3	635.3	-187.4	357.4	1.63	1035.6	2303.9	4128	1.01	2.80
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	65.1	1.09	125.1	1.18	34.1	1.18	258.8	1.63	-582.8	-323.9	-2280	1.01	4.39	258.8	347.9	434.9	-199.6	128.3	1.63	708.9	967.7	2810	1.01	3.64
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-171.0	1.09	-351.0	1.18	-98.6	1.18	-717.0	1.63	-539.8	-1256.8	-2273	1.01	2.92	-717.0	192.0	240.0	-186.1	-53.0	1.63	391.2	0.0	2810	1.01	9.09
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-395.6**	1.09	-803.4	1.18	-229.6	1.18	**-1650.2**	**1.63**	**-621.9**	**-2272.1**	**-3273**	**1.01**	2.66	**-1650.2**	**87.8**	**109.8**	-231.6	-263.0	**1.63**	**178.9**	**0.0**	**4128**	**1.01**	**32.52**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (CENTER TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	$P_{f,DL}$	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5								Factor		19		19							Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-525.9	-778.6	-911	1.01	1.27	-252.7	0.9	1.2	-41.9	-67.2	1.63	1.9	0.0	2207	1.01	1293.00
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-28.5	1.09	-93.6	1.18	-30.4	1.18	-177.4	1.63	-471.0	-648.5	-769	1.01	1.27	-177.4	36.1	45.2	-23.5	8.9	1.63	73.6	0.0	1859	1.01	27.92
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.4	1.09	-86.6	1.18	-26.3	1.18	-160.9	1.63	-494.0	-654.9	-1006	1.01	1.73	-160.9	42.6	53.3	-20.4	22.4	1.63	86.9	0.0	1859	1.01	23.47
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.5	1.09	-77.5	1.18	-23.1	1.18	-142.1	1.63	-499.6	-641.7	-1173	1.01	2.09	-142.1	47.5	59.4	-17.1	34.0	1.63	96.8	0.0	1859	1.01	20.86
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-25.3	1.09	-86.0	1.18	-26.1	1.18	-159.8	1.63	-507.8	-667.6	-1232	1.01	2.14	-159.8	38.1	47.6	-18.6	19.5	1.63	77.7	0.0	1859	1.01	26.24
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.8	1.09	-78.3	1.18	-23.4	1.18	-143.7	1.63	-502.7	-646.4	-1173	1.01	2.07	-143.7	46.3	57.9	-17.5	31.9	1.63	94.3	0.0	1859	1.01	21.44
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.6	1.09	-87.2	1.18	-26.4	1.18	-162.0	1.63	-499.1	-661.0	-1006	1.01	1.71	-162.0	41.6	52.1	-19.6	22.3	1.63	84.8	0.0	1859	1.01	24.04
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-28.8	1.09	-92.8	1.18	-30.2	1.18	-176.6	1.63	-475.8	-652.4	-769	1.01	1.26	-176.6	32.8	41.0	-22.6	5.9	1.63	66.8	0.0	1859	1.01	30.74
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-33.4	1.09	-108.9	1.18	-41.4	1.18	-213.8	1.63	-512.8	-726.6	-911	1.01	1.38	-213.8	0.1	0.1	-38.1	-62.0	1.63	0.2	0.0	2207	1.01	#######
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-287.3	1.09	-587.1	1.18	-179.8	1.18	-1218.1	1.63	-772.7	-1990.8	-2518	1.01	1.71	-1218.1	21.5	26.9	-163.7	-238.8	1.63	43.9	0.0	3299	1.01	103.62
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	261.5	1.09	487.6	1.18	136.2	1.18	1021.1	1.63	-147.3	0.0	-1530	1.01	17.42	1021.1	250.8	313.5	-20.2	294.0	1.63	511.0	1532.0	2688	1.01	3.31
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.9	1.09	-551.4	1.18	-163.3	1.18	-1126.6	1.63	-741.6	-1868.3	-2722	1.01	2.19	-1126.6	40.4	50.5	-160.2	-208.5	1.63	82.3	0.0	3299	1.01	54.19
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	232.7	1.09	438.2	1.18	115.0	1.18	906.5	1.63	-249.2	0.0	-1744	1.01	10.71	906.5	253.6	316.9	-21.3	295.9	1.63	516.6	1423.2	2688	1.01	3.50
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-203.6	1.09	-442.6	1.18	-131.7	1.18	-899.5	1.63	-720.6	-1620.1	-2437	1.01	2.17	-899.5	74.6	93.2	-139.4	-130.0	1.63	151.9	0.0	2810	1.01	24.60
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	168.5	1.09	300.7	1.18	74.4	1.18	626.3	1.63	-344.6	0.0	-1306	1.01	5.65	626.3	238.0	297.5	-22.2	274.2	1.63	485.0	1111.3	2207	1.01	3.30
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-97.4	1.09	-225.1	1.18	-71.6	1.18	-456.3	1.63	-638.0	-1094.4	-1577	1.01	1.78	-456.3	126.9	158.7	-93.6	12.9	1.63	258.6	0.0	2076	1.01	9.87
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	47.1	1.09	54.5	1.18	6.5	1.18	123.3	1.63	-458.8	-335.5	-1050	1.01	2.58	123.3	196.9	246.1	-22.6	219.8	1.63	401.1	524.4	1556	1.01	3.61
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	58.7	1.09	79.9	1.18	13.4	1.18	174.1	1.63	-471.4	-297.3	-1050	1.01	2.62	174.1	191.8	239.7	-20.6	216.4	1.63	390.7	564.8	1556	1.01	3.58
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-102.8	1.09	-249.4	1.18	-78.3	1.18	-498.8	1.63	-624.6	-1123.4	-1577	1.01	1.75	-498.8	130.8	163.5	-61.4	70.5	1.63	266.5	0.0	2076	1.01	9.74
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	172.6	1.09	321.8	1.18	80.3	1.18	662.6	1.63	-349.3	0.0	-1435	1.01	6.05	662.6	237.3	296.6	3.6	315.2	1.63	483.4	1146.0	2404	1.01	3.65
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-205.9	1.09	-461.5	1.18	-137.0	1.18	-930.7	1.63	-722.0	-1652.8	-2839	1.01	2.68	-930.7	76.3	95.3	-111.4	-82.1	1.63	155.4	0.0	3299	1.01	27.43
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	240.0	1.09	451.0	1.18	118.6	1.18	933.6	1.63	-239.5	0.0	-1744	1.01	11.25	933.6	257.3	321.6	-7.9	322.7	1.63	524.3	1457.9	2688	1.01	3.40
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.1	1.09	-563.3	1.18	-166.6	1.18	-1143.7	1.63	-753.2	-1896.9	-2722	1.01	2.13	-1143.7	35.0	43.8	-145.6	-191.7	1.63	71.4	0.0	3299	1.01	62.68
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	267.4	1.09	491.9	1.18	137.2	1.18	1033.8	1.63	-139.1	0.0	-1530	1.01	18.54	1033.8	259.3	324.2	-18.7	307.7	1.63	528.4	1562.2	2688	1.01	3.18
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-282.1	1.09	-590.1	1.18	-180.5	1.18	-1216.8	1.63	-784.6	-2001.4	-2518	1.01	1.69	-1216.8	18.1	22.6	-164.3	-244.2	1.63	36.9	0.0	3299	1.01	123.33
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**571.9**	1.09	1136.4	1.18	320.4	1.18	**2342.3**	**1.63**	**-140.0**	**0.0**	-5855	1.01	58.97	**2342.3**	**192.8**	**241.0**	35.7	309.6	**1.63**	**392.9**	**2735.2**	6516	1.01	10.79
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	306.5	1.09	611.7	1.18	166.8	1.18	1252.8	1.63	-230.4	0.0	-3414	1.01	20.40	1252.8	146.8	183.4	28.8	238.2	1.63	299.0	1551.8	3713	1.01	8.35
									324.3	1.09	649.3	1.18	179.1	1.18	1331.0	1.63	-225.3	0.0	-3414	1.01	21.21	1331.0	151.5	189.4	28.8	244.4	1.63	308.7	1639.7	3713	1.01	7.84
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	43.4	1.09	80.4	1.18	19.8	1.18	165.5	1.63	-468.0	-302.5	-2593	1.01	5.95	165.5	134.9	168.6	-47.8	97.9	1.63	274.8	440.3	2810	1.01	9.72
									75.9	1.09	147.7	1.18	40.0	1.18	304.2	1.63	-461.3	-157.2	-2593	1.01	6.34	304.2	146.4	183.0	-2.8	186.4	1.63	298.3	602.5	2810	1.01	8.49
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-163.1	1.09	-332.6	1.18	-92.5	1.18	-679.4	1.63	-715.8	-1395.2	-3037	1.01	3.34	-679.4	111.5	139.3	-102.7	-22.1	1.63	227.1	0.0	3299	1.01	17.66
									-144.0	1.09	-294.2	1.18	-81.0	1.18	-599.7	1.63	-721.9	-1321.6	-3037	1.01	3.42	-599.7	126.9	158.6	-72.0	48.2	1.63	258.6	0.0	3299	1.01	15.20
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-243.6	1.09	-486.6	1.18	-134.6	1.18	-998.6	1.63	-860.4	-1859.1	-4165	1.01	3.73	-998.6	107.3	134.1	-126.3	-66.0	1.63	218.6	0.0	4542	1.01	25.55
									-244.8	1.09	-490.1	1.18	-135.6	1.18	-1005.2	1.63	-858.7	-1863.9	-4165	1.01	3.73	-1005.2	94.1	117.6	-119.4	-72.0	1.63	191.7	0.0	4542	1.01	29.18
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-132.7	1.09	-263.1	1.18	-72.6	1.18	-540.8	1.63	-741.4	-1282.2	-3037	1.01	3.41	-540.8	156.3	195.4	-90.6	56.2	1.63	318.4	0.0	3299	1.01	12.16
									-154.1	1.09	-308.3	1.18	-86.1	1.18	-633.4	1.63	-734.5	-1367.8	-3037	1.01	3.31	-633.4	138.9	173.6	-110.3	1.3	1.63	282.9	0.0	3299	1.01	14.01
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	95.3	1.09	198.1	1.18	53.8	1.18	401.1	1.63	-486.6	-85.5	-2593	1.01	6.21	401.1	180.4	225.5	-27.7	190.1	1.63	367.6	768.7	2810	1.01	6.63
									63.8	1.09	131.9	1.18	33.8	1.18	265.0	1.63	-495.9	-230.9	-2593	1.01	5.82	265.0	170.9	213.6	-67.6	112.7	1.63	348.2	613.2	2810	1.01	7.39
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	353.3	1.09	715.4	1.18	197.0	1.18	1461.7	1.63	-240.5	0.0	-3789	1.01	21.99	1461.7	186.3	232.9	39.1	306.7	1.63	379.6	1841.3	4128	1.01	7.13
									334.1	1.09	674.9	1.18	183.8	1.18	1377.3	1.63	-257.1	0.0	-3789	1.01	20.25	1377.3	185.5	231.9	-3.6	236.0	1.63	377.9	1755.3	4128	1.01	7.39
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**604.6**	1.09	1202.9	1.18	338.1	1.18	**2477.4**	**1.63**	**-109.8**	**0.0**	-5497	1.01	73.10	**2477.4**	**181.6**	**227.0**	79.2	365.9	**1.63**	**370.0**	**2847.3**	6022	1.01	9.74
																1.63											1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-406.4**	1.09	-814.0	1.18	-232.7	1.18	**-1678.1**	**1.63**	**-574.8**	**-2252.9**	-3227	1.01	2.75	**-1678.1**	**82.0**	**102.4**	-226.9	-263.0	**1.63**	**167.0**	**0.0**	4128	1.01	35.02
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-194.7	1.09	-387.7	1.18	-108.9	1.18	-798.2	1.63	-363.5	-1161.7	-2273	1.01	4.12	-798.2	168.5	210.6	-109.1	41.8	1.63	343.3	0.0	2810	1.01	10.59
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	12.8	1.09	37.8	1.18	9.7	1.18	70.0	1.63	-407.0	-337.0	-2280	1.01	5.83	70.0	302.6	378.2	-130.8	181.3	1.63	616.5	686.5	2810	1.01	4.49
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	216.6	1.09	449.4	1.18	123.3	1.18	911.9	1.63	-492.0	0.0	-2954	1.01	7.92	911.9	457.2	571.4	-193.1	281.3	1.63	931.5	1843.4	3713	1.01	3.05
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	210.6	1.09	431.5	1.18	118.5	1.18	878.5	1.63	-561.1	0.0	-2954	1.01	6.88	878.5	461.6	577.0	-214.5	252.2	1.63	940.4	1818.9	3713	1.01	3.05
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	0.6	1.09	0.4	1.18	-0.8	1.18	0.2	1.63	-512.7	-512.5	-2280	1.01	4.49	0.2	303.7	379.6	-176.4	108.5	1.63	618.7	618.9	2810	1.01	4.59
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-220.4	1.09	-451.7	1.18	-126.9	1.18	-923.0	1.63	-435.6	-1358.6	-2634	1.01	3.99	-923.0	159.5	199.3	-138.6	-18.0	1.63	324.9	0.0	3299	1.01	13.10
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-413.8	1.09	-839.8	1.18	-239.3	1.18	-1724.4	1.63	-541.1	**-2265.5**	-3527	1.01	3.40	-1724.4	54.7	68.3	-198.8	-252.8	1.63	111.4	**0.0**	4542	1.01	56.67

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-4.2	1.09	-16.0	1.18	-9.2	1.18	-34.4	-180.9	-226.1	-15.6	-261.2	1.63	-368.5	-402.8	-1232	1.01	3.28	20.7	25.8	-15.6	1.5	1.63	42.1	7.7	1859	1.01	45.43
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-18.6	1.09	-63.2	1.18	-22.2	1.18	-121.0	-183.0	-228.7	-15.4	-263.8	1.63	-372.9	-493.9	-1232	1.01	3.01	12.3	15.3	-15.4	-9.2	1.63	25.0	0.0	1859	1.01	80.08
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-23.4	1.09	-67.8	1.18	-23.7	1.18	-133.5	-184.1	-230.2	-16.3	-266.7	1.63	-375.2	-508.7	-1232	1.01	2.96	15.5	19.3	-16.3	-6.4	1.63	31.5	0.0	1859	1.01	63.79
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-18.3	1.09	-61.5	1.18	-22.8	1.18	-119.5	-182.5	-228.1	-16.1	-264.3	1.63	-371.9	-491.3	-1173	1.01	2.87	16.2	20.3	-16.1	-5.1	1.63	33.1	0.0	1859	1.01	60.41
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.4	1.09	-56.3	1.18	-22.5	1.18	-107.5	-179.2	-224.0	-16.5	-260.5	1.63	-365.1	-472.6	-1006	1.01	2.49	16.0	20.0	-16.5	-6.0	1.63	32.6	0.0	1859	1.01	60.84
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-12.8	1.09	-49.2	1.18	-21.1	1.18	-96.8	-167.9	-209.9	-17.7	-247.8	1.63	-342.1	-439.0	-769	1.01	1.99	14.3	17.8	-17.7	-10.2	1.63	29.0	0.0	1859	1.01	68.00
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-165.0	-206.3	-25.9	-257.5	1.63	-336.3	-413.4	-911	1.01	2.51	17.2	21.5	-25.9	-19.8	1.63	35.1	0.0	2207	1.01	65.69
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-161.8	1.09	-340.2	1.18	-125.1	1.18	-725.5	-523.8	-654.7	-133.3	-900.3	1.63	-1067.2	-1792.7	-2392	1.01	1.58	92.3	115.3	-133.3	-97.0	1.63	188.0	0.0	2893	1.01	19.40
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	127.6	1.09	260.0	1.18	99.6	1.18	563.4	-91.6	-114.5	-45.9	-194.2	1.63	-194.2	0.0	-983	1.01	8.01	439.6	549.4	-45.9	498.4	1.63	895.6	1459.0	2071	1.01	1.71
U3 - L2	DIAGONAL	2-10C20			5388	1298	1498	1652	-60.6	1.09	-134.6	1.18	-51.1	1.18	-285.2	-353.6	-442.0	-78.7	-589.3	1.63	-720.4	-1005.6	-1298	1.01	1.42	94.3	117.9	-78.7	-5.2	1.63	192.2	0.0	1652	1.01	10.16
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	27.9	1.09	45.8	1.18	22.3	1.18	110.8	-150.9	-188.6	-42.8	-266.6	1.63	-307.4	-196.6	-797	1.01	2.98	271.4	339.3	-42.8	284.1	1.63	553.0	663.9	1133	1.01	1.87
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	53.6	1.09	103.9	1.18	32.4	1.18	219.4	-188.6	-235.7	-11.0	-263.9	1.63	-384.2	-164.8	-797	1.01	2.67	203.2	254.0	-11.0	247.0	1.63	414.0	633.4	1133	1.01	2.24
U5 - L6	DIAGONAL	2-10C25			5559	1577	1876	2076	-84.1	1.09	-187.3	1.18	-59.5	1.18	-382.9	-288.7	-360.8	-51.5	-460.4	1.63	-588.1	-971.0	-1577	1.01	2.06	121.4	151.8	-51.5	74.4	1.63	247.4	0.0	2076	1.01	10.02
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	153.1	1.09	314.5	1.18	108.8	1.18	666.3	-62.2	-77.8	11.1	-63.0	1.63	-126.7	0.0	-1306	1.01	15.67	389.3	486.7	11.1	525.8	1.63	793.3	1459.6	2207	1.01	1.97
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-169.7	1.09	-365.6	1.18	-124.6	1.18	-763.4	-444.4	-555.6	-93.2	-731.5	1.63	-905.6	-1669.0	-2497	1.01	1.94	27.7	34.6	-93.2	-115.8	1.63	56.4	0.0	2884	1.01	65.15
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	183.5	1.09	386.5	1.18	142.1	1.18	823.8	-36.7	-45.9	-7.0	-59.2	1.63	-74.9	0.0	-1744	1.01	34.54	465.7	582.2	-7.0	596.0	1.63	948.9	1772.8	2688	1.01	1.99
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-195.4	1.09	-422.8	1.18	-152.5	1.18	-891.8	-500.2	-625.2	-117.5	-843.7	1.63	-1019.1	-1910.9	-3041	1.01	2.14	22.5	28.1	-117.5	-162.2	1.63	45.7	0.0	3713	1.01	101.47
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	180.2	1.09	359.6	1.18	142.4	1.18	788.8	-44.6	-55.7	-17.7	-87.0	1.63	-90.8	0.0	-1530	1.01	25.69	451.6	564.5	-17.7	560.0	1.63	920.1	1708.9	2688	1.01	2.09
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-193.3	1.09	-391.3	1.18	-150.4	1.18	-850.0	-486.1	-607.6	-128.3	-842.9	1.63	-990.3	-1840.3	-2804	1.01	2.00	43.4	54.2	-128.3	-152.5	1.63	88.3	0.0	3713	1.01	52.08
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	-3.1	1.09	0.5	1.18	9.6	1.18	8.6	-22.7	-28.4	-10.1	-46.1	1.63	-46.3	-37.7	-3414	1.01	74.70	95.8	119.7	-10.1	108.4	1.63	195.2	203.7	3713	1.01	19.17
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-116.7	-145.9	27.5	-107.3	1.63	-237.8	0.0	-3414	1.01	19.37	316.0	395.0	27.5	457.0	1.63	643.9	1801.6	3713	1.01	4.03
									-213.9	1.09	-429.9	1.18	-135.3	1.18	-900.1	-500.2	-625.2	-82.4	-786.6	1.63	-1019.2	-1919.2	-3414	1.01	2.50	112.9	141.1	-82.4	12.8	1.63	229.9	0.0	3713	1.01	20.22
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-274.7**	1.09	-557.4	1.18	-187.2	1.18	**-1178.0**	**-743.1**	**-928.9**	-160.1	-1230.0	**1.63**	**-1514.1**	**-2692.1**	**-4333**	**1.01**	**2.11**	**232.3**	**290.4**	-160.1	42.0	**1.63**	**473.4**	**0.0**	**4779**	**1.01**	**12.68**
									-282.6	1.09	-568.3	1.18	-183.9	1.18	-1195.7	-732.4	-915.6	-144.9	-1191.2	1.63	-1492.3	-2688.0	-4333	1.01	2.13	226.9	283.7	-144.9	59.8	1.63	462.4	0.0	4779	1.01	13.02
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-185.2	1.09	-366.8	1.18	-120.4	1.18	-776.7	-640.7	-800.8	-142.0	-1066.9	1.63	-1305.4	-2082.0	-3789	1.01	2.34	320.1	400.1	-142.0	185.9	1.63	652.2	0.0	4128	1.01	7.58
									-186.8	1.09	-373.0	1.18	-126.8	1.18	-793.3	-661.2	-826.4	-150.8	-1108.0	1.63	-1347.1	-2140.4	-3789	1.01	2.25	317.6	397.1	-150.8	168.4	1.63	647.2	0.0	4128	1.01	7.67
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	26.6	1.09	69.4	1.18	24.9	1.18	140.3	-366.9	-458.6	-67.8	-588.9	1.63	-747.5	-607.2	-2593	1.01	3.69	351.3	439.2	-67.8	347.6	1.63	715.8	856.1	2810	1.01	3.77
									25.2	1.09	60.4	1.18	12.3	1.18	113.2	-411.0	-513.8	-99.2	-697.6	1.63	-837.5	-724.3	-2593	1.01	3.26	365.8	457.3	-99.2	315.4	1.63	745.4	858.6	2810	1.01	3.66
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	248.7	1.09	528.4	1.18	182.6	1.18	1110.0	-123.5	-154.4	7.2	-149.3	1.63	-251.7	0.0	-3414	1.01	18.11	365.5	456.9	7.2	488.4	1.63	744.7	1854.7	3713	1.01	3.55
									251.5	1.09	530.2	1.18	174.9	1.18	1106.1	-149.5	-186.8	-32.8	-248.4	1.63	-304.5	0.0	-3414	1.01	14.95	406.5	508.1	-32.8	476.6	1.63	828.3	1934.3	3713	1.01	3.19
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**439.2**	1.09	898.2	1.18	318.4	1.18	**1914.3**	**-115.1**	**-143.9**	39.6	-85.6	**1.63**	**-234.5**	**0.0**	**-5855**	**1.01**	**33.38**	**409.9**	**512.4**	39.6	599.0	**1.63**	**835.2**	**2749.5**	**6516**	**1.01**	**5.59**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	122.7	1.09	251.3	1.18	75.6	1.18	519.5	-49.5	-61.9	-27.7	-109.7	1.63	-109.7	0.0	-2283	1.01	25.77	288.0	360.0	-27.7	330.5	1.63	586.9	1106.3	2810	1.01	3.95
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	232.7	1.09	477.0	1.18	154.5	1.18	998.7	-140.2	-175.3	-75.0	-305.1	1.63	-305.1	0.0	-3260	1.01	14.07	620.9	776.1	-75.0	687.4	1.63	1265.0	2263.8	4128	1.01	2.51
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	213.1	1.09	436.1	1.18	147.4	1.18	920.8	-250.3	-312.8	-129.7	-537.7	1.63	-537.7	0.0	-3260	1.01	7.83	683.8	854.7	-129.7	680.2	1.63	1393.2	2314.0	4128	1.01	2.33
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	92.4	1.09	184.8	1.18	59.7	1.18	389.2	-339.0	-423.7	-175.9	-728.7	1.63	-728.7	-339.5	-2280	1.01	3.69	529.3	661.6	-175.9	403.5	1.63	1078.4	1467.6	2810	1.01	2.27
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-126.6	1.09	-268.2	1.18	-92.9	1.18	-564.1	-403.9	-504.8	-205.6	-861.7	1.63	-861.7	-1425.8	-2273	1.01	2.01	279.0	348.7	-205.6	28.7	1.63	568.4	4.4	2810	1.01	5.99
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-384.3**	1.09	-787.7	1.18	-269.2	1.18	**-1666.0**	**-463.0**	**-578.8**	-257.7	-1023.9	**1.63**	**-1023.9**	**-2689.9**	**-3273**	**1.01**	1.60	**142.8**	**178.5**	-257.7	-233.9	**1.63**	**290.9**	**0.0**	**4128**	**1.01**	**20.06**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-165.0	-206.3	-25.9	-257.5	1.63	-336.3	-413.4	-911	1.01	2.51	17.2	21.5	-25.9	-19.8	1.63	35.1	0.0	2207	1.01	65.69
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-14.0	1.09	-51.8	1.18	-21.7	1.18	-102.0	-172.2	-215.3	-18.0	-253.9	1.63	-350.9	-452.9	-769	1.01	1.92	13.6	17.0	-18.0	-11.6	1.63	27.8	0.0	1859	1.01	71.27
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.9	1.09	-57.2	1.18	-22.7	1.18	-109.4	-179.4	-224.3	-16.4	-260.8	1.63	-365.5	-475.0	-1006	1.01	2.48	15.4	19.2	-16.4	-6.7	1.63	31.4	0.0	1859	1.01	63.36
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.9	1.09	-61.6	1.18	-22.8	1.18	-118.1	-182.4	-228.0	-15.1	-262.5	1.63	-371.7	-489.7	-1173	1.01	2.87	16.4	20.5	-15.1	-3.3	1.63	33.5	0.0	1859	1.01	59.64
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-21.9	1.09	-65.6	1.18	-23.2	1.18	-128.6	-183.9	-229.9	-17.2	-268.0	1.63	-374.8	-503.4	-1232	1.01	2.98	14.5	18.1	-17.2	-9.2	1.63	29.6	0.0	1859	1.01	67.85
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.7	1.09	-61.2	1.18	-22.9	1.18	-117.6	-183.0	-228.8	-15.1	-263.3	1.63	-372.9	-490.5	-1173	1.01	2.86	16.3	20.3	-15.1	-3.5	1.63	33.1	0.0	1859	1.01	60.24
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.7	1.09	-56.9	1.18	-22.7	1.18	-108.9	-177.7	-222.1	-16.1	-257.9	1.63	-362.0	-471.0	-1006	1.01	2.50	17.0	21.2	-16.1	-4.0	1.63	34.6	0.0	1859	1.01	57.37
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-14.2	1.09	-51.2	1.18	-21.8	1.18	-101.7	-169.1	-211.3	-18.3	-250.2	1.63	-344.5	-446.2	-769	1.01	1.96	14.2	17.7	-18.3	-11.3	1.63	28.9	0.0	1859	1.01	68.46
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-10.4	1.09	-32.3	1.18	-19.4	1.18	-72.4	-165.0	-206.3	-27.4	-259.9	1.63	-336.2	-408.7	-911	1.01	2.52	16.9	21.1	-27.4	-22.7	1.63	34.5	0.0	2207	1.01	66.80
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-185.6	1.09	-363.5	1.18	-144.1	1.18	-801.2	-479.0	-598.8	-133.9	-842.9	1.63	-976.0	-1777.2	-2518	1.01	1.78	49.3	61.7	-133.9	-153.9	1.63	100.5	0.0	3299	1.01	41.11
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	167.9	1.09	330.3	1.18	135.8	1.18	733.0	-51.8	-64.7	-31.2	-118.4	1.63	-118.4	0.0	-1530	1.01	19.24	445.2	556.5	-31.2	529.6	1.63	907.1	1640.1	2688	1.01	2.18
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-180.2	1.09	-385.5	1.18	-144.3	1.18	-821.6	-496.1	-620.1	-136.4	-869.3	1.63	-1010.8	-1832.4	-2722	1.01	1.91	61.5	76.8	-136.4	-142.2	1.63	125.2	0.0	3299	1.01	33.16
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	164.2	1.09	346.9	1.18	133.5	1.18	745.8	-66.7	-83.4	-36.1	-145.7	1.63	-145.7	0.0	-1744	1.01	17.21	464.0	579.9	-36.1	546.2	1.63	945.3	1691.2	2688	1.01	2.08
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-149.4	1.09	-323.6	1.18	-115.6	1.18	-681.1	-459.3	-574.1	-114.0	-784.8	1.63	-935.9	-1616.9	-2437	1.01	1.90	81.8	102.2	-114.0	-79.3	1.63	166.6	0.0	2810	1.01	21.12
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	130.4	1.09	270.5	1.18	99.4	1.18	578.7	-97.3	-121.7	-34.8	-183.7	1.63	-198.3	0.0	-1306	1.01	9.57	413.8	517.3	-34.8	482.8	1.63	843.1	1421.9	2207	1.01	1.96
U19-L18	DIAGONAL	2-10C25			5559	1577	1876	2076	-68.7	1.09	-150.7	1.18	-52.1	1.18	-314.2	-341.3	-426.6	-67.7	-555.3	1.63	-695.4	-1009.6	-1577	1.01	1.84	126.1	157.6	-67.7	54.1	1.63	256.9	0.0	2076	1.01	9.39
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	36.3	1.09	68.3	1.18	25.5	1.18	150.3	-177.3	-221.6	-21.1	-265.6	1.63	-361.2	-211.0	-1050	1.01	3.35	269.5	336.9	-21.1	317.0	1.63	549.1	699.4	1556	1.01	2.59
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	44.9	1.09	87.3	1.18	31.7	1.18	189.3	-180.8	-225.9	-1.5	-238.2	1.63	-368.3	-179.0	-1050	1.01	3.39	263.7	329.6	-1.5	341.4	1.63	537.3	726.6	1556	1.01	2.57
U21-L22	DIAGONAL	2-10C25			5559	1577	1876	2076	-71.2	1.09	-168.6	1.18	-58.0	1.18	-345.0	-336.0	-419.9	-41.1	-505.1	1.63	-684.5	-1029.6	-1577	1.01	1.82	119.4	149.2	-41.1	88.7	1.63	243.2	0.0	2076	1.01	10.04
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	130.7	1.09	283.1	1.18	104.3	1.18	599.6	-89.9	-112.3	-15.5	-142.5	1.63	-183.1	0.0	-1435	1.01	11.19	410.5	513.2	-15.5	510.1	1.63	836.4	1436.1	2404	1.01	2.19
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-148.3	1.09	-335.2	1.18	-120.1	1.18	-698.9	-456.4	-570.5	-99.7	-757.6	1.63	-929.9	-1628.9	-2839	1.01	2.33	65.5	81.9	-99.7	-77.0	1.63	133.5	0.0	3299	1.01	30.19
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	167.9	1.09	352.1	1.18	136.0	1.18	759.0	-53.4	-66.8	-23.6	-108.1	1.63	-108.8	0.0	-1744	1.01	23.17	458.8	573.5	-23.6	559.9	1.63	934.8	1693.9	2688	1.01	2.09
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-176.1	1.09	-390.3	1.18	-146.6	1.18	-825.6	-491.2	-614.0	-126.4	-846.6	1.63	-1000.8	-1826.4	-2722	1.01	1.92	49.2	61.5	-126.4	-141.9	1.63	100.2	0.0	3299	1.01	41.49
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	171.4	1.09	330.2	1.18	136.8	1.18	737.9	-47.2	-59.0	-25.3	-102.8	1.63	-102.8	0.0	-1530	1.01	22.21	439.4	549.2	-25.3	531.7	1.63	895.2	1633.2	2688	1.01	2.21
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-178.8	1.09	-363.6	1.18	-145.1	1.18	-795.2	-474.4	-593.0	-128.8	-828.4	1.63	-966.5	-1761.7	-2518	1.01	1.81	44.7	55.9	-128.8	-151.6	1.63	91.1	0.0	3299	1.01	45.32
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**435.6**	1.09	893.3	1.18	318.9	1.18	**1905.2**	**-120.5**	**-150.6**	33.4	-102.7	**1.63**	**-245.6**	**0.0**	-5855	1.01	31.84	**459.8**	**574.7**	33.4	654.0	**1.63**	**936.8**	**2842.0**	6516	1.01	4.99
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-116.7	-145.9	27.5	-107.3	1.63	-237.8	0.0	-3414	1.01	19.37	316.0	395.0	27.5	457.0	1.63	643.9	1801.6	3713	1.01	4.03
									255.9	1.09	541.1	1.18	190.2	1.18	1141.9	-96.5	-120.7	25.2	-84.9	1.63	-196.7	0.0	-3414	1.01	23.34	296.2	370.3	25.2	427.3	1.63	603.6	1745.5	3713	1.01	4.32
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	60.3	1.09	117.9	1.18	29.6	1.18	239.9	-329.2	-411.5	-51.4	-513.1	1.63	-670.8	-430.9	-2593	1.01	4.26	273.3	341.7	-51.4	272.6	1.63	556.9	796.8	2810	1.01	4.67
									55.8	1.09	119.7	1.18	44.2	1.18	254.2	-289.0	-361.3	-7.8	-389.6	1.63	-588.8	-334.6	-2593	1.01	4.88	258.0	322.5	-7.8	323.7	1.63	525.7	779.9	2810	1.01	4.92
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-123.5	1.09	-266.4	1.18	-95.4	1.18	-561.5	-583.4	-729.3	-123.9	-962.8	1.63	-1188.8	-1750.3	-3037	1.01	2.11	228.3	285.4	-123.9	95.7	1.63	465.1	0.0	3299	1.01	8.37
									-127.8	1.09	-267.5	1.18	-86.1	1.18	-556.7	-549.9	-687.3	-96.0	-873.5	1.63	-1120.4	-1677.1	-3037	1.01	2.24	229.1	286.3	-96.0	142.2	1.63	466.7	0.0	3299	1.01	8.33
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-200.2	1.09	-418.9	1.18	-139.7	1.18	-877.4	-682.0	-852.4	-152.6	-1138.0	1.63	-1389.5	-2266.9	-4165	1.01	2.40	200.1	250.2	-152.6	12.2	1.63	407.8	0.0	4542	1.01	13.40
									-200.0	1.09	-418.7	1.18	-140.0	1.18	-877.2	-683.6	-854.5	-148.1	-1132.7	1.63	-1392.8	-2270.0	-4165	1.01	2.39	193.8	242.3	-148.1	11.4	1.63	394.9	0.0	4542	1.01	13.84
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-119.3	1.09	-241.7	1.18	-77.9	1.18	-507.2	-560.8	-701.0	-112.8	-915.1	1.63	-1142.6	-1649.7	-3037	1.01	2.24	284.9	356.2	-112.8	187.6	1.63	580.5	73.4	3299	1.01	6.61
									-115.1	1.09	-241.1	1.18	-87.5	1.18	-513.3	-592.3	-740.3	-132.9	-988.9	1.63	-1206.7	-1720.0	-3037	1.01	2.12	282.7	353.3	-132.9	152.0	1.63	575.9	62.6	3299	1.01	6.68
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	69.9	1.09	160.8	1.18	58.2	1.18	334.6	-305.6	-382.0	-31.4	-449.7	1.63	-622.7	-288.0	-2593	1.01	4.74	322.0	402.4	-31.4	368.6	1.63	656.0	990.6	2810	1.01	3.82
									74.8	1.09	160.9	1.18	44.7	1.18	324.2	-342.4	-428.0	-70.0	-560.6	1.63	-697.7	-373.5	-2593	1.01	4.22	338.0	422.5	-70.0	326.6	1.63	688.6	1012.8	2810	1.01	3.65
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	274.9	1.09	590.1	1.18	208.1	1.18	1241.4	-108.2	-135.2	30.1	-91.9	1.63	-220.4	0.0	-3789	1.01	23.00	346.2	432.8	30.1	500.6	1.63	705.5	1946.9	4128	1.01	4.15
									283.4	1.09	600.5	1.18	199.9	1.18	1253.4	-129.2	-161.5	4.9	-160.5	1.63	-263.3	0.0	-3789	1.01	19.29	383.5	479.4	4.9	508.1	1.63	781.4	2034.7	4128	1.01	3.73
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**456.1**	1.09	940.1	1.18	338.0	1.18	**2005.3**	**-93.5**	**-116.9**	37.4	-61.0	**1.63**	**-190.5**	**0.0**	-5497	1.01	39.67	**439.3**	**549.1**	37.4	633.8	**1.63**	**895.1**	**2900.4**	6022	1.01	4.55
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-392.2**	1.09	-793.7	1.18	-274.0	1.18	**-1687.3**	**-402.2**	**-502.8**	-250.6	-932.9	**1.63**	**-932.9**	**-2620.2**	-3227	1.01	1.68	**121.1**	**151.3**	-250.6	-250.6	**1.63**	**246.7**	**0.0**	4128	1.01	23.74
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-146.0	1.09	-297.0	1.18	-105.6	1.18	-634.1	-303.2	-379.1	-97.3	-554.1	1.63	-617.9	-1252.0	-2273	1.01	2.69	214.9	268.7	-97.3	121.6	1.63	437.9	0.0	2810	1.01	7.93
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	57.4	1.09	130.1	1.18	39.0	1.18	262.1	-251.4	-314.3	-119.5	-522.6	1.63	-522.6	-260.5	-2280	1.01	4.91	447.2	559.0	-119.5	388.4	1.63	911.1	1173.2	2810	1.01	2.83
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	165.3	1.09	356.2	1.18	118.8	1.18	740.7	-180.0	-225.0	-133.8	-452.9	1.63	-452.9	0.0	-2954	1.01	8.22	608.1	760.1	-133.8	574.8	1.63	1239.0	1979.6	3713	1.01	2.43
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	161.3	1.09	342.8	1.18	114.3	1.18	715.3	-225.2	-281.5	-151.7	-540.8	1.63	-540.8	0.0	-2954	1.01	6.84	615.4	769.2	-151.7	555.2	1.63	1253.8	1969.1	3713	1.01	2.42
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	46.1	1.09	94.2	1.18	27.4	1.18	193.7	-317.9	-397.4	-168.6	-689.5	1.63	-689.5	-495.8	-2280	1.01	3.62	465.3	581.6	-168.6	331.8	1.63	948.0	1141.7	2810	1.01	2.79
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-164.1	1.09	-349.2	1.18	-123.4	1.18	-736.6	-388.9	-486.2	-171.9	-787.4	1.63	-792.4	-1529.0	-2634	1.01	2.43	248.0	310.0	-171.9	43.1	1.63	505.3	0.0	3299	1.01	8.05
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-408.9	1.09	-844.8	1.18	-293.1	1.18	-1788.5	-450.3	-562.9	-221.2	-947.8	1.63	-947.8	**-2736.3**	-3527	1.01	1.87	110.7	138.4	-221.2	-216.3	1.63	225.5	**0.0**	4542	1.01	28.27

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2, asphalt}$	$P_{f,DL}$	C_T	$C_{T,DLA}$	C_{LL}	$C_{T+LL,f}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5			19		19							Factor	7		19							Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-4.2	1.09	-16.0	1.18	-9.2	1.18	-34.4	-177.6	-222.0	-15.6	-257.0	1.63	-361.9	-396.3	-1232	1.01	3.34	18.4	23.0	-15.6	-1.4	1.63	37.5	3.1	1859	1.01	51.06
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-18.6	1.09	-63.2	1.18	-22.2	1.18	-121.0	-182.3	-227.8	-15.4	-262.8	1.63	-371.3	-492.3	-1232	1.01	3.02	11.7	14.6	-15.4	-9.9	1.63	23.8	0.0	1859	1.01	83.85
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-23.4	1.09	-67.8	1.18	-23.7	1.18	-133.5	-183.1	-228.8	-16.3	-265.3	1.63	-373.0	-506.5	-1232	1.01	2.98	14.3	17.9	-16.3	-8.0	1.63	29.1	0.0	1859	1.01	69.11
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-18.3	1.09	-61.5	1.18	-22.8	1.18	-119.5	-181.5	-226.9	-16.1	-263.0	1.63	-369.9	-489.3	-1173	1.01	2.88	15.1	18.9	-16.1	-6.6	1.63	30.8	0.0	1859	1.01	64.95
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.4	1.09	-56.3	1.18	-22.5	1.18	-107.5	-178.4	-223.0	-16.5	-259.5	1.63	-363.4	-471.0	-1006	1.01	2.50	15.0	18.7	-16.5	-7.4	1.63	30.5	0.0	1859	1.01	65.17
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-12.8	1.09	-49.2	1.18	-21.1	1.18	-96.8	-166.3	-207.9	-17.7	-245.6	1.63	-338.8	-435.6	-769	1.01	2.01	13.3	16.6	-17.7	-11.4	1.63	27.1	0.0	1859	1.01	72.83
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-161.9	-202.3	-25.9	-253.3	1.63	-329.8	-406.9	-911	1.01	2.56	15.9	19.9	-25.9	-21.5	1.63	32.4	0.0	2207	1.01	71.07
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-161.8	1.09	-340.2	1.18	-125.1	1.18	-725.5	-461.5	-576.9	-133.3	-819.1	1.63	-940.3	-1665.9	-2392	1.01	1.80	76.9	96.2	-133.3	-117.0	1.63	156.7	0.0	2893	1.01	23.27
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	127.6	1.09	260.0	1.18	99.6	1.18	563.4	-76.4	-95.5	-45.9	-174.4	1.63	-174.4	0.0	-983	1.01	8.93	388.2	485.3	-45.9	431.4	1.63	791.0	1354.3	2071	1.01	1.93
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-60.6	1.09	-134.6	1.18	-51.1	1.18	-285.2	-316.5	-395.7	-78.7	-541.0	1.63	-644.9	-930.1	-1298	1.01	1.59	87.6	109.5	-78.7	-14.0	1.63	178.4	0.0	1652	1.01	10.95
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	27.9	1.09	45.8	1.18	22.3	1.18	110.8	-144.4	-180.4	-42.8	-258.1	1.63	-294.1	-183.3	-797	1.01	3.11	242.4	303.0	-42.8	246.3	1.63	493.9	604.7	1133	1.01	2.09
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	53.6	1.09	103.9	1.18	32.4	1.18	219.4	-173.2	-216.5	-11.0	-243.9	1.63	-353.0	-133.6	-797	1.01	2.90	199.3	249.2	-11.0	241.9	1.63	406.1	625.5	1133	1.01	2.28
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-84.1	1.09	-187.3	1.18	-59.5	1.18	-382.9	-273.4	-341.8	-51.5	-440.5	1.63	-557.1	-940.0	-1577	1.01	2.17	112.8	141.0	-51.5	63.1	1.63	229.8	0.0	2076	1.01	10.79
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	153.1	1.09	314.5	1.18	108.8	1.18	666.3	-59.8	-74.8	11.1	-59.9	1.63	-121.9	0.0	-1306	1.01	16.29	349.6	437.0	11.1	474.0	1.63	712.3	1378.7	2207	1.01	2.19
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-169.7	1.09	-365.6	1.18	-124.6	1.18	-763.4	-396.5	-495.7	-93.2	-669.0	1.63	-807.9	-1571.3	-2497	1.01	2.18	27.3	34.1	-93.2	-116.3	1.63	55.6	0.0	2884	1.01	66.08
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	183.5	1.09	386.5	1.18	142.1	1.18	823.8	-33.5	-41.9	-7.0	-55.1	1.63	-68.3	0.0	-1744	1.01	37.83	409.6	512.0	-7.0	522.8	1.63	834.5	1658.3	2688	1.01	2.27
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-195.4	1.09	-422.8	1.18	-152.5	1.18	-891.8	-437.9	-547.4	-117.5	-762.5	1.63	-892.2	-1784.0	-3041	1.01	2.44	18.9	23.7	-117.5	-166.8	1.63	38.6	0.0	3713	1.01	120.38
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	180.2	1.09	359.6	1.18	142.4	1.18	788.8	-37.6	-47.0	-17.7	-78.0	1.63	-78.0	0.0	-1530	1.01	29.94	396.7	495.9	-17.7	488.4	1.63	808.3	1597.0	2688	1.01	2.38
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-193.3	1.09	-391.3	1.18	-150.4	1.18	-850.0	-423.0	-528.8	-128.3	-760.7	1.63	-861.9	-1711.8	-2804	1.01	2.30	36.1	45.1	-128.3	-162.0	1.63	73.5	0.0	3713	1.01	62.57
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	-3.1	1.09	0.5	1.18	9.6	1.18	8.6	-19.8	-24.8	-10.1	-42.3	1.63	-42.3	-33.8	-3414	1.01	81.61	89.1	111.3	-10.1	99.7	1.63	181.5	190.0	3713	1.01	20.62
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-113.7	-142.2	27.5	-103.4	1.63	-231.7	0.0	-3414	1.01	19.87	268.1	335.1	27.5	394.5	1.63	546.2	1704.0	3713	1.01	4.75
									-213.9	1.09	-429.9	1.18	-135.3	1.18	-900.1	-444.7	-555.9	-82.4	-714.3	1.63	-906.1	-1806.1	-3414	1.01	2.81	94.2	117.7	-82.4	-11.6	1.63	191.8	0.0	3713	1.01	24.24
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-274.7**	1.09	-557.4	1.18	-187.2	1.18	**-1178.0**	**-670.3**	**-837.9**	-160.1	-1135.1	**1.63**	**-1365.7**	**-2543.7**	**-4333**	**1.01**	**2.34**	**193.8**	**242.2**	-160.1	-8.3	**1.63**	**394.8**	**0.0**	**4779**	**1.01**	**15.21**
									-282.6	1.09	-568.3	1.18	-183.9	1.18	-1195.7	-657.7	-822.2	-144.9	-1093.8	1.63	-1340.2	-2535.9	-4333	1.01	2.37	189.3	236.7	-144.9	10.8	1.63	385.8	0.0	4779	1.01	15.61
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-185.2	1.09	-366.8	1.18	-120.4	1.18	-776.7	-582.5	-728.1	-142.0	-991.0	1.63	-1186.8	-1963.4	-3789	1.01	2.57	266.9	333.7	-142.0	116.6	1.63	543.9	0.0	4128	1.01	9.09
									-186.8	1.09	-373.0	1.18	-126.8	1.18	-793.3	-603.6	-754.5	-150.8	-1033.0	1.63	-1229.9	-2023.2	-3789	1.01	2.47	264.9	331.1	-150.8	99.6	1.63	539.7	0.0	4128	1.01	9.19
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	26.6	1.09	69.4	1.18	24.9	1.18	140.3	-333.9	-417.3	-67.8	-545.9	1.63	-680.3	-540.0	-2593	1.01	4.06	293.0	366.2	-67.8	271.5	1.63	596.9	737.2	2810	1.01	4.52
									25.2	1.09	60.4	1.18	12.3	1.18	113.2	-376.0	-469.9	-99.2	-651.9	1.63	-766.0	-652.8	-2593	1.01	3.57	305.0	381.3	-99.2	236.1	1.63	621.5	734.7	2810	1.01	4.38
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	248.7	1.09	528.4	1.18	182.6	1.18	1110.0	-117.7	-147.1	7.2	-141.6	1.63	-239.8	0.0	-3414	1.01	19.01	305.3	381.7	7.2	410.0	1.63	622.1	1732.1	3713	1.01	4.24
									251.5	1.09	530.2	1.18	174.9	1.18	1106.1	-140.2	-175.2	-32.8	-236.3	1.63	-285.6	0.0	-3414	1.01	15.94	340.3	425.4	-32.8	390.3	1.63	693.4	1799.5	3713	1.01	3.81
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**439.2**	1.09	898.2	1.18	318.4	1.18	**1914.3**	**-96.1**	**-120.1**	39.6	-60.8	**1.63**	**-195.8**	**0.0**	**-5855**	**1.01**	**39.97**	**344.9**	**431.1**	39.6	514.2	**1.63**	**702.7**	**2617.0**	**6516**	**1.01**	**6.64**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	122.7	1.09	251.3	1.18	75.6	1.18	519.5	-41.3	-51.7	-27.7	-99.0	1.63	-99.0	0.0	-2283	1.01	28.55	258.3	322.9	-27.7	291.8	1.63	526.3	1045.8	2810	1.01	4.41
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	232.7	1.09	477.0	1.18	154.5	1.18	998.7	-117.0	-146.2	-75.0	-274.8	1.63	-274.8	0.0	-3260	1.01	15.62	557.7	697.2	-75.0	605.1	1.63	1136.4	2135.1	4128	1.01	2.79
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	213.1	1.09	436.1	1.18	147.4	1.18	920.8	-208.7	-260.9	-129.7	-483.6	1.63	-483.6	0.0	-3260	1.01	8.71	618.3	772.9	-129.7	594.9	1.63	1259.8	2180.7	4128	1.01	2.58
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	92.4	1.09	184.8	1.18	59.7	1.18	389.2	-282.8	-353.4	-175.9	-655.4	1.63	-655.4	-266.2	-2280	1.01	4.11	478.6	598.3	-175.9	337.4	1.63	975.2	1364.4	2810	1.01	2.51
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-126.6	1.09	-268.2	1.18	-92.9	1.18	-564.1	-337.1	-421.4	-205.6	-774.7	1.63	-774.7	-1338.8	-2273	1.01	2.24	256.1	320.1	-205.6	-1.1	1.63	521.8	0.0	2810	1.01	6.52
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-384.3**	1.09	-787.7	1.18	-269.2	1.18	**-1666.0**	**-387.8**	**-484.7**	-257.7	-925.7	**1.63**	**-925.7**	**-2591.7**	**-3273**	**1.01**	1.77	**119.2**	**149.0**	-257.7	-264.6	**1.63**	**242.9**	**0.0**	**4128**	**1.01**	**24.02**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN	α_{D1}	DL2 kN	α_{D2}	$DL2_{asphalt}$ kN	$\alpha_{D2, asphalt}$	$P_{f,DL}$ kN	C_T kN	$C_{T,DLA}$ kN	C_{LL} kN	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN	$T_{T,DLA}$ kN	T_{LL} kN	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
									5		5		5			19		19								19		19							
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-161.9	-202.3	-25.9	-253.3	1.63	-329.8	-406.9	-911	1.01	2.56	15.9	19.9	-25.9	-21.5	1.63	32.4	0.0	2207	1.01	71.07
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-14.0	1.09	-51.8	1.18	-21.7	1.18	-102.0	-170.3	-212.9	-18.0	-251.4	1.63	-347.0	-449.0	-769	1.01	**1.95**	12.7	15.9	-18.0	-12.8	1.63	25.9	0.0	1859	1.01	76.50
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.9	1.09	-57.2	1.18	-22.7	1.18	-109.4	-178.8	-223.5	-16.4	-260.0	1.63	-364.3	-473.8	-1006	1.01	2.49	14.4	18.0	-16.4	-8.0	1.63	29.4	0.0	1859	1.01	67.58
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.9	1.09	-61.6	1.18	-22.8	1.18	-118.1	-181.7	-227.2	-15.1	-261.7	1.63	-370.3	-488.4	-1173	1.01	2.88	15.3	19.1	-15.1	-4.8	1.63	31.1	0.0	1859	1.01	64.22
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-21.9	1.09	-65.6	1.18	-23.2	1.18	-128.6	-182.9	-228.7	-17.2	-266.7	1.63	-372.7	-501.3	-1232	1.01	2.99	13.5	16.9	-17.2	-10.5	1.63	27.5	0.0	1859	1.01	72.88
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.7	1.09	-61.2	1.18	-22.9	1.18	-117.6	-182.2	-227.8	-15.1	-262.3	1.63	-371.2	-488.8	-1173	1.01	2.88	15.1	18.9	-15.1	-5.0	1.63	30.8	0.0	1859	1.01	64.84
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.7	1.09	-56.9	1.18	-22.7	1.18	-108.9	-177.1	-221.3	-16.1	-257.1	1.63	-360.8	-469.7	-1006	1.01	2.51	15.8	19.8	-16.1	-5.5	1.63	32.3	0.0	1859	1.01	61.60
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-14.2	1.09	-51.2	1.18	-21.8	1.18	-101.7	-167.4	-209.3	-18.3	-248.1	1.63	-341.2	-442.9	-769	1.01	1.98	13.4	16.7	-18.3	-12.3	1.63	27.2	0.0	1859	1.01	72.68
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-10.4	1.09	-32.3	1.18	-19.4	1.18	-72.4	-161.8	-202.2	-27.4	-255.7	1.63	-329.6	-402.0	-911	1.01	2.57	15.5	19.4	-27.4	-24.5	1.63	31.6	0.0	2207	1.01	72.87
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-185.6	1.09	-363.5	1.18	-144.1	1.18	-801.2	-416.7	-520.9	-133.9	-761.6	1.63	-849.0	-1650.2	-2518	1.01	2.05	41.6	52.0	-133.9	-164.0	1.63	84.7	0.0	3299	1.01	48.79
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	167.9	1.09	330.3	1.18	135.8	1.18	733.0	-43.6	-54.5	-31.2	-107.8	1.63	-107.8	0.0	-1530	1.01	21.13	390.4	488.0	-31.2	458.2	1.63	795.5	1528.5	2688	1.01	2.49
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-180.2	1.09	-385.5	1.18	-144.3	1.18	-821.6	-433.2	-541.5	-136.4	-787.2	1.63	-882.6	-1704.2	-2722	1.01	2.18	51.3	64.1	-136.4	-155.4	1.63	104.5	0.0	3299	1.01	39.73
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	164.2	1.09	346.9	1.18	133.5	1.18	745.8	-55.7	-69.6	-36.1	-131.4	1.63	-131.4	0.0	-1744	1.01	19.09	406.5	508.2	-36.1	471.3	1.63	828.3	1574.1	2688	1.01	2.38
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-149.4	1.09	-323.6	1.18	-115.6	1.18	-681.1	-404.9	-506.1	-114.0	-713.9	1.63	-825.0	-1506.1	-2437	1.01	2.16	68.3	85.3	-114.0	-96.9	1.63	139.1	0.0	2810	1.01	25.31
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	130.4	1.09	270.5	1.18	99.4	1.18	578.7	-88.4	-110.5	-34.8	-172.0	1.63	-180.0	0.0	-1306	1.01	10.54	364.8	456.0	-34.8	418.9	1.63	743.3	1322.0	2207	1.01	2.22
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-68.7	1.09	-150.7	1.18	-52.1	1.18	-314.2	-305.1	-381.3	-67.7	-508.1	1.63	-621.6	-935.8	-1577	1.01	2.06	113.2	141.5	-67.7	37.4	1.63	230.7	0.0	2076	1.01	10.45
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	36.3	1.09	68.3	1.18	25.5	1.18	150.3	-161.4	-201.7	-21.1	-244.8	1.63	-328.8	-178.5	-1050	1.01	3.68	241.2	301.5	-21.1	280.1	1.63	491.5	641.7	1556	1.01	2.89
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	44.9	1.09	87.3	1.18	31.7	1.18	189.3	-165.3	-206.6	-1.5	-218.0	1.63	-336.7	-147.4	-1050	1.01	3.71	236.7	295.9	-1.5	306.2	1.63	482.3	671.6	1556	1.01	2.87
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-71.2	1.09	-168.6	1.18	-58.0	1.18	-345.0	-300.8	-376.0	-41.1	-459.2	1.63	-612.9	-958.0	-1577	1.01	2.04	109.6	137.0	-41.1	75.9	1.63	223.3	0.0	2076	1.01	10.93
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	130.7	1.09	283.1	1.18	104.3	1.18	599.6	-82.6	-103.3	-15.5	-133.0	1.63	-168.4	0.0	-1435	1.01	12.17	362.5	453.1	-15.5	447.4	1.63	738.6	1338.2	2404	1.01	2.47
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-148.3	1.09	-335.2	1.18	-120.1	1.18	-698.9	-402.5	-503.1	-99.7	-687.4	1.63	-820.1	-1519.1	-2839	1.01	2.64	55.7	69.6	-99.7	-89.9	1.63	113.4	0.0	3299	1.01	35.53
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	167.9	1.09	352.1	1.18	136.0	1.18	759.0	-45.4	-56.7	-23.6	-97.6	1.63	-97.6	0.0	-1744	1.01	25.83	402.6	503.3	-23.6	486.6	1.63	820.4	1579.4	2688	1.01	2.38
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-176.1	1.09	-390.3	1.18	-146.6	1.18	-825.6	-429.0	-536.2	-126.4	-765.4	1.63	-874.0	-1699.6	-2722	1.01	2.20	41.8	52.2	-126.4	-151.6	1.63	85.1	0.0	3299	1.01	48.83
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	171.4	1.09	330.2	1.18	136.8	1.18	737.9	-39.9	-49.8	-25.3	-93.2	1.63	-93.2	0.0	-1530	1.01	24.49	385.8	482.3	-25.3	461.9	1.63	786.1	1524.1	2688	1.01	**2.51**
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-178.8	1.09	-363.6	1.18	-145.1	1.18	-795.2	-412.7	-515.8	-128.8	-748.0	1.63	-840.8	-1636.0	-2518	1.01	**2.08**	37.7	47.2	-128.8	-160.7	1.63	76.9	0.0	3299	1.01	53.68
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**435.6**	1.09	893.3	1.18	318.9	1.18	**1905.2**	**-100.6**	**-125.8**	33.4	-76.8	**1.63**	**-205.0**	**0.0**	-5855	1.01	38.14	**385.0**	**481.3**	33.4	556.5	**1.63**	**784.5**	**2689.7**	6516	1.01	5.96
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-113.7	-142.2	27.5	-103.4	1.63	-231.7	0.0	-3414	1.01	19.87	268.1	335.1	27.5	394.5	1.63	546.2	1704.0	3713	1.01	4.75
									255.9	1.09	541.1	1.18	190.2	1.18	1141.9	-94.7	-118.3	25.2	-82.4	1.63	-192.9	0.0	-3414	1.01	23.80	251.4	314.2	25.2	368.8	1.63	512.2	1654.1	3713	1.01	5.09
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	60.3	1.09	117.9	1.18	29.6	1.18	239.9	-316.6	-395.7	-51.4	-496.6	1.63	-645.0	-405.1	-2593	1.01	4.43	232.1	290.2	-51.4	218.9	1.63	473.0	712.9	2810	1.01	5.49
									55.8	1.09	119.7	1.18	44.2	1.18	254.2	-273.9	-342.3	-7.8	-369.8	1.63	-558.0	-303.8	-2593	1.01	5.15	219.2	274.0	-7.8	273.1	1.63	446.7	700.9	2810	1.01	5.78
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-123.5	1.09	-266.4	1.18	-95.4	1.18	-561.5	-530.0	-662.6	-123.9	-893.1	1.63	-1080.0	-1641.5	-3037	1.01	2.32	194.0	242.5	-123.9	51.0	1.63	395.3	0.0	3299	1.01	9.85
									-127.8	1.09	-267.5	1.18	-86.1	1.18	-556.7	-500.1	-625.1	-96.0	-808.6	1.63	-1018.9	-1575.6	-3037	1.01	2.46	194.7	243.3	-96.0	97.4	1.63	396.7	0.0	3299	1.01	9.80
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-200.2	1.09	-418.9	1.18	-139.7	1.18	-877.4	-621.4	-776.8	-152.6	-1059.1	1.63	-1266.2	-2143.6	-4165	1.01	2.63	167.1	208.9	-152.6	-30.8	1.63	340.5	0.0	4542	1.01	16.05
									-200.0	1.09	-418.7	1.18	-140.0	1.18	-877.2	-621.9	-777.4	-148.1	-1052.3	1.63	-1267.1	-2144.3	-4165	1.01	2.63	161.9	202.4	-148.1	-30.2	1.63	329.9	0.0	4542	1.01	16.56
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-119.3	1.09	-241.7	1.18	-77.9	1.18	-507.2	-509.7	-637.2	-112.8	-848.6	1.63	-1038.6	-1545.8	-3037	1.01	2.47	237.9	297.4	-112.8	126.3	1.63	484.7	0.0	3299	1.01	7.92
									-115.1	1.09	-241.1	1.18	-87.5	1.18	-513.3	-538.1	-672.6	-132.9	-918.3	1.63	-1096.4	-1609.7	-3037	1.01	2.33	236.0	295.0	-132.9	91.2	1.63	480.9	0.0	3299	1.01	8.00
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	69.9	1.09	160.8	1.18	58.2	1.18	334.6	-288.2	-360.2	-31.4	-427.0	1.63	-587.1	-252.5	-2593	1.01	5.03	268.8	335.9	-31.4	299.2	1.63	547.6	882.2	2810	1.01	4.57
									74.8	1.09	160.9	1.18	44.7	1.18	324.2	-327.4	-409.3	-70.0	-541.0	1.63	-667.1	-342.9	-2593	1.01	4.41	282.1	352.7	-70.0	253.8	1.63	574.8	899.0	2810	1.01	4.37
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	274.9	1.09	590.1	1.18	208.1	1.18	1241.4	-105.2	-131.4	30.1	-88.0	1.63	-214.2	0.0	-3789	1.01	23.66	289.5	361.9	30.1	426.7	1.63	589.9	1831.3	4128	1.01	4.96
									283.4	1.09	600.5	1.18	199.9	1.18	1253.4	-123.1	-153.9	4.9	-152.5	1.63	-250.8	0.0	-3789	1.01	20.26	321.4	401.8	4.9	427.1	1.63	654.9	1908.3	4128	1.01	4.45
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**456.1**	1.09	940.1	1.18	338.0	1.18	**2005.3**	**-79.4**	**-99.3**	37.4	-42.7	**1.63**	**-161.9**	**0.0**	-5497	1.01	46.69	**368.7**	**460.9**	37.4	541.7	**1.63**	**751.2**	**2756.6**	6022	1.01	5.43
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-392.2**	1.09	-793.7	1.18	-274.0	1.18	**-1687.3**	**-340.9**	**-426.1**	-250.6	-853.0	**1.63**	**-853.0**	**-2540.3**	-3227	1.01	1.84	**101.1**	**126.3**	-250.6	-276.7	**1.63**	**205.9**	**0.0**	4128	1.01	28.44
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-146.0	1.09	-297.0	1.18	-105.6	1.18	-634.1	-257.8	-322.3	-97.3	-494.8	1.63	-525.3	-1159.4	-2273	1.01	3.16	203.5	254.4	-97.3	106.7	1.63	414.6	0.0	2810	1.01	8.37
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	57.4	1.09	130.1	1.18	39.0	1.18	262.1	-213.7	-267.2	-119.5	-473.4	1.63	-473.4	-211.3	-2280	1.01	5.42	408.4	510.5	-119.5	337.9	1.63	832.2	1094.3	2810	1.01	3.10
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	165.3	1.09	356.2	1.18	118.8	1.18	740.7	-153.0	-191.3	-133.8	-417.7	1.63	-417.7	0.0	-2954	1.01	8.92	553.3	691.6	-133.8	503.4	1.63	1127.4	1868.0	3713	1.01	**2.67**
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	161.3	1.09	342.8	1.18	114.3	1.18	715.3	-188.0	-235.0	-151.7	-492.3	1.63	-492.3	0.0	-2954	1.01	7.51	558.5	698.1	-151.7	481.0	1.63	1137.8	1853.1	3713	1.01	**2.67**
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	46.1	1.09	94.2	1.18	27.4	1.18	193.7	-265.4	-331.7	-168.6	-621.0	1.63	-621.0	-427.3	-2280	1.01	4.02	424.1	530.1	-168.6	278.1	1.63	864.1	1057.7	2810	1.01	3.06
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-164.1	1.09	-349.2	1.18	-123.4	1.18	-736.6	-324.8	-406.0	-171.9	-703.8	1.63	-703.8	-1440.4	-2634	1.01	2.73	232.1	290.1	-171.9	22.4	1.63	472.9	0.0	3299	1.01	8.60
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-408.9	1.09	-844.8	1.18	-293.1	1.18	-1788.5	-377.0	-471.2	-221.2	-852.2	1.63	-852.2	**-2640.7**	-3527	1.01	2.08	94.1	117.6	-221.2	-238.0	1.63	191.7	**0.0**	4542	1.01	33.27

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN

Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-4.2	1.09	-16.0	1.18	-9.2	1.18	-34.4
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-18.6	1.09	-63.2	1.18	-22.2	1.18	-121.0
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-23.4	1.09	-67.8	1.18	-23.7	1.18	-133.5
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-18.3	1.09	-61.5	1.18	-22.8	1.18	-119.5
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.4	1.09	-56.3	1.18	-22.5	1.18	-107.5
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-12.8	1.09	-49.2	1.18	-21.1	1.18	-96.8
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-161.8	1.09	-340.2	1.18	-125.1	1.18	-725.5
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	127.6	1.09	260.0	1.18	99.6	1.18	563.4
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-60.6	1.09	-134.6	1.18	-51.1	1.18	-285.2
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	27.9	1.09	45.8	1.18	22.3	1.18	110.8
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	53.6	1.09	103.9	1.18	32.4	1.18	219.4
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-84.1	1.09	-187.3	1.18	-59.5	1.18	-382.9
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	153.1	1.09	314.5	1.18	108.8	1.18	666.3
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-169.7	1.09	-365.6	1.18	-124.6	1.18	-763.4
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	183.5	1.09	386.5	1.18	142.1	1.18	823.8
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-195.4	1.09	-422.8	1.18	-152.5	1.18	-891.8
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	180.2	1.09	359.6	1.18	142.4	1.18	788.8
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-193.3	1.09	-391.3	1.18	-150.4	1.18	-850.0
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	-3.1	1.09	0.5	1.18	9.6	1.18	8.6
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7
									-213.9	1.09	-429.9	1.18	-135.3	1.18	-900.1
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-274.7**	1.09	-557.4	1.18	-187.2	1.18	**-1178.0**
									-282.6	1.09	-568.3	1.18	-183.9	1.18	-1195.7
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-185.2	1.09	-366.8	1.18	-120.4	1.18	-776.7
									-186.8	1.09	-373.0	1.18	-126.8	1.18	-793.3
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	26.6	1.09	69.4	1.18	24.9	1.18	140.3
									25.2	1.09	60.4	1.18	12.3	1.18	113.2
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	248.7	1.09	528.4	1.18	182.6	1.18	1110.0
									251.5	1.09	530.2	1.18	174.9	1.18	1106.1
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**439.2**	1.09	898.2	1.18	318.4	1.18	**1914.3**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	122.7	1.09	251.3	1.18	75.6	1.18	519.5
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	232.7	1.09	477.0	1.18	154.5	1.18	998.7
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	213.1	1.09	436.1	1.18	147.4	1.18	920.8
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	92.4	1.09	184.8	1.18	59.7	1.18	389.2
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-126.6	1.09	-268.2	1.18	-92.9	1.18	-564.1
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-384.3**	1.09	-787.7	1.18	-269.2	1.18	**-1666.0**

Member	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	-174.9	-218.6	-15.6	-253.4	1.63	-356.3	-390.7	-1232	1.01	3.40	15.6	19.6	-15.6	-5.0	1.63	31.9	0.0	1859	1.01	60.00
U2 - L2	-178.5	-223.1	-15.4	-257.9	1.63	-363.7	-484.7	-1232	1.01	3.09	10.4	13.0	-15.4	-11.6	1.63	21.2	0.0	1859	1.01	94.41
U4 - L4	-177.9	-222.3	-16.3	-258.5	1.63	-362.4	-495.9	-1232	1.01	3.06	10.1	12.6	-16.3	-13.4	1.63	20.6	0.0	1859	1.01	97.73
U6 - L6	-176.7	-220.9	-16.1	-256.7	1.63	-360.0	-479.5	-1173	1.01	2.96	11.7	14.6	-16.1	-11.1	1.63	23.7	0.0	1859	1.01	84.11
U8 - L8	-173.8	-217.3	-16.5	-253.5	1.63	-354.2	-461.7	-1006	1.01	2.56	11.9	14.9	-16.5	-11.3	1.63	24.3	0.0	1859	1.01	81.59
U10 - L10	-163.5	-204.4	-17.7	-242.1	1.63	-333.2	-430.0	-769	1.01	**2.04**	11.3	14.2	-17.7	-14.0	1.63	23.1	0.0	1859	1.01	85.60
U12 - L12	-156.9	-196.2	-25.9	-246.9	1.63	-319.8	-396.9	-911	1.01	2.64	13.9	17.4	-25.9	-24.1	1.63	28.4	0.0	2207	1.01	81.24
U1 - L0	-350.6	-438.3	-133.3	-674.5	1.63	-714.4	-1440.0	-2392	1.01	2.37	51.5	64.3	-133.3	-150.2	1.63	104.9	0.0	2893	1.01	34.78
U1 - L2	-56.7	-70.9	-45.9	-148.7	1.63	-148.7	0.0	-983	1.01	10.47	293.1	366.4	-45.9	307.4	1.63	597.2	1160.5	2071	1.01	**2.56**
U3 - L2	-250.0	-312.5	-78.7	-454.2	1.63	-509.4	-794.6	-1298	1.01	**2.01**	76.2	95.2	-78.7	-28.9	1.63	155.2	0.0	1652	1.01	12.59
U3 - L4	-125.8	-157.2	-42.8	-233.9	1.63	-256.3	-145.5	-797	1.01	3.57	191.6	239.5	-42.8	180.1	1.63	390.5	501.3	1133	1.01	2.65
U5 - L4	-143.6	-179.4	-11.0	-205.2	1.63	-292.5	-73.1	-797	1.01	3.50	167.6	209.5	-11.0	200.6	1.63	341.5	560.8	1133	1.01	2.71
U5 - L6	-224.3	-280.4	-51.5	-376.5	1.63	-457.0	-840.0	-1577	1.01	2.65	91.6	114.5	-51.5	35.5	1.63	186.6	0.0	2076	1.01	13.29
U7 - L6	-53.7	-67.1	11.1	-51.9	1.63	-109.4	0.0	-1306	1.01	18.15	271.6	339.5	11.1	372.3	1.63	553.3	1219.7	2207	1.01	2.82
U7 - L8	-306.1	-382.6	-93.2	-551.1	1.63	-623.7	-1387.1	-2497	1.01	2.82	24.8	31.0	-93.2	-119.6	1.63	50.5	0.0	2884	1.01	72.80
U9 - L8	-27.6	-34.5	-7.0	-47.3	1.63	-56.2	0.0	-1744	1.01	45.99	303.7	379.7	-7.0	384.7	1.63	618.9	1442.7	2688	1.01	3.05
U9 - L10	-327.1	-408.8	-117.5	-618.0	1.63	-666.4	-1558.2	-3041	1.01	3.27	13.4	16.8	-117.5	-174.0	1.63	27.4	0.0	3713	1.01	169.55
U11 - L10	-27.0	-33.7	-17.7	-64.1	1.63	-64.1	0.0	-1530	1.01	36.43	288.0	359.9	-17.7	346.6	1.63	586.7	1375.5	2688	1.01	3.28
U11 - L12	-313.4	-391.8	-128.3	-617.8	1.63	-638.6	-1488.6	-2804	1.01	3.10	24.2	30.3	-128.3	-177.5	1.63	49.3	0.0	3713	1.01	93.29
U0 - U1	-14.2	-17.7	-10.1	-35.0	1.63	-35.0	-26.4	-3414	1.01	98.88	73.0	91.2	-10.1	78.7	1.63	148.7	157.3	3713	1.01	25.16
U1 - U3	-107.7	-134.6	27.5	-95.5	1.63	-219.5	0.0	-3414	1.01	20.99	181.0	226.2	27.5	280.9	1.63	368.8	1526.5	3713	1.01	7.03
	-328.5	-410.6	-82.4	-562.7	1.63	-669.3	-1569.4	-3414	1.01	3.81	62.9	78.7	-82.4	-52.3	1.63	128.2	0.0	3713	1.01	36.26
U3 - U5	**-498.4**	**-623.0**	-160.1	-910.9	**1.63**	**-1015.5**	**-2193.5**	**-4333**	**1.01**	**3.15**	**129.6**	**162.0**	-160.1	-92.0	**1.63**	**264.0**	**0.0**	**4779**	**1.01**	**22.74**
	-486.2	-607.7	-144.9	-870.1	1.63	-990.5	-2186.2	-4333	1.01	3.21	126.5	158.1	-144.9	-71.2	1.63	257.7	0.0	4779	1.01	23.37
U5 - U7	-432.7	-540.9	-142.0	-795.8	1.63	-881.7	-1658.3	-3789	1.01	3.46	178.5	223.2	-142.0	1.3	1.63	363.7	0.0	4128	1.01	13.60
	-451.3	-564.2	-150.8	-834.4	1.63	-919.6	-1712.9	-3789	1.01	3.30	177.1	221.4	-150.8	-14.9	1.63	360.9	0.0	4128	1.01	13.75
U7 - U9	-256.8	-321.0	-67.8	-445.4	1.63	-523.3	-383.0	-2593	1.01	5.27	196.0	245.0	-67.8	145.1	1.63	399.4	539.7	2810	1.01	6.75
	-288.7	-360.9	-99.2	-538.2	1.63	-588.3	-475.1	-2593	1.01	4.64	204.1	255.1	-99.2	104.5	1.63	415.9	529.1	2810	1.01	6.55
U9 - U11	-103.3	-129.2	7.2	-123.0	1.63	-210.6	0.0	-3414	1.01	21.64	204.2	255.3	7.2	278.1	1.63	416.1	1526.1	3713	1.01	6.35
	-125.4	-156.8	-32.8	-217.1	1.63	-255.6	0.0	-3414	1.01	17.82	227.2	284.0	-32.8	242.8	1.63	463.0	1569.0	3713	1.01	5.71
U11 - U13	**-64.3**	**-80.4**	39.6	-19.4	**1.63**	**-131.1**	**0.0**	**-5855**	**1.01**	**59.72**	**232.4**	**290.5**	39.6	367.5	**1.63**	**473.5**	**2387.8**	**6516**	**1.01**	**9.86**
L0 - L2	-27.6	-34.5	-27.7	-81.1	1.63	-81.1	0.0	-2283	1.01	34.84	205.1	256.4	-27.7	222.4	1.63	417.9	937.3	2810	1.01	5.55
L2 - L4	-78.2	-97.8	-75.0	-224.2	1.63	-224.2	0.0	-3260	1.01	19.14	417.0	521.2	-75.0	421.5	1.63	849.6	1848.3	4128	1.01	**3.73**
L4 - L6	-139.6	-174.5	-129.7	-393.4	1.63	-393.4	0.0	-3260	1.01	10.71	460.4	575.5	-129.7	389.0	1.63	938.1	1859.0	4128	1.01	**3.46**
L6 - L8	-189.2	-236.5	-175.9	-533.4	1.63	-533.4	-144.1	-2280	1.01	5.05	354.1	442.6	-175.9	175.1	1.63	721.5	1110.7	2810	1.01	3.39
L8 - L10	-225.6	-282.0	-205.6	-629.3	1.63	-629.3	-1193.4	-2273	1.01	2.75	192.1	240.1	-205.6	-84.6	1.63	391.3	0.0	2810	1.01	8.69
L10 - L12	**-259.4**	**-324.2**	-257.7	-758.3	**1.63**	**-758.3**	**-2424.3**	**-3273**	**1.01**	2.16	**79.8**	**99.7**	-257.7	-316.0	**1.63**	**162.6**	**0.0**	**4128**	**1.01**	**35.89**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-156.9	-196.2	-25.9	-246.9	1.63	-319.8	-396.9	-911	1.01	2.64	13.9	17.4	-25.9	-24.1	1.63	28.4	0.0	2207	1.01	81.24
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-14.0	1.09	-51.8	1.18	-21.7	1.18	-102.0	-166.5	-208.1	-18.0	-246.4	1.63	-339.2	-441.1	-769	1.01	1.99	10.4	13.0	-18.0	-15.8	1.63	21.2	0.0	1859	1.01	93.19
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.9	1.09	-57.2	1.18	-22.7	1.18	-109.4	-174.2	-217.8	-16.4	-254.0	1.63	-355.0	-464.4	-1006	1.01	2.55	11.3	14.2	-16.4	-12.0	1.63	23.1	0.0	1859	1.01	86.07
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.9	1.09	-61.6	1.18	-22.8	1.18	-118.1	-177.3	-221.6	-15.1	-255.8	1.63	-361.2	-479.2	-1173	1.01	2.95	11.8	14.7	-15.1	-9.3	1.63	24.0	0.0	1859	1.01	83.30
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-21.9	1.09	-65.6	1.18	-23.2	1.18	-128.6	-177.9	-222.4	-17.2	-260.1	1.63	-362.6	-491.2	-1232	1.01	3.08	9.6	12.1	-17.2	-15.5	1.63	19.6	0.0	1859	1.01	102.12
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.7	1.09	-61.2	1.18	-22.9	1.18	-117.6	-177.5	-221.8	-15.1	-256.1	1.63	-361.6	-479.1	-1173	1.01	2.95	11.6	14.5	-15.1	-9.5	1.63	23.6	0.0	1859	1.01	84.48
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.7	1.09	-56.9	1.18	-22.7	1.18	-108.9	-173.0	-216.2	-16.1	-251.7	1.63	-352.4	-461.4	-1006	1.01	2.57	12.8	16.0	-16.1	-9.5	1.63	26.1	0.0	1859	1.01	76.06
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-14.2	1.09	-51.2	1.18	-21.8	1.18	-101.7	-164.9	-206.1	-18.3	-244.8	1.63	-335.9	-437.7	-769	1.01	2.01	11.2	13.9	-18.3	-15.2	1.63	22.7	0.0	1859	1.01	87.10
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-10.4	1.09	-32.3	1.18	-19.4	1.18	-72.4	-156.8	-196.0	-27.4	-249.1	1.63	-319.4	-391.8	-911	1.01	2.65	13.4	16.7	-27.4	-27.3	1.63	27.2	0.0	2207	1.01	84.51
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-185.6	1.09	-363.5	1.18	-144.1	1.18	-801.2	-310.0	-387.5	-133.9	-622.5	1.63	-631.7	-1432.9	-2518	1.01	2.76	27.9	34.8	-133.9	-181.9	1.63	56.8	0.0	3299	1.01	72.77
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	167.9	1.09	330.3	1.18	135.8	1.18	733.0	-29.3	-36.6	-31.2	-89.1	1.63	-89.1	0.0	-1530	1.01	25.57	284.9	356.1	-31.2	320.6	1.63	580.4	1313.4	2688	1.01	3.41
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-180.2	1.09	-385.5	1.18	-144.3	1.18	-821.6	-323.3	-404.2	-136.4	-644.0	1.63	-658.8	-1480.4	-2722	1.01	2.93	34.4	42.9	-136.4	-177.5	1.63	70.0	0.0	3299	1.01	59.33
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	164.2	1.09	346.9	1.18	133.5	1.18	745.8	-37.3	-46.6	-36.1	-107.4	1.63	-107.4	0.0	-1744	1.01	23.35	300.4	375.5	-36.1	332.9	1.63	612.0	1357.9	2688	1.01	3.22
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-149.4	1.09	-323.6	1.18	-115.6	1.18	-681.1	-308.5	-385.7	-114.0	-588.2	1.63	-628.6	-1309.7	-2437	1.01	2.83	45.7	57.1	-114.0	-126.3	1.63	93.1	0.0	2810	1.01	37.79
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	130.4	1.09	270.5	1.18	99.4	1.18	578.7	-71.2	-89.1	-34.8	-149.7	1.63	-149.7	0.0	-1306	1.01	12.68	277.4	346.7	-34.8	304.9	1.63	565.1	1143.9	2207	1.01	2.92
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-68.7	1.09	-150.7	1.18	-52.1	1.18	-314.2	-241.7	-302.1	-67.7	-425.4	1.63	-492.4	-806.6	-1577	1.01	2.60	90.1	112.6	-67.7	7.2	1.63	183.5	0.0	2076	1.01	13.14
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	36.3	1.09	68.3	1.18	25.5	1.18	150.3	-133.7	-167.1	-21.1	-208.7	1.63	-272.4	-122.1	-1050	1.01	4.45	189.8	237.3	-21.1	213.1	1.63	386.8	537.1	1556	1.01	3.67
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	44.9	1.09	87.3	1.18	31.7	1.18	189.3	-136.4	-170.5	-1.5	-180.4	1.63	-277.9	-88.6	-1050	1.01	4.50	186.9	233.6	-1.5	241.2	1.63	380.7	570.1	1556	1.01	3.63
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-71.2	1.09	-168.6	1.18	-58.0	1.18	-345.0	-238.8	-298.5	-41.1	-378.4	1.63	-486.6	-831.7	-1577	1.01	2.56	88.0	109.9	-41.1	47.7	1.63	179.2	0.0	2076	1.01	13.62
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	130.7	1.09	283.1	1.18	104.3	1.18	599.6	-67.3	-84.2	-15.5	-113.1	1.63	-137.2	0.0	-1435	1.01	14.94	275.9	344.9	-15.5	334.5	1.63	562.2	1161.8	2404	1.01	3.25
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-148.3	1.09	-335.2	1.18	-120.1	1.18	-698.9	-307.1	-383.9	-99.7	-562.9	1.63	-625.7	-1324.6	-2839	1.01	3.47	41.4	51.7	-99.7	-108.5	1.63	84.3	0.0	3299	1.01	47.82
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	167.9	1.09	352.1	1.18	136.0	1.18	759.0	-33.9	-42.3	-23.6	-82.6	1.63	-82.6	0.0	-1744	1.01	30.52	297.6	372.1	-23.6	349.7	1.63	606.4	1365.5	2688	1.01	3.22
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-176.1	1.09	-390.3	1.18	-146.6	1.18	-825.6	-320.6	-400.8	-126.4	-624.1	1.63	-653.2	-1478.8	-2722	1.01	2.94	28.2	35.2	-126.4	-169.3	1.63	57.4	0.0	3299	1.01	72.40
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	171.4	1.09	330.2	1.18	136.8	1.18	737.9	-26.8	-33.5	-25.3	-76.2	1.63	-76.2	0.0	-1530	1.01	29.97	281.6	352.0	-25.3	326.0	1.63	573.8	1311.7	2688	1.01	3.44
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-178.8	1.09	-363.6	1.18	-145.1	1.18	-795.2	-307.5	-384.3	-128.8	-610.8	1.63	-626.5	-1421.6	-2518	1.01	2.79	25.4	31.7	-128.8	-176.8	1.63	51.7	0.0	3299	1.01	79.83
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**435.6**	1.09	893.3	1.18	318.9	1.18	**1905.2**	**-67.4**	**-84.2**	33.4	-33.4	**1.63**	**-137.2**	**0.0**	-5855	1.01	56.97	**257.8**	**322.2**	33.4	390.6	**1.63**	**525.2**	**2430.4**	6516	1.01	8.90
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-107.7	-134.6	27.5	-95.5	1.63	-219.5	0.0	-3414	1.01	20.99	181.0	226.2	27.5	280.9	1.63	368.8	1526.5	3713	1.01	7.03
									255.9	1.09	541.1	1.18	190.2	1.18	1141.9	-87.9	-109.8	25.2	-73.6	1.63	-179.0	0.0	-3414	1.01	25.64	170.2	212.7	25.2	262.9	1.63	346.7	1488.6	3713	1.01	7.52
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	60.3	1.09	117.9	1.18	29.6	1.18	239.9	-249.3	-311.7	-51.4	-408.9	1.63	-508.0	-268.1	-2593	1.01	5.63	156.4	195.5	-51.4	120.1	1.63	318.7	558.6	2810	1.01	8.15
									55.8	1.09	119.7	1.18	44.2	1.18	254.2	-219.5	-274.4	-7.8	-299.0	1.63	-447.3	-193.1	-2593	1.01	6.42	147.7	184.6	-7.8	179.8	1.63	300.9	555.1	2810	1.01	8.59
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-123.5	1.09	-266.4	1.18	-95.4	1.18	-561.5	-399.7	-499.6	-123.9	-723.2	1.63	-814.4	-1376.0	-3037	1.01	3.08	130.6	163.3	-123.9	-31.6	1.63	266.2	0.0	3299	1.01	14.63
									-127.8	1.09	-267.5	1.18	-86.1	1.18	-556.7	-376.6	-470.8	-96.0	-647.6	1.63	-767.4	-1324.1	-3037	1.01	3.27	131.1	163.9	-96.0	14.5	1.63	267.2	0.0	3299	1.01	14.55
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-200.2	1.09	-418.9	1.18	-139.7	1.18	-877.4	-464.2	-580.3	-152.6	-854.1	1.63	-945.9	-1823.3	-4165	1.01	3.52	111.9	139.8	-152.6	-102.9	1.63	227.9	0.0	4542	1.01	23.98
									-200.0	1.09	-418.7	1.18	-140.0	1.18	-877.2	-464.3	-580.4	-148.1	-846.8	1.63	-946.0	-1823.2	-4165	1.01	3.52	108.3	135.4	-148.1	-100.1	1.63	220.7	0.0	4542	1.01	24.76
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-119.3	1.09	-241.7	1.18	-77.9	1.18	-507.2	-383.2	-479.1	-112.8	-683.7	1.63	-780.9	-1288.0	-3037	1.01	3.28	159.3	199.1	-112.8	23.8	1.63	324.5	0.0	3299	1.01	11.83
									-115.1	1.09	-241.1	1.18	-87.5	1.18	-513.3	-405.4	-506.7	-132.9	-745.2	1.63	-826.0	-1339.2	-3037	1.01	3.09	158.0	197.5	-132.9	-10.5	1.63	321.9	0.0	3299	1.01	11.94
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	69.9	1.09	160.8	1.18	58.2	1.18	334.6	-228.8	-286.0	-31.4	-349.6	1.63	-466.2	-131.6	-2593	1.01	6.34	180.0	225.0	-31.4	183.5	1.63	366.7	701.4	2810	1.01	6.83
									74.8	1.09	160.9	1.18	44.7	1.18	324.2	-256.8	-321.0	-70.0	-449.0	1.63	-523.3	-199.1	-2593	1.01	5.63	189.0	236.3	-70.0	132.4	1.63	385.1	709.3	2810	1.01	6.53
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	274.9	1.09	590.1	1.18	208.1	1.18	1241.4	-95.7	-119.6	30.1	-75.6	1.63	-195.0	0.0	-3789	1.01	26.00	193.8	242.3	30.1	301.9	1.63	394.9	1636.3	4128	1.01	7.41
									283.4	1.09	600.5	1.18	199.9	1.18	1253.4	-114.5	-143.1	4.9	-141.3	1.63	-233.3	0.0	-3789	1.01	21.78	214.9	268.6	4.9	288.2	1.63	437.8	1691.2	4128	1.01	6.66
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**456.1**	1.09	940.1	1.18	338.0	1.18	**2005.3**	**-53.6**	**-66.9**	37.4	-8.9	**1.63**	**-109.1**	**0.0**	-5497	1.01	69.25	**247.2**	**309.0**	37.4	383.3	**1.63**	**503.7**	**2509.1**	6022	1.01	8.09
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-392.2**	1.09	-793.7	1.18	-274.0	1.18	**-1687.3**	**-228.3**	**-285.3**	-250.6	-706.1	**1.63**	**-706.1**	**-2393.4**	-3227	1.01	2.23	**67.7**	**84.6**	-250.6	-320.2	**1.63**	**137.9**	**0.0**	4128	1.01	42.47
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-146.0	1.09	-297.0	1.18	-105.6	1.18	-634.1	-173.8	-217.3	-97.3	-385.3	1.63	-385.3	-1019.4	-2273	1.01	4.31	160.5	200.6	-97.3	50.6	1.63	327.0	0.0	2810	1.01	10.62
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	57.4	1.09	130.1	1.18	39.0	1.18	262.1	-144.1	-180.1	-119.5	-382.6	1.63	-382.6	-120.5	-2280	1.01	6.70	307.6	384.5	-119.5	206.4	1.63	626.7	888.8	2810	1.01	4.11
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	165.3	1.09	356.2	1.18	118.8	1.18	740.7	-103.1	-128.9	-133.8	-352.6	1.63	-352.6	0.0	-2954	1.01	10.56	414.9	518.7	-133.8	322.9	1.63	845.4	1586.1	3713	1.01	3.56
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	161.3	1.09	342.8	1.18	114.3	1.18	715.3	-125.8	-157.3	-151.7	-411.3	1.63	-411.3	0.0	-2954	1.01	8.99	418.5	523.1	-151.7	298.5	1.63	852.7	1567.9	3713	1.01	3.56
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	46.1	1.09	94.2	1.18	27.4	1.18	193.7	-177.7	-222.1	-168.6	-506.6	1.63	-506.6	-312.9	-2280	1.01	4.93	318.4	398.0	-168.6	140.4	1.63	648.8	842.5	2810	1.01	4.08
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-164.1	1.09	-349.2	1.18	-123.4	1.18	-736.6	-217.4	-271.8	-171.9	-563.7	1.63	-563.7	-1300.3	-2634	1.01	3.41	178.7	223.4	-171.9	-47.2	1.63	364.2	0.0	3299	1.01	11.17
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-408.9	1.09	-844.8	1.18	-293.1	1.18	-1788.5	-251.9	-314.8	-221.2	-689.1	1.63	-689.1	**-2477.6**	-3527	1.01	2.57	64.3	80.3	-221.2	-276.8	1.63	131.0	**0.0**	4542	1.01	48.69

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (RIGHT TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-30.4	1.09	-53.7	1.18	-2.0	1.18	-98.9	-123.1	-153.9	-15.6	-186.0	1.63	-250.9	-349.8	-1232	1.01	4.56	24.3	30.3	-15.6	6.2	1.63	49.4	0.0	1859	1.01	39.99
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-37.7	1.09	-90.8	1.18	-16.9	1.18	-168.1	-129.4	-161.8	-15.4	-194.0	1.63	-263.8	-431.9	-1232	1.01	4.08	8.2	10.3	-15.4	-14.4	1.63	16.8	0.0	1859	1.01	122.07
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.9	1.09	-91.6	1.18	-19.1	1.18	-174.2	-133.1	-166.4	-16.3	-200.1	1.63	-271.2	-445.3	-1232	1.01	3.95	7.3	9.1	-16.3	-17.1	1.63	14.8	0.0	1859	1.01	138.67
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-37.2	1.09	-88.8	1.18	-17.6	1.18	-166.0	-130.3	-162.9	-16.1	-196.3	1.63	-265.6	-431.5	-1173	1.01	3.84	9.4	11.8	-16.1	-14.0	1.63	19.2	0.0	1859	1.01	106.34
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.2	1.09	-90.6	1.18	-15.9	1.18	-166.1	-126.9	-158.7	-16.5	-192.4	1.63	-258.7	-424.8	-1006	1.01	3.28	10.5	13.2	-16.5	-13.2	1.63	21.4	0.0	1859	1.01	95.36
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-42.7	1.09	-92.4	1.18	-12.7	1.18	-170.6	-117.4	-146.8	-17.7	-181.9	1.63	-239.2	-409.9	-769	1.01	2.54	10.2	12.7	-17.7	-15.5	1.63	20.7	0.0	1859	1.01	98.77
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-112.5	-140.6	-25.9	-189.0	1.63	-229.2	-428.8	-911	1.01	3.14	20.3	25.3	-25.9	-15.8	1.63	41.3	0.0	2207	1.01	58.83
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-284.5	1.09	-518.8	1.18	-90.7	1.18	-1029.2	-340.8	-426.0	-133.3	-661.6	1.63	-694.3	-1723.5	-2392	1.01	2.00	72.8	91.0	-133.3	-122.3	1.63	148.3	0.0	2893	1.01	26.63
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	209.1	1.09	377.9	1.18	76.8	1.18	764.4	-72.2	-90.3	-45.9	-169.0	1.63	-169.0	0.0	-983	1.01	10.40	295.1	368.8	-45.9	309.9	1.63	601.2	1365.6	2071	1.01	2.21
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-116.8	1.09	-216.4	1.18	-35.3	1.18	-424.3	-231.0	-288.7	-78.7	-429.4	1.63	-470.6	-895.0	-1298	1.01	1.88	69.4	86.7	-78.7	-37.8	1.63	141.3	0.0	1652	1.01	14.81
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	42.2	1.09	66.0	1.18	18.4	1.18	145.7	-105.4	-131.7	-42.8	-207.2	1.63	-214.7	-69.0	-797	1.01	4.43	185.0	231.2	-42.8	171.3	1.63	376.8	522.5	1133	1.01	2.65
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	56.1	1.09	107.1	1.18	31.8	1.18	225.1	-117.6	-147.0	-11.0	-171.4	1.63	-239.6	-14.5	-797	1.01	4.30	143.3	179.2	-11.0	168.9	1.63	292.0	517.1	1133	1.01	3.15
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-127.0	1.09	-250.1	1.18	-47.4	1.18	-489.4	-188.4	-235.5	-51.5	-329.6	1.63	-383.8	-873.3	-1577	1.01	2.87	78.9	98.6	-51.5	18.9	1.63	160.7	0.0	2076	1.01	16.09
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	213.4	1.09	401.8	1.18	91.9	1.18	815.1	-29.7	-37.1	11.1	-20.6	1.63	-60.5	0.0	-1306	1.01	35.28	268.9	336.2	11.1	368.8	1.63	548.0	1363.1	2207	1.01	2.58
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-263.6	1.09	-502.1	1.18	-98.3	1.18	-995.8	-292.2	-365.2	-93.2	-533.0	1.63	-595.4	-1591.1	-2497	1.01	2.56	15.9	19.8	-93.2	-131.2	1.63	32.3	0.0	2884	1.01	120.87
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	289.8	1.09	540.5	1.18	112.4	1.18	1086.3	-26.7	-33.4	-6.9	-46.1	1.63	-54.4	0.0	-1744	1.01	52.33	313.1	391.3	-6.9	397.0	1.63	637.9	1724.2	2688	1.01	2.55
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-328.9	1.09	-617.1	1.18	-115.0	1.18	-1222.4	-325.3	-406.6	-117.4	-615.6	1.63	-662.8	-1885.3	-3041	1.01	2.79	26.6	33.3	-117.4	-156.7	1.63	54.3	0.0	3713	1.01	91.64
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	320.4	1.09	562.7	1.18	103.2	1.18	1135.0	-50.5	-63.1	-17.7	-94.6	1.63	-102.9	0.0	-1530	1.01	26.05	299.2	374.0	-17.7	361.4	1.63	609.7	1744.6	2688	1.01	2.59
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-356.2	1.09	-628.3	1.18	-104.7	1.18	-1253.1	-308.5	-385.7	-128.2	-611.3	1.63	-628.6	-1881.8	-2804	1.01	2.51	49.3	61.6	-128.2	-144.7	1.63	100.4	0.0	3713	1.01	49.82
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	26.9	1.09	43.8	1.18	1.3	1.18	82.5	-28.1	-35.1	-10.1	-53.1	1.63	-57.2	0.0	-3414	1.01	61.76	60.5	75.6	-10.1	62.4	1.63	123.2	205.7	3713	1.01	29.78
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-318.7	1.09	-588.8	1.18	-117.0	1.18	-1180.2	-407.0	-508.7	-120.0	-726.3	1.63	-829.2	-2009.4	-3414	1.01	2.73	97.9	122.4	-120.0	-67.8	1.63	199.5	0.0	3713	1.01	24.71
									-279.8	1.09	-525.9	1.18	-116.8	1.18	-1063.3	-376.3	-470.3	-82.4	-625.0	1.63	-766.6	-1829.9	-3414	1.01	3.11	94.9	118.7	-82.4	-10.6	1.63	193.4	0.0	3713	1.01	24.88
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-390.4**	1.09	-725.5	1.18	-154.7	1.18	**-1464.1**	**-563.7**	**-704.6**	-160.1	-996.0	**1.63**	**-1148.5**	**-2612.6**	-4333	**1.01**	**2.54**	**190.0**	**237.5**	-160.1	-13.3	**1.63**	**387.1**	**0.0**	**4779**	**1.01**	**16.25**
									-380.3	1.09	-710.1	1.18	-156.6	1.18	-1437.2	-561.8	-702.2	-144.9	-968.7	1.63	-1144.6	-2581.8	-4333	1.01	2.57	189.1	236.4	-144.9	10.5	1.63	385.3	0.0	4779	1.01	16.26
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-251.7	1.09	-463.4	1.18	-101.7	1.18	-941.2	-506.8	-633.4	-142.0	-892.3	1.63	-1032.5	-1973.7	-3789	1.01	2.80	261.8	327.2	-142.0	109.9	1.63	533.4	0.0	4128	1.01	9.58
									-269.8	1.09	-493.0	1.18	-103.6	1.18	-998.0	-516.0	-645.0	-150.8	-918.7	1.63	-1051.3	-2049.3	-3789	1.01	2.69	261.4	326.8	-150.8	95.0	1.63	532.6	0.0	4128	1.01	9.70
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.6	1.09	93.8	1.18	20.2	1.18	182.0	-302.1	-377.6	-67.8	-504.4	1.63	-615.4	-433.5	-2593	1.01	4.55	283.9	354.8	-67.8	259.6	1.63	578.4	760.4	2810	1.01	4.59
									8.5	1.09	36.4	1.18	16.9	1.18	72.2	-321.4	-401.8	-99.2	-580.8	1.63	-654.9	-582.7	-2593	1.01	4.11	292.3	365.4	-99.2	219.5	1.63	595.6	667.8	2810	1.01	4.64
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	370.3	1.09	704.6	1.18	148.6	1.18	1410.4	-118.9	-148.6	7.2	-143.3	1.63	-242.2	0.0	-3414	1.01	20.05	283.6	354.4	7.2	381.5	1.63	577.7	1988.2	3713	1.01	4.05
									345.7	1.09	667.0	1.18	148.4	1.18	1339.1	-127.0	-158.7	-32.9	-219.2	1.63	-258.7	0.0	-3414	1.01	18.50	304.5	380.6	-32.9	343.4	1.63	620.4	1959.5	3713	1.01	3.89
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**681.7**	1.09	1249.8	1.18	250.5	1.18	**2513.5**	**-93.7**	**-117.1**	39.6	-57.6	**1.63**	**-190.9**	**0.0**	**-5855**	**1.01**	**44.15**	**284.5**	**355.7**	39.6	435.6	**1.63**	**579.7**	**3093.3**	**6516**	**1.01**	**7.02**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	152.5	1.09	294.8	1.18	67.2	1.18	593.5	-41.4	-51.8	-27.7	-99.1	1.63	-99.1	0.0	-2283	1.01	29.25	215.3	269.2	-27.7	235.7	1.63	438.7	1032.2	2810	1.01	5.12
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	322.5	1.09	607.4	1.18	129.3	1.18	1220.8	-114.7	-143.3	-75.0	-271.7	1.63	-271.7	0.0	-3260	1.01	16.61	450.6	563.2	-75.0	465.4	1.63	918.1	2138.9	4128	1.01	3.21
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	311.3	1.09	578.6	1.18	119.9	1.18	1163.6	-200.4	-250.4	-129.7	-472.7	1.63	-472.7	0.0	-3260	1.01	9.43	507.1	633.9	-129.7	449.8	1.63	1033.2	2196.8	4128	1.01	2.91
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	120.7	1.09	225.7	1.18	51.8	1.18	459.0	-269.2	-336.6	-175.9	-637.8	1.63	-637.8	-178.8	-2280	1.01	4.33	415.7	519.6	-175.9	255.3	1.63	846.9	1306.0	2810	1.01	2.81
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-195.6	1.09	-368.3	1.18	-73.6	1.18	-734.6	-312.7	-390.8	-205.6	-742.9	1.63	-742.9	-1477.5	-2273	1.01	2.10	242.5	303.2	-205.6	-18.9	1.63	494.2	0.0	2810	1.01	7.23
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-571.5**	1.09	-1059.3	1.18	-216.8	1.18	**-2128.8**	**-340.9**	**-426.1**	-257.8	-864.7	**1.63**	**-864.7**	**-2993.5**	**-3273**	**1.01**	1.36	**116.9**	**146.1**	-257.8	-267.8	**1.63**	**238.2**	**0.0**	**4128**	**1.01**	**26.44**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-112.5	-140.6	-25.9	-189.0	1.63	-229.2	-428.8	-911	1.01	3.14	20.3	25.3	-25.9	-15.8	1.63	41.3	0.0	2207	1.01	58.83
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-43.6	1.09	-94.6	1.18	-13.4	1.18	-175.1	-119.5	-149.4	-18.0	-185.2	1.63	-243.5	-418.6	-769	1.01	2.47	9.4	11.8	-18.0	-17.1	1.63	19.2	0.0	1859	1.01	107.05
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.3	1.18	-16.1	1.18	-167.8	-127.7	-159.6	-16.5	-193.3	1.63	-260.2	-427.9	-1006	1.01	3.26	10.2	12.8	-16.5	-13.5	1.63	20.9	0.0	1859	1.01	98.03
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.0	1.09	-89.1	1.18	-17.5	1.18	-165.0	-130.5	-163.1	-15.1	-194.8	1.63	-265.8	-430.9	-1173	1.01	3.84	9.7	12.1	-15.1	-12.1	1.63	19.7	0.0	1859	1.01	103.62
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.2	1.09	-90.5	1.18	-18.4	1.18	-171.2	-132.1	-165.2	-17.2	-200.4	1.63	-269.2	-440.4	-1232	1.01	3.99	7.2	9.0	-17.2	-18.8	1.63	14.6	0.0	1859	1.01	140.44
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.5	1.09	-89.8	1.18	-17.4	1.18	-166.3	-130.2	-162.7	-15.1	-194.4	1.63	-265.2	-431.5	-1173	1.01	3.84	9.9	12.3	-15.1	-11.8	1.63	20.1	0.0	1859	1.01	101.61
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.4	1.18	-16.1	1.18	-167.8	-125.6	-157.0	-16.1	-190.0	1.63	-256.0	-423.7	-1006	1.01	3.31	11.2	14.0	-16.1	-11.6	1.63	22.8	0.0	1859	1.01	89.76
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-44.6	1.09	-95.1	1.18	-13.4	1.18	-176.5	-117.5	-146.9	-18.0	-182.6	1.63	-239.5	-416.0	-769	1.01	2.51	10.1	12.6	-18.0	-16.2	1.63	20.5	0.0	1859	1.01	100.20
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-62.7	1.09	-107.9	1.18	-4.8	1.18	-201.3	-112.6	-140.7	-21.1	-181.2	1.63	-229.4	-430.8	-911	1.01	3.13	19.4	24.3	-21.1	-9.1	1.63	39.5	0.0	2207	1.01	61.45
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-351.6	1.09	-604.8	1.18	-97.5	1.18	-1212.0	-303.1	-378.9	-134.1	-613.9	1.63	-617.6	-1829.6	-2518	1.01	2.16	44.0	55.0	-134.1	-161.3	1.63	89.6	0.0	3299	1.01	50.70
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	311.5	1.09	538.5	1.18	95.6	1.18	1087.8	-46.4	-58.0	-31.4	-111.7	1.63	-111.7	0.0	-1530	1.01	23.56	292.9	366.1	-31.4	330.7	1.63	596.8	1684.6	2688	1.01	2.73
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-318.9	1.09	-587.1	1.18	-105.4	1.18	-1164.7	-321.2	-401.4	-136.7	-641.6	1.63	-654.3	-1819.1	-2722	1.01	2.42	48.3	60.4	-136.7	-159.8	1.63	98.4	0.0	3299	1.01	45.68
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	276.2	1.09	509.2	1.18	102.2	1.18	1022.5	-52.4	-65.5	-36.3	-127.5	1.63	-127.5	0.0	-1744	1.01	21.84	309.8	387.3	-36.3	344.9	1.63	631.3	1653.8	2688	1.01	2.68
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-249.5	1.09	-469.2	1.18	-87.5	1.18	-928.9	-301.7	-377.2	-114.3	-579.8	1.63	-614.8	-1543.7	-2437	1.01	2.49	64.6	80.8	-114.3	-102.1	1.63	131.6	0.0	2810	1.01	28.62
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	197.6	1.09	367.7	1.18	80.7	1.18	744.4	-69.2	-86.5	-35.1	-147.4	1.63	-147.4	0.0	-1306	1.01	14.00	280.9	351.2	-35.1	309.2	1.63	572.4	1316.8	2207	1.01	2.59
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-117.6	1.09	-222.1	1.18	-38.3	1.18	-435.5	-221.1	-276.3	-67.9	-398.9	1.63	-450.4	-885.9	-1577	1.01	2.57	92.6	115.7	-67.9	10.1	1.63	188.6	0.0	2076	1.01	13.42
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	45.0	1.09	80.5	1.18	23.1	1.18	171.3	-121.4	-151.7	-21.3	-193.0	1.63	-247.3	-76.0	-1050	1.01	4.98	182.3	227.9	-21.3	203.0	1.63	371.5	542.8	1556	1.01	3.77
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	57.0	1.09	104.4	1.18	28.4	1.18	218.8	-116.4	-145.5	-1.7	-154.6	1.63	-237.1	-18.3	-1050	1.01	5.40	176.8	221.0	-1.7	227.8	1.63	360.3	579.1	1556	1.01	3.75
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-123.3	1.09	-244.8	1.18	-43.3	1.18	-474.4	-215.6	-269.5	-41.0	-348.1	1.63	-439.3	-913.8	-1577	1.01	2.55	87.8	109.8	-41.0	47.7	1.63	179.0	0.0	2076	1.01	14.36
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	202.4	1.09	387.0	1.18	84.3	1.18	776.7	-55.9	-69.9	-15.3	-97.8	1.63	-113.9	0.0	-1435	1.01	19.54	276.6	345.7	-15.3	335.8	1.63	563.5	1340.2	2404	1.01	2.93
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-252.7	1.09	-487.1	1.18	-90.8	1.18	-957.4	-297.6	-372.0	-99.4	-550.1	1.63	-606.3	-1563.8	-2839	1.01	3.15	52.2	65.3	-99.4	-94.0	1.63	106.4	0.0	3299	1.01	40.32
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	283.3	1.09	519.2	1.18	103.8	1.18	1043.9	-42.3	-52.9	-23.2	-93.1	1.63	-93.1	0.0	-1744	1.01	30.15	305.6	382.0	-23.2	360.7	1.63	622.7	1666.6	2688	1.01	2.68
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-317.9	1.09	-596.6	1.18	-106.8	1.18	-1176.6	-316.4	-395.4	-126.0	-618.0	1.63	-644.6	-1821.1	-2722	1.01	2.44	39.0	48.7	-126.0	-154.6	1.63	79.4	0.0	3299	1.01	56.74
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	317.9	1.09	542.6	1.18	95.8	1.18	1099.8	-43.7	-54.6	-24.7	-97.2	1.63	-97.2	0.0	-1530	1.01	27.21	288.2	360.2	-24.7	335.6	1.63	587.2	1687.0	2688	1.01	2.75
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-347.5	1.09	-608.8	1.18	-97.8	1.18	-1212.6	-298.3	-372.9	-131.6	-603.4	1.63	-607.8	-1820.4	-2518	1.01	2.19	41.3	51.6	-131.6	-160.6	1.63	84.1	0.0	3299	1.01	54.04
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**683.4**	1.09	1252.5	1.18	249.6	1.18	**2517.4**	**-96.8**	**-121.0**	33.2	-72.1	**1.63**	**-197.2**	**0.0**	-5855	1.01	42.76	**307.7**	**384.6**	33.2	455.3	**1.63**	**626.9**	**3144.3**	6516	1.01	6.48
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	362.5	1.09	693.2	1.18	154.7	1.18	1395.6	-96.5	-120.6	27.6	-80.9	1.63	-196.6	0.0	-3414	1.01	24.63	232.1	290.1	27.6	347.6	1.63	472.9	1868.5	3713	1.01	4.98
									389.7	1.09	734.9	1.18	152.8	1.18	1472.3	-87.5	-109.3	25.0	-73.3	1.63	-178.2	0.0	-3414	1.01	27.61	216.1	270.1	25.0	322.5	1.63	440.3	1912.6	3713	1.01	5.17
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	49.5	1.09	102.4	1.18	32.6	1.18	213.3	-263.2	-329.0	-51.4	-427.0	1.63	-536.3	-323.0	-2593	1.01	5.28	219.1	273.9	-51.4	201.9	1.63	446.4	659.7	2810	1.01	5.88
									89.9	1.09	168.7	1.18	34.7	1.18	338.0	-243.6	-304.4	-7.6	-330.0	1.63	-496.2	-158.2	-2593	1.01	5.96	210.2	262.8	-7.6	261.7	1.63	428.3	766.3	2810	1.01	5.84
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-198.0	1.09	-374.1	1.18	-74.6	1.18	-745.3	-449.2	-561.5	-124.0	-787.9	1.63	-915.2	-1660.5	-3037	1.01	2.54	190.7	238.3	-124.0	46.5	1.63	388.5	0.0	3299	1.01	10.49
									-172.0	1.09	-331.7	1.18	-73.8	1.18	-666.0	-436.1	-545.1	-95.9	-725.0	1.63	-888.5	-1554.5	-3037	1.01	2.70	190.2	237.8	-95.9	91.7	1.63	387.6	0.0	3299	1.01	10.31
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-284.0	1.09	-540.5	1.18	-116.2	1.18	-1084.5	-533.9	-667.3	-152.8	-945.2	1.63	-1087.8	-2172.3	-4165	1.01	2.87	164.4	205.5	-152.8	-34.6	1.63	335.0	0.0	4542	1.01	16.93
									-284.8	1.09	-541.7	1.18	-116.2	1.18	-1086.8	-534.0	-667.5	-148.1	-937.8	1.63	-1088.0	-2174.9	-4165	1.01	2.87	162.4	203.0	-148.1	-29.7	1.63	330.9	0.0	4542	1.01	17.15
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-159.8	1.09	-300.6	1.18	-66.5	1.18	-607.4	-446.1	-557.6	-113.2	-766.2	1.63	-908.9	-1516.3	-3037	1.01	2.71	233.1	291.4	-113.2	119.5	1.63	474.9	0.0	3299	1.01	8.29
									-186.8	1.09	-344.6	1.18	-67.5	1.18	-689.9	-457.9	-572.4	-133.3	-814.4	1.63	-932.9	-1622.8	-3037	1.01	2.55	232.3	290.4	-133.3	85.6	1.63	473.4	0.0	3299	1.01	8.50
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	112.6	1.09	222.5	1.18	46.3	1.18	439.9	-259.6	-324.5	-32.5	-391.4	1.63	-528.9	-89.0	-2593	1.01	5.78	259.0	323.7	-32.5	284.8	1.63	527.7	967.6	2810	1.01	4.54
									74.0	1.09	159.9	1.18	44.9	1.18	322.2	-275.6	-344.4	-72.0	-476.7	1.63	-561.4	-239.3	-2593	1.01	5.24	268.1	335.1	-72.0	232.2	1.63	546.3	868.4	2810	1.01	4.61
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	422.5	1.09	803.8	1.18	166.8	1.18	1605.9	-101.3	-126.6	30.4	-82.5	1.63	-206.4	0.0	-3789	1.01	26.33	266.3	332.9	30.4	396.8	1.63	542.6	2148.5	4128	1.01	4.72
									395.5	1.09	763.3	1.18	168.5	1.18	1530.6	-107.6	-134.6	-2.1	-143.7	1.63	-219.3	0.0	-3789	1.01	24.43	283.8	354.7	-2.1	366.7	1.63	578.2	2108.8	4128	1.01	4.56
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**722.5**	1.09	1326.4	1.18	263.5	1.18	**2663.6**	**-75.8**	**-94.7**	36.8	-38.9	**1.63**	**-154.3**	**0.0**	-5497	1.01	53.22	**301.2**	**376.5**	36.8	452.7	**1.63**	**613.7**	**3277.3**	6022	1.01	5.57
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-588.9**	1.09	-1079.1	1.18	-218.9	1.18	**-2173.5**	**-278.8**	**-348.4**	-250.8	-772.4	**1.63**	**-772.4**	**-2945.9**	-3227	1.01	1.41	**96.6**	**120.8**	-250.8	-282.9	**1.63**	**196.9**	**0.0**	4128	1.01	32.21
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-230.1	1.09	-419.0	1.18	-82.0	1.18	-841.9	-234.0	-292.5	-97.5	-464.1	1.63	-476.7	-1318.7	-2273	1.01	3.05	191.5	239.4	-97.5	90.8	1.63	390.3	0.0	2810	1.01	9.43
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	66.2	1.09	142.6	1.18	36.6	1.18	283.6	-201.1	-251.3	-119.3	-456.6	1.63	-456.6	-173.0	-2280	1.01	5.66	356.0	445.0	-119.3	269.8	1.63	725.4	1009.0	2810	1.01	3.52
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	237.0	1.09	460.2	1.18	98.7	1.18	917.8	-146.0	-182.5	-133.7	-408.3	1.63	-408.3	0.0	-2954	1.01	9.56	461.7	577.2	-133.7	384.2	1.63	940.8	1858.6	3713	1.01	3.01
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	230.6	1.09	443.3	1.18	94.9	1.18	886.4	-180.3	-225.4	-151.8	-482.5	1.63	-482.5	0.0	-2954	1.01	8.02	468.1	585.1	-151.8	363.1	1.63	953.8	1840.2	3713	1.01	3.00
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	48.9	1.09	98.1	1.18	26.6	1.18	200.5	-251.5	-314.4	-168.7	-603.0	1.63	-603.0	-402.5	-2280	1.01	4.15	372.5	465.7	-168.7	210.7	1.63	759.0	959.5	2810	1.01	3.47
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-259.8	1.09	-488.1	1.18	-96.6	1.18	-973.1	-298.8	-373.5	-172.1	-670.2	1.63	-670.2	-1643.3	-2634	1.01	2.52	220.9	276.1	-172.1	7.5	1.63	450.1	0.0	3299	1.01	9.56
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-622.3	1.09	-1154.4	1.18	-233.4	1.18	-2315.9	-328.1	-410.1	-221.3	-788.5	1.63	-788.5	**-3104.4**	-3527	1.01	1.58	91.8	114.7	-221.3	-241.0	1.63	187.0	**0.0**	4542	1.01	36.92

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	C_T	$C_{T,DLA}$	C_{LL}	$C_{T+LL,f}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5			19		19							Factor	7		19							Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-30.4	1.09	-53.7	1.18	-2.0	1.18	-98.9	-121.2	-151.5	-15.6	-183.4	1.63	-246.9	-345.8	-1232	1.01	4.64	20.4	25.5	-15.6	1.2	1.63	41.6	0.0	1859	1.01	47.58
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-37.7	1.09	-90.8	1.18	-16.9	1.18	-168.1	-120.9	-151.1	-15.4	-182.8	1.63	-246.3	-414.4	-1232	1.01	4.37	7.6	9.5	-15.4	-15.3	1.63	15.5	0.0	1859	1.01	132.09
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.9	1.09	-91.6	1.18	-19.1	1.18	-174.2	-121.9	-152.4	-16.3	-185.6	1.63	-248.5	-422.6	-1232	1.01	4.31	5.8	7.3	-16.3	-19.0	1.63	11.9	0.0	1859	1.01	172.94
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-37.2	1.09	-88.8	1.18	-17.6	1.18	-166.0	-119.8	-149.7	-16.1	-182.5	1.63	-244.0	-410.0	-1173	1.01	4.18	8.3	10.4	-16.1	-15.5	1.63	16.9	0.0	1859	1.01	121.00
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.2	1.09	-90.6	1.18	-15.9	1.18	-166.1	-117.8	-147.2	-16.5	-180.4	1.63	-239.9	-406.1	-1006	1.01	3.54	9.3	11.6	-16.5	-14.8	1.63	18.9	0.0	1859	1.01	108.25
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-42.7	1.09	-92.4	1.18	-12.7	1.18	-170.6	-111.4	-139.2	-17.7	-174.0	1.63	-226.9	-397.6	-769	1.01	2.67	9.1	11.4	-17.7	-16.9	1.63	18.6	0.0	1859	1.01	110.02
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-109.1	-136.3	-25.9	-184.5	1.63	-222.2	-421.8	-911	1.01	3.24	17.4	21.8	-25.9	-19.5	1.63	35.5	0.0	2207	1.01	68.34
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-284.5	1.09	-518.8	1.18	-90.7	1.18	-1029.2	-249.6	-312.0	-133.3	-542.7	1.63	-542.7	-1571.9	-2392	1.01	2.55	48.7	60.9	-133.3	-153.8	1.63	99.2	0.0	2893	1.01	39.83
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	209.1	1.09	377.9	1.18	76.8	1.18	764.4	-48.3	-60.4	-45.9	-137.8	1.63	-137.8	0.0	-983	1.01	12.75	218.9	273.6	-45.9	210.6	1.63	446.0	1210.4	2071	1.01	2.98
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-116.8	1.09	-216.4	1.18	-35.3	1.18	-424.3	-179.1	-223.9	-78.7	-361.7	1.63	-364.9	-789.2	-1298	1.01	2.43	58.9	73.6	-78.7	-51.5	1.63	119.9	0.0	1652	1.01	17.45
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	42.2	1.09	66.0	1.18	18.4	1.18	145.7	-89.5	-111.9	-42.8	-186.6	1.63	-186.6	-40.9	-797	1.01	5.09	141.9	177.4	-42.8	115.2	1.63	289.2	434.9	1133	1.01	3.45
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	56.1	1.09	107.1	1.18	31.8	1.18	225.1	-94.7	-118.4	-11.0	-141.5	1.63	-192.9	0.0	-797	1.01	5.34	118.2	147.8	-11.0	136.2	1.63	240.9	466.0	1133	1.01	3.82
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-127.0	1.09	-250.1	1.18	-47.4	1.18	-489.4	-153.8	-192.2	-51.5	-284.5	1.63	-313.4	-802.8	-1577	1.01	3.52	64.4	80.5	-51.5	0.0	1.63	131.2	0.0	2076	1.01	19.71
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	213.4	1.09	401.8	1.18	91.9	1.18	815.1	-25.5	-31.9	11.1	-15.1	1.63	-52.0	0.0	-1306	1.01	41.09	202.9	253.6	11.1	282.7	1.63	413.4	1228.5	2207	1.01	3.42
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-263.6	1.09	-502.1	1.18	-98.3	1.18	-995.8	-219.8	-274.8	-93.2	-438.6	1.63	-447.9	-1443.7	-2497	1.01	3.41	13.5	16.9	-93.2	-134.3	1.63	27.6	0.0	2884	1.01	141.86
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	289.8	1.09	540.5	1.18	112.4	1.18	1086.3	-18.3	-22.9	-6.9	-35.1	1.63	-37.2	0.0	-1744	1.01	76.47	227.8	284.7	-6.9	285.7	1.63	464.1	1550.4	2688	1.01	3.51
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-328.9	1.09	-617.1	1.18	-115.0	1.18	-1222.4	-235.5	-294.4	-117.4	-498.6	1.63	-498.6	-1721.0	-3041	1.01	3.71	17.8	22.3	-117.4	-168.2	1.63	36.3	0.0	3713	1.01	137.02
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	320.4	1.09	562.7	1.18	103.2	1.18	1135.0	-33.7	-42.2	-17.7	-72.8	1.63	-72.8	0.0	-1530	1.01	36.83	213.3	266.6	-17.7	249.3	1.63	434.6	1569.5	2688	1.01	3.63
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-356.2	1.09	-628.3	1.18	-104.7	1.18	-1253.1	-219.4	-274.2	-128.2	-495.0	1.63	-495.0	-1748.2	-2804	1.01	3.19	32.9	41.1	-128.2	-166.1	1.63	66.9	0.0	3713	1.01	74.75
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	26.9	1.09	43.8	1.18	1.3	1.18	82.5	-19.9	-24.8	-10.1	-42.4	1.63	-42.4	0.0	-3414	1.01	83.27	49.5	61.9	-10.1	48.1	1.63	100.9	183.4	3713	1.01	36.36
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-318.7	1.09	-588.8	1.18	-117.0	1.18	-1180.2	-297.2	-371.5	-120.0	-583.2	1.63	-605.6	-1785.8	-3414	1.01	3.74	65.5	81.8	-120.0	-110.2	1.63	133.4	0.0	3713	1.01	36.96
									-279.8	1.09	-525.9	1.18	-116.8	1.18	-1063.3	-271.6	-339.6	-82.4	-488.6	1.63	-553.5	-1616.7	-3414	1.01	4.31	63.5	79.3	-82.4	-51.6	1.63	129.3	0.0	3713	1.01	37.22
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-390.4**	1.09	-725.5	1.18	-154.7	1.18	**-1464.1**	**-412.4**	**-515.5**	-160.1	-798.7	**1.63**	**-840.2**	**-2304.3**	**-4333**	**1.01**	**3.47**	**127.0**	**158.8**	-160.1	-95.4	**1.63**	**258.8**	**0.0**	**4779**	**1.01**	**24.31**
									-380.3	1.09	-710.1	1.18	-156.6	1.18	-1437.2	-406.9	-508.6	-144.9	-766.7	1.63	-829.0	-2266.2	-4333	1.01	3.55	126.4	157.9	-144.9	-71.4	1.63	257.4	0.0	4779	1.01	24.33
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-251.7	1.09	-463.4	1.18	-101.7	1.18	-941.2	-370.1	-462.7	-142.0	-714.2	1.63	-754.2	-1695.3	-3789	1.01	3.83	175.0	218.8	-142.0	-3.3	1.63	356.6	0.0	4128	1.01	14.33
									-269.8	1.09	-493.0	1.18	-103.6	1.18	-998.0	-380.2	-475.2	-150.8	-741.6	1.63	-774.6	-1772.6	-3789	1.01	3.65	174.7	218.4	-150.8	-18.0	1.63	356.0	0.0	4128	1.01	14.51
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.6	1.09	93.8	1.18	20.2	1.18	182.0	-223.9	-279.9	-67.8	-402.5	1.63	-456.2	-274.2	-2593	1.01	6.14	189.8	237.3	-67.8	137.0	1.63	386.7	568.7	2810	1.01	6.87
									8.5	1.09	36.4	1.18	16.9	1.18	72.2	-242.1	-302.6	-99.2	-477.4	1.63	-493.3	-421.1	-2593	1.01	5.46	195.5	244.4	-99.2	93.2	1.63	398.3	470.5	2810	1.01	6.94
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	370.3	1.09	704.6	1.18	148.6	1.18	1410.4	-94.1	-117.7	7.2	-111.1	1.63	-191.8	0.0	-3414	1.01	25.33	189.8	237.3	7.2	259.3	1.63	386.8	1797.2	3713	1.01	6.05
									345.7	1.09	667.0	1.18	148.4	1.18	1339.1	-103.6	-129.4	-32.9	-188.7	1.63	-211.0	0.0	-3414	1.01	22.69	203.6	254.5	-32.9	211.8	1.63	414.8	1753.9	3713	1.01	5.81
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**681.7**	1.09	1249.8	1.18	250.5	1.18	**2513.5**	**-62.7**	**-78.4**	39.6	-17.2	**1.63**	**-127.7**	**0.0**	**-5855**	**1.01**	**65.98**	**191.9**	**239.8**	39.6	314.7	**1.63**	**390.9**	**2904.4**	**6516**	**1.01**	**10.40**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	152.5	1.09	294.8	1.18	67.2	1.18	593.5	-27.7	-34.6	-27.7	-81.2	1.63	-81.2	0.0	-2283	1.01	35.71	164.0	205.0	-27.7	168.8	1.63	334.1	927.6	2810	1.01	6.72
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	322.5	1.09	607.4	1.18	129.3	1.18	1220.8	-76.7	-95.8	-75.0	-222.2	1.63	-222.2	0.0	-3260	1.01	20.32	334.9	418.6	-75.0	314.4	1.63	682.3	1903.1	4128	1.01	4.32
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	311.3	1.09	578.6	1.18	119.9	1.18	1163.6	-134.0	-167.5	-129.7	-386.1	1.63	-386.1	0.0	-3260	1.01	11.54	368.0	460.0	-129.7	268.4	1.63	749.7	1913.3	4128	1.01	4.01
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	120.7	1.09	225.7	1.18	51.8	1.18	459.0	-180.1	-225.1	-175.9	-521.6	1.63	-521.6	-62.5	-2280	1.01	5.29	302.8	378.6	-175.9	108.2	1.63	617.0	1076.1	2810	1.01	3.86
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-195.6	1.09	-368.3	1.18	-73.6	1.18	-734.6	-209.3	-261.6	-205.6	-608.1	1.63	-608.1	-1342.7	-2273	1.01	2.57	175.7	219.6	-205.6	-106.1	1.63	358.0	0.0	2810	1.01	9.98
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-571.5**	1.09	-1059.3	1.18	-216.8	1.18	**-2128.8**	**-228.1**	**-285.1**	-257.8	-717.7	**1.63**	**-717.7**	**-2846.4**	**-3273**	**1.01**	1.64	**78.2**	**97.8**	-257.8	-318.2	**1.63**	**159.4**	**0.0**	**4128**	**1.01**	**39.51**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-109.1	-136.3	-25.9	-184.5	1.63	-222.2	-421.8	-911	1.01	3.24	17.4	21.8	-25.9	-19.5	1.63	35.5	0.0	2207	1.01	68.34
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-43.6	1.09	-94.6	1.18	-13.4	1.18	-175.1	-113.3	-141.6	-18.0	-177.1	1.63	-230.9	-406.0	-769	1.01	2.61	8.3	10.4	-18.0	-18.5	1.63	17.0	0.0	1859	1.01	120.90
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.3	1.18	-16.1	1.18	-167.8	-118.1	-147.6	-16.5	-180.8	1.63	-240.6	-408.3	-1006	1.01	3.52	9.0	11.3	-16.5	-15.1	1.63	18.4	0.0	1859	1.01	111.39
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.0	1.09	-89.1	1.18	-17.5	1.18	-165.0	-120.3	-150.4	-15.1	-181.5	1.63	-245.1	-410.1	-1173	1.01	4.16	8.5	10.7	-15.1	-13.6	1.63	17.4	0.0	1859	1.01	117.59
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.2	1.09	-90.5	1.18	-18.4	1.18	-171.2	-121.3	-151.6	-17.2	-186.2	1.63	-247.1	-418.3	-1232	1.01	4.34	5.8	7.2	-17.2	-20.6	1.63	11.8	0.0	1859	1.01	173.70
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.5	1.09	-89.8	1.18	-17.4	1.18	-166.3	-119.9	-149.9	-15.1	-181.0	1.63	-244.3	-410.6	-1173	1.01	4.17	8.6	10.8	-15.1	-13.4	1.63	17.6	0.0	1859	1.01	116.04
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.4	1.18	-16.1	1.18	-167.8	-117.3	-146.7	-16.1	-179.2	1.63	-239.1	-406.8	-1006	1.01	3.55	9.9	12.3	-16.1	-13.3	1.63	20.1	0.0	1859	1.01	101.77
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-44.6	1.09	-95.1	1.18	-13.4	1.18	-176.5	-112.3	-140.3	-18.0	-175.7	1.63	-228.7	-405.3	-769	1.01	2.63	8.9	11.1	-18.0	-17.7	1.63	18.1	0.0	1859	1.01	113.20
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-62.7	1.09	-107.9	1.18	-4.8	1.18	-201.3	-109.0	-136.3	-21.1	-176.6	1.63	-222.2	-423.5	-911	1.01	3.24	16.4	20.5	-21.1	-13.0	1.63	33.4	0.0	2207	1.01	72.84
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-351.6	1.09	-604.8	1.18	-97.5	1.18	-1212.0	-216.7	-270.9	-134.1	-501.2	1.63	-501.2	-1713.1	-2518	1.01	2.66	29.7	37.1	-134.1	-179.9	1.63	60.5	0.0	3299	1.01	75.11
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	311.5	1.09	538.5	1.18	95.6	1.18	1087.8	-31.3	-39.2	-31.4	-92.1	1.63	-92.1	0.0	-1530	1.01	28.59	209.8	262.3	-31.4	222.4	1.63	427.5	1515.3	2688	1.01	3.80
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-318.9	1.09	-587.1	1.18	-105.4	1.18	-1164.7	-232.2	-290.2	-136.7	-525.5	1.63	-525.5	-1690.2	-2722	1.01	3.01	32.3	40.4	-136.7	-180.6	1.63	65.9	0.0	3299	1.01	68.24
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	276.2	1.09	509.2	1.18	102.2	1.18	1022.5	-35.1	-43.9	-36.3	-104.9	1.63	-104.9	0.0	-1744	1.01	26.55	224.6	280.7	-36.3	233.7	1.63	457.5	1480.0	2688	1.01	3.70
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-249.5	1.09	-469.2	1.18	-87.5	1.18	-928.9	-222.2	-277.8	-114.3	-476.1	1.63	-476.1	-1405.0	-2437	1.01	3.22	43.2	54.1	-114.3	-130.0	1.63	88.1	0.0	2810	1.01	42.76
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	197.6	1.09	367.7	1.18	80.7	1.18	744.4	-46.3	-57.9	-35.1	-117.6	1.63	-117.6	0.0	-1306	1.01	17.55	208.7	260.8	-35.1	214.9	1.63	425.2	1169.6	2207	1.01	3.49
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-117.6	1.09	-222.1	1.18	-38.3	1.18	-435.5	-170.1	-212.6	-67.9	-332.4	1.63	-346.5	-782.0	-1577	1.01	3.34	71.9	89.9	-67.9	-16.8	1.63	146.5	0.0	2076	1.01	17.28
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	45.0	1.09	80.5	1.18	23.1	1.18	171.3	-95.3	-119.2	-21.3	-159.0	1.63	-194.2	-22.9	-1050	1.01	6.34	139.8	174.7	-21.3	147.5	1.63	284.8	456.1	1556	1.01	4.92
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	57.0	1.09	104.4	1.18	28.4	1.18	218.8	-92.1	-115.1	-1.7	-122.9	1.63	-187.7	0.0	-1050	1.01	6.82	136.2	170.2	-1.7	174.8	1.63	277.5	496.3	1556	1.01	4.87
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-123.3	1.09	-244.8	1.18	-43.3	1.18	-474.4	-166.7	-208.4	-41.0	-284.3	1.63	-339.7	-814.1	-1577	1.01	3.29	68.9	86.1	-41.0	23.0	1.63	140.4	0.0	2076	1.01	18.32
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	202.4	1.09	387.0	1.18	84.3	1.18	776.7	-40.6	-50.7	-15.3	-77.7	1.63	-82.6	0.0	-1435	1.01	26.95	206.0	257.5	-15.3	243.7	1.63	419.7	1196.4	2404	1.01	3.93
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-252.7	1.09	-487.1	1.18	-90.8	1.18	-957.4	-219.4	-274.2	-99.4	-448.1	1.63	-448.1	-1405.6	-2839	1.01	4.26	35.2	44.0	-99.4	-116.2	1.63	71.6	0.0	3299	1.01	59.87
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	283.3	1.09	519.2	1.18	103.8	1.18	1043.9	-28.5	-35.6	-23.2	-75.0	1.63	-75.0	0.0	-1744	1.01	37.39	221.6	277.0	-23.2	251.1	1.63	451.5	1495.4	2688	1.01	3.70
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-317.9	1.09	-596.6	1.18	-106.8	1.18	-1176.6	-229.0	-286.3	-126.0	-504.1	1.63	-504.1	-1680.7	-2722	1.01	3.12	26.3	32.8	-126.0	-171.2	1.63	53.5	0.0	3299	1.01	84.26
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	317.9	1.09	542.6	1.18	95.8	1.18	1099.8	-29.4	-36.7	-24.7	-78.5	1.63	-78.5	0.0	-1530	1.01	33.69	206.4	258.0	-24.7	228.9	1.63	420.5	1520.3	2688	1.01	3.84
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-347.5	1.09	-608.8	1.18	-97.8	1.18	-1212.6	-213.9	-267.3	-131.6	-493.3	1.63	-493.3	-1705.9	-2518	1.01	2.70	27.8	34.7	-131.6	-178.2	1.63	56.6	0.0	3299	1.01	80.35
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**683.4**	1.09	1252.5	1.18	249.6	1.18	**2517.4**	**-64.8**	**-80.9**	33.2	-30.4	**1.63**	**-131.9**	**0.0**	-5855	1.01	63.90	**205.9**	**257.4**	33.2	322.6	**1.63**	**419.6**	**2937.0**	6516	1.01	9.68
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	362.5	1.09	693.2	1.18	154.7	1.18	1395.6	-82.6	-103.3	27.6	-62.9	1.63	-168.4	0.0	-3414	1.01	28.76	156.5	195.6	27.6	248.9	1.63	318.8	1714.4	3713	1.01	7.39
									389.7	1.09	734.9	1.18	152.8	1.18	1472.3	-74.2	-92.8	25.0	-56.1	1.63	-151.3	0.0	-3414	1.01	32.52	146.5	183.1	25.0	231.8	1.63	298.5	1770.8	3713	1.01	7.63
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	49.5	1.09	102.4	1.18	32.6	1.18	213.3	-204.3	-255.4	-51.4	-350.2	1.63	-416.3	-203.1	-2593	1.01	6.80	147.6	184.5	-51.4	108.7	1.63	300.8	514.0	2810	1.01	8.73
									89.9	1.09	168.7	1.18	34.7	1.18	338.0	-188.3	-235.4	-7.6	-258.0	1.63	-383.7	-45.7	-2593	1.01	7.71	141.6	176.9	-7.6	172.1	1.63	288.4	626.4	2810	1.01	8.67
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-198.0	1.09	-374.1	1.18	-74.6	1.18	-745.3	-333.7	-417.1	-124.0	-637.3	1.63	-679.9	-1425.2	-3037	1.01	3.42	128.4	160.5	-124.0	-34.7	1.63	261.7	0.0	3299	1.01	15.58
									-172.0	1.09	-331.7	1.18	-73.8	1.18	-666.0	-321.8	-402.3	-95.9	-576.1	1.63	-655.8	-1321.8	-3037	1.01	3.66	128.1	160.1	-95.9	10.7	1.63	261.0	0.0	3299	1.01	15.32
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-284.0	1.09	-540.5	1.18	-116.2	1.18	-1084.5	-391.6	-489.5	-152.8	-759.7	1.63	-798.0	-1882.5	-4165	1.01	3.91	110.0	137.5	-152.8	-105.5	1.63	224.2	0.0	4542	1.01	25.30
									-284.8	1.09	-541.7	1.18	-116.2	1.18	-1086.8	-391.6	-489.4	-148.1	-752.0	1.63	-797.8	-1884.6	-4165	1.01	3.91	108.7	135.8	-148.1	-99.8	1.63	221.4	0.0	4542	1.01	25.63
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-159.8	1.09	-300.6	1.18	-66.5	1.18	-607.4	-328.6	-410.7	-113.2	-613.0	1.63	-669.5	-1276.9	-3037	1.01	3.67	156.0	195.0	-113.2	18.9	1.63	317.8	0.0	3299	1.01	12.39
									-186.8	1.09	-344.6	1.18	-67.5	1.18	-689.9	-339.6	-424.5	-133.3	-660.2	1.63	-691.9	-1381.8	-3037	1.01	3.44	155.5	194.4	-133.3	-14.6	1.63	316.8	0.0	3299	1.01	12.69
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	112.6	1.09	222.5	1.18	46.3	1.18	439.9	-197.8	-247.2	-32.5	-310.8	1.63	-403.0	0.0	-2593	1.01	7.59	173.4	216.7	-32.5	173.1	1.63	353.2	793.1	2810	1.01	6.79
									74.0	1.09	159.9	1.18	44.9	1.18	322.2	-212.3	-265.4	-72.0	-394.2	1.63	-432.6	-110.4	-2593	1.01	6.80	179.5	224.4	-72.0	116.7	1.63	365.8	688.0	2810	1.01	6.88
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	422.5	1.09	803.8	1.18	166.8	1.18	1605.9	-83.0	-103.7	30.4	-58.6	1.63	-169.0	0.0	-3789	1.01	32.14	178.5	223.1	30.4	282.3	1.63	363.7	1969.5	4128	1.01	7.05
									395.5	1.09	763.3	1.18	168.5	1.18	1530.6	-91.1	-113.8	-2.1	-122.1	1.63	-185.6	0.0	-3789	1.01	28.87	190.0	237.5	-2.1	244.4	1.63	387.1	1917.7	4128	1.01	6.82
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**722.5**	1.09	1326.4	1.18	263.5	1.18	**2663.6**	**-51.0**	**-63.8**	36.8	-6.6	**1.63**	**-103.9**	**0.0**	-5497	1.01	79.04	**201.4**	**251.7**	36.8	322.5	**1.63**	**410.3**	**3073.9**	6022	1.01	8.33
																				1.63										**1.63**					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-588.9**	1.09	**-1079.1**	1.18	-218.9	1.18	**-2173.5**	**-188.1**	**-235.2**	-250.8	-654.2	**1.63**	**-654.2**	**-2827.8**	-3227	1.01	1.66	**64.7**	**80.8**	-250.8	-324.5	**1.63**	**131.8**	**0.0**	4128	1.01	48.13
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-230.1	1.09	-419.0	1.18	-82.0	1.18	-841.9	-157.7	-197.1	-97.5	-364.6	1.63	-364.6	-1206.5	-2273	1.01	3.99	144.1	180.2	-97.5	29.0	1.63	293.7	0.0	2810	1.01	12.53
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	66.2	1.09	142.6	1.18	36.6	1.18	283.6	-135.3	-169.2	-119.3	-370.9	1.63	-370.9	-87.3	-2280	1.01	6.97	262.2	327.7	-119.3	147.5	1.63	534.2	817.8	2810	1.01	4.78
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	237.0	1.09	460.2	1.18	98.7	1.18	917.8	-98.3	-122.9	-133.7	-346.0	1.63	-346.0	0.0	-2954	1.01	11.27	338.4	423.0	-133.7	223.4	1.63	689.5	1607.2	3713	1.01	4.11
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	230.6	1.09	443.3	1.18	94.9	1.18	886.4	-120.7	-150.8	-151.8	-404.7	1.63	-404.7	0.0	-2954	1.01	9.56	342.2	427.7	-151.8	198.8	1.63	697.2	1583.6	3713	1.01	4.11
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	48.9	1.09	98.1	1.18	26.6	1.18	200.5	-168.3	-210.4	-168.7	-494.6	1.63	-494.6	-294.1	-2280	1.01	5.06	273.5	341.9	-168.7	81.6	1.63	557.2	757.7	2810	1.01	4.73
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-259.8	1.09	-488.1	1.18	-96.6	1.18	-973.1	-200.1	-250.1	-172.1	-541.5	1.63	-541.5	-1514.6	-2634	1.01	3.12	162.6	203.2	-172.1	-68.5	1.63	331.3	0.0	3299	1.01	12.99
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-622.3	1.09	-1154.4	1.18	-233.4	1.18	-2315.9	-219.4	-274.2	-221.3	-646.7	1.63	-646.7	**-2962.6**	-3527	1.01	1.93	64.6	80.8	-221.3	-276.4	1.63	131.7	**0.0**	4542	1.01	52.43

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIL LOAD CAPACITY EVALUATION LEVEL 1 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-30.4	1.09	-53.7	1.18	-2.0	1.18	-98.9	1.63	-255.6	-354.4	-1232	1.01	4.48	27.5	34.3	-15.6	10.4	1.63	56.0	0.0	1859	1.01	35.32
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-37.7	1.09	-90.8	1.18	-16.9	1.18	-168.1	1.63	-266.5	-434.6	-1232	1.01	4.04	8.7	10.8	-15.4	-13.9	1.63	17.7	0.0	1859	1.01	115.92
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.9	1.09	-91.6	1.18	-19.1	1.18	-174.2	1.63	-275.7	-449.8	-1232	1.01	3.88	7.7	9.6	-16.3	-16.6	1.63	15.7	0.0	1859	1.01	131.00
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-37.2	1.09	-88.8	1.18	-17.6	1.18	-166.0	1.63	-269.4	-435.4	-1173	1.01	3.78	9.9	12.4	-16.1	-13.4	1.63	20.2	0.0	1859	1.01	101.28
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.2	1.09	-90.6	1.18	-15.9	1.18	-166.1	1.63	-261.9	-428.1	-1006	1.01	3.24	11.0	13.8	-16.5	-12.5	1.63	22.5	0.0	1859	1.01	90.81
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-42.7	1.09	-92.4	1.18	-12.7	1.18	-170.6	1.63	-240.4	-411.0	-769	1.01	2.52	11.2	14.0	-17.7	-14.2	1.63	22.8	0.0	1859	1.01	89.72
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	1.63	-233.9	-433.4	-911	1.01	3.08	22.1	27.7	-25.9	-13.4	1.63	45.1	0.0	2207	1.01	53.85
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-284.5	1.09	-518.8	1.18	-90.7	1.18	-1029.2	1.63	-778.4	-1807.6	-2392	1.01	1.78	87.3	109.1	-133.3	-103.5	1.63	177.8	0.0	2893	1.01	22.22
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	209.1	1.09	377.9	1.18	76.8	1.18	764.4	1.63	-187.7	0.0	-983	1.01	9.36	337.7	422.2	-45.9	365.6	1.63	688.1	1452.5	2071	1.01	**1.93**
U3 - L2	DIAGONAL	2-10C20			5388	1298	1498	1652	-116.8	1.09	-216.4	1.18	-35.3	1.18	-424.3	1.63	-529.2	-953.5	-1298	1.01	**1.68**	82.8	103.5	-78.7	-20.2	1.63	168.8	0.0	1652	1.01	12.40
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	42.2	1.09	66.0	1.18	18.4	1.18	145.7	1.63	-226.8	-81.1	-797	1.01	4.19	208.6	260.8	-42.8	202.2	1.63	425.1	570.7	1133	1.01	2.35
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	56.1	1.09	107.1	1.18	31.8	1.18	225.1	1.63	-262.2	-37.1	-797	1.01	3.93	146.2	182.8	-11.0	172.7	1.63	297.9	523.1	1133	1.01	3.09
U5 - L6	DIAGONAL	2-10C25			5559	1577	1876	2076	-127.0	1.09	-250.1	1.18	-47.4	1.18	-489.4	1.63	-409.3	-898.7	-1577	1.01	2.70	85.6	107.0	-51.5	27.6	1.63	174.3	0.0	2076	1.01	14.83
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	213.4	1.09	401.8	1.18	91.9	1.18	815.1	1.63	-64.5	0.0	-1306	1.01	33.09	300.4	375.5	11.1	409.9	1.63	612.1	1427.3	2207	1.01	2.31
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-263.6	1.09	-502.1	1.18	-98.3	1.18	-995.8	1.63	-666.5	-1662.3	-2497	1.01	2.29	16.5	20.6	-93.2	-130.4	1.63	33.6	0.0	2884	1.01	116.33
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	289.8	1.09	540.5	1.18	112.4	1.18	1086.3	1.63	-64.7	0.0	-1744	1.01	44.03	359.9	449.8	-6.9	458.0	1.63	733.2	1819.6	2688	1.01	2.22
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-328.9	1.09	-617.1	1.18	-115.0	1.18	-1222.4	1.63	-751.9	-1974.3	-3041	1.01	2.46	31.7	39.6	-117.4	-150.1	1.63	64.5	0.0	3713	1.01	77.04
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	320.4	1.09	562.7	1.18	103.2	1.18	1135.0	1.63	-122.6	0.0	-1530	1.01	21.86	342.9	428.7	-17.7	418.4	1.63	698.7	1833.7	2688	1.01	2.26
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-356.2	1.09	-628.3	1.18	-104.7	1.18	-1253.1	1.63	-709.8	-1962.9	-2804	1.01	2.22	58.7	73.4	-128.2	-132.4	1.63	119.7	0.0	3713	1.01	41.80
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	26.9	1.09	43.8	1.18	1.3	1.18	82.5	1.63	-64.6	0.0	-3414	1.01	54.68	65.3	81.6	-10.1	68.6	1.63	133.0	215.5	3713	1.01	27.58
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-318.7	1.09	-588.8	1.18	-117.0	1.18	-1180.2	1.63	-940.9	-2121.1	-3414	1.01	2.41	117.4	146.7	-120.0	-42.5	1.63	239.2	0.0	3713	1.01	20.61
									-279.8	1.09	-525.9	1.18	-116.8	1.18	-1063.3	1.63	-866.7	-1930.0	-3414	1.01	2.75	113.8	142.3	-82.4	14.0	1.63	231.9	0.0	3713	1.01	20.76
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-390.4**	1.09	-725.5	1.18	-154.7	1.18	**-1464.1**	**1.63**	**-1284.1**	**-2748.2**	**-4333**	**1.01**	**2.27**	**227.7**	**284.6**	-160.1	35.9	**1.63**	**463.9**	**0.0**	**4779**	**1.01**	**13.56**
									-380.3	1.09	-710.1	1.18	-156.6	1.18	-1437.2	1.63	-1287.2	-2724.4	-4333	1.01	2.28	226.7	283.3	-144.9	59.4	1.63	461.8	0.0	4779	1.01	13.56
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-251.7	1.09	-463.4	1.18	-101.7	1.18	-941.2	1.63	-1148.7	-2089.9	-3789	1.01	2.51	313.8	392.2	-142.0	177.7	1.63	639.3	0.0	4128	1.01	7.99
									-269.8	1.09	-493.0	1.18	-103.6	1.18	-998.0	1.63	-1166.5	-2164.5	-3789	1.01	2.43	313.4	391.7	-150.8	162.8	1.63	638.5	0.0	4128	1.01	8.09
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.6	1.09	93.8	1.18	20.2	1.18	182.0	1.63	-691.4	-509.5	-2593	1.01	4.05	340.2	425.3	-67.8	333.1	1.63	693.2	875.2	2810	1.01	3.83
									8.5	1.09	36.4	1.18	16.9	1.18	72.2	1.63	-722.3	-650.1	-2593	1.01	3.73	350.5	438.1	-99.2	295.3	1.63	714.0	786.3	2810	1.01	3.87
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	370.3	1.09	704.6	1.18	148.6	1.18	1410.4	1.63	-253.9	0.0	-3414	1.01	19.13	339.7	424.6	7.2	454.6	1.63	692.1	2102.5	3713	1.01	3.38
									345.7	1.09	667.0	1.18	148.4	1.18	1339.1	1.63	-278.7	0.0	-3414	1.01	17.18	364.0	455.0	-32.9	421.0	1.63	741.7	2080.8	3713	1.01	3.25
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**681.7**	1.09	1249.8	1.18	250.5	1.18	**2513.5**	**1.63**	**-228.5**	**0.0**	**-5855**	**1.01**	**36.88**	**338.2**	**422.7**	39.6	505.5	**1.63**	**689.0**	**3202.5**	**6516**	**1.01**	**5.90**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	152.5	1.09	294.8	1.18	67.2	1.18	593.5	1.63	-109.8	0.0	-2283	1.01	26.40	242.2	302.8	-27.7	270.8	1.63	493.6	1087.1	2810	1.01	4.55
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	322.5	1.09	607.4	1.18	129.3	1.18	1220.8	1.63	-301.4	0.0	-3260	1.01	14.98	505.5	631.9	-75.0	537.0	1.63	1030.0	2250.8	4128	1.01	2.86
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	311.3	1.09	578.6	1.18	119.9	1.18	1163.6	1.63	-524.5	0.0	-3260	1.01	8.50	568.7	710.8	-129.7	530.1	1.63	1158.7	2322.3	4128	1.01	**2.59**
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	120.7	1.09	225.7	1.18	51.8	1.18	459.0	1.63	-707.4	-248.4	-2280	1.01	3.90	467.2	583.9	-175.9	322.5	1.63	951.8	1410.9	2810	1.01	2.50
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-195.6	1.09	-368.3	1.18	-73.6	1.18	-734.6	1.63	-823.2	-1557.8	-2273	1.01	1.90	272.4	340.5	-205.6	20.1	1.63	555.0	0.0	2810	1.01	6.44
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-571.5**	1.09	-1059.3	1.18	-216.8	1.18	**-2128.8**	**1.63**	**-952.0**	**-3080.8**	**-3273**	**1.01**	**1.24**	**140.0**	**174.9**	-257.8	-237.7	**1.63**	**285.1**	**0.0**	**4128**	**1.01**	**22.09**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

W.O. 7108.300
Dundas St, EA Guelph Line to Appleby
Tansley Bridge Over Bronte Creek

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (RIGHT TRUSS)

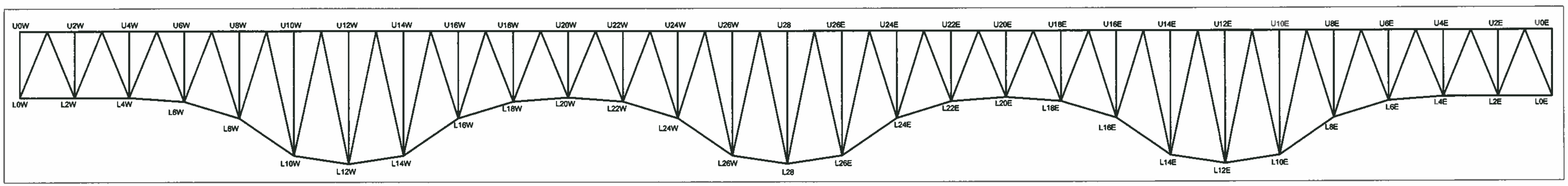
Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5								Factor	19		19							Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	1.63	-233.9	-433.4	-911	1.01	3.08	22.1	27.7	-25.9	-13.4	1.63	45.1	0.0	2207	1.01	53.85
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-43.6	1.09	-94.6	1.18	-13.4	1.18	-175.1	1.63	-246.7	-421.8	-769	1.01	2.44	10.5	13.2	-18.0	-15.6	1.63	21.4	0.0	1859	1.01	95.77
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.3	1.18	-16.1	1.18	-167.8	1.63	-262.7	-430.5	-1006	1.01	3.23	10.7	13.4	-16.5	-12.9	1.63	21.8	0.0	1859	1.01	93.86
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.0	1.09	-89.1	1.18	-17.5	1.18	-165.0	1.63	-269.1	-434.1	-1173	1.01	3.79	10.2	12.7	-15.1	-11.4	1.63	20.7	0.0	1859	1.01	98.48
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.2	1.09	-90.5	1.18	-18.4	1.18	-171.2	1.63	-273.4	-444.5	-1232	1.01	3.92	7.5	9.4	-17.2	-18.3	1.63	15.3	0.0	1859	1.01	133.67
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.5	1.09	-89.8	1.18	-17.4	1.18	-166.3	1.63	-268.7	-435.0	-1173	1.01	3.79	10.4	12.9	-15.1	-11.2	1.63	21.1	0.0	1859	1.01	96.90
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.4	1.18	-16.1	1.18	-167.8	1.63	-258.6	-426.3	-1006	1.01	3.28	11.8	14.8	-16.1	-10.8	1.63	24.1	0.0	1859	1.01	84.99
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-44.6	1.09	-95.1	1.18	-13.4	1.18	-176.5	1.63	-240.5	-417.0	-769	1.01	2.50	11.0	13.7	-18.0	-15.0	1.63	22.4	0.0	1859	1.01	91.71
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-62.7	1.09	-107.9	1.18	-4.8	1.18	-201.3	1.63	-234.1	-435.5	-911	1.01	3.07	21.4	26.8	-21.1	-6.4	1.63	43.7	0.0	2207	1.01	55.67
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-351.6	1.09	-604.8	1.18	-97.5	1.18	-1212.0	1.63	-697.2	-1909.2	-2518	1.01	1.91	52.3	65.4	-134.1	-150.4	1.63	106.6	0.0	3299	1.01	42.60
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	311.5	1.09	538.5	1.18	95.6	1.18	1087.8	1.63	-123.3	0.0	-1530	1.01	21.36	336.4	420.5	-31.4	387.5	1.63	685.5	1773.3	2688	1.01	2.37
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-318.9	1.09	-587.1	1.18	-105.4	1.18	-1164.7	1.63	-743.7	-1908.4	-2722	1.01	2.13	57.8	72.3	-136.7	-147.3	1.63	117.9	0.0	3299	1.01	38.15
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	276.2	1.09	509.2	1.18	102.2	1.18	1022.5	1.63	-141.0	0.0	-1744	1.01	19.75	357.7	447.1	-36.3	407.3	1.63	728.8	1751.3	2688	1.01	2.32
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-249.5	1.09	-469.2	1.18	-87.5	1.18	-928.9	1.63	-693.7	-1622.6	-2437	1.01	2.21	77.4	96.7	-114.3	-85.5	1.63	157.6	0.0	2810	1.01	23.90
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	197.6	1.09	367.7	1.18	80.7	1.18	744.4	1.63	-168.9	0.0	-1306	1.01	12.22	322.3	402.9	-35.1	363.1	1.63	656.7	1401.2	2207	1.01	2.26
U19-L18	DIAGONAL	2-10C25			5559	1577	1876	2076	-117.6	1.09	-222.1	1.18	-38.3	1.18	-435.5	1.63	-503.7	-939.1	-1577	1.01	2.30	104.1	130.1	-67.9	25.1	1.63	212.1	0.0	2076	1.01	11.94
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	45.0	1.09	80.5	1.18	23.1	1.18	171.3	1.63	-278.5	-107.2	-1050	1.01	4.42	205.2	256.5	-21.3	232.8	1.63	418.0	589.3	1556	1.01	3.35
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	57.0	1.09	104.4	1.18	28.4	1.18	218.8	1.63	-265.7	-46.9	-1050	1.01	4.81	198.3	247.9	-1.7	255.7	1.63	404.0	622.8	1556	1.01	3.35
U21-L22	DIAGONAL	2-10C25			5559	1577	1876	2076	-123.3	1.09	-244.8	1.18	-43.3	1.18	-474.4	1.63	-490.9	-965.4	-1577	1.01	2.28	97.9	122.4	-41.0	60.8	1.63	199.5	0.0	2076	1.01	12.89
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	202.4	1.09	387.0	1.18	84.3	1.18	776.7	1.63	-134.0	0.0	-1435	1.01	16.61	316.8	396.0	-15.3	388.2	1.63	645.4	1422.1	2404	1.01	2.56
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-252.7	1.09	-487.1	1.18	-90.8	1.18	-957.4	1.63	-683.2	-1640.6	-2839	1.01	2.80	61.4	76.8	-99.4	-82.0	1.63	125.1	0.0	3299	1.01	34.27
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	283.3	1.09	519.2	1.18	103.8	1.18	1043.9	1.63	-102.8	0.0	-1744	1.01	27.29	352.1	440.1	-23.2	421.3	1.63	717.3	1761.2	2688	1.01	2.33
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-317.9	1.09	-596.6	1.18	-106.8	1.18	-1176.6	1.63	-731.9	-1908.5	-2722	1.01	2.15	45.9	57.3	-126.0	-145.6	1.63	93.5	0.0	3299	1.01	48.23
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	317.9	1.09	542.6	1.18	95.8	1.18	1099.8	1.63	-107.6	0.0	-1530	1.01	24.58	330.5	413.1	-24.7	390.8	1.63	673.4	1773.2	2688	1.01	2.40
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-347.5	1.09	-608.8	1.18	-97.8	1.18	-1212.6	1.63	-686.5	-1899.1	-2518	1.01	1.94	48.8	61.0	-131.6	-150.8	1.63	99.5	0.0	3299	1.01	45.67
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**683.4**	1.09	1252.5	1.18	249.6	1.18	**2517.4**	**1.63**	**-236.1**	**0.0**	-5855	1.01	35.71	**366.4**	**458.0**	33.2	531.9	**1.63**	**746.5**	**3263.9**	6516	1.01	5.44
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	362.5	1.09	693.2	1.18	154.7	1.18	1395.6	1.63	-209.2	0.0	-3414	1.01	23.15	273.3	341.7	27.6	401.3	1.63	556.9	1952.5	3713	1.01	4.23
									389.7	1.09	734.9	1.18	152.8	1.18	1472.3	1.63	-183.7	0.0	-3414	1.01	26.78	254.8	318.5	25.0	373.0	1.63	519.1	1991.4	3713	1.01	4.39
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	49.5	1.09	102.4	1.18	32.6	1.18	213.3	1.63	-561.5	-348.2	-2593	1.01	5.04	257.9	322.4	-51.4	252.5	1.63	525.5	738.8	2810	1.01	4.99
									89.9	1.09	168.7	1.18	34.7	1.18	338.0	1.63	-540.7	-202.6	-2593	1.01	5.47	247.3	309.1	-7.6	310.0	1.63	503.8	841.9	2810	1.01	4.96
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-198.0	1.09	-374.1	1.18	-74.6	1.18	-745.3	1.63	-1015.9	-1761.2	-3037	1.01	2.29	224.3	280.4	-124.0	90.4	1.63	457.1	0.0	3299	1.01	8.92
									-172.0	1.09	-331.7	1.18	-73.8	1.18	-666.0	1.63	-991.2	-1657.2	-3037	1.01	2.42	223.8	279.7	-95.9	135.4	1.63	456.0	0.0	3299	1.01	8.77
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-284.0	1.09	-540.5	1.18	-116.2	1.18	-1084.5	1.63	-1208.3	-2292.8	-4165	1.01	2.58	196.9	246.1	-152.8	7.7	1.63	401.1	0.0	4542	1.01	14.14
									-284.8	1.09	-541.7	1.18	-116.2	1.18	-1086.8	1.63	-1210.7	-2297.6	-4165	1.01	2.58	194.4	243.0	-148.1	12.1	1.63	396.2	0.0	4542	1.01	14.32
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-159.8	1.09	-300.6	1.18	-66.5	1.18	-607.4	1.63	-1014.4	-1621.8	-3037	1.01	2.43	279.1	348.8	-113.2	179.4	1.63	568.6	0.0	3299	1.01	6.93
									-186.8	1.09	-344.6	1.18	-67.5	1.18	-689.9	1.63	-1035.3	-1725.2	-3037	1.01	2.30	278.1	347.7	-133.3	145.3	1.63	566.7	0.0	3299	1.01	7.10
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	112.6	1.09	222.5	1.18	46.3	1.18	439.9	1.63	-580.4	-140.4	-2593	1.01	5.27	310.1	387.6	-32.5	351.4	1.63	631.8	1071.7	2810	1.01	3.80
									74.0	1.09	159.9	1.18	44.9	1.18	322.2	1.63	-590.6	-268.4	-2593	1.01	4.98	321.0	401.2	-72.0	301.2	1.63	654.0	976.2	2810	1.01	3.85
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	422.5	1.09	803.8	1.18	166.8	1.18	1605.9	1.63	-213.9	0.0	-3789	1.01	25.39	318.7	398.4	30.4	465.2	1.63	649.4	2255.3	4128	1.01	3.95
									395.5	1.09	763.3	1.18	168.5	1.18	1530.6	1.63	-233.0	0.0	-3789	1.01	22.99	338.7	423.4	-2.1	438.3	1.63	690.1	2220.7	4128	1.01	3.82
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**722.5**	1.09	1326.4	1.18	263.5	1.18	**2663.6**	**1.63**	**-181.6**	**0.0**	-5497	1.01	45.24	**357.6**	**447.0**	36.8	526.3	**1.63**	**728.7**	**3392.3**	6022	1.01	4.69
																1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-588.9**	1.09	-1079.1	1.18	-218.9	1.18	**-2173.5**	**1.63**	**-838.0**	**-3011.5**	-3227	1.01	1.30	**115.7**	**144.6**	-250.8	-258.0	**1.63**	**235.8**	**0.0**	4128	1.01	26.90
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-230.1	1.09	-419.0	1.18	-82.0	1.18	-841.9	1.63	-560.2	-1402.1	-2273	1.01	2.60	206.5	258.1	-97.5	110.3	1.63	420.7	0.0	2810	1.01	8.75
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	66.2	1.09	142.6	1.18	36.6	1.18	283.6	1.63	-502.8	-219.2	-2280	1.01	5.14	397.0	496.2	-119.3	323.2	1.63	808.9	1092.4	2810	1.01	3.16
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	237.0	1.09	460.2	1.18	98.7	1.18	917.8	1.63	-441.8	0.0	-2954	1.01	8.83	515.2	643.9	-133.7	453.9	1.63	1049.6	1967.4	3713	1.01	2.70
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	230.6	1.09	443.3	1.18	94.9	1.18	886.4	1.63	-528.9	0.0	-2954	1.01	7.32	523.1	653.9	-151.8	434.8	1.63	1065.9	1952.3	3713	1.01	2.69
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	48.9	1.09	98.1	1.18	26.6	1.18	200.5	1.63	-667.8	-467.3	-2280	1.01	3.75	416.9	521.1	-168.7	268.6	1.63	849.5	1050.0	2810	1.01	3.10
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-259.8	1.09	-488.1	1.18	-96.6	1.18	-973.1	1.63	-747.1	-1720.3	-2634	1.01	2.26	242.3	302.9	-172.1	35.4	1.63	493.8	0.0	3299	1.01	8.72
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-622.3	1.09	-1154.4	1.18	-233.4	1.18	-2315.9	1.63	-871.6	**-3187.5**	-3527	1.01	1.43	108.0	135.0	-221.3	-219.9	1.63	220.0	**0.0**	4542	1.01	31.38

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

APPENDIX 'D'
TRUSS DIAGRAM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U8W
U10W
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U18W
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U26W
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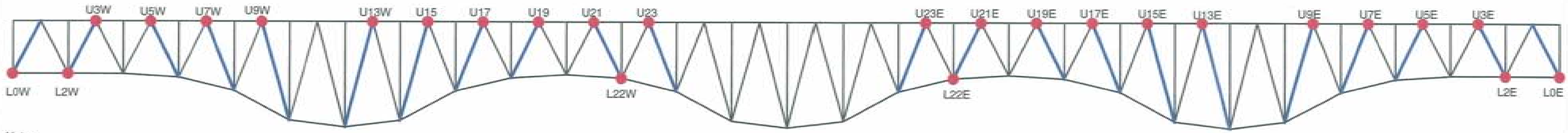
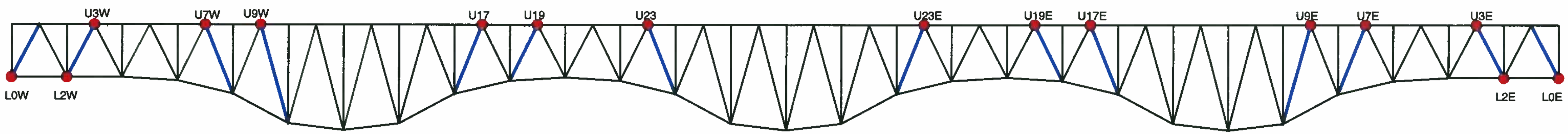


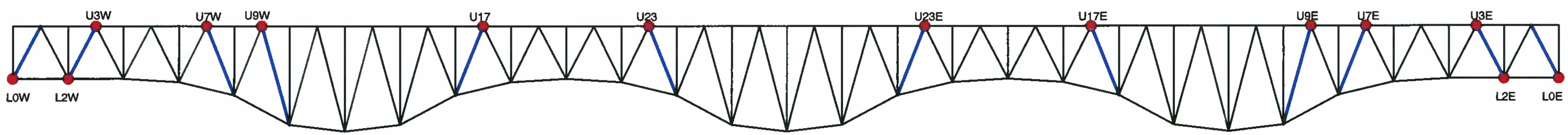
Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Center Truss



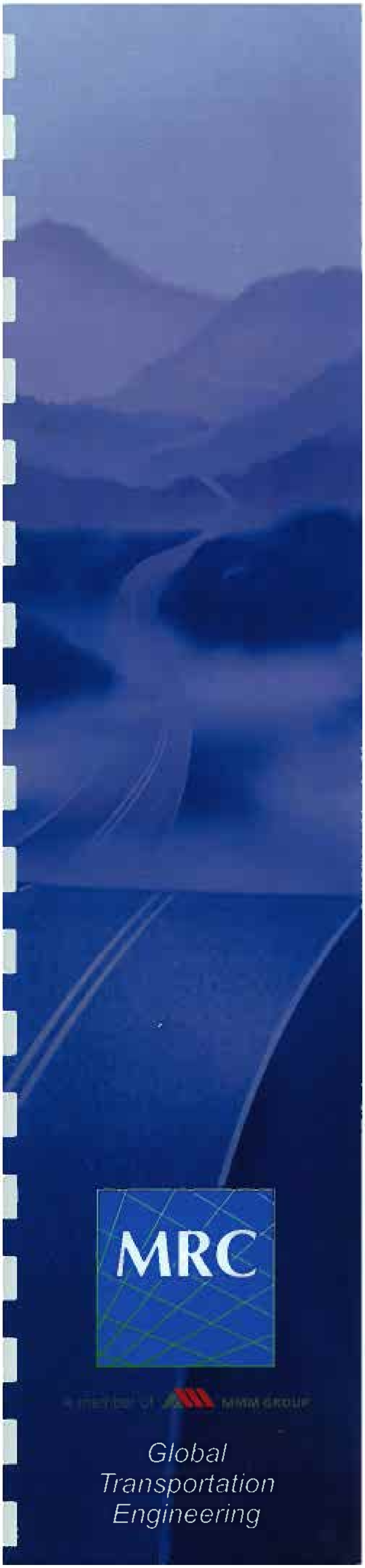
Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Left Truss



Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Right Truss



Halton REGION

Dundas Street (Reg. Rd. 5) Class EA Study Brant Street (Reg. Rd. 18) to Proudfoot Trail

Tansley Bridge
Dundas Street at Bronte Creek
Bridge No. 005109
MTO Site N0. 010-0111

STRUCTURAL EVALUATION REPORT
VOLUME 2

October 2009

Updated on November 2009

STRUCTURAL EVALUATION REPORT
VOLUME 2: DETAILED CALCULATIONS

TANSLEY BRIDGE
BRIDGE NO. 005109
DUNDAS STREET AT BRONTE CREEK
CITY OF BURLINGTON
REGIONAL MUNICIPALITY OF HALTON
MTO SITE NO. 10-111

Report Prepared by:

LICENSED PROFESSIONAL ENGINEER
K. W. SHEK
100072331
Oct. 30/09
PROVINCE OF ONTARIO

Katherine Shek, M.E.Sc., P. Eng.

Report Reviewed by:

LICENSED PROFESSIONAL ENGINEER
T. P. A. SMALL
Oct 30/09
PROVINCE OF ONTARIO

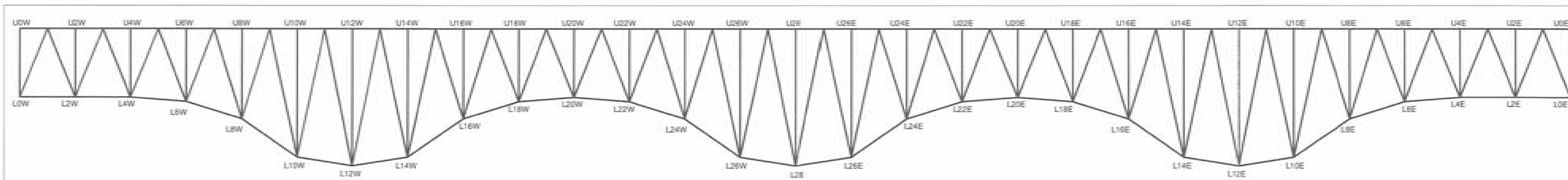
Trevor Small, M.Sc., P. Eng.
Senior Project Manager

MRC

McCormick Rankin Corporation

A member of MMM GROUP

October 2009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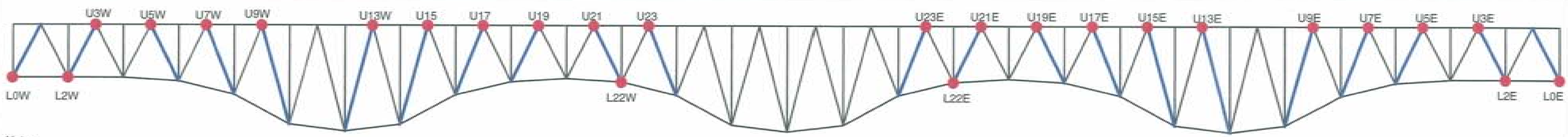
L0W L2W L4W L6W L8W L10W L12W L14W L16W L18W L20W L22W L24W L26W L28 L26E L24E L22E L20E L18E L16E L14E L12E L10E L8E L6E L4E L2E L0E



Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Center Truss

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	**0.81**	Compressive buckling @ end of Member U1-L0	-901	-1019	-1709	1.01	Assume L_2=235mm	no	0.080	50.3
L2E	**0.61**	Compressive buckling @ end of Member U3-L2	-388	-802	-868	1.01		no	0.060	37.4
L4E	2.16	Compressive buckling @ end of Member U5-L4	198	-595	-1078	1.01		no	0.219	
L6E	1.07	Compressive buckling @ end of Member U5-L6	-525	-714	-1274	1.01		no	0.107	
L8E	2.17	Compressive buckling @ end of Member U7-L8	-963	-896	-2880	1.01		no	0.221	
L10E	1.08	Compressive buckling @ end of Member U9-L10	-1178	-975	-2208	1.01		no	0.108	
L12E	1.66	Compressive buckling @ end of Member U11-L12	-1258	-1033	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.168	
L14E	1.97	Compressive buckling @ end of Member U15-L14	-1127	-981	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.199	
L16E	1.75	Compressive buckling @ end of Member U17-L16	-900	-937	-2512	1.01		no	0.177	
L18E	2.00	Compressive buckling @ end of Member U19-L18	-456	-813	-2058	1.01		no	0.202	
L20E	2.54	Compressive buckling @ end of Member U21-L20	174	-571	-1264	1.01		no	0.259	
L22E	**0.77**	Compressive buckling @ end of Member U21-L22	-499	-793	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.076	47.7
L24E	1.28	Compressive buckling @ end of Member U23-L24	-931	-936	-2104	1.01		no	0.128	
L26E	1.43	Compressive buckling @ end of Member U25-L26	-1144	-1000	-2544	1.01		no	0.144	
L28	1.12	Compressive buckling @ end of Member U27-L28	-1217	-1052	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.113	

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:

$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.08	Compressive buckling @ end of Member U1-L0	-901	-1019	-1978	1.01		no	0.108	
U3E	**0.51**	Compressive buckling @ end of Member U3-L2	-388	-802	-786	1.01		no	0.049	30.8
U5E	**0.69**	Compressive buckling @ end of Member U5-L6	-525	-714	-1010	1.01		no	0.068	42.8
U7E	**0.51**	Compressive buckling @ end of Member U7-L8	-963	-896	-1406	1.01		no	0.050	31.0
U9E	**0.65**	Compressive buckling @ end of Member U9-L10	-1178	-975	-1798	1.01	Effective width = 762.0mm	no	0.064	40.3
U11E	1.13	Compressive buckling @ end of Member U11-L12	-1258	-1033	-2400	1.01	Effective width = 616.9mm	yes	0.113	
U13E	**0.95**	Compressive buckling @ end of Member U13-L12	-1218	-1023	-2170	1.01		yes	0.095	59.4
U15E	**0.88**	Compressive buckling @ end of Member U15-L14	-1127	-981	-1974	1.01		no	0.088	55.0
U17E	**0.53**	Compressive buckling @ end of Member U17-L16	-900	-937	-1382	1.01		no	0.052	32.3
U19E	**0.67**	Compressive buckling @ end of Member U19-L18	-456	-813	-990	1.01		no	0.066	41.2
U21E	**0.74**	Compressive buckling @ end of Member U21-L22	-499	-793	-1076	1.01		no	0.073	45.9
U23E	**0.51**	Compressive buckling @ end of Member U23-L24	-931	-936	-1394	1.01		no	0.050	31.0
U25E	1.24	Compressive buckling @ end of Member U25-L26	-1144	-1000	-2356	1.01		no	0.124	
U27E	**0.83**	Compressive buckling @ end of Member U27-L28	-1217	-1052	-2073	1.01	Effective width = 495.88mm	yes	0.083	51.8

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	0.89	Compressive buckling @ end of Member U1-L0	-901	-925	-1709	1.01	Assume L_2=235mm	no	0.064	40.0
L2E	0.67	Compressive buckling @ end of Member U3-L2	-388	-735	-868	1.01		no	0.047	29.5
L4E	2.30	Compressive buckling @ end of Member U5-L4	198	-559	-1078	1.01		no	0.169	
L6E	1.12	Compressive buckling @ end of Member U5-L6	-525	-681	-1274	1.01		no	0.081	
L8E	2.36	Compressive buckling @ end of Member U7-L8	-963	-823	-2880	1.01		no	0.173	
L10E	1.19	Compressive buckling @ end of Member U9-L10	-1178	-881	-2208	1.01		no	0.086	
L12E	1.83	Compressive buckling @ end of Member U11-L12	-1258	-935	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.134	
L14E	2.18	Compressive buckling @ end of Member U15-L14	-1127	-884	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.160	
L16E	1.93	Compressive buckling @ end of Member U17-L16	-900	-848	-2512	1.01		no	0.141	
L18E	2.18	Compressive buckling @ end of Member U19-L18	-456	-744	-2058	1.01		no	0.160	
L20E	2.71	Compressive buckling @ end of Member U21-L20	174	-535	-1264	1.01		no	0.199	
L22E	0.84	Compressive buckling @ end of Member U21-L22	-499	-728	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.060	37.5
L24E	1.41	Compressive buckling @ end of Member U23-L24	-931	-849	-2104	1.01		no	0.102	
L26E	1.58	Compressive buckling @ end of Member U25-L26	-1144	-901	-2544	1.01		no	0.115	
L28	1.24	Compressive buckling @ end of Member U27-L28	-1217	-950	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.090	

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:

$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.19	Compressive buckling @ end of Member U1-L0	-901	-925	-1978	1.01		no	0.086	
U3E	0.55	Compressive buckling @ end of Member U3-L2	-388	-735	-786	1.01		no	0.039	24.2
U5E	0.73	Compressive buckling @ end of Member U5-L6	-525	-681	-1010	1.01		no	0.052	32.3
U7E	0.56	Compressive buckling @ end of Member U7-L8	-963	-823	-1406	1.01		no	0.039	24.3
U9E	0.72	Compressive buckling @ end of Member U9-L10	-1178	-881	-1798	1.01	Effective width = 762.0mm	no	0.051	32.2
U11E	1.25	Compressive buckling @ end of Member U11-L12	-1258	-935	-2400	1.01	Effective width = 616.9mm	yes	0.090	
U13E	1.05	Compressive buckling @ end of Member U13-L12	-1218	-926	-2170	1.01		yes	0.076	
U15E	0.98	Compressive buckling @ end of Member U15-L14	-1127	-883	-1974	1.01		no	0.071	44.1
U17E	0.59	Compressive buckling @ end of Member U17-L16	-900	-848	-1382	1.01		no	0.041	25.7
U19E	0.73	Compressive buckling @ end of Member U19-L18	-456	-744	-990	1.01		no	0.052	32.5
U21E	0.81	Compressive buckling @ end of Member U21-L22	-499	-728	-1076	1.01		no	0.058	36.1
U23E	0.56	Compressive buckling @ end of Member U23-L24	-931	-849	-1394	1.01		no	0.040	24.7
U25E	1.37	Compressive buckling @ end of Member U25-L26	-1144	-901	-2356	1.01		no	0.100	
U27E	0.92	Compressive buckling @ end of Member U27-L28	-1217	-950	-2073	1.01	Effective width = 495.88mm	yes	0.066	41.5

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.04	Compressive buckling @ end of Member U1-L0	-901	-795	-1709	1.01	Assume L_2=235mm	no	0.042	
L2E	**0.78**	Compressive buckling @ end of Member U3-L2	-388	-628	-868	1.01		no	0.031	19.3
L4E	2.62	Compressive buckling @ end of Member U5-L4	198	-491	-1078	1.01		no	0.107	
L6E	1.28	Compressive buckling @ end of Member U5-L6	-525	-597	-1274	1.01		no	0.051	
L8E	2.76	Compressive buckling @ end of Member U7-L8	-963	-704	-2880	1.01		no	0.113	
L10E	1.42	Compressive buckling @ end of Member U9-L10	-1178	-740	-2208	1.01		no	0.057	
L12E	2.20	Compressive buckling @ end of Member U11-L12	-1258	-778	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.090	
L14E	2.60	Compressive buckling @ end of Member U15-L14	-1127	-742	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.106	
L16E	2.27	Compressive buckling @ end of Member U17-L16	-900	-721	-2512	1.01		no	0.093	
L18E	2.54	Compressive buckling @ end of Member U19-L18	-456	-638	-2058	1.01		no	0.104	
L20E	3.08	Compressive buckling @ end of Member U21-L20	174	-471	-1264	1.01		no	0.126	
L22E	**0.98**	Compressive buckling @ end of Member U21-L22	-499	-625	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.039	24.4
L24E	1.65	Compressive buckling @ end of Member U23-L24	-931	-722	-2104	1.01		no	0.067	
L26E	1.89	Compressive buckling @ end of Member U25-L26	-1144	-753	-2544	1.01		no	0.077	
L28	1.51	Compressive buckling @ end of Member U27-L28	-1217	-785	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.061	

GUSSET PLATES

CENTER TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.38	Compressive buckling @ end of Member U1-L0	-901	-795	-1978	1.01		no	0.056	
U3E	**0.65**	Compressive buckling @ end of Member U3-L2	-388	-628	-786	1.01		no	0.025	15.9
U5E	**0.83**	Compressive buckling @ end of Member U5-L6	-525	-597	-1010	1.01		no	0.033	20.6
U7E	**0.65**	Compressive buckling @ end of Member U7-L8	-963	-704	-1406	1.01		no	0.025	15.9
U9E	**0.86**	Compressive buckling @ end of Member U9-L10	-1178	-740	-1798	1.01	Effective width = 762.0mm	no	0.034	21.4
U11E	1.50	Compressive buckling @ end of Member U11-L12	-1258	-778	-2400	1.01	Effective width = 616.9mm	yes	0.061	
U13E	1.26	Compressive buckling @ end of Member U13-L12	-1218	-773	-2170	1.01		yes	0.051	
U15E	**0.98**	Compressive buckling @ end of Member U15-L14	-1127	-884	-1974	1.01		no	0.039	24.5
U17E	**0.69**	Compressive buckling @ end of Member U17-L16	-900	-721	-1382	1.01		no	0.027	16.9
U19E	**0.85**	Compressive buckling @ end of Member U19-L18	-456	-638	-990	1.01		no	0.034	21.2
U21E	**0.94**	Compressive buckling @ end of Member U21-L22	-499	-625	-1076	1.01		no	0.038	23.5
U23E	**0.66**	Compressive buckling @ end of Member U23-L24	-931	-722	-1394	1.01		no	0.026	16.2
U25E	1.64	Compressive buckling @ end of Member U25-L26	-1144	-753	-2356	1.01		no	0.067	
U27E	1.12	Compressive buckling @ end of Member U27-L28	-1217	-785	-2073	1.01	Effective width = 495.88mm	yes	0.045	

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	MN C	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3854	-15.2	1.09	-53.6	1.18	-22.7	1.18	-106.6	1.63	-642.4	-748.9	-1232	1.01	1.77	12.0	0.0	1859	1.01	165.24
U2 - L2	VERTICAL	12 WF 45			3855	-17.9	1.09	-76.1	1.18	-24.8	1.18	-138.6	1.63	-499.7	-638.3	-1232	1.01	2.21	120.2	0.0	1859	1.01	16.78
U4 - L4	VERTICAL	12 WF 45			3856	-24.4	1.09	-83.1	1.18	-25.0	1.18	-154.1	1.63	-508.6	-662.7	-1232	1.01	2.14	124.2	0.0	1859	1.01	16.37
U6 - L6	VERTICAL	12 WF 45			3857	-20.2	1.09	-72.2	1.18	-21.4	1.18	-132.5	1.63	-497.7	-630.2	-1173	1.01	2.11	149.2	16.7	1859	1.01	13.47
U8 - L8	VERTICAL	12 WF 45			3858	-24.0	1.09	-84.2	1.18	-25.6	1.18	-155.7	1.63	-495.1	-650.8	-1006	1.01	1.74	135.0	0.0	1859	1.01	15.06
U10 - L10	VERTICAL	12 WF 45			3859	-27.6	1.09	-90.9	1.18	-29.7	1.18	-172.4	1.63	-465.7	-638.1	-769	1.01	1.30	95.8	0.0	1859	1.01	21.41
U12 - L12	VERTICAL	12 WF 53			3860	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-533.2	-785.9	-911	1.01	1.25	3.4	0.0	2207	1.01	722.41
U1 - L0	DIAGONAL	2-12C35			3798	-201.4	1.09	-440.9	1.18	-136.4	1.18	-900.9	1.63	-1019.4	-1920.3	-2392	1.01	1.49	163.7	0.0	2893	1.01	23.35
U1 - L2	DIAGONAL	12 WF 50			3799	149.4	1.09	267.0	1.18	68.9	1.18	559.2	1.63	-282.7	0.0	-983	1.01	5.49	668.1	1227.3	2071	1.01	2.29
U3 - L2	DIAGONAL	2-10C20			3800	-83.6	1.09	-190.7	1.18	-60.5	1.18	-387.6	1.63	-802.4	-1189.9	-1298	1.01	1.15	223.2	0.0	1652	1.01	9.21
U3 - L4	DIAGONAL	2-8C13.75			3801	33.6	1.09	14.0	1.18	-6.5	1.18	45.4	1.63	-495.7	-450.3	-797	1.01	1.71	526.3	571.7	1133	1.01	2.09
U5 - L4	DIAGONAL	2-8C13.75			3802	62.4	1.09	92.5	1.18	17.9	1.18	198.3	1.63	-595.4	-397.1	-797	1.01	1.68	408.5	606.8	1133	1.01	2.32
U5 - L6	DIAGONAL	2-10C25			3803	-109.8	1.09	-261.3	1.18	-82.3	1.18	-525.1	1.63	-714.4	-1239.5	-1577	1.01	1.49	348.3	0.0	2076	1.01	7.53
U7 - L6	DIAGONAL	12 WF 53			3804	183.9	1.09	335.3	1.18	84.1	1.18	695.3	1.63	-404.8	0.0	-1306	1.01	4.98	609.4	1304.8	2207	1.01	2.52
U7 - L8	DIAGONAL	2-15C35			3805	-216.8	1.09	-475.3	1.18	-140.9	1.18	-963.4	1.63	-895.6	-1859.0	-2497	1.01	1.74	176.6	0.0	2884	1.01	21.95
U9 - L8	DIAGONAL	12 WF 65			3806	244.7	1.09	467.7	1.18	123.3	1.18	964.1	1.63	-266.2	0.0	-1744	1.01	10.24	708.0	1672.1	2688	1.01	2.47
U9 - L10	DIAGONAL	2-15C45			3807	-268.3	1.09	-579.4	1.18	-171.2	1.18	-1178.1	1.63	-974.6	-2152.7	-3041	1.01	1.94	81.9	0.0	3713	1.01	60.17
U11 - L10	DIAGONAL	12 WF 65			3808	269.7	1.09	511.7	1.18	143.0	1.18	1066.5	1.63	-142.8	0.0	-1530	1.01	18.29	717.3	1783.8	2688	1.01	2.30
U11 - L12	DIAGONAL	2-15C45			3809	-291.2	1.09	-610.3	1.18	-186.4	1.18	-1257.5	1.63	-1032.9	-2290.4	-2804	1.01	1.52	7.5	0.0	3713	1.01	663.76
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3763	9.9	1.09	23.4	1.18	8.5	1.18	48.5	1.63	-30.2	0.0	-3414	1.01	115.79	202.9	251.4	3713	1.01	18.24
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		3885	-234.7	1.09	-475.7	1.18	-136.2	1.18	-977.9	1.63	-932.3	-1910.2	-3414	1.01	2.65	213.3	0.0	3713	1.01	22.16
					3886	-228.0	1.09	-459.0	1.18	-129.2	1.18	-942.7	1.63	-899.3	-1842.0	-3414	1.01	2.79	184.8	0.0	3713	1.01	25.39
U3 - U5	TOP CHORD	2-15C40	LACED L/R=29	2-PLs14x3/8	3887	-309.1	1.09	-603.8	1.18	-167.4	1.18	-1247.0	1.63	-1281.3	-2528.2	-4333	1.01	2.44	438.2	0.0	4779	1.01	13.86
					3888	-318.7	1.09	-624.1	1.18	-173.1	1.18	-1288.1	1.63	-1283.9	-2572.0	-4333	1.01	2.41	394.6	0.0	4779	1.01	15.50
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		3889	-197.6	1.09	-380.2	1.18	-104.2	1.18	-786.9	1.63	-1187.0	-1973.9	-3789	1.01	2.56	632.1	0.0	4128	1.01	7.84
					3890	-219.8	1.09	-427.3	1.18	-118.4	1.18	-883.5	1.63	-1145.0	-2028.5	-3789	1.01	2.57	558.8	0.0	4128	1.01	9.04
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		3891	43.8	1.09	97.3	1.18	26.5	1.18	193.8	1.63	-757.9	-564.1	-2593	1.01	3.71	716.0	909.8	2810	1.01	3.69
					3892	11.1	1.09	28.6	1.18	5.7	1.18	52.5	1.63	-748.1	-695.6	-2593	1.01	3.57	660.6	713.1	2810	1.01	4.22
U9 - U11	TOP CHORD	2-15C45		-6r	3893	311.7	1.09	630.8	1.18	174.3	1.18	1289.8	1.63	-286.2	0.0	-3414	1.01	16.55	731.3	2021.1	3713	1.01	3.36
					3894	292.2	1.09	589.2	1.18	160.6	1.18	1203.3	1.63	-293.4	0.0	-3414	1.01	15.85	718.1	1921.4	3713	1.01	3.55
U11 - U13	TOP CHORD	2-15C55	2-PLs14X1/2"	-6r	3762	572.0	1.09	1137.2	1.18	320.7	1.18	2343.8	1.63	-252.3	0.0	-5855	1.01	32.73	718.7	3062.5	6516	1.01	5.90
L0 - L2	BOT CHORD	2-15C33.9		-6r	3770	140.8	1.09	311.8	1.18	96.5	1.18	635.2	1.63	-128.6	0.0	-2283	1.01	22.88	720.7	1356.0	2810	1.01	3.06
L2 - L4	BOT CHORD	2-15C50		-6r	3771	340.8	1.09	696.7	1.18	197.7	1.18	1426.9	1.63	-447.3	0.0	-3260	1.01	10.55	1414.3	2841.1	4128	1.01	1.94
L4 - L6	BOT CHORD	2-15C50		-6r	3774	310.3	1.09	617.4	1.18	170.8	1.18	1268.3	1.63	-743.2	0.0	-3260	1.01	6.14	1525.2	2793.5	4128	1.01	1.90
L6 - L8	BOT CHORD	2-15C33.9		-6r	3775	65.1	1.09	125.1	1.18	34.1	1.18	258.8	1.63	-787.9	-529.1	-2280	1.01	3.25	999.5	1258.4	2810	1.01	2.58
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		3776	-171.0	1.09	-351.0	1.18	-98.6	1.18	-717.0	1.63	-729.6	-1446.6	-2273	1.01	2.16	469.0	0.0	2810	1.01	7.58
L10 - L12	BOT CHORD	2-15C50	LACED L/R=62	2-PLs14x1/2 *	3777	-395.6	1.09	-803.4	1.18	-229.6	1.18	-1650.2	1.63	-814.9	-2465.1	-3273	1.01	2.03	206.0	0.0	4128	1.01	28.24

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN					MN	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	α_L	$C_{f,LL}$	**C_f**	Cr	Adjust	LL	$T_{f,LL}$	**T_f**	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up		kN 5		kN 5		kN 5		kN		kN	**kN**	kN	Factor	Capacity Factor	kN	**kN**	kN	Factor	Capacity Factor
U12-L12	VERTICAL	12 WF 53			3860	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-533.2	-785.9	-911	1.01	1.25	3.4	0.0	2207	1.01	722.41
U14-L14	VERTICAL	12 WF 45			3861	-28.5	1.09	-93.6	1.18	-30.4	1.18	-177.4	1.63	-474.4	-651.9	-769	1.01	1.26	99.1	0.0	1859	1.01	20.74
U16-L16	VERTICAL	12 WF 45			3862	-25.4	1.09	-86.6	1.18	-26.3	1.18	-160.9	1.63	-495.6	-656.5	-1006	1.01	1.72	133.4	0.0	1859	1.01	15.28
U18-L18	VERTICAL	12 WF 45			3863	-21.5	1.09	-77.5	1.18	-23.1	1.18	-142.1	1.63	-499.6	-641.8	-1173	1.01	2.09	147.5	5.4	1859	1.01	13.69
U20-L20	VERTICAL	12 WF 45			3864	-25.3	1.09	-86.0	1.18	-26.1	1.18	-159.8	1.63	-508.8	-668.7	-1232	1.01	2.13	121.4	0.0	1859	1.01	16.78
U22-L22	VERTICAL	12 WF 45			3865	-21.8	1.09	-78.3	1.18	-23.4	1.18	-143.7	1.63	-503.5	-647.2	-1173	1.01	2.07	145.6	1.9	1859	1.01	13.89
U24-L24	VERTICAL	12 WF 45			3866	-25.6	1.09	-87.2	1.18	-26.4	1.18	-162.0	1.63	-500.5	-662.5	-1006	1.01	1.71	128.5	0.0	1859	1.01	15.87
U26-L26	VERTICAL	12 WF 45			3867	-28.8	1.09	-92.8	1.18	-30.2	1.18	-176.6	1.63	-477.9	-654.4	-769	1.01	1.26	92.6	0.0	1859	1.01	22.19
U28-L28	VERTICAL	12 WF 53			3868	-33.4	1.09	-108.9	1.18	-41.4	1.18	-213.8	1.63	-516.4	-730.2	-911	1.01	1.37	0.3	0.0	2207	1.01	7096.92
U13-L12	DIAGONAL	2-15C40			3810	-287.3	1.09	-587.1	1.18	-179.8	1.18	-1218.1	1.63	-1022.6	-2240.8	-2518	1.01	1.30	78.6	0.0	3299	1.01	57.90
U13-L14	DIAGONAL	12 WF 65			3811	261.5	1.09	487.6	1.18	136.2	1.18	1021.1	1.63	-148.3	0.0	-1530	1.01	17.30	716.6	1737.6	2688	1.01	2.36
U15-L14	DIAGONAL	2-15C40			3812	-259.9	1.09	-551.4	1.18	-163.3	1.18	-1126.6	1.63	-981.3	-2107.9	-2722	1.01	1.65	119.5	0.0	3299	1.01	37.31
U15-L16	DIAGONAL	12 WF 65			3813	232.7	1.09	438.2	1.18	115.0	1.18	906.5	1.63	-264.1	0.0	-1744	1.01	10.10	723.9	1630.5	2688	1.01	2.50
U17-L16	DIAGONAL	2-15C33.9			3814	-203.6	1.09	-442.6	1.18	-131.7	1.18	-899.5	1.63	-937.1	-1836.6	-2437	1.01	1.67	171.7	0.0	2810	1.01	21.77
U17-L18	DIAGONAL	12 WF 53			3815	168.5	1.09	300.7	1.18	74.4	1.18	626.3	1.63	-388.2	0.0	-1306	1.01	5.01	668.8	1295.0	2207	1.01	2.40
U19-L18	DIAGONAL	2-10C25			3816	-97.4	1.09	-225.1	1.18	-71.6	1.18	-456.3	1.63	-812.7	-1269.0	-1577	1.01	1.40	319.2	0.0	2076	1.01	8.00
U19-L20	DIAGONAL	2-8C18.75			3817	47.1	1.09	54.5	1.18	6.5	1.18	123.3	1.63	-554.0	-430.7	-1050	1.01	2.14	535.2	658.4	1556	1.01	2.71
U21-L20	DIAGONAL	2-8C18.75			3818	58.7	1.09	79.9	1.18	13.4	1.18	174.1	1.63	-570.9	-396.8	-1050	1.01	2.16	518.4	692.5	1556	1.01	2.70
U21-L22	DIAGONAL	2-10C25			3819	-102.8	1.09	-249.4	1.18	-78.3	1.18	-498.8	1.63	-792.9	-1291.7	-1577	1.01	1.38	330.3	0.0	2076	1.01	7.86
U23-L22	DIAGONAL	12 WF 58			3820	172.6	1.09	321.8	1.18	80.3	1.18	662.6	1.63	-392.7	0.0	-1435	1.01	5.38	661.7	1324.3	2404	1.01	2.67
U23-L24	DIAGONAL	2-15C40			3821	-205.9	1.09	-461.5	1.18	-137.0	1.18	-930.7	1.63	-935.8	-1866.6	-2839	1.01	2.07	169.5	0.0	3299	1.01	25.15
U25-L24	DIAGONAL	12 WF 65			3822	240.0	1.09	451.0	1.18	118.6	1.18	933.6	1.63	-251.0	0.0	-1744	1.01	10.74	732.4	1666.0	2688	1.01	2.43
U25-L26	DIAGONAL	2-15C40			3823	-259.1	1.09	-563.3	1.18	-166.6	1.18	-1143.7	1.63	-999.6	-2143.3	-2722	1.01	1.61	96.0	0.0	3299	1.01	46.61
U27-L26	DIAGONAL	12 WF 65			3824	267.4	1.09	491.9	1.18	137.2	1.18	1033.8	1.63	-140.9	0.0	-1530	1.01	18.30	742.3	1776.1	2688	1.01	2.26
U27-L28	DIAGONAL	2-15C40			3825	-282.1	1.09	-590.1	1.18	-180.5	1.18	-1216.8	1.63	-1052.0	-2268.8	-2518	1.01	1.26	64.4	0.0	3299	1.01	70.58
U11 - U13	TOP CHORD	2-15C55	2-PLs14x1/2	-6r	3764	571.9	1.09	1136.4	1.18	320.4	1.18	2342.3	1.63	-250.6	0.0	-5855	1.01	32.95	711.5	3053.9	6516	1.01	5.96
U13 - U15	TOP CHORD	2-15C45		-6r	3895	306.5	1.09	611.7	1.18	166.8	1.18	1252.8	1.63	-247.6	0.0	-3414	1.01	18.98	526.1	1778.9	3713	1.01	4.75
					3896	324.3	1.09	649.3	1.18	179.1	1.18	1331.0	1.63	-234.9	0.0	-3414	1.01	20.34	540.7	1871.6	3713	1.01	4.47
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		3897	43.4	1.09	80.4	1.18	19.8	1.18	165.5	1.63	-602.8	-437.3	-2593	1.01	4.62	481.2	646.7	2810	1.01	5.55
					3898	75.9	1.09	147.7	1.18	40.0	1.18	304.2	1.63	-598.3	-294.1	-2593	1.01	4.89	521.4	825.5	2810	1.01	4.86
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		3899	-163.1	1.09	-332.6	1.18	-92.5	1.18	-679.4	1.63	-1017.7	-1697.1	-3037	1.01	2.35	397.3	0.0	3299	1.01	10.10
					3900	-144.0	1.09	-294.2	1.18	-81.0	1.18	-599.7	1.63	-1034.8	-1634.6	-3037	1.01	2.38	452.4	0.0	3299	1.01	8.69
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		3901	-243.6	1.09	-486.6	1.18	-134.6	1.18	-998.6	1.63	-1236.0	-2234.6	-4165	1.01	2.60	391.3	0.0	4542	1.01	14.28
					3902	-244.8	1.09	-490.1	1.18	-135.6	1.18	-1005.2	1.63	-1240.3	-2245.5	-4165	1.01	2.58	343.1	0.0	4542	1.01	16.30
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		3903	-132.7	1.09	-263.1	1.18	-72.6	1.18	-540.8	1.63	-1063.5	-1604.3	-3037	1.01	2.38	570.0	29.3	3299	1.01	6.79
					3904	-154.1	1.09	-308.3	1.18	-86.1	1.18	-633.4	1.63	-1044.0	-1677.4	-3037	1.01	2.33	506.5	0.0	3299	1.01	7.83
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		3905	95.3	1.09	198.1	1.18	53.8	1.18	401.1	1.63	-641.0	-239.9	-2593	1.01	4.71	658.4	1059.5	2810	1.01	3.70
					3906	63.8	1.09	131.9	1.18	33.8	1.18	265.0	1.63	-649.4	-384.4	-2593	1.01	4.44	624.1	889.1	2810	1.01	4.12
U25 - U27	TOP CHORD	2-15C50		-6r	3883	353.3	1.09	715.4	1.18	197.0	1.18	1461.7	1.63	-254.8	0.0	-3789	1.01	20.75	681.1	2142.8	4128	1.01	3.97
					3884	334.1	1.09	674.9	1.18	183.8	1.18	1377.3	1.63	-281.4	0.0	-3789	1.01	18.49	679.4	2056.7	4128	1.01	4.11
U27 - U29	TOP CHORD	2-15C55	2-PLs14X3/8	-6r	3765	604.6	1.09	1202.9	1.18	338.1	1.18	2477.4	1.63	-191.9	0.0	-5497	1.01	41.85	669.5	3146.8	6022	1.01	5.38
													1.63										
L12 - L14	BOT CHORD	2-15C50	LACED L/R=62	2-PLs14X1/2 *	3778	-406.4	1.09	-814.0	1.18	-232.7	1.18	-1678.1	1.63	-735.8	-2413.8	-3227	1.01	2.15	176.7	0.0	4128	1.01	33.09
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		3779	-194.7	1.09	-387.7	1.18	-108.9	1.18	-798.2	1.63	-505.2	-1303.4	-2273	1.01	2.96	391.6	0.0	2810	1.01	9.29
L16- L18	BOT CHORD	2-15C33.9		-6r	3780	12.8	1.09	37.8	1.18	9.7	1.18	70.0	1.63	-551.1	-481.1	-2280	1.01	4.31	831.1	901.1	2810	1.01	3.33
L18 - L20	BOT CHORD	2-15C45		-6r	3781	216.6	1.09	449.4	1.18	123.3	1.18	911.9	1.63	-623.9	0.0	-2954	1.01	6.24	1357.0	2269.0	3713	1.01	2.09
L20 - L22	BOT CHORD	2-15C45		-6r	3782	210.6	1.09	431.5	1.18	118.5	1.18	878.5	1.63	-728.0	0.0	-2954	1.01	5.31	1370.1	2248.6	3713	1.01	2.10
L22 - L24	BOT CHORD	2-15C33.9		-6r	3783	0.6	1.09	0.4	1.18	-0.8	1.18	0.2	1.63	-690.5	-690.3	-2280	1.01	3.33	835.6	835.8	2810	1.01	3.40
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		3784	-220.4	1.09	-451.7	1.18	-126.9	1.18	-923.0	1.63	-601.1	-1524.2	-2634	1.01	2.89	369.2	0.0	3299	1.01	11.53
L26 - L28	BOT CHORD	2-15C55	LACED L/R=62	2-PLs14x1/2 *	3785	-413.8	1.09	-839.8	1.18	-239.3	1.18	-1724.4	1.63	-696.8	-2421.1	-3527	1.01	2.64	143.1	0.0	4542	1.01	44.12

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2, asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-15.2	1.09	-53.6	1.18	-22.7	1.18	-106.6	-315.3	-394.1	-24.4	-450.9	1.63	-642.4	-748.9	-1232	1.01	1.77	10.4	0.0	1859	1.01	190.95
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-17.9	1.09	-76.1	1.18	-24.8	1.18	-138.6	-245.2	-306.5	-19.1	-350.9	1.63	-499.7	-638.3	-1232	1.01	2.21	117.9	0.0	1859	1.01	17.10
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-24.4	1.09	-83.1	1.18	-25.0	1.18	-154.1	-249.6	-312.0	-19.0	-356.5	1.63	-508.6	-662.7	-1232	1.01	2.14	116.1	0.0	1859	1.01	17.50
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-20.2	1.09	-72.2	1.18	-21.4	1.18	-132.5	-244.3	-305.4	-17.3	-346.7	1.63	-497.7	-630.2	-1173	1.01	2.11	138.6	6.1	1859	1.01	14.50
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-24.0	1.09	-84.2	1.18	-25.6	1.18	-155.7	-242.9	-303.7	-20.3	-349.8	1.63	-495.0	-650.7	-1006	1.01	1.74	126.9	0.0	1859	1.01	16.03
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-27.6	1.09	-90.9	1.18	-29.7	1.18	-172.4	-227.7	-284.6	-21.9	-332.6	1.63	-464.0	-636.3	-769	1.01	1.30	95.7	0.0	1859	1.01	21.42
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	-260.2	-325.2	-41.9	-407.7	1.63	-530.1	-782.9	-911	1.01	1.26	2.9	0.0	2207	1.01	864.79
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-201.4	1.09	-440.9	1.18	-136.4	1.18	-900.9	-454.2	-567.7	-153.9	-843.1	1.63	-925.3	-1826.2	-2392	1.01	1.64	136.6	0.0	2893	1.01	27.98
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	149.4	1.09	267.0	1.18	68.9	1.18	559.2	-138.7	-173.4	-48.6	-260.2	1.63	-282.7	0.0	-983	1.01	5.49	590.7	1149.9	2071	1.01	2.59
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-83.6	1.09	-190.7	1.18	-60.5	1.18	-387.6	-360.6	-450.7	-98.1	-630.2	1.63	-734.7	-1122.2	-1298	1.01	1.26	223.2	0.0	1652	1.01	9.21
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	33.6	1.09	14.0	1.18	-6.5	1.18	45.4	-243.3	-304.1	-53.0	-403.6	1.63	-495.7	-450.3	-797	1.01	1.71	474.2	519.6	1133	1.01	2.32
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	62.4	1.09	92.5	1.18	17.9	1.18	198.3	-274.1	-342.6	-31.5	-408.8	1.63	-558.5	-360.1	-797	1.01	1.80	401.5	599.8	1133	1.01	2.36
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-109.8	1.09	-261.3	1.18	-82.3	1.18	-525.1	-334.1	-417.6	-78.5	-563.6	1.63	-680.7	-1205.8	-1577	1.01	1.57	324.0	0.0	2076	1.01	8.09
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	183.9	1.09	335.3	1.18	84.1	1.18	695.3	-192.6	-240.7	33.7	-196.2	1.63	-392.4	0.0	-1306	1.01	5.13	555.2	1250.6	2207	1.01	2.76
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-216.8	1.09	-475.3	1.18	-140.9	1.18	-963.4	-403.8	-504.7	-125.1	-730.5	1.63	-822.7	-1786.0	-2497	1.01	1.90	174.0	0.0	2884	1.01	22.28
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	244.7	1.09	467.7	1.18	123.3	1.18	964.1	-130.6	-163.3	22.5	-133.7	1.63	-266.2	0.0	-1744	1.01	10.24	627.3	1591.5	2688	1.01	2.79
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-268.3	1.09	-579.4	1.18	-171.2	1.18	-1178.1	-432.6	-540.7	-147.9	-805.2	1.63	-881.4	-2059.5	-3041	1.01	2.15	81.9	0.0	3713	1.01	60.17
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	269.7	1.09	511.7	1.18	143.0	1.18	1066.5	-69.8	-87.3	4.9	-83.0	1.63	-142.3	0.0	-1530	1.01	18.35	629.1	1695.7	2688	1.01	2.62
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-291.2	1.09	-610.3	1.18	-186.4	1.18	-1257.5	-459.0	-573.8	-152.6	-847.3	1.63	-935.2	-2192.7	-2804	1.01	1.68	6.4	0.0	3713	1.01	787.90
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	9.9	1.09	23.4	1.18	8.5	1.18	48.5	-5.7	-7.1	-13.1	-28.7	1.63	-28.7	0.0	-3414	1.01	121.77	195.4	243.9	3713	1.01	18.95
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-234.7	1.09	-475.7	1.18	-136.2	1.18	-977.9	-407.3	-509.1	-102.9	-698.9	1.63	-829.8	-1807.7	-3414	1.01	2.98	178.0	0.0	3713	1.01	26.56
									-228.0	1.09	-459.0	1.18	-129.2	1.18	-942.7	-392.4	-490.5	-56.0	-603.0	1.63	-799.5	-1742.2	-3414	1.01	3.13	154.3	0.0	3713	1.01	30.42
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-309.1**	1.09	-603.8	1.18	-167.4	1.18	**-1247.0**	**-568.5**	**-710.6**	-131.9	-956.3	**1.63**	**-1158.2**	**-2405.2**	**-4333**	**1.01**	**2.70**	**365.7**	**0.0**	**4779**	**1.01**	**16.61**
									-318.7	1.09	-624.1	1.18	-173.1	1.18	-1288.1	-569.4	-711.7	-108.7	-919.6	1.63	-1160.1	-2448.1	-4333	1.01	2.66	329.4	0.0	4779	1.01	18.56
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-197.6	1.09	-380.2	1.18	-104.2	1.18	-786.9	-534.1	-667.6	-115.3	-884.5	1.63	-1088.2	-1875.1	-3789	1.01	2.79	527.6	0.0	4128	1.01	9.39
									-219.8	1.09	-427.3	1.18	-118.4	1.18	-883.5	-518.7	-648.4	-116.4	-866.1	1.63	-1056.9	-1940.4	-3789	1.01	2.79	466.5	0.0	4128	1.01	10.83
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.8	1.09	97.3	1.18	26.5	1.18	193.8	-340.9	-426.2	-61.0	-544.0	1.63	-694.7	-500.9	-2593	1.01	4.05	597.6	791.4	2810	1.01	4.42
									11.1	1.09	28.6	1.18	5.7	1.18	52.5	-336.8	-421.0	-85.6	-578.7	1.63	-686.3	-633.8	-2593	1.01	3.89	551.5	604.0	2810	1.01	5.05
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	311.7	1.09	630.8	1.18	174.3	1.18	1289.8	-140.5	-175.6	-1.1	-184.9	1.63	-286.2	0.0	-3414	1.01	16.55	609.5	1899.2	3713	1.01	4.04
									292.2	1.09	589.2	1.18	160.6	1.18	1203.3	-144.0	-180.0	-36.3	-247.0	1.63	-293.4	0.0	-3414	1.01	15.85	598.4	1801.8	3713	1.01	4.26
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**572.0**	1.09	1137.2	1.18	320.7	1.18	**2343.8**	**-103.4**	**-129.3**	58.6	-39.3	**1.63**	**-210.7**	**0.0**	**-5855**	**1.01**	**39.19**	**597.3**	**2941.1**	**6516**	**1.01**	**7.09**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	140.8	1.09	311.8	1.18	96.5	1.18	635.2	-47.4	-59.3	-33.4	-116.3	1.63	-116.3	0.0	-2283	1.01	25.29	654.2	1289.4	2810	1.01	3.37
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	340.8	1.09	696.7	1.18	197.7	1.18	1426.9	-167.1	-208.9	-114.2	-404.1	1.63	-404.1	0.0	-3260	1.01	11.68	1265.5	2692.4	4128	1.01	2.17
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	310.3	1.09	617.4	1.18	170.8	1.18	1268.3	-280.2	-350.2	-187.4	-670.7	1.63	-670.7	0.0	-3260	1.01	6.80	1373.1	2641.4	4128	1.01	2.11
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	65.1	1.09	125.1	1.18	34.1	1.18	258.8	-295.8	-369.8	-199.6	-711.1	1.63	-711.1	-452.2	-2280	1.01	3.60	908.9	1167.7	2810	1.01	2.84
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-171.0	1.09	-351.0	1.18	-98.6	1.18	-717.0	-272.7	-340.9	-186.1	-658.9	1.63	-658.9	-1375.9	-2273	1.01	2.40	456.6	0.0	2810	1.01	7.79
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-395.6**	1.09	-803.4	1.18	-229.6	1.18	**-1650.2**	**-280.7**	**-350.9**	-231.6	-743.5	**1.63**	**-743.5**	**-2393.7**	**-3273**	**1.01**	2.23	**184.4**	**0.0**	**4128**	**1.01**	**31.56**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (CENTER TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN

Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2, asphalt}$
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-28.5	1.09	-93.6	1.18	-30.4	1.18
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.4	1.09	-86.6	1.18	-26.3	1.18
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.5	1.09	-77.5	1.18	-23.1	1.18
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-25.3	1.09	-86.0	1.18	-26.1	1.18
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.8	1.09	-78.3	1.18	-23.4	1.18
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.6	1.09	-87.2	1.18	-26.4	1.18
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-28.8	1.09	-92.8	1.18	-30.2	1.18
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-33.4	1.09	-108.9	1.18	-41.4	1.18
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-287.3	1.09	-587.1	1.18	-179.8	1.18
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	261.5	1.09	487.6	1.18	136.2	1.18
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.9	1.09	-551.4	1.18	-163.3	1.18
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	232.7	1.09	438.2	1.18	115.0	1.18
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-203.6	1.09	-442.6	1.18	-131.7	1.18
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	168.5	1.09	300.7	1.18	74.4	1.18
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-97.4	1.09	-225.1	1.18	-71.6	1.18
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	47.1	1.09	54.5	1.18	6.5	1.18
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	58.7	1.09	79.9	1.18	13.4	1.18
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-102.8	1.09	-249.4	1.18	-78.3	1.18
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	172.6	1.09	321.8	1.18	80.3	1.18
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-205.9	1.09	-461.5	1.18	-137.0	1.18
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	240.0	1.09	451.0	1.18	118.6	1.18
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.1	1.09	-563.3	1.18	-166.6	1.18
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	267.4	1.09	491.9	1.18	137.2	1.18
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-282.1	1.09	-590.1	1.18	-180.5	1.18
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**571.9**	1.09	1136.4	1.18	320.4	1.18
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	306.5	1.09	611.7	1.18	166.8	1.18
									324.3	1.09	649.3	1.18	179.1	1.18
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	43.4	1.09	80.4	1.18	19.8	1.18
									75.9	1.09	147.7	1.18	40.0	1.18
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-163.1	1.09	-332.6	1.18	-92.5	1.18
									-144.0	1.09	-294.2	1.18	-81.0	1.18
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-243.6	1.09	-486.6	1.18	-134.6	1.18
									-244.8	1.09	-490.1	1.18	-135.6	1.18
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-132.7	1.09	-263.1	1.18	-72.6	1.18
									-154.1	1.09	-308.3	1.18	-86.1	1.18
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	95.3	1.09	198.1	1.18	53.8	1.18
									63.8	1.09	131.9	1.18	33.8	1.18
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	353.3	1.09	715.4	1.18	197.0	1.18
									334.1	1.09	674.9	1.18	183.8	1.18
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**604.6**	1.09	1202.9	1.18	338.1	1.18
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-406.4**	1.09	-814.0	1.18	-232.7	1.18
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-194.7	1.09	-387.7	1.18	-108.9	1.18
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	12.8	1.09	37.8	1.18	9.7	1.18
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	216.6	1.09	449.4	1.18	123.3	1.18
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	210.6	1.09	431.5	1.18	118.5	1.18
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	0.6	1.09	0.4	1.18	-0.8	1.18
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-220.4	1.09	-451.7	1.18	-126.9	1.18
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-413.8	1.09	-839.8	1.18	-239.3	1.18

Member	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	-252.7	-260.2	-325.2	-41.9	-407.7	1.63	-530.1	-782.9	-911	1.01	1.26	2.9	0.0	2207	1.01	864.79
U14-L14	-177.4	-232.1	-290.1	-23.5	-340.9	1.63	-472.9	-650.4	-769	1.01	**1.27**	99.0	0.0	1859	1.01	20.75
U16-L16	-160.9	-243.2	-304.0	-20.4	-350.3	1.63	-495.4	-656.4	-1006	1.01	1.73	125.5	0.0	1859	1.01	16.24
U18-L18	-142.1	-245.2	-306.5	-17.1	-347.7	1.63	-499.6	-641.8	-1173	1.01	2.09	137.7	0.0	1859	1.01	14.67
U20-L20	-159.8	-249.7	-312.2	-18.6	-355.9	1.63	-508.8	-668.7	-1232	1.01	2.13	113.5	0.0	1859	1.01	17.95
U22-L22	-143.7	-247.1	-308.9	-17.5	-350.8	1.63	-503.5	-647.2	-1173	1.01	2.07	135.6	0.0	1859	1.01	14.91
U24-L24	-162.0	-245.6	-306.9	-19.6	-352.2	1.63	-500.3	-662.3	-1006	1.01	1.71	121.7	0.0	1859	1.01	16.77
U26-L26	-176.6	-233.8	-292.3	-22.6	-341.8	1.63	-476.4	-653.0	-769	1.01	1.26	92.4	0.0	1859	1.01	22.24
U28-L28	-213.8	-253.0	-316.2	-38.1	-392.0	1.63	-515.4	-729.2	-911	1.01	1.37	0.3	0.0	2207	1.01	7744.72
U13-L12	-1218.1	-454.5	-568.1	-163.7	-859.5	1.63	-926.0	-2144.1	-2518	1.01	1.43	65.6	0.0	3299	1.01	69.31
U13-L14	1021.1	-72.6	-90.7	-20.2	-127.6	1.63	-147.9	0.0	-1530	1.01	17.35	628.5	1649.6	2688	1.01	2.69
U15-L14	-1126.6	-433.8	-542.2	-160.2	-826.8	1.63	-883.8	-2010.5	-2722	1.01	1.84	99.8	0.0	3299	1.01	44.67
U15-L16	906.5	-129.6	-162.1	-21.3	-203.7	1.63	-264.1	0.0	-1744	1.01	10.10	635.3	1541.9	2688	1.01	2.85
U17-L16	-899.5	-416.2	-520.2	-139.4	-769.9	1.63	-848.0	-1747.5	-2437	1.01	1.84	164.8	0.0	2810	1.01	22.67
U17-L18	626.3	-185.0	-231.2	-22.2	-277.4	1.63	-376.9	0.0	-1306	1.01	5.16	591.1	1217.3	2207	1.01	2.71
U19-L18	-456.3	-365.4	-456.7	-93.6	-629.0	1.63	-744.4	-1200.7	-1577	1.01	1.53	297.3	0.0	2076	1.01	8.59
U19-L20	123.3	-255.4	-319.3	-22.6	-370.0	1.63	-520.4	-397.2	-1050	1.01	2.27	481.0	604.2	1556	1.01	3.01
U21-L20	174.1	-262.7	-328.4	-20.6	-376.2	1.63	-535.2	-361.1	-1050	1.01	2.31	467.1	641.2	1556	1.01	2.99
U21-L22	-498.8	-357.3	-446.6	-61.4	-566.0	1.63	-728.0	-1226.8	-1577	1.01	1.50	307.1	0.0	2076	1.01	8.45
U23-L22	662.6	-187.4	-234.3	3.6	-238.5	1.63	-381.8	0.0	-1435	1.01	5.53	586.6	1249.2	2404	1.01	3.01
U23-L24	-930.7	-416.7	-520.9	-111.4	-724.9	1.63	-849.0	-1779.7	-2839	1.01	2.28	167.5	0.0	3299	1.01	25.44
U25-L24	933.6	-123.2	-154.0	-7.9	-173.5	1.63	-251.0	0.0	-1744	1.01	10.74	644.2	1577.8	2688	1.01	2.76
U25-L26	-1143.7	-442.3	-552.8	-145.6	-814.1	1.63	-901.1	-2044.8	-2722	1.01	1.78	82.4	0.0	3299	1.01	54.32
U27-L26	1033.8	-68.5	-85.6	-18.7	-119.9	1.63	-139.6	0.0	-1530	1.01	18.47	651.0	1684.8	2688	1.01	**2.58**
U27-L28	-1216.8	-466.2	-582.7	-164.3	-875.7	1.63	-949.9	-2166.7	-2518	1.01	**1.40**	54.8	0.0	3299	1.01	82.98
U11 - U13	**2342.3**	**-102.7**	**-128.4**	35.7	-75.8	**1.63**	**-209.3**	**0.0**	-5855	1.01	39.44	**590.5**	**2932.9**	6516	1.01	7.18
U13 - U15	1252.8	-121.5	-151.9	28.8	-111.6	1.63	-247.6	0.0	-3414	1.01	18.98	444.9	1697.8	3713	1.01	5.61
	1331.0	-115.3	-144.1	28.8	-103.5	1.63	-234.9	0.0	-3414	1.01	20.34	458.3	1789.2	3713	1.01	5.28
U15 - U17	165.5	-286.4	-358.0	-47.8	-451.4	1.63	-583.5	-418.0	-2593	1.01	4.77	408.8	574.3	2810	1.01	6.54
	304.2	-281.6	-352.0	-2.8	-371.8	1.63	-573.8	-269.6	-2593	1.01	5.09	443.4	747.6	2810	1.01	5.71
U17 - U19	-679.4	-456.2	-570.2	-102.7	-762.4	1.63	-929.5	-1608.9	-3037	1.01	2.57	337.7	0.0	3299	1.01	11.88
	-599.7	-465.1	-581.3	-72.0	-723.8	1.63	-947.6	-1547.3	-3037	1.01	2.60	384.5	0.0	3299	1.01	10.22
U19 - U21	-998.6	-556.3	-695.3	-126.3	-931.3	1.63	-1133.4	-2132.0	-4165	1.01	2.83	326.9	0.0	4542	1.01	17.09
	-1005.2	-557.0	-696.2	-119.4	-921.0	1.63	-1134.8	-2140.0	-4165	1.01	2.82	286.6	0.0	4542	1.01	19.51
U21 - U23	-540.8	-477.8	-597.2	-90.6	-770.6	1.63	-973.5	-1514.2	-3037	1.01	2.60	476.2	0.0	3299	1.01	8.13
	-633.4	-469.6	-587.0	-110.3	-792.2	1.63	-956.9	-1590.3	-3037	1.01	2.54	423.1	0.0	3299	1.01	9.37
U23 - U25	401.1	-298.9	-373.6	-27.7	-434.9	1.63	-609.0	-207.9	-2593	1.01	4.96	549.9	951.0	2810	1.01	4.43
	265.0	-306.3	-382.9	-67.6	-509.6	1.63	-624.1	-359.1	-2593	1.01	4.62	521.0	786.0	2810	1.01	4.94
U25 - U27	1461.7	-125.1	-156.3	39.1	-99.4	1.63	-254.8	0.0	-3789	1.01	20.75	568.3	2030.0	4128	1.01	4.76
	1377.3	-138.1	-172.6	-3.6	-186.0	1.63	-281.4	0.0	-3789	1.01	18.49	566.2	1943.5	4128	1.01	4.93
U27 - U29	**2477.4**	**-80.1**	**-100.1**	79.2	24.7	**1.63**	**-163.2**	**0.0**	-5497	1.01	49.19	**556.5**	**3033.9**	6022	1.01	6.48
						1.63										
L12 - L14	**-1678.1**	**-238.6**	**-298.2**	-226.9	-681.0	**1.63**	**-681.0**	**-2359.0**	-3227	1.01	2.32	**167.0**	**0.0**	4128	1.01	35.02
L14 - L16	-798.2	-209.9	-262.4	-109.1	-451.6	1.63	-451.6	-1249.8	-2273	1.01	3.32	391.5	0.0	2810	1.01	9.29
L16- L18	70.0	-220.3	-275.4	-130.8	-500.6	1.63	-500.6	-430.6	-2280	1.01	4.74	777.6	847.6	2810	1.01	3.56
L18 - L20	911.9	-201.7	-252.2	-193.1	-577.9	1.63	-577.9	0.0	-2954	1.01	6.74	1226.0	2138.0	3713	1.01	**2.32**
L20 - L22	878.5	-242.3	-302.9	-214.5	-665.7	1.63	-665.7	0.0	-2954	1.01	5.80	1237.9	2116.3	3713	1.01	**2.32**
L22 - L24	0.2	-258.2	-322.7	-176.4	-624.2	1.63	-624.2	-623.9	-2280	1.01	3.69	780.6	780.8	2810	1.01	3.64
L24 - L26	-923.0	-240.4	-300.4	-138.6	-539.4	1.63	-539.4	-1462.4	-2634	1.01	3.22	369.2	0.0	3299	1.01	11.53
L26 - L28	-1724.4	-242.5	-303.1	-198.8	-640.3	1.63	-640.3	**-2364.7**	-3527	1.01	2.87	121.7	**0.0**	4542	1.01	51.86

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (CENTER TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	$P_{f,DL}$ kN	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-15.2	1.09	-53.6	1.18	-22.7	1.18	-106.6	1.63	-642.4	-748.9	-1232	1.01	1.77	-106.6	3.9	4.9	-24.4	-34.6	1.63	8.0	0.0	1859	1.01	247.29
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-17.9	1.09	-76.1	1.18	-24.8	1.18	-138.6	1.63	-499.7	-638.3	-1232	1.01	2.21	-138.6	46.1	57.6	-19.1	29.0	1.63	93.9	0.0	1859	1.01	21.47
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-24.4	1.09	-83.1	1.18	-25.0	1.18	-154.1	1.63	-507.5	-661.6	-1232	1.01	2.15	-154.1	38.8	48.5	-19.0	19.6	1.63	79.1	0.0	1859	1.01	25.70
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-20.2	1.09	-72.2	1.18	-21.4	1.18	-132.5	1.63	-497.3	-629.8	-1173	1.01	2.12	-132.5	47.2	59.0	-17.3	33.5	1.63	96.2	0.0	1859	1.01	20.89
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-24.0	1.09	-84.2	1.18	-25.6	1.18	-155.7	1.63	-494.1	-649.8	-1006	1.01	1.74	-155.7	43.3	54.1	-20.3	23.4	1.63	88.2	0.0	1859	1.01	23.06
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-27.6	1.09	-90.9	1.18	-29.7	1.18	-172.4	1.63	-463.6	-636.0	-769	1.01	1.30	-172.4	35.6	44.5	-21.9	10.7	1.63	72.5	0.0	1859	1.01	28.29
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-525.9	-778.6	-911	1.01	1.27	-252.7	0.9	1.2	-41.9	-67.2	1.63	1.9	0.0	2207	1.01	1293.00
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-201.4	1.09	-440.9	1.18	-136.4	1.18	-900.9	1.63	-795.2	-1696.1	-2392	1.01	1.90	-900.9	44.8	56.0	-153.9	-192.5	1.63	91.3	0.0	2893	1.01	41.88
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	149.4	1.09	267.0	1.18	68.9	1.18	559.2	1.63	-282.7	0.0	-983	1.01	5.49	559.2	237.4	296.8	-48.6	230.4	1.63	483.8	1042.9	2071	1.01	3.17
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-83.6	1.09	-190.7	1.18	-60.5	1.18	-387.6	1.63	-628.1	-1015.6	-1298	1.01	1.47	-387.6	109.5	136.9	-98.1	-17.1	1.63	223.2	0.0	1652	1.01	9.21
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	33.6	1.09	14.0	1.18	-6.5	1.18	45.4	1.63	-464.0	-418.6	-797	1.01	1.83	45.4	194.3	242.9	-53.0	167.0	1.63	395.9	441.3	1133	1.01	2.78
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	62.4	1.09	92.5	1.18	17.9	1.18	198.3	1.63	-491.3	-293.0	-797	1.01	2.04	198.3	173.6	217.0	-31.5	175.0	1.63	353.7	552.0	1133	1.01	2.68
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-109.8	1.09	-261.3	1.18	-82.3	1.18	-525.1	1.63	-597.3	-1122.4	-1577	1.01	1.79	-525.1	138.2	172.7	-78.5	52.2	1.63	281.6	0.0	2076	1.01	9.31
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	183.9	1.09	335.3	1.18	84.1	1.18	695.3	1.63	-358.2	0.0	-1306	1.01	5.63	695.3	228.0	285.0	33.7	352.3	1.63	464.6	1159.9	2207	1.01	3.30
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-216.8	1.09	-475.3	1.18	-140.9	1.18	-963.4	1.63	-703.9	-1667.2	-2497	1.01	2.21	-963.4	78.6	98.3	-125.1	-101.5	1.63	160.1	0.0	2884	1.01	24.21
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	244.7	1.09	467.7	1.18	123.3	1.18	964.1	1.63	-250.7	0.0	-1744	1.01	10.87	964.1	251.5	314.3	22.5	364.6	1.63	512.4	1476.5	2688	1.01	3.42
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-268.3	1.09	-579.4	1.18	-171.2	1.18	-1178.1	1.63	-740.2	-1918.4	-3041	1.01	2.56	-1178.1	40.2	50.3	-147.9	-188.7	1.63	81.9	0.0	3713	1.01	60.17
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	269.7	1.09	511.7	1.18	143.0	1.18	1066.5	1.63	-141.8	0.0	-1530	1.01	18.42	1066.5	250.5	313.2	4.9	334.7	1.63	510.5	1577.0	2688	1.01	3.23
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-291.2	1.09	-610.3	1.18	-186.4	1.18	-1257.5	1.63	-778.0	-2035.5	-2804	1.01	2.02	-1257.5	2.2	2.7	-152.6	-245.9	1.63	4.4	0.0	3713	1.01	1125.69
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	9.9	1.09	23.4	1.18	8.5	1.18	48.5	1.63	-26.2	0.0	-3414	1.01	133.25	48.5	90.4	113.1	-13.1	96.7	1.63	184.3	232.7	3713	1.01	20.09
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-234.7	1.09	-475.7	1.18	-136.2	1.18	-977.9	1.63	-639.5	-1617.4	-3414	1.01	3.86	-977.9	58.4	73.0	-102.9	-91.6	1.63	119.0	0.0	3713	1.01	39.73
									-228.0	1.09	-459.0	1.18	-129.2	1.18	-942.7	1.63	-613.6	-1556.3	-3414	1.01	4.08	-942.7	50.6	63.2	-56.0	-25.3	1.63	103.1	0.0	3713	1.01	45.52
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-309.1**	1.09	-603.8	1.18	-167.4	1.18	**-1247.0**	**1.63**	**-877.9**	**-2124.8**	**-4333**	**1.01**	**3.56**	**-1247.0**	**120.0**	**150.0**	-131.9	-58.6	**1.63**	**244.4**	**0.0**	**4779**	**1.01**	**24.85**
									-318.7	1.09	-624.1	1.18	-173.1	1.18	-1288.1	1.63	-871.3	-2159.3	-4333	1.01	3.54	-1288.1	108.0	135.0	-108.7	-36.3	1.63	220.1	0.0	4779	1.01	27.78
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-197.6	1.09	-380.2	1.18	-104.2	1.18	-786.9	1.63	-822.8	-1609.7	-3789	1.01	3.69	-786.9	173.1	216.4	-115.3	37.7	1.63	352.7	0.0	4128	1.01	14.05
									-219.8	1.09	-427.3	1.18	-118.4	1.18	-883.5	1.63	-806.0	-1689.5	-3789	1.01	3.65	-883.5	153.0	191.3	-116.4	9.8	1.63	311.8	0.0	4128	1.01	16.21
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.8	1.09	97.3	1.18	26.5	1.18	193.8	1.63	-535.7	-341.9	-2593	1.01	5.25	193.8	196.0	245.0	-61.0	156.2	1.63	399.3	593.1	2810	1.01	6.62
									11.1	1.09	28.6	1.18	5.7	1.18	52.5	1.63	-534.6	-482.1	-2593	1.01	5.00	52.5	180.9	226.2	-85.6	96.5	1.63	368.7	421.2	2810	1.01	7.56
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	311.7	1.09	630.8	1.18	174.3	1.18	1289.8	1.63	-256.0	0.0	-3414	1.01	18.51	1289.8	199.6	249.5	-1.1	258.5	1.63	406.7	1696.5	3713	1.01	6.05
									292.2	1.09	589.2	1.18	160.6	1.18	1203.3	1.63	-265.0	0.0	-3414	1.01	17.55	1203.3	196.1	245.1	-36.3	196.4	1.63	399.5	1602.8	3713	1.01	6.38
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**572.0**	1.09	1137.2	1.18	320.7	1.18	**2343.8**	**1.63**	**-140.9**	**0.0**	**-5855**	**1.01**	**58.59**	**2343.8**	**195.2**	**244.0**	58.6	350.1	**1.63**	**397.8**	**2741.6**	**6516**	**1.01**	**10.65**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	140.8	1.09	311.8	1.18	96.5	1.18	635.2	1.63	-95.8	0.0	-2283	1.01	30.70	635.2	275.9	344.9	-33.4	305.3	1.63	562.2	1197.4	2810	1.01	3.92
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	340.8	1.09	696.7	1.18	197.7	1.18	1426.9	1.63	-331.8	0.0	-3260	1.01	14.23	1426.9	472.4	590.5	-114.2	429.8	1.63	962.5	2389.4	4128	1.01	2.85
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	310.3	1.09	617.4	1.18	170.8	1.18	1268.3	1.63	-549.4	0.0	-3260	1.01	8.30	1268.3	508.3	635.3	-187.4	357.4	1.63	1035.6	2303.9	4128	1.01	2.80
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	65.1	1.09	125.1	1.18	34.1	1.18	258.8	1.63	-582.8	-323.9	-2280	1.01	4.39	258.8	347.9	434.9	-199.6	128.3	1.63	708.9	967.7	2810	1.01	3.64
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-171.0	1.09	-351.0	1.18	-98.6	1.18	-717.0	1.63	-539.8	-1256.8	-2273	1.01	2.92	-717.0	192.0	240.0	-186.1	-53.0	1.63	391.2	0.0	2810	1.01	9.09
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-395.6**	1.09	-803.4	1.18	-229.6	1.18	**-1650.2**	**1.63**	**-621.9**	**-2272.1**	**-3273**	**1.01**	2.66	**-1650.2**	**87.8**	**109.8**	-231.6	-263.0	**1.63**	**178.9**	**0.0**	**4128**	**1.01**	**32.52**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

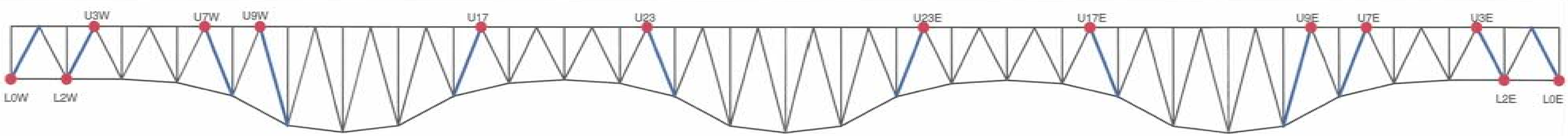
AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (CENTER TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	$P_{f,DL}$	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN		kN	**kN**	kN	Factor	Capacity	kN	kN	kN	kN	kN		kN	**kN**	kN	Factor	Capacity
									5		5		5								Factor		19		19							Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-43.0	1.09	-127.5	1.18	-46.9	1.18	-252.7	1.63	-525.9	-778.6	-911	1.01	1.27	-252.7	0.9	1.2	-41.9	-67.2	1.63	1.9	0.0	2207	1.01	1293.00
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-28.5	1.09	-93.6	1.18	-30.4	1.18	-177.4	1.63	-471.0	-648.5	-769	1.01	1.27	-177.4	36.1	45.2	-23.5	8.9	1.63	73.6	0.0	1859	1.01	27.92
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.4	1.09	-86.6	1.18	-26.3	1.18	-160.9	1.63	-494.0	-654.9	-1006	1.01	1.73	-160.9	42.6	53.3	-20.4	22.4	1.63	86.9	0.0	1859	1.01	23.47
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.5	1.09	-77.5	1.18	-23.1	1.18	-142.1	1.63	-499.6	-641.7	-1173	1.01	2.09	-142.1	47.5	59.4	-17.1	34.0	1.63	96.8	0.0	1859	1.01	20.86
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-25.3	1.09	-86.0	1.18	-26.1	1.18	-159.8	1.63	-507.8	-667.6	-1232	1.01	2.14	-159.8	38.1	47.6	-18.6	19.5	1.63	77.7	0.0	1859	1.01	26.24
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-21.8	1.09	-78.3	1.18	-23.4	1.18	-143.7	1.63	-502.7	-646.4	-1173	1.01	2.07	-143.7	46.3	57.9	-17.5	31.9	1.63	94.3	0.0	1859	1.01	21.44
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-25.6	1.09	-87.2	1.18	-26.4	1.18	-162.0	1.63	-499.1	-661.0	-1006	1.01	1.71	-162.0	41.6	52.1	-19.6	22.3	1.63	84.8	0.0	1859	1.01	24.04
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-28.8	1.09	-92.8	1.18	-30.2	1.18	-176.6	1.63	-475.8	-652.4	-769	1.01	1.26	-176.6	32.8	41.0	-22.6	5.9	1.63	66.8	0.0	1859	1.01	30.74
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-33.4	1.09	-108.9	1.18	-41.4	1.18	-213.8	1.63	-512.8	-726.6	-911	1.01	1.38	-213.8	0.1	0.1	-38.1	-62.0	1.63	0.2	0.0	2207	1.01	#######
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-287.3	1.09	-587.1	1.18	-179.8	1.18	-1218.1	1.63	-772.7	-1990.8	-2518	1.01	1.71	-1218.1	21.5	26.9	-163.7	-238.8	1.63	43.9	0.0	3299	1.01	103.62
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	261.5	1.09	487.6	1.18	136.2	1.18	1021.1	1.63	-147.3	0.0	-1530	1.01	17.42	1021.1	250.8	313.5	-20.2	294.0	1.63	511.0	1532.0	2688	1.01	3.31
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.9	1.09	-551.4	1.18	-163.3	1.18	-1126.6	1.63	-741.6	-1868.3	-2722	1.01	2.19	-1126.6	40.4	50.5	-160.2	-208.5	1.63	82.3	0.0	3299	1.01	54.19
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	232.7	1.09	438.2	1.18	115.0	1.18	906.5	1.63	-249.2	0.0	-1744	1.01	10.71	906.5	253.6	316.9	-21.3	295.9	1.63	516.6	1423.2	2688	1.01	3.50
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-203.6	1.09	-442.6	1.18	-131.7	1.18	-899.5	1.63	-720.6	-1620.1	-2437	1.01	2.17	-899.5	74.6	93.2	-139.4	-130.0	1.63	151.9	0.0	2810	1.01	24.60
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	168.5	1.09	300.7	1.18	74.4	1.18	626.3	1.63	-344.6	0.0	-1306	1.01	5.65	626.3	238.0	297.5	-22.2	274.2	1.63	485.0	1111.3	2207	1.01	3.30
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-97.4	1.09	-225.1	1.18	-71.6	1.18	-456.3	1.63	-638.0	-1094.4	-1577	1.01	1.78	-456.3	126.9	158.7	-93.6	12.9	1.63	258.6	0.0	2076	1.01	9.87
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	47.1	1.09	54.5	1.18	6.5	1.18	123.3	1.63	-458.8	-335.5	-1050	1.01	2.58	123.3	196.9	246.1	-22.6	219.8	1.63	401.1	524.4	1556	1.01	3.61
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	58.7	1.09	79.9	1.18	13.4	1.18	174.1	1.63	-471.4	-297.3	-1050	1.01	2.62	174.1	191.8	239.7	-20.6	216.4	1.63	390.7	564.8	1556	1.01	3.58
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-102.8	1.09	-249.4	1.18	-78.3	1.18	-498.8	1.63	-624.6	-1123.4	-1577	1.01	1.75	-498.8	130.8	163.5	-61.4	70.5	1.63	266.5	0.0	2076	1.01	9.74
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	172.6	1.09	321.8	1.18	80.3	1.18	662.6	1.63	-349.3	0.0	-1435	1.01	6.05	662.6	237.3	296.6	3.6	315.2	1.63	483.4	1146.0	2404	1.01	3.65
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-205.9	1.09	-461.5	1.18	-137.0	1.18	-930.7	1.63	-722.0	-1652.8	-2839	1.01	2.68	-930.7	76.3	95.3	-111.4	-82.1	1.63	155.4	0.0	3299	1.01	27.43
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	240.0	1.09	451.0	1.18	118.6	1.18	933.6	1.63	-239.5	0.0	-1744	1.01	11.25	933.6	257.3	321.6	-7.9	322.7	1.63	524.3	1457.9	2688	1.01	3.40
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-259.1	1.09	-563.3	1.18	-166.6	1.18	-1143.7	1.63	-753.2	-1896.9	-2722	1.01	2.13	-1143.7	35.0	43.8	-145.6	-191.7	1.63	71.4	0.0	3299	1.01	62.68
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	267.4	1.09	491.9	1.18	137.2	1.18	1033.8	1.63	-139.1	0.0	-1530	1.01	18.54	1033.8	259.3	324.2	-18.7	307.7	1.63	528.4	1562.2	2688	1.01	3.18
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-282.1	1.09	-590.1	1.18	-180.5	1.18	-1216.8	1.63	-784.6	-2001.4	-2518	1.01	1.69	-1216.8	18.1	22.6	-164.3	-244.2	1.63	36.9	0.0	3299	1.01	123.33
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**571.9**	1.09	1136.4	1.18	320.4	1.18	**2342.3**	**1.63**	**-140.0**	**0.0**	-5855	1.01	58.97	**2342.3**	**192.8**	**241.0**	35.7	309.6	**1.63**	**392.9**	**2735.2**	6516	1.01	10.79
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	306.5	1.09	611.7	1.18	166.8	1.18	1252.8	1.63	-230.4	0.0	-3414	1.01	20.40	1252.8	146.8	183.4	28.8	238.2	1.63	299.0	1551.8	3713	1.01	8.35
									324.3	1.09	649.3	1.18	179.1	1.18	1331.0	1.63	-225.3	0.0	-3414	1.01	21.21	1331.0	151.5	189.4	28.8	244.4	1.63	308.7	1639.7	3713	1.01	7.84
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	43.4	1.09	80.4	1.18	19.8	1.18	165.5	1.63	-468.0	-302.5	-2593	1.01	5.95	165.5	134.9	168.6	-47.8	97.9	1.63	274.8	440.3	2810	1.01	9.72
									75.9	1.09	147.7	1.18	40.0	1.18	304.2	1.63	-461.3	-157.2	-2593	1.01	6.34	304.2	146.4	183.0	-2.8	186.4	1.63	298.3	602.5	2810	1.01	8.49
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-163.1	1.09	-332.6	1.18	-92.5	1.18	-679.4	1.63	-715.8	-1395.2	-3037	1.01	3.34	-679.4	111.5	139.3	-102.7	-22.1	1.63	227.1	0.0	3299	1.01	17.66
									-144.0	1.09	-294.2	1.18	-81.0	1.18	-599.7	1.63	-721.9	-1321.6	-3037	1.01	3.42	-599.7	126.9	158.6	-72.0	48.2	1.63	258.6	0.0	3299	1.01	15.20
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-243.6	1.09	-486.6	1.18	-134.6	1.18	-998.6	1.63	-860.4	-1859.1	-4165	1.01	3.73	-998.6	107.3	134.1	-126.3	-66.0	1.63	218.6	0.0	4542	1.01	25.55
									-244.8	1.09	-490.1	1.18	-135.6	1.18	-1005.2	1.63	-858.7	-1863.9	-4165	1.01	3.73	-1005.2	94.1	117.6	-119.4	-72.0	1.63	191.7	0.0	4542	1.01	29.18
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-132.7	1.09	-263.1	1.18	-72.6	1.18	-540.8	1.63	-741.4	-1282.2	-3037	1.01	3.41	-540.8	156.3	195.4	-90.6	56.2	1.63	318.4	0.0	3299	1.01	12.16
									-154.1	1.09	-308.3	1.18	-86.1	1.18	-633.4	1.63	-734.5	-1367.8	-3037	1.01	3.31	-633.4	138.9	173.6	-110.3	1.3	1.63	282.9	0.0	3299	1.01	14.01
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	95.3	1.09	198.1	1.18	53.8	1.18	401.1	1.63	-486.6	-85.5	-2593	1.01	6.21	401.1	180.4	225.5	-27.7	190.1	1.63	367.6	768.7	2810	1.01	6.63
									63.8	1.09	131.9	1.18	33.8	1.18	265.0	1.63	-495.9	-230.9	-2593	1.01	5.82	265.0	170.9	213.6	-67.6	112.7	1.63	348.2	613.2	2810	1.01	7.39
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	353.3	1.09	715.4	1.18	197.0	1.18	1461.7	1.63	-240.5	0.0	-3789	1.01	21.99	1461.7	186.3	232.9	39.1	306.7	1.63	379.6	1841.3	4128	1.01	7.13
									334.1	1.09	674.9	1.18	183.8	1.18	1377.3	1.63	-257.1	0.0	-3789	1.01	20.25	1377.3	185.5	231.9	-3.6	236.0	1.63	377.9	1755.3	4128	1.01	7.39
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**604.6**	1.09	1202.9	1.18	338.1	1.18	**2477.4**	**1.63**	**-109.8**	**0.0**	-5497	1.01	73.10	**2477.4**	**181.6**	**227.0**	79.2	365.9	**1.63**	**370.0**	**2847.3**	6022	1.01	9.74
																1.63											1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-406.4**	1.09	-814.0	1.18	-232.7	1.18	**-1678.1**	**1.63**	**-574.8**	**-2252.9**	-3227	1.01	2.75	**-1678.1**	**82.0**	**102.4**	-226.9	-263.0	**1.63**	**167.0**	**0.0**	4128	1.01	35.02
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-194.7	1.09	-387.7	1.18	-108.9	1.18	-798.2	1.63	-363.5	-1161.7	-2273	1.01	4.12	-798.2	168.5	210.6	-109.1	41.8	1.63	343.3	0.0	2810	1.01	10.59
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	12.8	1.09	37.8	1.18	9.7	1.18	70.0	1.63	-407.0	-337.0	-2280	1.01	5.83	70.0	302.6	378.2	-130.8	181.3	1.63	616.5	686.5	2810	1.01	4.49
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	216.6	1.09	449.4	1.18	123.3	1.18	911.9	1.63	-492.0	0.0	-2954	1.01	7.92	911.9	457.2	571.4	-193.1	281.3	1.63	931.5	1843.4	3713	1.01	3.05
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	210.6	1.09	431.5	1.18	118.5	1.18	878.5	1.63	-561.1	0.0	-2954	1.01	6.88	878.5	461.6	577.0	-214.5	252.2	1.63	940.4	1818.9	3713	1.01	3.05
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	0.6	1.09	0.4	1.18	-0.8	1.18	0.2	1.63	-512.7	-512.5	-2280	1.01	4.49	0.2	303.7	379.6	-176.4	108.5	1.63	618.7	618.9	2810	1.01	4.59
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-220.4	1.09	-451.7	1.18	-126.9	1.18	-923.0	1.63	-435.6	-1358.6	-2634	1.01	3.99	-923.0	159.5	199.3	-138.6	-18.0	1.63	324.9	0.0	3299	1.01	13.10
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-413.8	1.09	-839.8	1.18	-239.3	1.18	-1724.4	1.63	-541.1	**-2265.5**	-3527	1.01	3.40	-1724.4	54.7	68.3	-198.8	-252.8	1.63	111.4	**0.0**	4542	1.01	56.67

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.



Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Right Truss

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	**0.90**	Compressive buckling @ end of Member U1-L0	-1029	-778	-1709	1.01	Assume L_2=235mm	no	0.089	56
L2E	**0.85**	Compressive buckling @ end of Member U3-L2	-424	-529	-868	1.01		no	0.085	53
L4E	5.44	Compressive buckling @ end of Member U3-L4	146	-227	-1078	1.01		no	0.557	
L6E	1.95	Compressive buckling @ end of Member U5-L6	-489	-409	-1274	1.01		no	0.198	
L8E	2.87	Compressive buckling @ end of Member U7-L8	-996	-667	-2880	1.01		no	0.292	
L10E	1.34	Compressive buckling @ end of Member U9-L10	-1222	-752	-2208	1.01		no	0.135	
L12E	2.42	Compressive buckling @ end of Member U11-L12	-1253	-710	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.246	
L14E	2.54	Compressive buckling @ end of Member U15-L14	-1165	-744	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.259	
L16E	2.32	Compressive buckling @ end of Member U17-L16	-929	-694	-2512	1.01		no	0.236	
L18E	3.26	Compressive buckling @ end of Member U19-L18	-436	-504	-2058	1.01		no	0.333	
L20E	5.20	Compressive buckling @ end of Member U19-L20	171	-279	-1264	1.01		no	0.532	
L22E	1.29	Compressive buckling @ end of Member U21-L22	-474	-491	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.130	
L24E	1.71	Compressive buckling @ end of Member U23-L24	-957	-683	-2104	1.01		no	0.173	
L26E	1.90	Compressive buckling @ end of Member U25-L26	-1177	-732	-2544	1.01		no	0.193	
L28	1.73	Compressive buckling @ end of Member U27-L28	-1213	-687	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.175	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.24	Compressive buckling @ end of Member U1-L0	-1029	-778	-1978	1.01		no	0.125	
U3E	**0.70**	Compressive buckling @ end of Member U3-L2	-424	-529	-786	1.01		no	0.069	43
U5E	1.30	Compressive buckling @ end of Member U5-L6	-489	-409	-1010	1.01		no	0.131	
U7E	**0.64**	Compressive buckling @ end of Member U7-L8	-996	-667	-1406	1.01		no	0.063	39
U9E	**0.79**	Compressive buckling @ end of Member U9-L10	-1222	-752	-1798	1.01	Effective width = 762.0mm	no	0.078	49
U11E	1.65	Compressive buckling @ end of Member U11-L12	-1253	-710	-2400	1.01	Effective width = 616.9mm	yes	0.167	
U13E	1.41	Compressive buckling @ end of Member U13-L12	-1212	-697	-2170	1.01		yes	0.142	
U15E	1.11	Compressive buckling @ end of Member U15-L14	-1165	-744	-1974	1.01		no	0.112	
U17E	**0.67**	Compressive buckling @ end of Member U17-L16	-929	-694	-1382	1.01		no	0.066	41
U19E	1.12	Compressive buckling @ end of Member U19-L18	-436	-504	-990	1.01		no	0.112	
U21E	1.25	Compressive buckling @ end of Member U21-L22	-474	-491	-1076	1.01		no	0.125	
U23E	**0.66**	Compressive buckling @ end of Member U23-L24	-957	-683	-1394	1.01		no	0.065	41
U25E	1.64	Compressive buckling @ end of Member U25-L26	-1177	-732	-2356	1.01		no	0.166	
U27E	1.28	Compressive buckling @ end of Member U27-L28	-1213	-687	-2073	1.01	Effective width = 495.88mm	yes	0.129	

W.O. 7108.300
Tansley Bridge Over Bronte Creek
Truss Bridge

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:

$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.00	Compressive buckling @ end of Member U1-L0	-1029	-694	-1709	1.01	Assume L_2=235mm	no	0.072	
L2E	0.96	Compressive buckling @ end of Member U3-L2	-424	-471	-868	1.01		no	0.069	43
L4E	5.75	Compressive buckling @ end of Member U3-L4	146	-215	-1078	1.01		no	0.425	
L6E	2.08	Compressive buckling @ end of Member U5-L6	-489	-384	-1274	1.01		no	0.152	
L8E	3.21	Compressive buckling @ end of Member U7-L8	-996	-595	-2880	1.01		no	0.236	
L10E	1.52	Compressive buckling @ end of Member U9-L10	-1222	-663	-2208	1.01		no	0.111	
L12E	2.73	Compressive buckling @ end of Member U11-L12	-1253	-629	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.201	
L14E	2.89	Compressive buckling @ end of Member U15-L14	-1165	-654	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.212	
L16E	2.62	Compressive buckling @ end of Member U17-L16	-929	-615	-2512	1.01		no	0.192	
L18E	3.65	Compressive buckling @ end of Member U19-L18	-436	-450	-2058	1.01		no	0.269	
L20E	5.85	Compressive buckling @ end of Member U19-L20	171	-247	-1264	1.01		no	0.433	
L22E	1.44	Compressive buckling @ end of Member U21-L22	-474	-439	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.105	
L24E	1.93	Compressive buckling @ end of Member U23-L24	-957	-606	-2104	1.01		no	0.141	
L26E	2.16	Compressive buckling @ end of Member U25-L26	-1177	-645	-2544	1.01		no	0.158	
L28	1.95	Compressive buckling @ end of Member U27-L28	-1213	-608	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.143	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.40	Compressive buckling @ end of Member U1-L0	-1029	-694	-1978	1.01		no	0.101	
U3E	**0.79**	Compressive buckling @ end of Member U3-L2	-424	-471	-786	1.01		no	0.056	35
U5E	1.38	Compressive buckling @ end of Member U5-L6	-489	-384	-1010	1.01		no	0.100	
U7E	**0.71**	Compressive buckling @ end of Member U7-L8	-996	-595	-1406	1.01		no	0.051	32
U9E	**0.90**	Compressive buckling @ end of Member U9-L10	-1222	-663	-1798	1.01	Effective width = 762.0mm	no	0.064	40
U11E	1.86	Compressive buckling @ end of Member U11-L12	-1253	-629	-2400	1.01	Effective width = 616.9mm	yes	0.136	
U13E	1.59	Compressive buckling @ end of Member U13-L12	-1212	-618	-2170	1.01		yes	0.116	
U15E	1.27	Compressive buckling @ end of Member U15-L14	-1165	-654	-1974	1.01		no	0.092	
U17E	**0.76**	Compressive buckling @ end of Member U17-L16	-929	-615	-1382	1.01		no	0.054	34
U19E	1.25	Compressive buckling @ end of Member U19-L18	-436	-450	-990	1.01		no	0.091	
U21E	1.39	Compressive buckling @ end of Member U21-L22	-474	-439	-1076	1.01		no	0.101	
U23E	**0.74**	Compressive buckling @ end of Member U23-L24	-957	-606	-1394	1.01		no	0.053	33
U25E	1.87	Compressive buckling @ end of Member U25-L26	-1177	-645	-2356	1.01		no	0.136	
U27E	1.45	Compressive buckling @ end of Member U27-L28	-1213	-608	-2073	1.01	Effective width = 495.88mm	yes	0.105	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.28	Compressive buckling @ end of Member U1-L0	-1029	-543	-1709	1.01	Assume L_2=235mm	no	0.052	
L2E	1.24	Compressive buckling @ end of Member U3-L2	-424	-365	-868	1.01		no	0.050	
L4E	6.62	Compressive buckling @ end of Member U3-L4	146	-187	-1078	1.01		no	0.273	
L6E	2.54	Compressive buckling @ end of Member U5-L6	-489	-313	-1274	1.01		no	0.104	
L8E	4.27	Compressive buckling @ end of Member U7-L8	-996	-448	-2880	1.01		no	0.176	
L10E	2.02	Compressive buckling @ end of Member U9-L10	-1222	-499	-2208	1.01		no	0.082	
L12E	3.47	Compressive buckling @ end of Member U11-L12	-1253	-495	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.142	
L14E	3.60	Compressive buckling @ end of Member U15-L14	-1165	-526	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.148	
L16E	3.38	Compressive buckling @ end of Member U17-L16	-929	-476	-2512	1.01		no	0.139	
L18E	4.74	Compressive buckling @ end of Member U19-L18	-436	-347	-2058	1.01		no	0.195	
L20E	7.46	Compressive buckling @ end of Member U19-L20	171	-194	-1264	1.01		no	0.307	
L22E	1.87	Compressive buckling @ end of Member U21-L22	-474	-340	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.076	
L24E	2.61	Compressive buckling @ end of Member U23-L24	-957	-448	-2104	1.01		no	0.107	
L26E	2.76	Compressive buckling @ end of Member U25-L26	-1177	-504	-2544	1.01		no	0.113	
L28	2.40	Compressive buckling @ end of Member U27-L28	-1213	-493	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.098	

GUSSET PLATES

RIGHT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.78	Compressive buckling @ end of Member U1-L0	-1029	-543	-1978	1.01		no	0.073	
U3E	1.01	Compressive buckling @ end of Member U3-L2	-424	-365	-786	1.01		no	0.041	
U5E	1.69	Compressive buckling @ end of Member U5-L6	-489	-313	-1010	1.01		no	0.069	
U7E	**0.95**	Compressive buckling @ end of Member U7-L8	-996	-448	-1406	1.01		no	0.038	24
U9E	1.19	Compressive buckling @ end of Member U9-L10	-1222	-499	-1798	1.01	Effective width = 762.0mm	no	0.048	
U11E	2.37	Compressive buckling @ end of Member U11-L12	-1253	-495	-2400	1.01	Effective width = 616.9mm	yes	0.097	
U13E	1.95	Compressive buckling @ end of Member U13-L12	-1212	-501	-2170	1.01		yes	0.080	
U15E	1.58	Compressive buckling @ end of Member U15-L14	-1165	-526	-1974	1.01		no	0.064	
U17E	**0.98**	Compressive buckling @ end of Member U17-L16	-929	-476	-1382	1.01		no	0.039	25
U19E	1.63	Compressive buckling @ end of Member U19-L18	-436	-347	-990	1.01		no	0.066	
U21E	1.80	Compressive buckling @ end of Member U21-L22	-474	-340	-1076	1.01		no	0.073	
U23E	1.01	Compressive buckling @ end of Member U23-L24	-957	-448	-1394	1.01		no	0.040	
U25E	2.39	Compressive buckling @ end of Member U25-L26	-1177	-504	-2356	1.01		no	0.097	
U27E	1.79	Compressive buckling @ end of Member U27-L28	-1213	-493	-2073	1.01	Effective width = 495.88mm	yes	0.073	

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (RIGHT TRUSS) **Effective Length Factor = 1.00**

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-30.4	1.09	-53.7	1.18	-2.0	1.18	-98.9	1.63	-255.6	-354.4	-1232	1.01	4.48	27.5	34.3	-15.6	10.4	1.63	56.0	0.0	1859	1.01	35.32
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-37.7	1.09	-90.8	1.18	-16.9	1.18	-168.1	1.63	-266.5	-434.6	-1232	1.01	4.04	8.7	10.8	-15.4	-13.9	1.63	17.7	0.0	1859	1.01	115.92
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.9	1.09	-91.6	1.18	-19.1	1.18	-174.2	1.63	-275.7	-449.8	-1232	1.01	3.88	7.7	9.6	-16.3	-16.6	1.63	15.7	0.0	1859	1.01	131.00
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-37.2	1.09	-88.8	1.18	-17.6	1.18	-166.0	1.63	-269.4	-435.4	-1173	1.01	3.78	9.9	12.4	-16.1	-13.4	1.63	20.2	0.0	1859	1.01	101.28
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.2	1.09	-90.6	1.18	-15.9	1.18	-166.1	1.63	-261.9	-428.1	-1006	1.01	3.24	11.0	13.8	-16.5	-12.5	1.63	22.5	0.0	1859	1.01	90.81
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-42.7	1.09	-92.4	1.18	-12.7	1.18	-170.6	1.63	-240.4	-411.0	-769	1.01	2.52	11.2	14.0	-17.7	-14.2	1.63	22.8	0.0	1859	1.01	89.72
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	1.63	-233.9	-433.4	-911	1.01	3.08	22.1	27.7	-25.9	-13.4	1.63	45.1	0.0	2207	1.01	53.85
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-284.5	1.09	-518.8	1.18	-90.7	1.18	-1029.2	1.63	-778.4	-1807.6	-2392	1.01	1.78	87.3	109.1	-133.3	-103.5	1.63	177.8	0.0	2893	1.01	22.22
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	209.1	1.09	377.9	1.18	76.8	1.18	764.4	1.63	-187.7	0.0	-983	1.01	9.36	337.7	422.2	-45.9	365.6	1.63	688.1	1452.5	2071	1.01	1.93
U3 - L2	DIAGONAL	2-10C20			5388	1298	1498	1652	-116.8	1.09	-216.4	1.18	-35.3	1.18	-424.3	1.63	-529.2	-953.5	-1298	1.01	1.68	82.8	103.5	-78.7	-20.2	1.63	168.8	0.0	1652	1.01	12.40
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	42.2	1.09	66.0	1.18	18.4	1.18	145.7	1.63	-226.8	-81.1	-797	1.01	4.19	208.6	260.8	-42.8	202.2	1.63	425.1	570.7	1133	1.01	2.35
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	56.1	1.09	107.1	1.18	31.8	1.18	225.1	1.63	-262.2	-37.1	-797	1.01	3.93	146.2	182.8	-11.0	172.7	1.63	297.9	523.1	1133	1.01	3.09
U5 - L6	DIAGONAL	2-10C25			5559	1577	1876	2076	-127.0	1.09	-250.1	1.18	-47.4	1.18	-489.4	1.63	-409.3	-898.7	-1577	1.01	2.70	85.6	107.0	-51.5	27.6	1.63	174.3	0.0	2076	1.01	14.83
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	213.4	1.09	401.8	1.18	91.9	1.18	815.1	1.63	-64.5	0.0	-1306	1.01	33.09	300.4	375.5	11.1	409.9	1.63	612.1	1427.3	2207	1.01	2.31
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-263.6	1.09	-502.1	1.18	-98.3	1.18	-995.8	1.63	-666.5	-1662.3	-2497	1.01	2.29	16.5	20.6	-93.2	-130.4	1.63	33.6	0.0	2884	1.01	116.33
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	289.8	1.09	540.5	1.18	112.4	1.18	1086.3	1.63	-64.7	0.0	-1744	1.01	44.03	359.9	449.8	-6.9	458.0	1.63	733.2	1819.6	2688	1.01	2.22
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-328.9	1.09	-617.1	1.18	-115.0	1.18	-1222.4	1.63	-751.9	-1974.3	-3041	1.01	2.46	31.7	39.6	-117.4	-150.1	1.63	64.5	0.0	3713	1.01	77.04
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	320.4	1.09	562.7	1.18	103.2	1.18	1135.0	1.63	-122.6	0.0	-1530	1.01	21.86	342.9	428.7	-17.7	418.4	1.63	698.7	1833.7	2688	1.01	2.26
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-356.2	1.09	-628.3	1.18	-104.7	1.18	-1253.1	1.63	-709.8	-1962.9	-2804	1.01	2.22	58.7	73.4	-128.2	-132.4	1.63	119.7	0.0	3713	1.01	41.80
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	26.9	1.09	43.8	1.18	1.3	1.18	82.5	1.63	-64.6	0.0	-3414	1.01	54.68	65.3	81.6	-10.1	68.6	1.63	133.0	215.5	3713	1.01	27.58
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-318.7	1.09	-588.8	1.18	-117.0	1.18	-1180.2	1.63	-940.9	-2121.1	-3414	1.01	2.41	117.4	146.7	-120.0	-42.5	1.63	239.2	0.0	3713	1.01	20.61
									-279.8	1.09	-525.9	1.18	-116.8	1.18	-1063.3	1.63	-866.7	-1930.0	-3414	1.01	2.75	113.8	142.3	-82.4	14.0	1.63	231.9	0.0	3713	1.01	20.76
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-390.4**	1.09	-725.5	1.18	-154.7	1.18	**-1464.1**	**1.63**	**-1284.1**	**-2748.2**	-4333	**1.01**	**2.27**	**227.7**	**284.6**	-160.1	35.9	**1.63**	**463.9**	**0.0**	**4779**	**1.01**	**13.56**
									-380.3	1.09	-710.1	1.18	-156.6	1.18	-1437.2	1.63	-1287.2	-2724.4	-4333	1.01	2.28	226.7	283.3	-144.9	59.4	1.63	461.8	0.0	4779	1.01	13.56
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-251.7	1.09	-463.4	1.18	-101.7	1.18	-941.2	1.63	-1148.7	-2089.9	-3789	1.01	2.51	313.8	392.2	-142.0	177.7	1.63	639.3	0.0	4128	1.01	7.99
									-269.8	1.09	-493.0	1.18	-103.6	1.18	-998.0	1.63	-1166.5	-2164.5	-3789	1.01	2.43	313.4	391.7	-150.8	162.8	1.63	638.5	0.0	4128	1.01	8.09
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.6	1.09	93.8	1.18	20.2	1.18	182.0	1.63	-691.4	-509.5	-2593	1.01	4.05	340.2	425.3	-67.8	333.1	1.63	693.2	875.2	2810	1.01	3.83
									8.5	1.09	36.4	1.18	16.9	1.18	72.2	1.63	-722.3	-650.1	-2593	1.01	3.73	350.5	438.1	-99.2	295.3	1.63	714.0	786.3	2810	1.01	3.87
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	370.3	1.09	704.6	1.18	148.6	1.18	1410.4	1.63	-253.9	0.0	-3414	1.01	19.13	339.7	424.6	7.2	454.6	1.63	692.1	2102.5	3713	1.01	3.38
									345.7	1.09	667.0	1.18	148.4	1.18	1339.1	1.63	-278.7	0.0	-3414	1.01	17.18	364.0	455.0	-32.9	421.0	1.63	741.7	2080.8	3713	1.01	3.25
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**681.7**	1.09	1249.8	1.18	250.5	1.18	**2513.5**	**1.63**	**-228.5**	**0.0**	**-5855**	**1.01**	**36.88**	**338.2**	**422.7**	39.6	505.5	**1.63**	**689.0**	**3202.5**	**6516**	**1.01**	**5.90**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	152.5	1.09	294.8	1.18	67.2	1.18	593.5	1.63	-109.8	0.0	-2283	1.01	26.40	242.2	302.8	-27.7	270.8	1.63	493.6	1087.1	2810	1.01	4.55
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	322.5	1.09	607.4	1.18	129.3	1.18	1220.8	1.63	-301.4	0.0	-3260	1.01	14.98	505.5	631.9	-75.0	537.0	1.63	1030.0	2250.8	4128	1.01	2.86
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	311.3	1.09	578.6	1.18	119.9	1.18	1163.6	1.63	-524.5	0.0	-3260	1.01	8.50	568.7	710.8	-129.7	530.1	1.63	1158.7	2322.3	4128	1.01	2.59
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	120.7	1.09	225.7	1.18	51.8	1.18	459.0	1.63	-707.4	-248.4	-2280	1.01	3.90	467.2	583.9	-175.9	322.5	1.63	951.8	1410.9	2810	1.01	2.50
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-195.6	1.09	-368.3	1.18	-73.6	1.18	-734.6	1.63	-823.2	-1557.8	-2273	1.01	1.90	272.4	340.5	-205.6	20.1	1.63	555.0	0.0	2810	1.01	6.44
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-571.5**	1.09	-1059.3	1.18	-216.8	1.18	**-2128.8**	**1.63**	**-952.0**	**-3080.8**	**-3273**	**1.01**	**1.24**	**140.0**	**174.9**	-257.8	-237.7	**1.63**	**285.1**	**0.0**	**4128**	**1.01**	**22.09**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5								Factor	19		19							Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	1.63	-233.9	-433.4	-911	1.01	3.08	22.1	27.7	-25.9	-13.4	1.63	45.1	0.0	2207	1.01	53.85
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-43.6	1.09	-94.6	1.18	-13.4	1.18	-175.1	1.63	-246.7	-421.8	-769	1.01	2.44	10.5	13.2	-18.0	-15.6	1.63	21.4	0.0	1859	1.01	95.77
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.3	1.18	-16.1	1.18	-167.8	1.63	-262.7	-430.5	-1006	1.01	3.23	10.7	13.4	-16.5	-12.9	1.63	21.8	0.0	1859	1.01	93.86
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.0	1.09	-89.1	1.18	-17.5	1.18	-165.0	1.63	-269.1	-434.1	-1173	1.01	3.79	10.2	12.7	-15.1	-11.4	1.63	20.7	0.0	1859	1.01	98.48
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.2	1.09	-90.5	1.18	-18.4	1.18	-171.2	1.63	-273.4	-444.5	-1232	1.01	3.92	7.5	9.4	-17.2	-18.3	1.63	15.3	0.0	1859	1.01	133.67
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.5	1.09	-89.8	1.18	-17.4	1.18	-166.3	1.63	-268.7	-435.0	-1173	1.01	3.79	10.4	12.9	-15.1	-11.2	1.63	21.1	0.0	1859	1.01	96.90
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.4	1.18	-16.1	1.18	-167.8	1.63	-258.6	-426.3	-1006	1.01	3.28	11.8	14.8	-16.1	-10.8	1.63	24.1	0.0	1859	1.01	84.99
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-44.6	1.09	-95.1	1.18	-13.4	1.18	-176.5	1.63	-240.5	-417.0	-769	1.01	2.50	11.0	13.7	-18.0	-15.0	1.63	22.4	0.0	1859	1.01	91.71
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-62.7	1.09	-107.9	1.18	-4.8	1.18	-201.3	1.63	-234.1	-435.5	-911	1.01	3.07	21.4	26.8	-21.1	-6.4	1.63	43.7	0.0	2207	1.01	55.67
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-351.6	1.09	-604.8	1.18	-97.5	1.18	-1212.0	1.63	-697.2	-1909.2	-2518	1.01	1.91	52.3	65.4	-134.1	-150.4	1.63	106.6	0.0	3299	1.01	42.60
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	311.5	1.09	538.5	1.18	95.6	1.18	1087.8	1.63	-123.3	0.0	-1530	1.01	21.36	336.4	420.5	-31.4	387.5	1.63	685.5	1773.3	2688	1.01	2.37
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-318.9	1.09	-587.1	1.18	-105.4	1.18	-1164.7	1.63	-743.7	-1908.4	-2722	1.01	2.13	57.8	72.3	-136.7	-147.3	1.63	117.9	0.0	3299	1.01	38.15
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	276.2	1.09	509.2	1.18	102.2	1.18	1022.5	1.63	-141.0	0.0	-1744	1.01	19.75	357.7	447.1	-36.3	407.3	1.63	728.8	1751.3	2688	1.01	2.32
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-249.5	1.09	-469.2	1.18	-87.5	1.18	-928.9	1.63	-693.7	-1622.6	-2437	1.01	2.21	77.4	96.7	-114.3	-85.5	1.63	157.6	0.0	2810	1.01	23.90
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	197.6	1.09	367.7	1.18	80.7	1.18	744.4	1.63	-168.9	0.0	-1306	1.01	12.22	322.3	402.9	-35.1	363.1	1.63	656.7	1401.2	2207	1.01	2.26
U19-L18	DIAGONAL	2-10C25			5559	1577	1876	2076	-117.6	1.09	-222.1	1.18	-38.3	1.18	-435.5	1.63	-503.7	-939.1	-1577	1.01	2.30	104.1	130.1	-67.9	25.1	1.63	212.1	0.0	2076	1.01	11.94
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	45.0	1.09	80.5	1.18	23.1	1.18	171.3	1.63	-278.5	-107.2	-1050	1.01	4.42	205.2	256.5	-21.3	232.8	1.63	418.0	589.3	1556	1.01	3.35
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	57.0	1.09	104.4	1.18	28.4	1.18	218.8	1.63	-265.7	-46.9	-1050	1.01	4.81	198.3	247.9	-1.7	255.7	1.63	404.0	622.8	1556	1.01	3.35
U21-L22	DIAGONAL	2-10C25			5559	1577	1876	2076	-123.3	1.09	-244.8	1.18	-43.3	1.18	-474.4	1.63	-490.9	-965.4	-1577	1.01	2.28	97.9	122.4	-41.0	60.8	1.63	199.5	0.0	2076	1.01	12.89
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	202.4	1.09	387.0	1.18	84.3	1.18	776.7	1.63	-134.0	0.0	-1435	1.01	16.61	316.8	396.0	-15.3	388.2	1.63	645.4	1422.1	2404	1.01	2.56
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-252.7	1.09	-487.1	1.18	-90.8	1.18	-957.4	1.63	-683.2	-1640.6	-2839	1.01	2.80	61.4	76.8	-99.4	-82.0	1.63	125.1	0.0	3299	1.01	34.27
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	283.3	1.09	519.2	1.18	103.8	1.18	1043.9	1.63	-102.8	0.0	-1744	1.01	27.29	352.1	440.1	-23.2	421.3	1.63	717.3	1761.2	2688	1.01	2.33
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-317.9	1.09	-596.6	1.18	-106.8	1.18	-1176.6	1.63	-731.9	-1908.5	-2722	1.01	2.15	45.9	57.3	-126.0	-145.6	1.63	93.5	0.0	3299	1.01	48.23
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	317.9	1.09	542.6	1.18	95.8	1.18	1099.8	1.63	-107.6	0.0	-1530	1.01	24.58	330.5	413.1	-24.7	390.8	1.63	673.4	1773.2	2688	1.01	2.40
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-347.5	1.09	-608.8	1.18	-97.8	1.18	-1212.6	1.63	-686.5	-1899.1	-2518	1.01	**1.94**	48.8	61.0	-131.6	-150.8	1.63	99.5	0.0	3299	1.01	45.67
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**683.4**	1.09	1252.5	1.18	249.6	1.18	**2517.4**	**1.63**	**-236.1**	**0.0**	-5855	1.01	35.71	**366.4**	**458.0**	33.2	531.9	**1.63**	**746.5**	**3263.9**	6516	1.01	5.44
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	362.5	1.09	693.2	1.18	154.7	1.18	1395.6	1.63	-209.2	0.0	-3414	1.01	23.15	273.3	341.7	27.6	401.3	1.63	556.9	1952.5	3713	1.01	4.23
									389.7	1.09	734.9	1.18	152.8	1.18	1472.3	1.63	-183.7	0.0	-3414	1.01	26.78	254.8	318.5	25.0	373.0	1.63	519.1	1991.4	3713	1.01	4.39
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	49.5	1.09	102.4	1.18	32.6	1.18	213.3	1.63	-561.5	-348.2	-2593	1.01	5.04	257.9	322.4	-51.4	252.5	1.63	525.5	738.8	2810	1.01	4.99
									89.9	1.09	168.7	1.18	34.7	1.18	338.0	1.63	-540.7	-202.6	-2593	1.01	5.47	247.3	309.1	-7.6	310.0	1.63	503.8	841.9	2810	1.01	4.96
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-198.0	1.09	-374.1	1.18	-74.6	1.18	-745.3	1.63	-1015.9	-1761.2	-3037	1.01	2.29	224.3	280.4	-124.0	90.4	1.63	457.1	0.0	3299	1.01	8.92
									-172.0	1.09	-331.7	1.18	-73.8	1.18	-666.0	1.63	-991.2	-1657.2	-3037	1.01	2.42	223.8	279.7	-95.9	135.4	1.63	456.0	0.0	3299	1.01	8.77
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-284.0	1.09	-540.5	1.18	-116.2	1.18	-1084.5	1.63	-1208.3	-2292.8	-4165	1.01	2.58	196.9	246.1	-152.8	7.7	1.63	401.1	0.0	4542	1.01	14.14
									-284.8	1.09	-541.7	1.18	-116.2	1.18	-1086.8	1.63	-1210.7	-2297.6	-4165	1.01	2.58	194.4	243.0	-148.1	12.1	1.63	396.2	0.0	4542	1.01	14.32
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-159.8	1.09	-300.6	1.18	-66.5	1.18	-607.4	1.63	-1014.4	-1621.8	-3037	1.01	2.43	279.1	348.8	-113.2	179.4	1.63	568.6	0.0	3299	1.01	6.93
									-186.8	1.09	-344.6	1.18	-67.5	1.18	-689.9	1.63	-1035.3	-1725.2	-3037	1.01	2.30	278.1	347.7	-133.3	145.3	1.63	566.7	0.0	3299	1.01	7.10
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	112.6	1.09	222.5	1.18	46.3	1.18	439.9	1.63	-580.4	-140.4	-2593	1.01	5.27	310.1	387.6	-32.5	351.4	1.63	631.8	1071.7	2810	1.01	3.80
									74.0	1.09	159.9	1.18	44.9	1.18	322.2	1.63	-590.6	-268.4	-2593	1.01	4.98	321.0	401.2	-72.0	301.2	1.63	654.0	976.2	2810	1.01	3.85
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	422.5	1.09	803.8	1.18	166.8	1.18	1605.9	1.63	-213.9	0.0	-3789	1.01	25.39	318.7	398.4	30.4	465.2	1.63	649.4	2255.3	4128	1.01	3.95
									395.5	1.09	763.3	1.18	168.5	1.18	1530.6	1.63	-233.0	0.0	-3789	1.01	22.99	338.7	423.4	-2.1	438.3	1.63	690.1	2220.7	4128	1.01	3.82
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**722.5**	1.09	1326.4	1.18	263.5	1.18	**2663.6**	**1.63**	**-181.6**	**0.0**	-5497	1.01	45.24	**357.6**	**447.0**	36.8	526.3	**1.63**	**728.7**	**3392.3**	6022	1.01	4.69
																1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-588.9**	1.09	-1079.1	1.18	-218.9	1.18	**-2173.5**	**1.63**	**-838.0**	**-3011.5**	-3227	1.01	1.30	**115.7**	**144.6**	-250.8	-258.0	**1.63**	**235.8**	**0.0**	4128	1.01	26.90
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-230.1	1.09	-419.0	1.18	-82.0	1.18	-841.9	1.63	-560.2	-1402.1	-2273	1.01	2.60	206.5	258.1	-97.5	110.3	1.63	420.7	0.0	2810	1.01	8.75
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	66.2	1.09	142.6	1.18	36.6	1.18	283.6	1.63	-502.8	-219.2	-2280	1.01	5.14	397.0	496.2	-119.3	323.2	1.63	808.9	1092.4	2810	1.01	3.16
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	237.0	1.09	460.2	1.18	98.7	1.18	917.8	1.63	-441.8	0.0	-2954	1.01	8.83	515.2	643.9	-133.7	453.9	1.63	1049.6	1967.4	3713	1.01	2.70
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	230.6	1.09	443.3	1.18	94.9	1.18	886.4	1.63	-528.9	0.0	-2954	1.01	7.32	523.1	653.9	-151.8	434.8	1.63	1065.9	1952.3	3713	1.01	2.69
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	48.9	1.09	98.1	1.18	26.6	1.18	200.5	1.63	-667.8	-467.3	-2280	1.01	3.75	416.9	521.1	-168.7	268.6	1.63	849.5	1050.0	2810	1.01	3.10
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-259.8	1.09	-488.1	1.18	-96.6	1.18	-973.1	1.63	-747.1	-1720.3	-2634	1.01	2.26	242.3	302.9	-172.1	35.4	1.63	493.8	0.0	3299	1.01	8.72
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-622.3	1.09	-1154.4	1.18	-233.4	1.18	-2315.9	1.63	-871.6	**-3187.5**	-3527	1.01	1.43	108.0	135.0	-221.3	-219.9	1.63	220.0	**0.0**	4542	1.01	31.38

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN

Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-30.4	1.09	-53.7	1.18	-2.0	1.18	-98.9	-123.1	-153.9	-15.6	-186.0	1.63	-250.9	-349.8	-1232	1.01	4.56	24.3	30.3	-15.6	6.2	1.63	49.4	0.0	1859	1.01	39.99
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-37.7	1.09	-90.8	1.18	-16.9	1.18	-168.1	-129.4	-161.8	-15.4	-194.0	1.63	-263.8	-431.9	-1232	1.01	4.08	8.2	10.3	-15.4	-14.4	1.63	16.8	0.0	1859	1.01	122.07
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.9	1.09	-91.6	1.18	-19.1	1.18	-174.2	-133.1	-166.4	-16.3	-200.1	1.63	-271.2	-445.3	-1232	1.01	3.95	7.3	9.1	-16.3	-17.1	1.63	14.8	0.0	1859	1.01	138.67
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-37.2	1.09	-88.8	1.18	-17.6	1.18	-166.0	-130.3	-162.9	-16.1	-196.3	1.63	-265.6	-431.5	-1173	1.01	3.84	9.4	11.8	-16.1	-14.0	1.63	19.2	0.0	1859	1.01	106.34
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.2	1.09	-90.6	1.18	-15.9	1.18	-166.1	-126.9	-158.7	-16.5	-192.4	1.63	-258.7	-424.8	-1006	1.01	3.28	10.5	13.2	-16.5	-13.2	1.63	21.4	0.0	1859	1.01	95.36
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-42.7	1.09	-92.4	1.18	-12.7	1.18	-170.6	-117.4	-146.8	-17.7	-181.9	1.63	-239.2	-409.9	-769	1.01	2.54	10.2	12.7	-17.7	-15.5	1.63	20.7	0.0	1859	1.01	98.77
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-112.5	-140.6	-25.9	-189.0	1.63	-229.2	-428.8	-911	1.01	3.14	20.3	25.3	-25.9	-15.8	1.63	41.3	0.0	2207	1.01	58.83
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-284.5	1.09	-518.8	1.18	-90.7	1.18	-1029.2	-340.8	-426.0	-133.3	-661.6	1.63	-694.3	-1723.5	-2392	1.01	2.00	72.8	91.0	-133.3	-122.3	1.63	148.3	0.0	2893	1.01	26.63
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	209.1	1.09	377.9	1.18	76.8	1.18	764.4	-72.2	-90.3	-45.9	-169.0	1.63	-169.0	0.0	-983	1.01	10.40	295.1	368.8	-45.9	309.9	1.63	601.2	1365.6	2071	1.01	2.21
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-116.8	1.09	-216.4	1.18	-35.3	1.18	-424.3	-231.0	-288.7	-78.7	-429.4	1.63	-470.6	-895.0	-1298	1.01	1.88	69.4	86.7	-78.7	-37.8	1.63	141.3	0.0	1652	1.01	14.81
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	42.2	1.09	66.0	1.18	18.4	1.18	145.7	-105.4	-131.7	-42.8	-207.2	1.63	-214.7	-69.0	-797	1.01	4.43	185.0	231.2	-42.8	171.3	1.63	376.8	522.5	1133	1.01	2.65
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	56.1	1.09	107.1	1.18	31.8	1.18	225.1	-117.6	-147.0	-11.0	-171.4	1.63	-239.6	-14.5	-797	1.01	4.30	143.3	179.2	-11.0	168.9	1.63	292.0	517.1	1133	1.01	3.15
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-127.0	1.09	-250.1	1.18	-47.4	1.18	-489.4	-188.4	-235.5	-51.5	-329.6	1.63	-383.8	-873.3	-1577	1.01	2.87	78.9	98.6	-51.5	18.9	1.63	160.7	0.0	2076	1.01	16.09
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	213.4	1.09	401.8	1.18	91.9	1.18	815.1	-29.7	-37.1	11.1	-20.6	1.63	-60.5	0.0	-1306	1.01	35.28	268.9	336.2	11.1	368.8	1.63	548.0	1363.1	2207	1.01	2.58
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-263.6	1.09	-502.1	1.18	-98.3	1.18	-995.8	-292.2	-365.2	-93.2	-533.0	1.63	-595.4	-1591.1	-2497	1.01	2.56	15.9	19.8	-93.2	-131.2	1.63	32.3	0.0	2884	1.01	120.87
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	289.8	1.09	540.5	1.18	112.4	1.18	1086.3	-26.7	-33.4	-6.9	-46.1	1.63	-54.4	0.0	-1744	1.01	52.33	313.1	391.3	-6.9	397.0	1.63	637.9	1724.2	2688	1.01	2.55
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-328.9	1.09	-617.1	1.18	-115.0	1.18	-1222.4	-325.3	-406.6	-117.4	-615.6	1.63	-662.8	-1885.3	-3041	1.01	2.79	26.6	33.3	-117.4	-156.7	1.63	54.3	0.0	3713	1.01	91.64
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	320.4	1.09	562.7	1.18	103.2	1.18	1135.0	-50.5	-63.1	-17.7	-94.6	1.63	-102.9	0.0	-1530	1.01	26.05	299.2	374.0	-17.7	361.4	1.63	609.7	1744.6	2688	1.01	2.59
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-356.2	1.09	-628.3	1.18	-104.7	1.18	-1253.1	-308.5	-385.7	-128.2	-611.3	1.63	-628.6	-1881.8	-2804	1.01	2.51	49.3	61.6	-128.2	-144.7	1.63	100.4	0.0	3713	1.01	49.82
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	26.9	1.09	43.8	1.18	1.3	1.18	82.5	-28.1	-35.1	-10.1	-53.1	1.63	-57.2	0.0	-3414	1.01	61.76	60.5	75.6	-10.1	62.4	1.63	123.2	205.7	3713	1.01	29.78
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-318.7	1.09	-588.8	1.18	-117.0	1.18	-1180.2	-407.0	-508.7	-120.0	-726.3	1.63	-829.2	-2009.4	-3414	1.01	2.73	97.9	122.4	-120.0	-67.8	1.63	199.5	0.0	3713	1.01	24.71
									-279.8	1.09	-525.9	1.18	-116.8	1.18	-1063.3	-376.3	-470.3	-82.4	-625.0	1.63	-766.6	-1829.9	-3414	1.01	3.11	94.9	118.7	-82.4	-10.6	1.63	193.4	0.0	3713	1.01	24.88
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-390.4**	1.09	-725.5	1.18	-154.7	1.18	**-1464.1**	**-563.7**	**-704.6**	-160.1	-996.0	**1.63**	**-1148.5**	**-2612.6**	**-4333**	**1.01**	**2.54**	**190.0**	**237.5**	-160.1	-13.3	**1.63**	**387.1**	**0.0**	**4779**	**1.01**	**16.25**
									-380.3	1.09	-710.1	1.18	-156.6	1.18	-1437.2	-561.8	-702.2	-144.9	-968.7	1.63	-1144.6	-2581.8	-4333	1.01	2.57	189.1	236.4	-144.9	10.5	1.63	385.3	0.0	4779	1.01	16.26
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-251.7	1.09	-463.4	1.18	-101.7	1.18	-941.2	-506.8	-633.4	-142.0	-892.3	1.63	-1032.5	-1973.7	-3789	1.01	2.80	261.8	327.2	-142.0	109.9	1.63	533.4	0.0	4128	1.01	9.58
									-269.8	1.09	-493.0	1.18	-103.6	1.18	-998.0	-516.0	-645.0	-150.8	-918.7	1.63	-1051.3	-2049.3	-3789	1.01	2.69	261.4	326.8	-150.8	95.0	1.63	532.6	0.0	4128	1.01	9.70
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.6	1.09	93.8	1.18	20.2	1.18	182.0	-302.1	-377.6	-67.8	-504.4	1.63	-615.4	-433.5	-2593	1.01	4.55	283.9	354.8	-67.8	259.6	1.63	578.4	760.4	2810	1.01	4.59
									8.5	1.09	36.4	1.18	16.9	1.18	72.2	-321.4	-401.8	-99.2	-580.8	1.63	-654.9	-582.7	-2593	1.01	4.11	292.3	365.4	-99.2	219.5	1.63	595.6	667.8	2810	1.01	4.64
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	370.3	1.09	704.6	1.18	148.6	1.18	1410.4	-118.9	-148.6	7.2	-143.3	1.63	-242.2	0.0	-3414	1.01	20.05	283.6	354.4	7.2	381.5	1.63	577.7	1988.2	3713	1.01	4.05
									345.7	1.09	667.0	1.18	148.4	1.18	1339.1	-127.0	-158.7	-32.9	-219.2	1.63	-258.7	0.0	-3414	1.01	18.50	304.5	380.6	-32.9	343.4	1.63	620.4	1959.5	3713	1.01	3.89
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**681.7**	1.09	1249.8	1.18	250.5	1.18	**2513.5**	**-93.7**	**-117.1**	39.6	-57.6	**1.63**	**-190.9**	**0.0**	**-5855**	**1.01**	**44.15**	**284.5**	**355.7**	39.6	435.6	**1.63**	**579.7**	**3093.3**	**6516**	**1.01**	**7.02**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	152.5	1.09	294.8	1.18	67.2	1.18	593.5	-41.4	-51.8	-27.7	-99.1	1.63	-99.1	0.0	-2283	1.01	29.25	215.3	269.2	-27.7	235.7	1.63	438.7	1032.2	2810	1.01	5.12
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	322.5	1.09	607.4	1.18	129.3	1.18	1220.8	-114.7	-143.3	-75.0	-271.7	1.63	-271.7	0.0	-3260	1.01	16.61	450.6	563.2	-75.0	465.4	1.63	918.1	2138.9	4128	1.01	3.21
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	311.3	1.09	578.6	1.18	119.9	1.18	1163.6	-200.4	-250.4	-129.7	-472.7	1.63	-472.7	0.0	-3260	1.01	9.43	507.1	633.9	-129.7	449.8	1.63	1033.2	2196.8	4128	1.01	2.91
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	120.7	1.09	225.7	1.18	51.8	1.18	459.0	-269.2	-336.6	-175.9	-637.8	1.63	-637.8	-178.8	-2280	1.01	4.33	415.7	519.6	-175.9	255.3	1.63	846.9	1306.0	2810	1.01	2.81
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-195.6	1.09	-368.3	1.18	-73.6	1.18	-734.6	-312.7	-390.8	-205.6	-742.9	1.63	-742.9	-1477.5	-2273	1.01	2.10	242.5	303.2	-205.6	-18.9	1.63	494.2	0.0	2810	1.01	7.23
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-571.5**	1.09	-1059.3	1.18	-216.8	1.18	**-2128.8**	**-340.9**	**-426.1**	-257.8	-864.7	**1.63**	**-864.7**	**-2993.5**	**-3273**	**1.01**	1.36	**116.9**	**146.1**	-257.8	-267.8	**1.63**	**238.2**	**0.0**	**4128**	**1.01**	**26.44**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-112.5	-140.6	-25.9	-189.0	1.63	-229.2	-428.8	-911	1.01	3.14	20.3	25.3	-25.9	-15.8	1.63	41.3	0.0	2207	1.01	58.83
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-43.6	1.09	-94.6	1.18	-13.4	1.18	-175.1	-119.5	-149.4	-18.0	-185.2	1.63	-243.5	-418.6	-769	1.01	2.47	9.4	11.8	-18.0	-17.1	1.63	19.2	0.0	1859	1.01	107.05
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.3	1.18	-16.1	1.18	-167.8	-127.7	-159.6	-16.5	-193.3	1.63	-260.2	-427.9	-1006	1.01	3.26	10.2	12.8	-16.5	-13.5	1.63	20.9	0.0	1859	1.01	98.03
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.0	1.09	-89.1	1.18	-17.5	1.18	-165.0	-130.5	-163.1	-15.1	-194.8	1.63	-265.8	-430.9	-1173	1.01	3.84	9.7	12.1	-15.1	-12.1	1.63	19.7	0.0	1859	1.01	103.62
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.2	1.09	-90.5	1.18	-18.4	1.18	-171.2	-132.1	-165.2	-17.2	-200.4	1.63	-269.2	-440.4	-1232	1.01	3.99	7.2	9.0	-17.2	-18.8	1.63	14.6	0.0	1859	1.01	140.44
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.5	1.09	-89.8	1.18	-17.4	1.18	-166.3	-130.2	-162.7	-15.1	-194.4	1.63	-265.2	-431.5	-1173	1.01	3.84	9.9	12.3	-15.1	-11.8	1.63	20.1	0.0	1859	1.01	101.61
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.4	1.18	-16.1	1.18	-167.8	-125.6	-157.0	-16.1	-190.0	1.63	-256.0	-423.7	-1006	1.01	3.31	11.2	14.0	-16.1	-11.6	1.63	22.8	0.0	1859	1.01	89.76
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-44.6	1.09	-95.1	1.18	-13.4	1.18	-176.5	-117.5	-146.9	-18.0	-182.6	1.63	-239.5	-416.0	-769	1.01	2.51	10.1	12.6	-18.0	-16.2	1.63	20.5	0.0	1859	1.01	100.20
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-62.7	1.09	-107.9	1.18	-4.8	1.18	-201.3	-112.6	-140.7	-21.1	-181.2	1.63	-229.4	-430.8	-911	1.01	3.13	19.4	24.3	-21.1	-9.1	1.63	39.5	0.0	2207	1.01	61.45
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-351.6	1.09	-604.8	1.18	-97.5	1.18	-1212.0	-303.1	-378.9	-134.1	-613.9	1.63	-617.6	-1829.6	-2518	1.01	2.16	44.0	55.0	-134.1	-161.3	1.63	89.6	0.0	3299	1.01	50.70
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	311.5	1.09	538.5	1.18	95.6	1.18	1087.8	-46.4	-58.0	-31.4	-111.7	1.63	-111.7	0.0	-1530	1.01	23.56	292.9	366.1	-31.4	330.7	1.63	596.8	1684.6	2688	1.01	2.73
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-318.9	1.09	-587.1	1.18	-105.4	1.18	-1164.7	-321.2	-401.4	-136.7	-641.6	1.63	-654.3	-1819.1	-2722	1.01	2.42	48.3	60.4	-136.7	-159.8	1.63	98.4	0.0	3299	1.01	45.68
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	276.2	1.09	509.2	1.18	102.2	1.18	1022.5	-52.4	-65.5	-36.3	-127.5	1.63	-127.5	0.0	-1744	1.01	21.84	309.8	387.3	-36.3	344.9	1.63	631.3	1653.8	2688	1.01	2.68
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-249.5	1.09	-469.2	1.18	-87.5	1.18	-928.9	-301.7	-377.2	-114.3	-579.8	1.63	-614.8	-1543.7	-2437	1.01	2.49	64.6	80.8	-114.3	-102.1	1.63	131.6	0.0	2810	1.01	28.62
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	197.6	1.09	367.7	1.18	80.7	1.18	744.4	-69.2	-86.5	-35.1	-147.4	1.63	-147.4	0.0	-1306	1.01	14.00	280.9	351.2	-35.1	309.2	1.63	572.4	1316.8	2207	1.01	2.59
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-117.6	1.09	-222.1	1.18	-38.3	1.18	-435.5	-221.1	-276.3	-67.9	-398.9	1.63	-450.4	-885.9	-1577	1.01	2.57	92.6	115.7	-67.9	10.1	1.63	188.6	0.0	2076	1.01	13.42
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	45.0	1.09	80.5	1.18	23.1	1.18	171.3	-121.4	-151.7	-21.3	-193.0	1.63	-247.3	-76.0	-1050	1.01	4.98	182.3	227.9	-21.3	203.0	1.63	371.5	542.8	1556	1.01	3.77
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	57.0	1.09	104.4	1.18	28.4	1.18	218.8	-116.4	-145.5	-1.7	-154.6	1.63	-237.1	-18.3	-1050	1.01	5.40	176.8	221.0	-1.7	227.8	1.63	360.3	579.1	1556	1.01	3.75
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-123.3	1.09	-244.8	1.18	-43.3	1.18	-474.4	-215.6	-269.5	-41.0	-348.1	1.63	-439.3	-913.8	-1577	1.01	2.55	87.8	109.8	-41.0	47.7	1.63	179.0	0.0	2076	1.01	14.36
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	202.4	1.09	387.0	1.18	84.3	1.18	776.7	-55.9	-69.9	-15.3	-97.8	1.63	-113.9	0.0	-1435	1.01	19.54	276.6	345.7	-15.3	335.8	1.63	563.5	1340.2	2404	1.01	2.93
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-252.7	1.09	-487.1	1.18	-90.8	1.18	-957.4	-297.6	-372.0	-99.4	-550.1	1.63	-606.3	-1563.8	-2839	1.01	3.15	52.2	65.3	-99.4	-94.0	1.63	106.4	0.0	3299	1.01	40.32
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	283.3	1.09	519.2	1.18	103.8	1.18	1043.9	-42.3	-52.9	-23.2	-93.1	1.63	-93.1	0.0	-1744	1.01	30.15	305.6	382.0	-23.2	360.7	1.63	622.7	1666.6	2688	1.01	2.68
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-317.9	1.09	-596.6	1.18	-106.8	1.18	-1176.6	-316.4	-395.4	-126.0	-618.0	1.63	-644.6	-1821.1	-2722	1.01	2.44	39.0	48.7	-126.0	-154.6	1.63	79.4	0.0	3299	1.01	56.74
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	317.9	1.09	542.6	1.18	95.8	1.18	1099.8	-43.7	-54.6	-24.7	-97.2	1.63	-97.2	0.0	-1530	1.01	27.21	288.2	360.2	-24.7	335.6	1.63	587.2	1687.0	2688	1.01	2.75
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-347.5	1.09	-608.8	1.18	-97.8	1.18	-1212.6	-298.3	-372.9	-131.6	-603.4	1.63	-607.8	-1820.4	-2518	1.01	2.19	41.3	51.6	-131.6	-160.6	1.63	84.1	0.0	3299	1.01	54.04
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**683.4**	1.09	1252.5	1.18	249.6	1.18	**2517.4**	**-96.8**	**-121.0**	33.2	-72.1	**1.63**	**-197.2**	**0.0**	-5855	1.01	42.76	**307.7**	**384.6**	33.2	455.3	**1.63**	**626.9**	**3144.3**	6516	1.01	6.48
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	362.5	1.09	693.2	1.18	154.7	1.18	1395.6	-96.5	-120.6	27.6	-80.9	1.63	-196.6	0.0	-3414	1.01	24.63	232.1	290.1	27.6	347.6	1.63	472.9	1868.5	3713	1.01	4.98
									389.7	1.09	734.9	1.18	152.8	1.18	1472.3	-87.5	-109.3	25.0	-73.3	1.63	-178.2	0.0	-3414	1.01	27.61	216.1	270.1	25.0	322.5	1.63	440.3	1912.6	3713	1.01	5.17
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	49.5	1.09	102.4	1.18	32.6	1.18	213.3	-263.2	-329.0	-51.4	-427.0	1.63	-536.3	-323.0	-2593	1.01	5.28	219.1	273.9	-51.4	201.9	1.63	446.4	659.7	2810	1.01	5.88
									89.9	1.09	168.7	1.18	34.7	1.18	338.0	-243.6	-304.4	-7.6	-330.0	1.63	-496.2	-158.2	-2593	1.01	5.96	210.2	262.8	-7.6	261.7	1.63	428.3	766.3	2810	1.01	5.84
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-198.0	1.09	-374.1	1.18	-74.6	1.18	-745.3	-449.2	-561.5	-124.0	-787.9	1.63	-915.2	-1660.5	-3037	1.01	2.54	190.7	238.3	-124.0	46.5	1.63	388.5	0.0	3299	1.01	10.49
									-172.0	1.09	-331.7	1.18	-73.8	1.18	-666.0	-436.1	-545.1	-95.9	-725.0	1.63	-888.5	-1554.5	-3037	1.01	2.70	190.2	237.8	-95.9	91.7	1.63	387.6	0.0	3299	1.01	10.31
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-284.0	1.09	-540.5	1.18	-116.2	1.18	-1084.5	-533.9	-667.3	-152.8	-945.2	1.63	-1087.8	-2172.3	-4165	1.01	2.87	164.4	205.5	-152.8	-34.6	1.63	335.0	0.0	4542	1.01	16.93
									-284.8	1.09	-541.7	1.18	-116.2	1.18	-1086.8	-534.0	-667.5	-148.1	-937.8	1.63	-1088.0	-2174.9	-4165	1.01	2.87	162.4	203.0	-148.1	-29.7	1.63	330.9	0.0	4542	1.01	17.15
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-159.8	1.09	-300.6	1.18	-66.5	1.18	-607.4	-446.1	-557.6	-113.2	-766.2	1.63	-908.9	-1516.3	-3037	1.01	2.71	233.1	291.4	-113.2	119.5	1.63	474.9	0.0	3299	1.01	8.29
									-186.8	1.09	-344.6	1.18	-67.5	1.18	-689.9	-457.9	-572.4	-133.3	-814.4	1.63	-932.9	-1622.8	-3037	1.01	2.55	232.3	290.4	-133.3	85.6	1.63	473.4	0.0	3299	1.01	8.50
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	112.6	1.09	222.5	1.18	46.3	1.18	439.9	-259.6	-324.5	-32.5	-391.4	1.63	-528.9	-89.0	-2593	1.01	5.78	259.0	323.7	-32.5	284.8	1.63	527.7	967.6	2810	1.01	4.54
									74.0	1.09	159.9	1.18	44.9	1.18	322.2	-275.6	-344.4	-72.0	-476.7	1.63	-561.4	-239.3	-2593	1.01	5.24	268.1	335.1	-72.0	232.2	1.63	546.3	868.4	2810	1.01	4.61
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	422.5	1.09	803.8	1.18	166.8	1.18	1605.9	-101.3	-126.6	30.4	-82.5	1.63	-206.4	0.0	-3789	1.01	26.33	266.3	332.9	30.4	396.8	1.63	542.6	2148.5	4128	1.01	4.72
									395.5	1.09	763.3	1.18	168.5	1.18	1530.6	-107.6	-134.6	-2.1	-143.7	1.63	-219.3	0.0	-3789	1.01	24.43	283.8	354.7	-2.1	366.7	1.63	578.2	2108.8	4128	1.01	4.56
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**722.5**	1.09	1326.4	1.18	263.5	1.18	**2663.6**	**-75.8**	**-94.7**	36.8	-38.9	**1.63**	**-154.3**	**0.0**	-5497	1.01	53.22	**301.2**	**376.5**	36.8	452.7	**1.63**	**613.7**	**3277.3**	6022	1.01	5.57
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-588.9**	1.09	-1079.1	1.18	-218.9	1.18	**-2173.5**	**-278.8**	**-348.4**	-250.8	-772.4	**1.63**	**-772.4**	**-2945.9**	-3227	1.01	1.41	**96.6**	**120.8**	-250.8	-282.9	**1.63**	**196.9**	**0.0**	4128	1.01	32.21
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-230.1	1.09	-419.0	1.18	-82.0	1.18	-841.9	-234.0	-292.5	-97.5	-464.1	1.63	-476.7	-1318.7	-2273	1.01	3.05	191.5	239.4	-97.5	90.8	1.63	390.3	0.0	2810	1.01	9.43
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	66.2	1.09	142.6	1.18	36.6	1.18	283.6	-201.1	-251.3	-119.3	-456.6	1.63	-456.6	-173.0	-2280	1.01	5.66	356.0	445.0	-119.3	269.8	1.63	725.4	1009.0	2810	1.01	3.52
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	237.0	1.09	460.2	1.18	98.7	1.18	917.8	-146.0	-182.5	-133.7	-408.3	1.63	-408.3	0.0	-2954	1.01	9.56	461.7	577.2	-133.7	384.2	1.63	940.8	1858.6	3713	1.01	3.01
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	230.6	1.09	443.3	1.18	94.9	1.18	886.4	-180.3	-225.4	-151.8	-482.5	1.63	-482.5	0.0	-2954	1.01	8.02	468.1	585.1	-151.8	363.1	1.63	953.8	1840.2	3713	1.01	3.00
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	48.9	1.09	98.1	1.18	26.6	1.18	200.5	-251.5	-314.4	-168.7	-603.0	1.63	-603.0	-402.5	-2280	1.01	4.15	372.5	465.7	-168.7	210.7	1.63	759.0	959.5	2810	1.01	3.47
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-259.8	1.09	-488.1	1.18	-96.6	1.18	-973.1	-298.8	-373.5	-172.1	-670.2	1.63	-670.2	-1643.3	-2634	1.01	2.52	220.9	276.1	-172.1	7.5	1.63	450.1	0.0	3299	1.01	9.56
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-622.3	1.09	-1154.4	1.18	-233.4	1.18	-2315.9	-328.1	-410.1	-221.3	-788.5	1.63	-788.5	**-3104.4**	-3527	1.01	1.58	91.8	114.7	-221.3	-241.0	1.63	187.0	**0.0**	4542	1.01	36.92

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (RIGHT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2,asphalt}$	$P_{f,DL}$	C_T	$C_{T,DLA}$	C_{LL}	$C_{T+LL,f}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5			19		19							Factor	7		19							Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-30.4	1.09	-53.7	1.18	-2.0	1.18	-98.9	-121.2	-151.5	-15.6	-183.4	1.63	-246.9	-345.8	-1232	1.01	4.64	20.4	25.5	-15.6	1.2	1.63	41.6	0.0	1859	1.01	47.58
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-37.7	1.09	-90.8	1.18	-16.9	1.18	-168.1	-120.9	-151.1	-15.4	-182.8	1.63	-246.3	-414.4	-1232	1.01	4.37	7.6	9.5	-15.4	-15.3	1.63	15.5	0.0	1859	1.01	132.09
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.9	1.09	-91.6	1.18	-19.1	1.18	-174.2	-121.9	-152.4	-16.3	-185.6	1.63	-248.5	-422.6	-1232	1.01	4.31	5.8	7.3	-16.3	-19.0	1.63	11.9	0.0	1859	1.01	172.94
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-37.2	1.09	-88.8	1.18	-17.6	1.18	-166.0	-119.8	-149.7	-16.1	-182.5	1.63	-244.0	-410.0	-1173	1.01	4.18	8.3	10.4	-16.1	-15.5	1.63	16.9	0.0	1859	1.01	121.00
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.2	1.09	-90.6	1.18	-15.9	1.18	-166.1	-117.8	-147.2	-16.5	-180.4	1.63	-239.9	-406.1	-1006	1.01	3.54	9.3	11.6	-16.5	-14.8	1.63	18.9	0.0	1859	1.01	108.25
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-42.7	1.09	-92.4	1.18	-12.7	1.18	-170.6	-111.4	-139.2	-17.7	-174.0	1.63	-226.9	-397.6	-769	1.01	**2.67**	9.1	11.4	-17.7	-16.9	1.63	18.6	0.0	1859	1.01	110.02
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-109.1	-136.3	-25.9	-184.5	1.63	-222.2	-421.8	-911	1.01	3.24	17.4	21.8	-25.9	-19.5	1.63	35.5	0.0	2207	1.01	68.34
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-284.5	1.09	-518.8	1.18	-90.7	1.18	-1029.2	-249.6	-312.0	-133.3	-542.7	1.63	-542.7	-1571.9	-2392	1.01	2.55	48.7	60.9	-133.3	-153.8	1.63	99.2	0.0	2893	1.01	39.83
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	209.1	1.09	377.9	1.18	76.8	1.18	764.4	-48.3	-60.4	-45.9	-137.8	1.63	-137.8	0.0	-983	1.01	12.75	218.9	273.6	-45.9	210.6	1.63	446.0	1210.4	2071	1.01	**2.98**
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-116.8	1.09	-216.4	1.18	-35.3	1.18	-424.3	-179.1	-223.9	-78.7	-361.7	1.63	-364.9	-789.2	-1298	1.01	**2.43**	58.9	73.6	-78.7	-51.5	1.63	119.9	0.0	1652	1.01	17.45
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	42.2	1.09	66.0	1.18	18.4	1.18	145.7	-89.5	-111.9	-42.8	-186.6	1.63	-186.6	-40.9	-797	1.01	5.09	141.9	177.4	-42.8	115.2	1.63	289.2	434.9	1133	1.01	3.45
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	56.1	1.09	107.1	1.18	31.8	1.18	225.1	-94.7	-118.4	-11.0	-141.5	1.63	-192.9	0.0	-797	1.01	5.34	118.2	147.8	-11.0	136.2	1.63	240.9	466.0	1133	1.01	3.82
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-127.0	1.09	-250.1	1.18	-47.4	1.18	-489.4	-153.8	-192.2	-51.5	-284.5	1.63	-313.4	-802.8	-1577	1.01	3.52	64.4	80.5	-51.5	0.0	1.63	131.2	0.0	2076	1.01	19.71
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	213.4	1.09	401.8	1.18	91.9	1.18	815.1	-25.5	-31.9	11.1	-15.1	1.63	-52.0	0.0	-1306	1.01	41.09	202.9	253.6	11.1	282.7	1.63	413.4	1228.5	2207	1.01	3.42
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-263.6	1.09	-502.1	1.18	-98.3	1.18	-995.8	-219.8	-274.8	-93.2	-438.6	1.63	-447.9	-1443.7	-2497	1.01	3.41	13.5	16.9	-93.2	-134.3	1.63	27.6	0.0	2884	1.01	141.86
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	289.8	1.09	540.5	1.18	112.4	1.18	1086.3	-18.3	-22.9	-6.9	-35.1	1.63	-37.2	0.0	-1744	1.01	76.47	227.8	284.7	-6.9	285.7	1.63	464.1	1550.4	2688	1.01	3.51
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-328.9	1.09	-617.1	1.18	-115.0	1.18	-1222.4	-235.5	-294.4	-117.4	-498.6	1.63	-498.6	-1721.0	-3041	1.01	3.71	17.8	22.3	-117.4	-168.2	1.63	36.3	0.0	3713	1.01	137.02
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	320.4	1.09	562.7	1.18	103.2	1.18	1135.0	-33.7	-42.2	-17.7	-72.8	1.63	-72.8	0.0	-1530	1.01	36.83	213.3	266.6	-17.7	249.3	1.63	434.6	1569.5	2688	1.01	3.63
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-356.2	1.09	-628.3	1.18	-104.7	1.18	-1253.1	-219.4	-274.2	-128.2	-495.0	1.63	-495.0	-1748.2	-2804	1.01	3.19	32.9	41.1	-128.2	-166.1	1.63	66.9	0.0	3713	1.01	74.75
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	26.9	1.09	43.8	1.18	1.3	1.18	82.5	-19.9	-24.8	-10.1	-42.4	1.63	-42.4	0.0	-3414	1.01	83.27	49.5	61.9	-10.1	48.1	1.63	100.9	183.4	3713	1.01	36.36
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	-318.7	1.09	-588.8	1.18	-117.0	1.18	-1180.2	-297.2	-371.5	-120.0	-583.2	1.63	-605.6	-1785.8	-3414	1.01	3.74	65.5	81.8	-120.0	-110.2	1.63	133.4	0.0	3713	1.01	36.96
									-279.8	1.09	-525.9	1.18	-116.8	1.18	-1063.3	-271.6	-339.6	-82.4	-488.6	1.63	-553.5	-1616.7	-3414	1.01	4.31	63.5	79.3	-82.4	-51.6	1.63	129.3	0.0	3713	1.01	37.22
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-390.4**	1.09	-725.5	1.18	-154.7	1.18	**-1464.1**	**-412.4**	**-515.5**	-160.1	-798.7	**1.63**	**-840.2**	**-2304.3**	**-4333**	**1.01**	**3.47**	**127.0**	**158.8**	-160.1	-95.4	**1.63**	**258.8**	**0.0**	**4779**	**1.01**	**24.31**
									-380.3	1.09	-710.1	1.18	-156.6	1.18	-1437.2	-406.9	-508.6	-144.9	-766.7	1.63	-829.0	-2266.2	-4333	1.01	3.55	126.4	157.9	-144.9	-71.4	1.63	257.4	0.0	4779	1.01	24.33
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-251.7	1.09	-463.4	1.18	-101.7	1.18	-941.2	-370.1	-462.7	-142.0	-714.2	1.63	-754.2	-1695.3	-3789	1.01	3.83	175.0	218.8	-142.0	-3.3	1.63	356.6	0.0	4128	1.01	14.33
									-269.8	1.09	-493.0	1.18	-103.6	1.18	-998.0	-380.2	-475.2	-150.8	-741.6	1.63	-774.6	-1772.6	-3789	1.01	3.65	174.7	218.4	-150.8	-18.0	1.63	356.0	0.0	4128	1.01	14.51
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	43.6	1.09	93.8	1.18	20.2	1.18	182.0	-223.9	-279.9	-67.8	-402.5	1.63	-456.2	-274.2	-2593	1.01	6.14	189.8	237.3	-67.8	137.0	1.63	386.7	568.7	2810	1.01	6.87
									8.5	1.09	36.4	1.18	16.9	1.18	72.2	-242.1	-302.6	-99.2	-477.4	1.63	-493.3	-421.1	-2593	1.01	5.46	195.5	244.4	-99.2	93.2	1.63	398.3	470.5	2810	1.01	6.94
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	370.3	1.09	704.6	1.18	148.6	1.18	1410.4	-94.1	-117.7	7.2	-111.1	1.63	-191.8	0.0	-3414	1.01	25.33	189.8	237.3	7.2	259.3	1.63	386.8	1797.2	3713	1.01	6.05
									345.7	1.09	667.0	1.18	148.4	1.18	1339.1	-103.6	-129.4	-32.9	-188.7	1.63	-211.0	0.0	-3414	1.01	22.69	203.6	254.5	-32.9	211.8	1.63	414.8	1753.9	3713	1.01	5.81
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**681.7**	1.09	1249.8	1.18	250.5	1.18	**2513.5**	**-62.7**	**-78.4**	39.6	-17.2	**1.63**	**-127.7**	**0.0**	**-5855**	**1.01**	**65.98**	**191.9**	**239.8**	39.6	314.7	**1.63**	**390.9**	**2904.4**	**6516**	**1.01**	**10.40**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	152.5	1.09	294.8	1.18	67.2	1.18	593.5	-27.7	-34.6	-27.7	-81.2	1.63	-81.2	0.0	-2283	1.01	35.71	164.0	205.0	-27.7	168.8	1.63	334.1	927.6	2810	1.01	6.72
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	322.5	1.09	607.4	1.18	129.3	1.18	1220.8	-76.7	-95.8	-75.0	-222.2	1.63	-222.2	0.0	-3260	1.01	20.32	334.9	418.6	-75.0	314.4	1.63	682.3	1903.1	4128	1.01	**4.32**
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	311.3	1.09	578.6	1.18	119.9	1.18	1163.6	-134.0	-167.5	-129.7	-386.1	1.63	-386.1	0.0	-3260	1.01	11.54	368.0	460.0	-129.7	268.4	1.63	749.7	1913.3	4128	1.01	**4.01**
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	120.7	1.09	225.7	1.18	51.8	1.18	459.0	-180.1	-225.1	-175.9	-521.6	1.63	-521.6	-62.5	-2280	1.01	5.29	302.8	378.6	-175.9	108.2	1.63	617.0	1076.1	2810	1.01	3.86
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-195.6	1.09	-368.3	1.18	-73.6	1.18	-734.6	-209.3	-261.6	-205.6	-608.1	1.63	-608.1	-1342.7	-2273	1.01	2.57	175.7	219.6	-205.6	-106.1	1.63	358.0	0.0	2810	1.01	9.98
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-571.5**	1.09	-1059.3	1.18	-216.8	1.18	**-2128.8**	**-228.1**	**-285.1**	-257.8	-717.7	**1.63**	**-717.7**	**-2846.4**	**-3273**	**1.01**	1.64	**78.2**	**97.8**	-257.8	-318.2	**1.63**	**159.4**	**0.0**	**4128**	**1.01**	**39.51**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (RIGHT TRUSS)

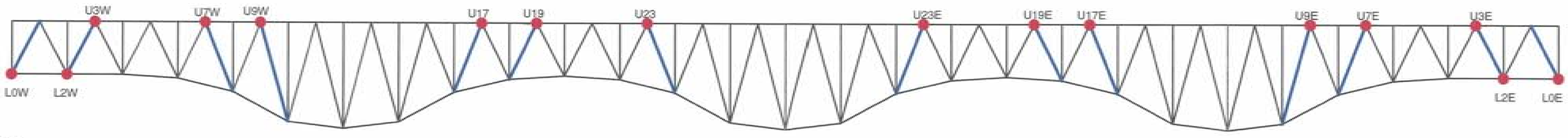
Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN

Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-62.2	1.09	-106.3	1.18	-5.3	1.18	-199.5	-109.1	-136.3	-25.9	-184.5	1.63	-222.2	-421.8	-911	1.01	3.24	17.4	21.8	-25.9	-19.5	1.63	35.5	0.0	2207	1.01	68.34
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-43.6	1.09	-94.6	1.18	-13.4	1.18	-175.1	-113.3	-141.6	-18.0	-177.1	1.63	-230.9	-406.0	-769	1.01	**2.61**	8.3	10.4	-18.0	-18.5	1.63	17.0	0.0	1859	1.01	120.90
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.3	1.18	-16.1	1.18	-167.8	-118.1	-147.6	-16.5	-180.8	1.63	-240.6	-408.3	-1006	1.01	3.52	9.0	11.3	-16.5	-15.1	1.63	18.4	0.0	1859	1.01	111.39
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.0	1.09	-89.1	1.18	-17.5	1.18	-165.0	-120.3	-150.4	-15.1	-181.5	1.63	-245.1	-410.1	-1173	1.01	4.16	8.5	10.7	-15.1	-13.6	1.63	17.4	0.0	1859	1.01	117.59
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-39.2	1.09	-90.5	1.18	-18.4	1.18	-171.2	-121.3	-151.6	-17.2	-186.2	1.63	-247.1	-418.3	-1232	1.01	4.34	5.8	7.2	-17.2	-20.6	1.63	11.8	0.0	1859	1.01	173.70
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-36.5	1.09	-89.8	1.18	-17.4	1.18	-166.3	-119.9	-149.9	-15.1	-181.0	1.63	-244.3	-410.6	-1173	1.01	4.17	8.6	10.8	-15.1	-13.4	1.63	17.6	0.0	1859	1.01	116.04
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-37.6	1.09	-91.4	1.18	-16.1	1.18	-167.8	-117.3	-146.7	-16.1	-179.2	1.63	-239.1	-406.8	-1006	1.01	3.55	9.9	12.3	-16.1	-13.3	1.63	20.1	0.0	1859	1.01	101.77
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-44.6	1.09	-95.1	1.18	-13.4	1.18	-176.5	-112.3	-140.3	-18.0	-175.7	1.63	-228.7	-405.3	-769	1.01	2.63	8.9	11.1	-18.0	-17.7	1.63	18.1	0.0	1859	1.01	113.20
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-62.7	1.09	-107.9	1.18	-4.8	1.18	-201.3	-109.0	-136.3	-21.1	-176.6	1.63	-222.2	-423.5	-911	1.01	3.24	16.4	20.5	-21.1	-13.0	1.63	33.4	0.0	2207	1.01	72.84
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-351.6	1.09	-604.8	1.18	-97.5	1.18	-1212.0	-216.7	-270.9	-134.1	-501.2	1.63	-501.2	-1713.1	-2518	1.01	2.66	29.7	37.1	-134.1	-179.9	1.63	60.5	0.0	3299	1.01	75.11
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	311.5	1.09	538.5	1.18	95.6	1.18	1087.8	-31.3	-39.2	-31.4	-92.1	1.63	-92.1	0.0	-1530	1.01	28.59	209.8	262.3	-31.4	222.4	1.63	427.5	1515.3	2688	1.01	3.80
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-318.9	1.09	-587.1	1.18	-105.4	1.18	-1164.7	-232.2	-290.2	-136.7	-525.5	1.63	-525.5	-1690.2	-2722	1.01	3.01	32.3	40.4	-136.7	-180.6	1.63	65.9	0.0	3299	1.01	68.24
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	276.2	1.09	509.2	1.18	102.2	1.18	1022.5	-35.1	-43.9	-36.3	-104.9	1.63	-104.9	0.0	-1744	1.01	26.55	224.6	280.7	-36.3	233.7	1.63	457.5	1480.0	2688	1.01	3.70
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-249.5	1.09	-469.2	1.18	-87.5	1.18	-928.9	-222.2	-277.8	-114.3	-476.1	1.63	-476.1	-1405.0	-2437	1.01	3.22	43.2	54.1	-114.3	-130.0	1.63	88.1	0.0	2810	1.01	42.76
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	197.6	1.09	367.7	1.18	80.7	1.18	744.4	-46.3	-57.9	-35.1	-117.6	1.63	-117.6	0.0	-1306	1.01	17.55	208.7	260.8	-35.1	214.9	1.63	425.2	1169.6	2207	1.01	3.49
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-117.6	1.09	-222.1	1.18	-38.3	1.18	-435.5	-170.1	-212.6	-67.9	-332.4	1.63	-346.5	-782.0	-1577	1.01	3.34	71.9	89.9	-67.9	-16.8	1.63	146.5	0.0	2076	1.01	17.28
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	45.0	1.09	80.5	1.18	23.1	1.18	171.3	-95.3	-119.2	-21.3	-159.0	1.63	-194.2	-22.9	-1050	1.01	6.34	139.8	174.7	-21.3	147.5	1.63	284.8	456.1	1556	1.01	4.92
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	57.0	1.09	104.4	1.18	28.4	1.18	218.8	-92.1	-115.1	-1.7	-122.9	1.63	-187.7	0.0	-1050	1.01	6.82	136.2	170.2	-1.7	174.8	1.63	277.5	496.3	1556	1.01	4.87
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-123.3	1.09	-244.8	1.18	-43.3	1.18	-474.4	-166.7	-208.4	-41.0	-284.3	1.63	-339.7	-814.1	-1577	1.01	3.29	68.9	86.1	-41.0	23.0	1.63	140.4	0.0	2076	1.01	18.32
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	202.4	1.09	387.0	1.18	84.3	1.18	776.7	-40.6	-50.7	-15.3	-77.7	1.63	-82.6	0.0	-1435	1.01	26.95	206.0	257.5	-15.3	243.7	1.63	419.7	1196.4	2404	1.01	3.93
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-252.7	1.09	-487.1	1.18	-90.8	1.18	-957.4	-219.4	-274.2	-99.4	-448.1	1.63	-448.1	-1405.6	-2839	1.01	4.26	35.2	44.0	-99.4	-116.2	1.63	71.6	0.0	3299	1.01	59.87
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	283.3	1.09	519.2	1.18	103.8	1.18	1043.9	-28.5	-35.6	-23.2	-75.0	1.63	-75.0	0.0	-1744	1.01	37.39	221.6	277.0	-23.2	251.1	1.63	451.5	1495.4	2688	1.01	3.70
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-317.9	1.09	-596.6	1.18	-106.8	1.18	-1176.6	-229.0	-286.3	-126.0	-504.1	1.63	-504.1	-1680.7	-2722	1.01	3.12	26.3	32.8	-126.0	-171.2	1.63	53.5	0.0	3299	1.01	84.26
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	317.9	1.09	542.6	1.18	95.8	1.18	1099.8	-29.4	-36.7	-24.7	-78.5	1.63	-78.5	0.0	-1530	1.01	33.69	206.4	258.0	-24.7	228.9	1.63	420.5	1520.3	2688	1.01	**3.84**
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-347.5	1.09	-608.8	1.18	-97.8	1.18	-1212.6	-213.9	-267.3	-131.6	-493.3	1.63	-493.3	-1705.9	-2518	1.01	**2.70**	27.8	34.7	-131.6	-178.2	1.63	56.6	0.0	3299	1.01	80.35
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**683.4**	1.09	1252.5	1.18	249.6	1.18	**2517.4**	**-64.8**	**-80.9**	33.2	-30.4	**1.63**	**-131.9**	**0.0**	-5855	1.01	63.90	**205.9**	**257.4**	33.2	322.6	**1.63**	**419.6**	**2937.0**	6516	1.01	9.68
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	362.5	1.09	693.2	1.18	154.7	1.18	1395.6	-82.6	-103.3	27.6	-62.9	1.63	-168.4	0.0	-3414	1.01	28.76	156.5	195.6	27.6	248.9	1.63	318.8	1714.4	3713	1.01	7.39
									389.7	1.09	734.9	1.18	152.8	1.18	1472.3	-74.2	-92.8	25.0	-56.1	1.63	-151.3	0.0	-3414	1.01	32.52	146.5	183.1	25.0	231.8	1.63	298.5	1770.8	3713	1.01	7.63
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	49.5	1.09	102.4	1.18	32.6	1.18	213.3	-204.3	-255.4	-51.4	-350.2	1.63	-416.3	-203.1	-2593	1.01	6.80	147.6	184.5	-51.4	108.7	1.63	300.8	514.0	2810	1.01	8.73
									89.9	1.09	168.7	1.18	34.7	1.18	338.0	-188.3	-235.4	-7.6	-258.0	1.63	-383.7	-45.7	-2593	1.01	7.71	141.6	176.9	-7.6	172.1	1.63	288.4	626.4	2810	1.01	8.67
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-198.0	1.09	-374.1	1.18	-74.6	1.18	-745.3	-333.7	-417.1	-124.0	-637.3	1.63	-679.9	-1425.2	-3037	1.01	3.42	128.4	160.5	-124.0	-34.7	1.63	261.7	0.0	3299	1.01	15.58
									-172.0	1.09	-331.7	1.18	-73.8	1.18	-666.0	-321.8	-402.3	-95.9	-576.1	1.63	-655.8	-1321.8	-3037	1.01	3.66	128.1	160.1	-95.9	10.7	1.63	261.0	0.0	3299	1.01	15.32
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-284.0	1.09	-540.5	1.18	-116.2	1.18	-1084.5	-391.6	-489.5	-152.8	-759.7	1.63	-798.0	-1882.5	-4165	1.01	3.91	110.0	137.5	-152.8	-105.5	1.63	224.2	0.0	4542	1.01	25.30
									-284.8	1.09	-541.7	1.18	-116.2	1.18	-1086.8	-391.6	-489.4	-148.1	-752.0	1.63	-797.8	-1884.6	-4165	1.01	3.91	108.7	135.8	-148.1	-99.8	1.63	221.4	0.0	4542	1.01	25.63
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-159.8	1.09	-300.6	1.18	-66.5	1.18	-607.4	-328.6	-410.7	-113.2	-613.0	1.63	-669.5	-1276.9	-3037	1.01	3.67	156.0	195.0	-113.2	18.9	1.63	317.8	0.0	3299	1.01	12.39
									-186.8	1.09	-344.6	1.18	-67.5	1.18	-689.9	-339.6	-424.5	-133.3	-660.2	1.63	-691.9	-1381.8	-3037	1.01	3.44	155.5	194.4	-133.3	-14.6	1.63	316.8	0.0	3299	1.01	12.69
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	112.6	1.09	222.5	1.18	46.3	1.18	439.9	-197.8	-247.2	-32.5	-310.8	1.63	-403.0	0.0	-2593	1.01	7.59	173.4	216.7	-32.5	173.1	1.63	353.2	793.1	2810	1.01	6.79
									74.0	1.09	159.9	1.18	44.9	1.18	322.2	-212.3	-265.4	-72.0	-394.2	1.63	-432.6	-110.4	-2593	1.01	6.80	179.5	224.4	-72.0	116.7	1.63	365.8	688.0	2810	1.01	6.88
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	422.5	1.09	803.8	1.18	166.8	1.18	1605.9	-83.0	-103.7	30.4	-58.6	1.63	-169.0	0.0	-3789	1.01	32.14	178.5	223.1	30.4	282.3	1.63	363.7	1969.5	4128	1.01	7.05
									395.5	1.09	763.3	1.18	168.5	1.18	1530.6	-91.1	-113.8	-2.1	-122.1	1.63	-185.6	0.0	-3789	1.01	28.87	190.0	237.5	-2.1	244.4	1.63	387.1	1917.7	4128	1.01	6.82
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**722.5**	1.09	1326.4	1.18	263.5	1.18	**2663.6**	**-51.0**	**-63.8**	36.8	-6.6	**1.63**	**-103.9**	**0.0**	-5497	1.01	79.04	**201.4**	**251.7**	36.8	322.5	**1.63**	**410.3**	**3073.9**	6022	1.01	8.33
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-588.9**	1.09	-1079.1	1.18	-218.9	1.18	**-2173.5**	**-188.1**	**-235.2**	-250.8	-654.2	**1.63**	**-654.2**	**-2827.8**	-3227	1.01	1.66	**64.7**	**80.8**	-250.8	-324.5	**1.63**	**131.8**	**0.0**	4128	1.01	48.13
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-230.1	1.09	-419.0	1.18	-82.0	1.18	-841.9	-157.7	-197.1	-97.5	-364.6	1.63	-364.6	-1206.5	-2273	1.01	3.99	144.1	180.2	-97.5	29.0	1.63	293.7	0.0	2810	1.01	12.53
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	66.2	1.09	142.6	1.18	36.6	1.18	283.6	-135.3	-169.2	-119.3	-370.9	1.63	-370.9	-87.3	-2280	1.01	6.97	262.2	327.7	-119.3	147.5	1.63	534.2	817.8	2810	1.01	4.78
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	237.0	1.09	460.2	1.18	98.7	1.18	917.8	-98.3	-122.9	-133.7	-346.0	1.63	-346.0	0.0	-2954	1.01	11.27	338.4	423.0	-133.7	223.4	1.63	689.5	1607.2	3713	1.01	**4.11**
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	230.6	1.09	443.3	1.18	94.9	1.18	886.4	-120.7	-150.8	-151.8	-404.7	1.63	-404.7	0.0	-2954	1.01	9.56	342.2	427.7	-151.8	198.8	1.63	697.2	1583.6	3713	1.01	**4.11**
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	48.9	1.09	98.1	1.18	26.6	1.18	200.5	-168.3	-210.4	-168.7	-494.6	1.63	-494.6	-294.1	-2280	1.01	5.06	273.5	341.9	-168.7	81.6	1.63	557.2	757.7	2810	1.01	4.73
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-259.8	1.09	-488.1	1.18	-96.6	1.18	-973.1	-200.1	-250.1	-172.1	-541.5	1.63	-541.5	-1514.6	-2634	1.01	3.12	162.6	203.2	-172.1	-68.5	1.63	331.3	0.0	3299	1.01	12.99
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-622.3	1.09	-1154.4	1.18	-233.4	1.18	-2315.9	-219.4	-274.2	-221.3	-646.7	1.63	-646.7	**-2962.6**	-3527	1.01	1.93	64.6	80.8	-221.3	-276.4	1.63	131.7	**0.0**	4542	1.01	52.43

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.



Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Left Truss

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance

F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	**0.94**	Compressive buckling @ end of Member U1-L0	-726	-1067	-1709	1.01	Assume L_2=235mm	no	0.094	58
L2E	**0.82**	Compressive buckling @ end of Member U3-L2	-285	-720	-868	1.01		no	0.082	51
L4E	3.40	Compressive buckling @ end of Member U5-L4	219	-384	-1078	1.01		no	0.347	
L6E	1.54	Compressive buckling @ end of Member U5-L6	-383	-588	-1274	1.01		no	0.155	
L8E	2.37	Compressive buckling @ end of Member U7-L8	-763	-906	-2880	1.01		no	0.241	
L10E	1.31	Compressive buckling @ end of Member U9-L10	-892	-1019	-2208	1.01		no	0.132	
L12E	2.14	Compressive buckling @ end of Member U11-L12	-850	-990	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.217	
L14E	2.21	Compressive buckling @ end of Member U15-L14	-822	-1011	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.225	
L16E	1.98	Compressive buckling @ end of Member U17-L16	-681	-936	-2512	1.01		no	0.201	
L18E	2.54	Compressive buckling @ end of Member U19-L18	-314	-695	-2058	1.01		no	0.258	
L20E	3.98	Compressive buckling @ end of Member U21-L20	189	-368	-1264	1.01		no	0.407	
L22E	1.12	Compressive buckling @ end of Member U21-L22	-345	-685	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.112	
L24E	1.53	Compressive buckling @ end of Member U23-L24	-699	-930	-2104	1.01		no	0.155	
L26E	1.74	Compressive buckling @ end of Member U25-L26	-826	-1001	-2544	1.01		no	0.176	
L28	1.66	Compressive buckling @ end of Member U27-L28	-795	-967	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.168	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 1 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.19	Compressive buckling @ end of Member U1-L0	-726	-1067	-1978	1.01		no	0.120	
U3E	**0.71**	Compressive buckling @ end of Member U3-L2	-285	-720	-786	1.01		no	0.070	44
U5E	1.08	Compressive buckling @ end of Member U5-L6	-383	-588	-1010	1.01		no	0.109	
U7E	**0.73**	Compressive buckling @ end of Member U7-L8	-763	-906	-1406	1.01		no	0.072	45
U9E	**0.91**	Compressive buckling @ end of Member U9-L10	-892	-1019	-1798	1.01	Effective width = 762.0mm	no	0.090	57
U11E	1.59	Compressive buckling @ end of Member U11-L12	-850	-990	-2400	1.01	Effective width = 616.9mm	yes	0.161	
U13E	1.42	Compressive buckling @ end of Member U13-L12	-801	-976	-2170	1.01		yes	0.144	
U15E	1.16	Compressive buckling @ end of Member U15-L14	-822	-1011	-1974	1.01		no	0.116	
U17E	**0.76**	Compressive buckling @ end of Member U17-L16	-681	-936	-1382	1.01		no	0.076	47
U19E	**0.99**	Compressive buckling @ end of Member U19-L18	-314	-695	-990	1.01		no	0.099	62
U21E	1.08	Compressive buckling @ end of Member U21-L22	-345	-685	-1076	1.01		no	0.109	
U23E	**0.76**	Compressive buckling @ end of Member U23-L24	-699	-930	-1394	1.01		no	0.076	47
U25E	1.55	Compressive buckling @ end of Member U25-L26	-826	-1001	-2356	1.01		no	0.157	
U27E	1.34	Compressive buckling @ end of Member U27-L28	-795	-967	-2073	1.01	Effective width = 495.88mm	yes	0.135	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.06	Compressive buckling @ end of Member U1-L0	-726	-940	-1709	1.01	Assume L_2=235mm	no	0.077	
L2E	0.92	Compressive buckling @ end of Member U3-L2	-285	-645	-868	1.01		no	0.066	41
L4E	3.71	Compressive buckling @ end of Member U5-L4	219	-353	-1078	1.01		no	0.273	
L6E	1.62	Compressive buckling @ end of Member U5-L6	-383	-557	-1274	1.01		no	0.118	
L8E	2.66	Compressive buckling @ end of Member U7-L8	-763	-808	-2880	1.01		no	0.195	
L10E	1.50	Compressive buckling @ end of Member U9-L10	-892	-892	-2208	1.01		no	0.109	
L12E	2.46	Compressive buckling @ end of Member U11-L12	-850	-862	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.181	
L14E	2.53	Compressive buckling @ end of Member U15-L14	-822	-883	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.186	
L16E	2.25	Compressive buckling @ end of Member U17-L16	-681	-825	-2512	1.01		no	0.165	
L18E	2.84	Compressive buckling @ end of Member U19-L18	-314	-622	-2058	1.01		no	0.209	
L20E	4.35	Compressive buckling @ end of Member U21-L20	189	-337	-1264	1.01		no	0.321	
L22E	1.25	Compressive buckling @ end of Member U21-L22	-345	-613	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.090	
L24E	1.74	Compressive buckling @ end of Member U23-L24	-699	-820	-2104	1.01		no	0.127	
L26E	2.00	Compressive buckling @ end of Member U25-L26	-826	-874	-2544	1.01		no	0.146	
L28	1.91	Compressive buckling @ end of Member U27-L28	-795	-841	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.139	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 2 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.35	Compressive buckling @ end of Member U1-L0	-726	-940	-1978	1.01		no	0.098	
U3E	**0.79**	Compressive buckling @ end of Member U3-L2	-285	-645	-786	1.01		no	0.056	35
U5E	1.14	Compressive buckling @ end of Member U5-L6	-383	-557	-1010	1.01		no	0.083	
U7E	**0.81**	Compressive buckling @ end of Member U7-L8	-763	-808	-1406	1.01		no	0.058	36
U9E	1.04	Compressive buckling @ end of Member U9-L10	-892	-892	-1798	1.01	Effective width = 762.0mm	no	0.075	
U11E	1.83	Compressive buckling @ end of Member U11-L12	-850	-862	-2400	1.01	Effective width = 616.9mm	yes	0.133	
U13E	1.64	Compressive buckling @ end of Member U13-L12	-801	-849	-2170	1.01		yes	0.119	
U15E	1.33	Compressive buckling @ end of Member U15-L14	-822	-883	-1974	1.01		no	0.096	
U17E	**0.87**	Compressive buckling @ end of Member U17-L16	-681	-825	-1382	1.01		no	0.062	39
U19E	1.10	Compressive buckling @ end of Member U19-L18	-314	-622	-990	1.01		no	0.080	
U21E	1.21	Compressive buckling @ end of Member U21-L22	-345	-613	-1076	1.01		no	0.088	
U23E	**0.87**	Compressive buckling @ end of Member U23-L24	-699	-820	-1394	1.01		no	0.062	39
U25E	1.78	Compressive buckling @ end of Member U25-L26	-826	-874	-2356	1.01		no	0.130	
U27E	1.54	Compressive buckling @ end of Member U27-L28	-795	-841	-2073	1.01	Effective width = 495.88mm	yes	0.112	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
L0E	1.40	Compressive buckling @ end of Member U1-L0	-726	-714	-1709	1.01	Assume L_2=235mm	no	0.057	
L2E	1.16	Compressive buckling @ end of Member U3-L2	-285	-509	-868	1.01		no	0.047	
L4E	4.48	Compressive buckling @ end of Member U5-L4	219	-292	-1078	1.01		no	0.184	
L6E	1.98	Compressive buckling @ end of Member U5-L6	-383	-457	-1274	1.01		no	0.081	
L8E	3.44	Compressive buckling @ end of Member U7-L8	-763	-624	-2880	1.01		no	0.141	
L10E	2.01	Compressive buckling @ end of Member U9-L10	-892	-666	-2208	1.01		no	0.082	
L12E	3.32	Compressive buckling @ end of Member U11-L12	-850	-639	-2942	1.01	Assume t=11.5mm for Gusset PL	yes	0.136	
L14E	3.39	Compressive buckling @ end of Member U15-L14	-822	-659	-3026	1.01	Use t=10.0mm for Gusset PL	no	0.139	
L16E	2.95	Compressive buckling @ end of Member U17-L16	-681	-629	-2512	1.01		no	0.121	
L18E	3.58	Compressive buckling @ end of Member U19-L18	-314	-492	-2058	1.01		no	0.147	
L20E	5.28	Compressive buckling @ end of Member U21-L20	189	-278	-1264	1.01		no	0.217	
L22E	1.57	Compressive buckling @ end of Member U21-L22	-345	-487	-1098	1.01	Use t=7.57mm for Gusset PL	no	0.064	
L24E	2.28	Compressive buckling @ end of Member U23-L24	-699	-626	-2104	1.01		no	0.093	
L26E	2.67	Compressive buckling @ end of Member U25-L26	-826	-653	-2544	1.01		no	0.109	
L28	2.56	Compressive buckling @ end of Member U27-L28	-795	-627	-2374	1.01	Assume t=8.5mm for Gusset PL	yes	0.105	

GUSSET PLATES

LEFT TRUSS
Gusset Plate Load Evaluation Level 3 Summary

Abbreviations:
$C_{f,DL}$: Factored compressive dead load
$C_{f,LL}$: Factored compressive live load
C_r: Factored compressive resistance
F: Live Load Capacity Factor
U: Resistance Adjustment Factor

Gusset Plate	F	Governing Resistance	$C_{f,DL}$ kN	$C_{f,LL}$ kN	Cr kN	U	Notes	Stiffened	Posting Factor, P	Posted Weight Limit tonnes
U1E	1.78	Compressive buckling @ end of Member U1-L0	-726	-714	-1978	1.01		no	0.072	
U3E	1.00	Compressive buckling @ end of Member U3-L2	-285	-509	-786	1.01		no	0.040	25
U5E	1.39	Compressive buckling @ end of Member U5-L6	-383	-457	-1010	1.01		no	0.056	
U7E	1.05	Compressive buckling @ end of Member U7-L8	-763	-624	-1406	1.01		no	0.042	
U9E	1.39	Compressive buckling @ end of Member U9-L10	-892	-666	-1798	1.01	Effective width = 762.0mm	no	0.056	
U11E	2.46	Compressive buckling @ end of Member U11-L12	-850	-639	-2400	1.01	Effective width = 616.9mm	yes	0.101	
U13E	2.20	Compressive buckling @ end of Member U13-L12	-801	-632	-2170	1.01		yes	0.090	
U15E	1.78	Compressive buckling @ end of Member U15-L14	-822	-659	-1974	1.01		no	0.072	
U17E	1.14	Compressive buckling @ end of Member U17-L16	-681	-629	-1382	1.01		no	0.046	
U19E	1.39	Compressive buckling @ end of Member U19-L18	-314	-492	-990	1.01		no	0.056	
U21E	1.52	Compressive buckling @ end of Member U21-L22	-345	-487	-1076	1.01		no	0.062	
U23E	1.13	Compressive buckling @ end of Member U23-L24	-699	-626	-1394	1.01		no	0.046	
U25E	2.38	Compressive buckling @ end of Member U25-L26	-826	-653	-2356	1.01		no	0.097	
U27E	2.07	Compressive buckling @ end of Member U27-L28	-795	-627	-2073	1.01	Effective width = 495.88mm	yes	0.084	

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	**C_f kN**	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	**T_f kN**	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-4.2	1.09	-16.0	1.18	-9.2	1.18	-34.4	-180.9	-226.1	-15.6	-261.2	1.63	-368.5	-402.8	-1232	1.01	3.28	20.7	25.8	-15.6	1.5	1.63	42.1	7.7	1859	1.01	45.43
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-18.6	1.09	-63.2	1.18	-22.2	1.18	-121.0	-183.0	-228.7	-15.4	-263.8	1.63	-372.9	-493.9	-1232	1.01	3.01	12.3	15.3	-15.4	-9.2	1.63	25.0	0.0	1859	1.01	80.08
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-23.4	1.09	-67.8	1.18	-23.7	1.18	-133.5	-184.1	-230.2	-16.3	-266.7	1.63	-375.2	-508.7	-1232	1.01	2.96	15.5	19.3	-16.3	-6.4	1.63	31.5	0.0	1859	1.01	63.79
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-18.3	1.09	-61.5	1.18	-22.8	1.18	-119.5	-182.5	-228.1	-16.1	-264.3	1.63	-371.9	-491.3	-1173	1.01	2.87	16.2	20.3	-16.1	-5.1	1.63	33.1	0.0	1859	1.01	60.41
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.4	1.09	-56.3	1.18	-22.5	1.18	-107.5	-179.2	-224.0	-16.5	-260.5	1.63	-365.1	-472.6	-1006	1.01	2.49	16.0	20.0	-16.5	-6.0	1.63	32.6	0.0	1859	1.01	60.84
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-12.8	1.09	-49.2	1.18	-21.1	1.18	-96.8	-167.9	-209.9	-17.7	-247.8	1.63	-342.1	-439.0	-769	1.01	1.99	14.3	17.8	-17.7	-10.2	1.63	29.0	0.0	1859	1.01	68.00
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-165.0	-206.3	-25.9	-257.5	1.63	-336.3	-413.4	-911	1.01	2.51	17.2	21.5	-25.9	-19.8	1.63	35.1	0.0	2207	1.01	65.69
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-161.8	1.09	-340.2	1.18	-125.1	1.18	-725.5	-523.8	-654.7	-133.3	-900.3	1.63	-1067.2	-1792.7	-2392	1.01	1.58	92.3	115.3	-133.3	-97.0	1.63	188.0	0.0	2893	1.01	19.40
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	127.6	1.09	260.0	1.18	99.6	1.18	563.4	-91.6	-114.5	-45.9	-194.2	1.63	-194.2	0.0	-983	1.01	8.01	439.6	549.4	-45.9	498.4	1.63	895.6	1459.0	2071	1.01	1.71
U3 - L2	DIAGONAL	2-10C20			5388	1298	1498	1652	-60.6	1.09	-134.6	1.18	-51.1	1.18	-285.2	-353.6	-442.0	-78.7	-589.3	1.63	-720.4	-1005.6	-1298	1.01	1.42	94.3	117.9	-78.7	-5.2	1.63	192.2	0.0	1652	1.01	10.16
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	27.9	1.09	45.8	1.18	22.3	1.18	110.8	-150.9	-188.6	-42.8	-266.6	1.63	-307.4	-196.6	-797	1.01	2.98	271.4	339.3	-42.8	284.1	1.63	553.0	663.9	1133	1.01	1.87
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	53.6	1.09	103.9	1.18	32.4	1.18	219.4	-188.6	-235.7	-11.0	-263.9	1.63	-384.2	-164.8	-797	1.01	2.67	203.2	254.0	-11.0	247.0	1.63	414.0	633.4	1133	1.01	2.24
U5 - L6	DIAGONAL	2-10C25			5559	1577	1876	2076	-84.1	1.09	-187.3	1.18	-59.5	1.18	-382.9	-288.7	-360.8	-51.5	-460.4	1.63	-588.1	-971.0	-1577	1.01	2.06	121.4	151.8	-51.5	74.4	1.63	247.4	0.0	2076	1.01	10.02
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	153.1	1.09	314.5	1.18	108.8	1.18	666.3	-62.2	-77.8	11.1	-63.0	1.63	-126.7	0.0	-1306	1.01	15.67	389.3	486.7	11.1	525.8	1.63	793.3	1459.6	2207	1.01	1.97
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-169.7	1.09	-365.6	1.18	-124.6	1.18	-763.4	-444.4	-555.6	-93.2	-731.5	1.63	-905.6	-1669.0	-2497	1.01	1.94	27.7	34.6	-93.2	-115.8	1.63	56.4	0.0	2884	1.01	65.15
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	183.5	1.09	386.5	1.18	142.1	1.18	823.8	-36.7	-45.9	-7.0	-59.2	1.63	-74.9	0.0	-1744	1.01	34.54	465.7	582.2	-7.0	596.0	1.63	948.9	1772.8	2688	1.01	1.99
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-195.4	1.09	-422.8	1.18	-152.5	1.18	-891.8	-500.2	-625.2	-117.5	-843.7	1.63	-1019.1	-1910.9	-3041	1.01	2.14	22.5	28.1	-117.5	-162.2	1.63	45.7	0.0	3713	1.01	101.47
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	180.2	1.09	359.6	1.18	142.4	1.18	788.8	-44.6	-55.7	-17.7	-87.0	1.63	-90.8	0.0	-1530	1.01	25.69	451.6	564.5	-17.7	560.0	1.63	920.1	1708.9	2688	1.01	2.09
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-193.3	1.09	-391.3	1.18	-150.4	1.18	-850.0	-486.1	-607.6	-128.3	-842.9	1.63	-990.3	-1840.3	-2804	1.01	2.00	43.4	54.2	-128.3	-152.5	1.63	88.3	0.0	3713	1.01	52.08
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	-3.1	1.09	0.5	1.18	9.6	1.18	8.6	-22.7	-28.4	-10.1	-46.1	1.63	-46.3	-37.7	-3414	1.01	74.70	95.8	119.7	-10.1	108.4	1.63	195.2	203.7	3713	1.01	19.17
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-116.7	-145.9	27.5	-107.3	1.63	-237.8	0.0	-3414	1.01	19.37	316.0	395.0	27.5	457.0	1.63	643.9	1801.6	3713	1.01	4.03
									-213.9	1.09	-429.9	1.18	-135.3	1.18	-900.1	-500.2	-625.2	-82.4	-786.6	1.63	-1019.2	-1919.2	-3414	1.01	2.50	112.9	141.1	-82.4	12.8	1.63	229.9	0.0	3713	1.01	20.22
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	-274.7	1.09	-557.4	1.18	-187.2	1.18	**-1178.0**	**-743.1**	**-928.9**	-160.1	-1230.0	**1.63**	**-1514.1**	**-2692.1**	**-4333**	**1.01**	**2.11**	**232.3**	**290.4**	-160.1	42.0	**1.63**	**473.4**	**0.0**	**4779**	**1.01**	**12.68**
									-282.6	1.09	-568.3	1.18	-183.9	1.18	-1195.7	-732.4	-915.6	-144.9	-1191.2	1.63	-1492.3	-2688.0	-4333	1.01	2.13	226.9	283.7	-144.9	59.8	1.63	462.4	0.0	4779	1.01	13.02
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-185.2	1.09	-366.8	1.18	-120.4	1.18	-776.7	-640.7	-800.8	-142.0	-1066.9	1.63	-1305.4	-2082.0	-3789	1.01	2.34	320.1	400.1	-142.0	185.9	1.63	652.2	0.0	4128	1.01	7.58
									-186.8	1.09	-373.0	1.18	-126.8	1.18	-793.3	-661.2	-826.4	-150.8	-1108.0	1.63	-1347.1	-2140.4	-3789	1.01	2.25	317.6	397.1	-150.8	168.4	1.63	647.2	0.0	4128	1.01	7.67
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	26.6	1.09	69.4	1.18	24.9	1.18	140.3	-366.9	-458.6	-67.8	-588.9	1.63	-747.5	-607.2	-2593	1.01	3.69	351.3	439.2	-67.8	347.6	1.63	715.8	856.1	2810	1.01	3.77
									25.2	1.09	60.4	1.18	12.3	1.18	113.2	-411.0	-513.8	-99.2	-697.6	1.63	-837.5	-724.3	-2593	1.01	3.26	365.8	457.3	-99.2	315.4	1.63	745.4	858.6	2810	1.01	3.66
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	248.7	1.09	528.4	1.18	182.6	1.18	1110.0	-123.5	-154.4	7.2	-149.3	1.63	-251.7	0.0	-3414	1.01	18.11	365.5	456.9	7.2	488.4	1.63	744.7	1854.7	3713	1.01	3.55
									251.5	1.09	530.2	1.18	174.9	1.18	1106.1	-149.5	-186.8	-32.8	-248.4	1.63	-304.5	0.0	-3414	1.01	14.95	406.5	508.1	-32.8	476.6	1.63	828.3	1934.3	3713	1.01	3.19
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**439.2**	1.09	898.2	1.18	318.4	1.18	**1914.3**	**-115.1**	**-143.9**	39.6	-85.6	**1.63**	**-234.5**	**0.0**	**-5855**	**1.01**	**33.38**	**409.9**	**512.4**	39.6	599.0	**1.63**	**835.2**	**2749.5**	**6516**	**1.01**	**5.59**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	122.7	1.09	251.3	1.18	75.6	1.18	519.5	-49.5	-61.9	-27.7	-109.7	1.63	-109.7	0.0	-2283	1.01	25.77	288.0	360.0	-27.7	330.5	1.63	586.9	1106.3	2810	1.01	3.95
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	232.7	1.09	477.0	1.18	154.5	1.18	998.7	-140.2	-175.3	-75.0	-305.1	1.63	-305.1	0.0	-3260	1.01	14.07	620.9	776.1	-75.0	687.4	1.63	1265.0	2263.8	4128	1.01	2.51
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	213.1	1.09	436.1	1.18	147.4	1.18	920.8	-250.3	-312.8	-129.7	-537.7	1.63	-537.7	0.0	-3260	1.01	7.83	683.8	854.7	-129.7	680.2	1.63	1393.2	2314.0	4128	1.01	2.33
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	92.4	1.09	184.8	1.18	59.7	1.18	389.2	-339.0	-423.7	-175.9	-728.7	1.63	-728.7	-339.5	-2280	1.01	3.69	529.3	661.6	-175.9	403.5	1.63	1078.4	1467.6	2810	1.01	2.27
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-126.6	1.09	-268.2	1.18	-92.9	1.18	-564.1	-403.9	-504.8	-205.6	-861.7	1.63	-861.7	-1425.8	-2273	1.01	2.01	279.0	348.7	-205.6	28.7	1.63	568.4	4.4	2810	1.01	5.99
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-384.3**	1.09	-787.7	1.18	-269.2	1.18	**-1666.0**	**-463.0**	**-578.8**	-257.7	-1023.9	**1.63**	**-1023.9**	**-2689.9**	**-3273**	**1.01**	1.60	**142.8**	**178.5**	-257.7	-233.9	**1.63**	**290.9**	**0.0**	**4128**	**1.01**	**20.06**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 1 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-165.0	-206.3	-25.9	-257.5	1.63	-336.3	-413.4	-911	1.01	2.51	17.2	21.5	-25.9	-19.8	1.63	35.1	0.0	2207	1.01	65.69
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-14.0	1.09	-51.8	1.18	-21.7	1.18	-102.0	-172.2	-215.3	-18.0	-253.9	1.63	-350.9	-452.9	-769	1.01	1.92	13.6	17.0	-18.0	-11.6	1.63	27.8	0.0	1859	1.01	71.27
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.9	1.09	-57.2	1.18	-22.7	1.18	-109.4	-179.4	-224.3	-16.4	-260.8	1.63	-365.5	-475.0	-1006	1.01	2.48	15.4	19.2	-16.4	-6.7	1.63	31.4	0.0	1859	1.01	63.36
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.9	1.09	-61.6	1.18	-22.8	1.18	-118.1	-182.4	-228.0	-15.1	-262.5	1.63	-371.7	-489.7	-1173	1.01	2.87	16.4	20.5	-15.1	-3.3	1.63	33.5	0.0	1859	1.01	59.64
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-21.9	1.09	-65.6	1.18	-23.2	1.18	-128.6	-183.9	-229.9	-17.2	-268.0	1.63	-374.8	-503.4	-1232	1.01	2.98	14.5	18.1	-17.2	-9.2	1.63	29.6	0.0	1859	1.01	67.85
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.7	1.09	-61.2	1.18	-22.9	1.18	-117.6	-183.0	-228.8	-15.1	-263.3	1.63	-372.9	-490.5	-1173	1.01	2.86	16.3	20.3	-15.1	-3.5	1.63	33.1	0.0	1859	1.01	60.24
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.7	1.09	-56.9	1.18	-22.7	1.18	-108.9	-177.7	-222.1	-16.1	-257.9	1.63	-362.0	-471.0	-1006	1.01	2.50	17.0	21.2	-16.1	-4.0	1.63	34.6	0.0	1859	1.01	57.37
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-14.2	1.09	-51.2	1.18	-21.8	1.18	-101.7	-169.1	-211.3	-18.3	-250.2	1.63	-344.5	-446.2	-769	1.01	1.96	14.2	17.7	-18.3	-11.3	1.63	28.9	0.0	1859	1.01	68.46
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-10.4	1.09	-32.3	1.18	-19.4	1.18	-72.4	-165.0	-206.3	-27.4	-259.9	1.63	-336.2	-408.7	-911	1.01	2.52	16.9	21.1	-27.4	-22.7	1.63	34.5	0.0	2207	1.01	66.80
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-185.6	1.09	-363.5	1.18	-144.1	1.18	-801.2	-479.0	-598.8	-133.9	-842.9	1.63	-976.0	-1777.2	-2518	1.01	1.78	49.3	61.7	-133.9	-153.9	1.63	100.5	0.0	3299	1.01	41.11
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	167.9	1.09	330.3	1.18	135.8	1.18	733.0	-51.8	-64.7	-31.2	-118.4	1.63	-118.4	0.0	-1530	1.01	19.24	445.2	556.5	-31.2	529.6	1.63	907.1	1640.1	2688	1.01	2.18
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-180.2	1.09	-385.5	1.18	-144.3	1.18	-821.6	-496.1	-620.1	-136.4	-869.3	1.63	-1010.8	-1832.4	-2722	1.01	1.91	61.5	76.8	-136.4	-142.2	1.63	125.2	0.0	3299	1.01	33.16
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	164.2	1.09	346.9	1.18	133.5	1.18	745.8	-66.7	-83.4	-36.1	-145.7	1.63	-145.7	0.0	-1744	1.01	17.21	464.0	579.9	-36.1	546.2	1.63	945.3	1691.2	2688	1.01	2.08
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-149.4	1.09	-323.6	1.18	-115.6	1.18	-681.1	-459.3	-574.1	-114.0	-784.8	1.63	-935.9	-1616.9	-2437	1.01	1.90	81.8	102.2	-114.0	-79.3	1.63	166.6	0.0	2810	1.01	21.12
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	130.4	1.09	270.5	1.18	99.4	1.18	578.7	-97.3	-121.7	-34.8	-183.7	1.63	-198.3	0.0	-1306	1.01	9.57	413.8	517.3	-34.8	482.8	1.63	843.1	1421.9	2207	1.01	1.96
U19-L18	DIAGONAL	2-10C25			5559	1577	1876	2076	-68.7	1.09	-150.7	1.18	-52.1	1.18	-314.2	-341.3	-426.6	-67.7	-555.3	1.63	-695.4	-1009.6	-1577	1.01	1.84	126.1	157.6	-67.7	54.1	1.63	256.9	0.0	2076	1.01	9.39
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	36.3	1.09	68.3	1.18	25.5	1.18	150.3	-177.3	-221.6	-21.1	-265.6	1.63	-361.2	-211.0	-1050	1.01	3.35	269.5	336.9	-21.1	317.0	1.63	549.1	699.4	1556	1.01	2.59
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	44.9	1.09	87.3	1.18	31.7	1.18	189.3	-180.8	-225.9	-1.5	-238.2	1.63	-368.3	-179.0	-1050	1.01	3.39	263.7	329.6	-1.5	341.4	1.63	537.3	726.6	1556	1.01	2.57
U21-L22	DIAGONAL	2-10C25			5559	1577	1876	2076	-71.2	1.09	-168.6	1.18	-58.0	1.18	-345.0	-336.0	-419.9	-41.1	-505.1	1.63	-684.5	-1029.6	-1577	1.01	1.82	119.4	149.2	-41.1	88.7	1.63	243.2	0.0	2076	1.01	10.04
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	130.7	1.09	283.1	1.18	104.3	1.18	599.6	-89.9	-112.3	-15.5	-142.5	1.63	-183.1	0.0	-1435	1.01	11.19	410.5	513.2	-15.5	510.1	1.63	836.4	1436.1	2404	1.01	2.19
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-148.3	1.09	-335.2	1.18	-120.1	1.18	-698.9	-456.4	-570.5	-99.7	-757.6	1.63	-929.9	-1628.9	-2839	1.01	2.33	65.5	81.9	-99.7	-77.0	1.63	133.5	0.0	3299	1.01	30.19
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	167.9	1.09	352.1	1.18	136.0	1.18	759.0	-53.4	-66.8	-23.6	-108.1	1.63	-108.8	0.0	-1744	1.01	23.17	458.8	573.5	-23.6	559.9	1.63	934.8	1693.9	2688	1.01	2.09
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-176.1	1.09	-390.3	1.18	-146.6	1.18	-825.6	-491.2	-614.0	-126.4	-846.6	1.63	-1000.8	-1826.4	-2722	1.01	1.92	49.2	61.5	-126.4	-141.9	1.63	100.2	0.0	3299	1.01	41.49
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	171.4	1.09	330.2	1.18	136.8	1.18	737.9	-47.2	-59.0	-25.3	-102.8	1.63	-102.8	0.0	-1530	1.01	22.21	439.4	549.2	-25.3	531.7	1.63	895.2	1633.2	2688	1.01	2.21
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-178.8	1.09	-363.6	1.18	-145.1	1.18	-795.2	-474.4	-593.0	-128.8	-828.4	1.63	-966.5	-1761.7	-2518	1.01	1.81	44.7	55.9	-128.8	-151.6	1.63	91.1	0.0	3299	1.01	45.32
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**435.6**	1.09	893.3	1.18	318.9	1.18	**1905.2**	**-120.5**	**-150.6**	33.4	-102.7	**1.63**	**-245.6**	**0.0**	-5855	1.01	31.84	**459.8**	**574.7**	33.4	654.0	**1.63**	**936.8**	**2842.0**	6516	1.01	4.99
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-116.7	-145.9	27.5	-107.3	1.63	-237.8	0.0	-3414	1.01	19.37	316.0	395.0	27.5	457.0	1.63	643.9	1801.6	3713	1.01	4.03
									255.9	1.09	541.1	1.18	190.2	1.18	1141.9	-96.5	-120.7	25.2	-84.9	1.63	-196.7	0.0	-3414	1.01	23.34	296.2	370.3	25.2	427.3	1.63	603.6	1745.5	3713	1.01	4.32
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	60.3	1.09	117.9	1.18	29.6	1.18	239.9	-329.2	-411.5	-51.4	-513.1	1.63	-670.8	-430.9	-2593	1.01	4.26	273.3	341.7	-51.4	272.6	1.63	556.9	796.8	2810	1.01	4.67
									55.8	1.09	119.7	1.18	44.2	1.18	254.2	-289.0	-361.3	-7.8	-389.6	1.63	-588.8	-334.6	-2593	1.01	4.88	258.0	322.5	-7.8	323.7	1.63	525.7	779.9	2810	1.01	4.92
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-123.5	1.09	-266.4	1.18	-95.4	1.18	-561.5	-583.4	-729.3	-123.9	-962.8	1.63	-1188.8	-1750.3	-3037	1.01	2.11	228.3	285.4	-123.9	95.7	1.63	465.1	0.0	3299	1.01	8.37
									-127.8	1.09	-267.5	1.18	-86.1	1.18	-556.7	-549.9	-687.3	-96.0	-873.5	1.63	-1120.4	-1677.1	-3037	1.01	2.24	229.1	286.3	-96.0	142.2	1.63	466.7	0.0	3299	1.01	8.33
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-200.2	1.09	-418.9	1.18	-139.7	1.18	-877.4	-682.0	-852.4	-152.6	-1138.0	1.63	-1389.5	-2266.9	-4165	1.01	2.40	200.1	250.2	-152.6	12.2	1.63	407.8	0.0	4542	1.01	13.40
									-200.0	1.09	-418.7	1.18	-140.0	1.18	-877.2	-683.6	-854.5	-148.1	-1132.7	1.63	-1392.8	-2270.0	-4165	1.01	2.39	193.8	242.3	-148.1	11.4	1.63	394.9	0.0	4542	1.01	13.84
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-119.3	1.09	-241.7	1.18	-77.9	1.18	-507.2	-560.8	-701.0	-112.8	-915.1	1.63	-1142.6	-1649.7	-3037	1.01	2.24	284.9	356.2	-112.8	187.6	1.63	580.5	73.4	3299	1.01	6.61
									-115.1	1.09	-241.1	1.18	-87.5	1.18	-513.3	-592.3	-740.3	-132.9	-988.9	1.63	-1206.7	-1720.0	-3037	1.01	2.12	282.7	353.3	-132.9	152.0	1.63	575.9	62.6	3299	1.01	6.68
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	69.9	1.09	160.8	1.18	58.2	1.18	334.6	-305.6	-382.0	-31.4	-449.7	1.63	-622.7	-288.0	-2593	1.01	4.74	322.0	402.4	-31.4	368.6	1.63	656.0	990.6	2810	1.01	3.82
									74.8	1.09	160.9	1.18	44.7	1.18	324.2	-342.4	-428.0	-70.0	-560.6	1.63	-697.7	-373.5	-2593	1.01	4.22	338.0	422.5	-70.0	326.6	1.63	688.6	1012.8	2810	1.01	3.65
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	274.9	1.09	590.1	1.18	208.1	1.18	1241.4	-108.2	-135.2	30.1	-91.9	1.63	-220.4	0.0	-3789	1.01	23.00	346.2	432.8	30.1	500.6	1.63	705.5	1946.9	4128	1.01	4.15
									283.4	1.09	600.5	1.18	199.9	1.18	1253.4	-129.2	-161.5	4.9	-160.5	1.63	-263.3	0.0	-3789	1.01	19.29	383.5	479.4	4.9	508.1	1.63	781.4	2034.7	4128	1.01	3.73
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**456.1**	1.09	940.1	1.18	338.0	1.18	**2005.3**	**-93.5**	**-116.9**	37.4	-61.0	**1.63**	**-190.5**	**0.0**	-5497	1.01	39.67	**439.3**	**549.1**	37.4	633.8	**1.63**	**895.1**	**2900.4**	6022	1.01	4.55
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-392.2**	1.09	-793.7	1.18	-274.0	1.18	**-1687.3**	**-402.2**	**-502.8**	-250.6	-932.9	**1.63**	**-932.9**	**-2620.2**	-3227	1.01	1.68	**121.1**	**151.3**	-250.6	-250.6	**1.63**	**246.7**	**0.0**	4128	1.01	23.74
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-146.0	1.09	-297.0	1.18	-105.6	1.18	-634.1	-303.2	-379.1	-97.3	-554.1	1.63	-617.9	-1252.0	-2273	1.01	2.69	214.9	268.7	-97.3	121.6	1.63	437.9	0.0	2810	1.01	7.93
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	57.4	1.09	130.1	1.18	39.0	1.18	262.1	-251.4	-314.3	-119.5	-522.6	1.63	-522.6	-260.5	-2280	1.01	4.91	447.2	559.0	-119.5	388.4	1.63	911.1	1173.2	2810	1.01	2.83
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	165.3	1.09	356.2	1.18	118.8	1.18	740.7	-180.0	-225.0	-133.8	-452.9	1.63	-452.9	0.0	-2954	1.01	8.22	608.1	760.1	-133.8	574.8	1.63	1239.0	1979.6	3713	1.01	2.43
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	161.3	1.09	342.8	1.18	114.3	1.18	715.3	-225.2	-281.5	-151.7	-540.8	1.63	-540.8	0.0	-2954	1.01	6.84	615.4	769.2	-151.7	555.2	1.63	1253.8	1969.1	3713	1.01	2.42
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	46.1	1.09	94.2	1.18	27.4	1.18	193.7	-317.9	-397.4	-168.6	-689.5	1.63	-689.5	-495.8	-2280	1.01	3.62	465.3	581.6	-168.6	331.8	1.63	948.0	1141.7	2810	1.01	2.79
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-164.1	1.09	-349.2	1.18	-123.4	1.18	-736.6	-388.9	-486.2	-171.9	-787.4	1.63	-792.4	-1529.0	-2634	1.01	2.43	248.0	310.0	-171.9	43.1	1.63	505.3	0.0	3299	1.01	8.05
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-408.9	1.09	-844.8	1.18	-293.1	1.18	-1788.5	-450.3	-562.9	-221.2	-947.8	1.63	-947.8	**-2736.3**	-3527	1.01	1.87	110.7	138.4	-221.2	-216.3	1.63	225.5	**0.0**	4542	1.01	28.27

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2, asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-4.2	1.09	-16.0	1.18	-9.2	1.18	-34.4	-177.6	-222.0	-15.6	-257.0	1.63	-361.9	-396.3	-1232	1.01	3.34	18.4	23.0	-15.6	-1.4	1.63	37.5	3.1	1859	1.01	51.06
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-18.6	1.09	-63.2	1.18	-22.2	1.18	-121.0	-182.3	-227.8	-15.4	-262.8	1.63	-371.3	-492.3	-1232	1.01	3.02	11.7	14.6	-15.4	-9.9	1.63	23.8	0.0	1859	1.01	83.85
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-23.4	1.09	-67.8	1.18	-23.7	1.18	-133.5	-183.1	-228.8	-16.3	-265.3	1.63	-373.0	-506.5	-1232	1.01	2.98	14.3	17.9	-16.3	-8.0	1.63	29.1	0.0	1859	1.01	69.11
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-18.3	1.09	-61.5	1.18	-22.8	1.18	-119.5	-181.5	-226.9	-16.1	-263.0	1.63	-369.9	-489.3	-1173	1.01	2.88	15.1	18.9	-16.1	-6.6	1.63	30.8	0.0	1859	1.01	64.95
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.4	1.09	-56.3	1.18	-22.5	1.18	-107.5	-178.4	-223.0	-16.5	-259.5	1.63	-363.4	-471.0	-1006	1.01	2.50	15.0	18.7	-16.5	-7.4	1.63	30.5	0.0	1859	1.01	65.17
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-12.8	1.09	-49.2	1.18	-21.1	1.18	-96.8	-166.3	-207.9	-17.7	-245.6	1.63	-338.8	-435.6	-769	1.01	**2.01**	13.3	16.6	-17.7	-11.4	1.63	27.1	0.0	1859	1.01	72.83
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-161.9	-202.3	-25.9	-253.3	1.63	-329.8	-406.9	-911	1.01	2.56	15.9	19.9	-25.9	-21.5	1.63	32.4	0.0	2207	1.01	71.07
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-161.8	1.09	-340.2	1.18	-125.1	1.18	-725.5	-461.5	-576.9	-133.3	-819.1	1.63	-940.3	-1665.9	-2392	1.01	1.80	76.9	96.2	-133.3	-117.0	1.63	156.7	0.0	2893	1.01	23.27
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	127.6	1.09	260.0	1.18	99.6	1.18	563.4	-76.4	-95.5	-45.9	-174.4	1.63	-174.4	0.0	-983	1.01	8.93	388.2	485.3	-45.9	431.4	1.63	791.0	1354.3	2071	1.01	**1.93**
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-60.6	1.09	-134.6	1.18	-51.1	1.18	-285.2	-316.5	-395.7	-78.7	-541.0	1.63	-644.9	-930.1	-1298	1.01	**1.59**	87.6	109.5	-78.7	-14.0	1.63	178.4	0.0	1652	1.01	10.95
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	27.9	1.09	45.8	1.18	22.3	1.18	110.8	-144.4	-180.4	-42.8	-258.1	1.63	-294.1	-183.3	-797	1.01	3.11	242.4	303.0	-42.8	246.3	1.63	493.9	604.7	1133	1.01	2.09
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	53.6	1.09	103.9	1.18	32.4	1.18	219.4	-173.2	-216.5	-11.0	-243.9	1.63	-353.0	-133.6	-797	1.01	2.90	199.3	249.2	-11.0	241.9	1.63	406.1	625.5	1133	1.01	2.28
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-84.1	1.09	-187.3	1.18	-59.5	1.18	-382.9	-273.4	-341.8	-51.5	-440.5	1.63	-557.1	-940.0	-1577	1.01	2.17	112.8	141.0	-51.5	63.1	1.63	229.8	0.0	2076	1.01	10.79
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	153.1	1.09	314.5	1.18	108.8	1.18	666.3	-59.8	-74.8	11.1	-59.9	1.63	-121.9	0.0	-1306	1.01	16.29	349.6	437.0	11.1	474.0	1.63	712.3	1378.7	2207	1.01	2.19
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-169.7	1.09	-365.6	1.18	-124.6	1.18	-763.4	-396.5	-495.7	-93.2	-669.0	1.63	-807.9	-1571.3	-2497	1.01	2.18	27.3	34.1	-93.2	-116.3	1.63	55.6	0.0	2884	1.01	66.08
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	183.5	1.09	386.5	1.18	142.1	1.18	823.8	-33.5	-41.9	-7.0	-55.1	1.63	-68.3	0.0	-1744	1.01	37.83	409.6	512.0	-7.0	522.8	1.63	834.5	1658.3	2688	1.01	2.27
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-195.4	1.09	-422.8	1.18	-152.5	1.18	-891.8	-437.9	-547.4	-117.5	-762.5	1.63	-892.2	-1784.0	-3041	1.01	2.44	18.9	23.7	-117.5	-166.8	1.63	38.6	0.0	3713	1.01	120.38
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	180.2	1.09	359.6	1.18	142.4	1.18	788.8	-37.6	-47.0	-17.7	-78.0	1.63	-78.0	0.0	-1530	1.01	29.94	396.7	495.9	-17.7	488.4	1.63	808.3	1597.0	2688	1.01	2.38
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-193.3	1.09	-391.3	1.18	-150.4	1.18	-850.0	-423.0	-528.8	-128.3	-760.7	1.63	-861.9	-1711.8	-2804	1.01	2.30	36.1	45.1	-128.3	-162.0	1.63	73.5	0.0	3713	1.01	62.57
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	-3.1	1.09	0.5	1.18	9.6	1.18	8.6	-19.8	-24.8	-10.1	-42.3	1.63	-42.3	-33.8	-3414	1.01	81.61	89.1	111.3	-10.1	99.7	1.63	181.5	190.0	3713	1.01	20.62
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-113.7	-142.2	27.5	-103.4	1.63	-231.7	0.0	-3414	1.01	19.87	268.1	335.1	27.5	394.5	1.63	546.2	1704.0	3713	1.01	4.75
									-213.9	1.09	-429.9	1.18	-135.3	1.18	-900.1	-444.7	-555.9	-82.4	-714.3	1.63	-906.1	-1806.1	-3414	1.01	2.81	94.2	117.7	-82.4	-11.6	1.63	191.8	0.0	3713	1.01	24.24
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-274.7**	1.09	-557.4	1.18	-187.2	1.18	**-1178.0**	**-670.3**	**-837.9**	-160.1	-1135.1	**1.63**	**-1365.7**	**-2543.7**	**-4333**	**1.01**	**2.34**	**193.8**	**242.2**	-160.1	-8.3	**1.63**	**394.8**	**0.0**	**4779**	**1.01**	**15.21**
									-282.6	1.09	-568.3	1.18	-183.9	1.18	-1195.7	-657.7	-822.2	-144.9	-1093.8	1.63	-1340.2	-2535.9	-4333	1.01	2.37	189.3	236.7	-144.9	10.8	1.63	385.8	0.0	4779	1.01	15.61
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-185.2	1.09	-366.8	1.18	-120.4	1.18	-776.7	-582.5	-728.1	-142.0	-991.0	1.63	-1186.8	-1963.4	-3789	1.01	2.57	266.9	333.7	-142.0	116.6	1.63	543.9	0.0	4128	1.01	9.09
									-186.8	1.09	-373.0	1.18	-126.8	1.18	-793.3	-603.6	-754.5	-150.8	-1033.0	1.63	-1229.9	-2023.2	-3789	1.01	2.47	264.9	331.1	-150.8	99.6	1.63	539.7	0.0	4128	1.01	9.19
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	26.6	1.09	69.4	1.18	24.9	1.18	140.3	-333.9	-417.3	-67.8	-545.9	1.63	-680.3	-540.0	-2593	1.01	4.06	293.0	366.2	-67.8	271.5	1.63	596.9	737.2	2810	1.01	4.52
									25.2	1.09	60.4	1.18	12.3	1.18	113.2	-376.0	-469.9	-99.2	-651.9	1.63	-766.0	-652.8	-2593	1.01	3.57	305.0	381.3	-99.2	236.1	1.63	621.5	734.7	2810	1.01	4.38
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	248.7	1.09	528.4	1.18	182.6	1.18	1110.0	-117.7	-147.1	7.2	-141.6	1.63	-239.8	0.0	-3414	1.01	19.01	305.3	381.7	7.2	410.0	1.63	622.1	1732.1	3713	1.01	4.24
									251.5	1.09	530.2	1.18	174.9	1.18	1106.1	-140.2	-175.2	-32.8	-236.3	1.63	-285.6	0.0	-3414	1.01	15.94	340.3	425.4	-32.8	390.3	1.63	693.4	1799.5	3713	1.01	3.81
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**439.2**	1.09	898.2	1.18	318.4	1.18	**1914.3**	**-96.1**	**-120.1**	39.6	-60.8	**1.63**	**-195.8**	**0.0**	**-5855**	**1.01**	**39.97**	**344.9**	**431.1**	39.6	514.2	**1.63**	**702.7**	**2617.0**	**6516**	**1.01**	**6.64**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	122.7	1.09	251.3	1.18	75.6	1.18	519.5	-41.3	-51.7	-27.7	-99.0	1.63	-99.0	0.0	-2283	1.01	28.55	258.3	322.9	-27.7	291.8	1.63	526.3	1045.8	2810	1.01	4.41
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	232.7	1.09	477.0	1.18	154.5	1.18	998.7	-117.0	-146.2	-75.0	-274.8	1.63	-274.8	0.0	-3260	1.01	15.62	557.7	697.2	-75.0	605.1	1.63	1136.4	2135.1	4128	1.01	**2.79**
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	213.1	1.09	436.1	1.18	147.4	1.18	920.8	-208.7	-260.9	-129.7	-483.6	1.63	-483.6	0.0	-3260	1.01	8.71	618.3	772.9	-129.7	594.9	1.63	1259.8	2180.7	4128	1.01	**2.58**
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	92.4	1.09	184.8	1.18	59.7	1.18	389.2	-282.8	-353.4	-175.9	-655.4	1.63	-655.4	-266.2	-2280	1.01	4.11	478.6	598.3	-175.9	337.4	1.63	975.2	1364.4	2810	1.01	2.51
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-126.6	1.09	-268.2	1.18	-92.9	1.18	-564.1	-337.1	-421.4	-205.6	-774.7	1.63	-774.7	-1338.8	-2273	1.01	2.24	256.1	320.1	-205.6	-1.1	1.63	521.8	0.0	2810	1.01	6.52
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-384.3**	1.09	-787.7	1.18	-269.2	1.18	**-1666.0**	**-387.8**	**-484.7**	-257.7	-925.7	**1.63**	**-925.7**	**-2591.7**	**-3273**	**1.01**	1.77	**119.2**	**149.0**	-257.7	-264.6	**1.63**	**242.9**	**0.0**	**4128**	**1.01**	**24.02**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 2 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN					L	C_{rx}	C_{ry}	T_r	DL1	α_{D1}	DL2	α_{D2}	$DL2_{asphalt}$	$\alpha_{D2, asphalt}$	$P_{f,DL}$	C_T	$C_{T,DLA}$	C_{LL}	$C_{T+LL,f}$	α_L	$C_{f,LL}$	C_f	Cr	Adjust	LL	T_T	$T_{T,DLA}$	T_{LL}	$T_{T+LL,f}$	α_L	$T_{f,LL}$	T_f	Tr	Adjust	LL
Member	Description	Shape	Built-up	Built-up	mm	kN	kN	kN	kN		kN		kN		kN	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity	kN	kN	kN	kN		kN	kN	kN	Factor	Capacity
									5		5		5			19		19							Factor	19		19							Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-161.9	-202.3	-25.9	-253.3	1.63	-329.8	-406.9	-911	1.01	2.56	15.9	19.9	-25.9	-21.5	1.63	32.4	0.0	2207	1.01	71.07
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-14.0	1.09	-51.8	1.18	-21.7	1.18	-102.0	-170.3	-212.9	-18.0	-251.4	1.63	-347.0	-449.0	-769	1.01	1.95	12.7	15.9	-18.0	-12.8	1.63	25.9	0.0	1859	1.01	76.50
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.9	1.09	-57.2	1.18	-22.7	1.18	-109.4	-178.8	-223.5	-16.4	-260.0	1.63	-364.3	-473.8	-1006	1.01	2.49	14.4	18.0	-16.4	-8.0	1.63	29.4	0.0	1859	1.01	67.58
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.9	1.09	-61.6	1.18	-22.8	1.18	-118.1	-181.7	-227.2	-15.1	-261.7	1.63	-370.3	-488.4	-1173	1.01	2.88	15.3	19.1	-15.1	-4.8	1.63	31.1	0.0	1859	1.01	64.22
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-21.9	1.09	-65.6	1.18	-23.2	1.18	-128.6	-182.9	-228.7	-17.2	-266.7	1.63	-372.7	-501.3	-1232	1.01	2.99	13.5	16.9	-17.2	-10.5	1.63	27.5	0.0	1859	1.01	72.88
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.7	1.09	-61.2	1.18	-22.9	1.18	-117.6	-182.2	-227.8	-15.1	-262.3	1.63	-371.2	-488.8	-1173	1.01	2.88	15.1	18.9	-15.1	-5.0	1.63	30.8	0.0	1859	1.01	64.84
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.7	1.09	-56.9	1.18	-22.7	1.18	-108.9	-177.1	-221.3	-16.1	-257.1	1.63	-360.8	-469.7	-1006	1.01	2.51	15.8	19.8	-16.1	-5.5	1.63	32.3	0.0	1859	1.01	61.60
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-14.2	1.09	-51.2	1.18	-21.8	1.18	-101.7	-167.4	-209.3	-18.3	-248.1	1.63	-341.2	-442.9	-769	1.01	1.98	13.4	16.7	-18.3	-12.3	1.63	27.2	0.0	1859	1.01	72.68
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-10.4	1.09	-32.3	1.18	-19.4	1.18	-72.4	-161.8	-202.2	-27.4	-255.7	1.63	-329.6	-402.0	-911	1.01	2.57	15.5	19.4	-27.4	-24.5	1.63	31.6	0.0	2207	1.01	72.87
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-185.6	1.09	-363.5	1.18	-144.1	1.18	-801.2	-416.7	-520.9	-133.9	-761.6	1.63	-849.0	-1650.2	-2518	1.01	2.05	41.6	52.0	-133.9	-164.0	1.63	84.7	0.0	3299	1.01	48.79
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	167.9	1.09	330.3	1.18	135.8	1.18	733.0	-43.6	-54.5	-31.2	-107.8	1.63	-107.8	0.0	-1530	1.01	21.13	390.4	488.0	-31.2	458.2	1.63	795.5	1528.5	2688	1.01	2.49
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-180.2	1.09	-385.5	1.18	-144.3	1.18	-821.6	-433.2	-541.5	-136.4	-787.2	1.63	-882.6	-1704.2	-2722	1.01	2.18	51.3	64.1	-136.4	-155.4	1.63	104.5	0.0	3299	1.01	39.73
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	164.2	1.09	346.9	1.18	133.5	1.18	745.8	-55.7	-69.6	-36.1	-131.4	1.63	-131.4	0.0	-1744	1.01	19.09	406.5	508.2	-36.1	471.3	1.63	828.3	1574.1	2688	1.01	2.38
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-149.4	1.09	-323.6	1.18	-115.6	1.18	-681.1	-404.9	-506.1	-114.0	-713.9	1.63	-825.0	-1506.1	-2437	1.01	2.16	68.3	85.3	-114.0	-96.9	1.63	139.1	0.0	2810	1.01	25.31
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	130.4	1.09	270.5	1.18	99.4	1.18	578.7	-88.4	-110.5	-34.8	-172.0	1.63	-180.0	0.0	-1306	1.01	10.54	364.8	456.0	-34.8	418.9	1.63	743.3	1322.0	2207	1.01	2.22
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-68.7	1.09	-150.7	1.18	-52.1	1.18	-314.2	-305.1	-381.3	-67.7	-508.1	1.63	-621.6	-935.8	-1577	1.01	2.06	113.2	141.5	-67.7	37.4	1.63	230.7	0.0	2076	1.01	10.45
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	36.3	1.09	68.3	1.18	25.5	1.18	150.3	-161.4	-201.7	-21.1	-244.8	1.63	-328.8	-178.5	-1050	1.01	3.68	241.2	301.5	-21.1	280.1	1.63	491.5	641.7	1556	1.01	2.89
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	44.9	1.09	87.3	1.18	31.7	1.18	189.3	-165.3	-206.6	-1.5	-218.0	1.63	-336.7	-147.4	-1050	1.01	3.71	236.7	295.9	-1.5	306.2	1.63	482.3	671.6	1556	1.01	2.87
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-71.2	1.09	-168.6	1.18	-58.0	1.18	-345.0	-300.8	-376.0	-41.1	-459.2	1.63	-612.9	-958.0	-1577	1.01	2.04	109.6	137.0	-41.1	75.9	1.63	223.3	0.0	2076	1.01	10.93
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	130.7	1.09	283.1	1.18	104.3	1.18	599.6	-82.6	-103.3	-15.5	-133.0	1.63	-168.4	0.0	-1435	1.01	12.17	362.5	453.1	-15.5	447.4	1.63	738.6	1338.2	2404	1.01	2.47
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-148.3	1.09	-335.2	1.18	-120.1	1.18	-698.9	-402.5	-503.1	-99.7	-687.4	1.63	-820.1	-1519.1	-2839	1.01	2.64	55.7	69.6	-99.7	-89.9	1.63	113.4	0.0	3299	1.01	35.53
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	167.9	1.09	352.1	1.18	136.0	1.18	759.0	-45.4	-56.7	-23.6	-97.6	1.63	-97.6	0.0	-1744	1.01	25.83	402.6	503.3	-23.6	486.6	1.63	820.4	1579.4	2688	1.01	2.38
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-176.1	1.09	-390.3	1.18	-146.6	1.18	-825.6	-429.0	-536.2	-126.4	-765.4	1.63	-874.0	-1699.6	-2722	1.01	2.20	41.8	52.2	-126.4	-151.6	1.63	85.1	0.0	3299	1.01	48.83
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	171.4	1.09	330.2	1.18	136.8	1.18	737.9	-39.9	-49.8	-25.3	-93.2	1.63	-93.2	0.0	-1530	1.01	24.49	385.8	482.3	-25.3	461.9	1.63	786.1	1524.1	2688	1.01	2.51
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-178.8	1.09	-363.6	1.18	-145.1	1.18	-795.2	-412.7	-515.8	-128.8	-748.0	1.63	-840.8	-1636.0	-2518	1.01	2.08	37.7	47.2	-128.8	-160.7	1.63	76.9	0.0	3299	1.01	53.68
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**435.6**	1.09	893.3	1.18	318.9	1.18	**1905.2**	**-100.6**	**-125.8**	33.4	-76.8	**1.63**	**-205.0**	**0.0**	-5855	1.01	38.14	**385.0**	**481.3**	33.4	556.5	**1.63**	**784.5**	**2689.7**	6516	1.01	5.96
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-113.7	-142.2	27.5	-103.4	1.63	-231.7	0.0	-3414	1.01	19.87	268.1	335.1	27.5	394.5	1.63	546.2	1704.0	3713	1.01	4.75
									255.9	1.09	541.1	1.18	190.2	1.18	1141.9	-94.7	-118.3	25.2	-82.4	1.63	-192.9	0.0	-3414	1.01	23.80	251.4	314.2	25.2	368.8	1.63	512.2	1654.1	3713	1.01	5.09
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	60.3	1.09	117.9	1.18	29.6	1.18	239.9	-316.6	-395.7	-51.4	-496.6	1.63	-645.0	-405.1	-2593	1.01	4.43	232.1	290.2	-51.4	218.9	1.63	473.0	712.9	2810	1.01	5.49
									55.8	1.09	119.7	1.18	44.2	1.18	254.2	-273.9	-342.3	-7.8	-369.8	1.63	-558.0	-303.8	-2593	1.01	5.15	219.2	274.0	-7.8	273.1	1.63	446.7	700.9	2810	1.01	5.78
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-123.5	1.09	-266.4	1.18	-95.4	1.18	-561.5	-530.0	-662.6	-123.9	-893.1	1.63	-1080.0	-1641.5	-3037	1.01	2.32	194.0	242.5	-123.9	51.0	1.63	395.3	0.0	3299	1.01	9.85
									-127.8	1.09	-267.5	1.18	-86.1	1.18	-556.7	-500.1	-625.1	-96.0	-808.6	1.63	-1018.9	-1575.6	-3037	1.01	2.46	194.7	243.3	-96.0	97.4	1.63	396.7	0.0	3299	1.01	9.80
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-200.2	1.09	-418.9	1.18	-139.7	1.18	-877.4	-621.4	-776.8	-152.6	-1059.1	1.63	-1266.2	-2143.6	-4165	1.01	2.63	167.1	208.9	-152.6	-30.8	1.63	340.5	0.0	4542	1.01	16.05
									-200.0	1.09	-418.7	1.18	-140.0	1.18	-877.2	-621.9	-777.4	-148.1	-1052.3	1.63	-1267.1	-2144.3	-4165	1.01	2.63	161.9	202.4	-148.1	-30.2	1.63	329.9	0.0	4542	1.01	16.56
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-119.3	1.09	-241.7	1.18	-77.9	1.18	-507.2	-509.7	-637.2	-112.8	-848.6	1.63	-1038.6	-1545.8	-3037	1.01	2.47	237.9	297.4	-112.8	126.3	1.63	484.7	0.0	3299	1.01	7.92
									-115.1	1.09	-241.1	1.18	-87.5	1.18	-513.3	-538.1	-672.6	-132.9	-918.3	1.63	-1096.4	-1609.7	-3037	1.01	2.33	236.0	295.0	-132.9	91.2	1.63	480.9	0.0	3299	1.01	8.00
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	69.9	1.09	160.8	1.18	58.2	1.18	334.6	-288.2	-360.2	-31.4	-427.0	1.63	-587.1	-252.5	-2593	1.01	5.03	268.8	335.9	-31.4	299.2	1.63	547.6	882.2	2810	1.01	4.57
									74.8	1.09	160.9	1.18	44.7	1.18	324.2	-327.4	-409.3	-70.0	-541.0	1.63	-667.1	-342.9	-2593	1.01	4.41	282.1	352.7	-70.0	253.8	1.63	574.8	899.0	2810	1.01	4.37
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	274.9	1.09	590.1	1.18	208.1	1.18	1241.4	-105.2	-131.4	30.1	-88.0	1.63	-214.2	0.0	-3789	1.01	23.66	289.5	361.9	30.1	426.7	1.63	589.9	1831.3	4128	1.01	4.96
									283.4	1.09	600.5	1.18	199.9	1.18	1253.4	-123.1	-153.9	4.9	-152.5	1.63	-250.8	0.0	-3789	1.01	20.26	321.4	401.8	4.9	427.1	1.63	654.9	1908.3	4128	1.01	4.45
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**456.1**	1.09	940.1	1.18	338.0	1.18	**2005.3**	**-79.4**	**-99.3**	37.4	-42.7	**1.63**	**-161.9**	**0.0**	-5497	1.01	46.69	**368.7**	**460.9**	37.4	541.7	**1.63**	**751.2**	**2756.6**	6022	1.01	5.43
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-392.2**	1.09	-793.7	1.18	-274.0	1.18	**-1687.3**	**-340.9**	**-426.1**	-250.6	-853.0	**1.63**	**-853.0**	**-2540.3**	-3227	1.01	1.84	**101.1**	**126.3**	-250.6	-276.7	**1.63**	**205.9**	**0.0**	4128	1.01	28.44
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-146.0	1.09	-297.0	1.18	-105.6	1.18	-634.1	-257.8	-322.3	-97.3	-494.8	1.63	-525.3	-1159.4	-2273	1.01	3.16	203.5	254.4	-97.3	106.7	1.63	414.6	0.0	2810	1.01	8.37
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	57.4	1.09	130.1	1.18	39.0	1.18	262.1	-213.7	-267.2	-119.5	-473.4	1.63	-473.4	-211.3	-2280	1.01	5.42	408.4	510.5	-119.5	337.9	1.63	832.2	1094.3	2810	1.01	3.10
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	165.3	1.09	356.2	1.18	118.8	1.18	740.7	-153.0	-191.3	-133.8	-417.7	1.63	-417.7	0.0	-2954	1.01	8.92	553.3	691.6	-133.8	503.4	1.63	1127.4	1868.0	3713	1.01	2.67
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	161.3	1.09	342.8	1.18	114.3	1.18	715.3	-188.0	-235.0	-151.7	-492.3	1.63	-492.3	0.0	-2954	1.01	7.51	558.5	698.1	-151.7	481.0	1.63	1137.8	1853.1	3713	1.01	2.67
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	46.1	1.09	94.2	1.18	27.4	1.18	193.7	-265.4	-331.7	-168.6	-621.0	1.63	-621.0	-427.3	-2280	1.01	4.02	424.1	530.1	-168.6	278.1	1.63	864.1	1057.7	2810	1.01	3.06
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-164.1	1.09	-349.2	1.18	-123.4	1.18	-736.6	-324.8	-406.0	-171.9	-703.8	1.63	-703.8	-1440.4	-2634	1.01	2.73	232.1	290.1	-171.9	22.4	1.63	472.9	0.0	3299	1.01	8.60
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-408.9	1.09	-844.8	1.18	-293.1	1.18	-1788.5	-377.0	-471.2	-221.2	-852.2	1.63	-852.2	**-2640.7**	-3527	1.01	2.08	94.1	117.6	-221.2	-238.0	1.63	191.7	**0.0**	4542	1.01	33.27

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

EXTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 7	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U0 - L0	VERTICAL	12 WF 45			3810	1705	1232	1859	-4.2	1.09	-16.0	1.18	-9.2	1.18	-34.4	-174.9	-218.6	-15.6	-253.4	1.63	-356.3	-390.7	-1232	1.01	3.40	15.6	19.6	-15.6	-5.0	1.63	31.9	0.0	1859	1.01	60.00
U2 - L2	VERTICAL	12 WF 45			3810	1705	1232	1859	-18.6	1.09	-63.2	1.18	-22.2	1.18	-121.0	-178.5	-223.1	-15.4	-257.9	1.63	-363.7	-484.7	-1232	1.01	3.09	10.4	13.0	-15.4	-11.6	1.63	21.2	0.0	1859	1.01	94.41
U4 - L4	VERTICAL	12 WF 45			3810	1705	1232	1859	-23.4	1.09	-67.8	1.18	-23.7	1.18	-133.5	-177.9	-222.3	-16.3	-258.5	1.63	-362.4	-495.9	-1232	1.01	3.06	10.1	12.6	-16.3	-13.4	1.63	20.6	0.0	1859	1.01	97.73
U6 - L6	VERTICAL	12 WF 45			4048	1695	1173	1859	-18.3	1.09	-61.5	1.18	-22.8	1.18	-119.5	-176.7	-220.9	-16.1	-256.7	1.63	-360.0	-479.5	-1173	1.01	2.96	11.7	14.6	-16.1	-11.1	1.63	23.7	0.0	1859	1.01	84.11
U8 - L8	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.4	1.09	-56.3	1.18	-22.5	1.18	-107.5	-173.8	-217.3	-16.5	-253.5	1.63	-354.2	-461.7	-1006	1.01	2.56	11.9	14.9	-16.5	-11.3	1.63	24.3	0.0	1859	1.01	81.59
U10 - L10	VERTICAL	12 WF 45			5953	1589	769	1859	-12.8	1.09	-49.2	1.18	-21.1	1.18	-96.8	-163.5	-204.4	-17.7	-242.1	1.63	-333.2	-430.0	-769	1.01	2.04	11.3	14.2	-17.7	-14.0	1.63	23.1	0.0	1859	1.01	85.60
U12 - L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-156.9	-196.2	-25.9	-246.9	1.63	-319.8	-396.9	-911	1.01	2.64	13.9	17.4	-25.9	-24.1	1.63	28.4	0.0	2207	1.01	81.24
U1 - L0	DIAGONAL	2-12C35			5388	2392	2591	2893	-161.8	1.09	-340.2	1.18	-125.1	1.18	-725.5	-350.6	-438.3	-133.3	-674.5	1.63	-714.4	-1440.0	-2392	1.01	2.37	51.5	64.3	-133.3	-150.2	1.63	104.9	0.0	2893	1.01	34.78
U1 - L2	DIAGONAL	12 WF 50			5388	1814	983	2071	127.6	1.09	260.0	1.18	99.6	1.18	563.4	-56.7	-70.9	-45.9	-148.7	1.63	-148.7	0.0	-983	1.01	10.47	293.1	366.4	-45.9	307.4	1.63	597.2	1160.5	2071	1.01	2.56
U3 - L2	DIAGONAL	2-10C20			5388	1298	1434	1652	-60.6	1.09	-134.6	1.18	-51.1	1.18	-285.2	-250.0	-312.5	-78.7	-454.2	1.63	-509.4	-794.6	-1298	1.01	2.01	76.2	95.2	-78.7	-28.9	1.63	155.2	0.0	1652	1.01	12.59
U3 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	27.9	1.09	45.8	1.18	22.3	1.18	110.8	-125.8	-157.2	-42.8	-233.9	1.63	-256.3	-145.5	-797	1.01	3.57	191.6	239.5	-42.8	180.1	1.63	390.5	501.3	1133	1.01	2.65
U5 - L4	DIAGONAL	2-8C13.75			5388	797	928	1133	53.6	1.09	103.9	1.18	32.4	1.18	219.4	-143.6	-179.4	-11.0	-205.2	1.63	-292.5	-73.1	-797	1.01	3.50	167.6	209.5	-11.0	200.6	1.63	341.5	560.8	1133	1.01	2.71
U5 - L6	DIAGONAL	2-10C25			5559	1577	1790	2076	-84.1	1.09	-187.3	1.18	-59.5	1.18	-382.9	-224.3	-280.4	-51.5	-376.5	1.63	-457.0	-840.0	-1577	1.01	2.65	91.6	114.5	-51.5	35.5	1.63	186.6	0.0	2076	1.01	13.29
U7 - L6	DIAGONAL	12 WF 53			5559	1923	1306	2207	153.1	1.09	314.5	1.18	108.8	1.18	666.3	-53.7	-67.1	11.1	-51.9	1.63	-109.4	0.0	-1306	1.01	18.15	271.6	339.5	11.1	372.3	1.63	553.3	1219.7	2207	1.01	2.82
U7 - L8	DIAGONAL	2-15C35			6100	2497	2614	2884	-169.7	1.09	-365.6	1.18	-124.6	1.18	-763.4	-306.1	-382.6	-93.2	-551.1	1.63	-623.7	-1387.1	-2497	1.01	2.82	24.8	31.0	-93.2	-119.6	1.63	50.5	0.0	2884	1.01	72.80
U9 - L8	DIAGONAL	12 WF 65			6100	2295	1744	2688	183.5	1.09	386.5	1.18	142.1	1.18	823.8	-27.6	-34.5	-7.0	-47.3	1.63	-56.2	0.0	-1744	1.01	45.99	303.7	379.7	-7.0	384.7	1.63	618.9	1442.7	2688	1.01	3.05
U9 - L10	DIAGONAL	2-15C45			7068	3041	3296	3713	-195.4	1.09	-422.8	1.18	-152.5	1.18	-891.8	-327.1	-408.8	-117.5	-618.0	1.63	-666.4	-1558.2	-3041	1.01	3.27	13.4	16.8	-117.5	-174.0	1.63	27.4	0.0	3713	1.01	169.55
U11 - L10	DIAGONAL	12 WF 65			7068	2194	1530	2688	180.2	1.09	359.6	1.18	142.4	1.18	788.8	-27.0	-33.7	-17.7	-64.1	1.63	-64.1	0.0	-1530	1.01	36.43	288.0	359.9	-17.7	346.6	1.63	586.7	1375.5	2688	1.01	3.28
U11 - L12	DIAGONAL	2-15C45			8519	2804	3168	3713	-193.3	1.09	-391.3	1.18	-150.4	1.18	-850.0	-313.4	-391.8	-128.3	-617.8	1.63	-638.6	-1488.6	-2804	1.01	3.10	24.2	30.3	-128.3	-177.5	1.63	49.3	0.0	3713	1.01	93.29
U0 - U1	TOP CHORD	2-15C45	LACED L/R=28		3810	3414	3473	3713	-3.1	1.09	0.5	1.18	9.6	1.18	8.6	-14.2	-17.7	-10.1	-35.0	1.63	-35.0	-26.4	-3414	1.01	98.88	73.0	91.2	-10.1	78.7	1.63	148.7	157.3	3713	1.01	25.16
U1 - U3	TOP CHORD	2-15C45	LACED L/R=28		7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-107.7	-134.6	27.5	-95.5	1.63	-219.5	0.0	-3414	1.01	20.99	181.0	226.2	27.5	280.9	1.63	368.8	1526.5	3713	1.01	7.03
									-213.9	1.09	-429.9	1.18	-135.3	1.18	-900.1	-328.5	-410.6	-82.4	-562.7	1.63	-669.3	-1569.4	-3414	1.01	3.81	62.9	78.7	-82.4	-52.3	1.63	128.2	0.0	3713	1.01	36.26
U3 - U5	**TOP CHORD**	**2-15C40**	**LACED L/R=29**	**2-PLs14x3/8**	**7620**	**4373**	**4333**	**4779**	**-274.7**	1.09	-557.4	1.18	-187.2	1.18	**-1178.0**	**-498.4**	**-623.0**	-160.1	-910.9	**1.63**	**-1015.5**	**-2193.5**	**-4333**	**1.01**	**3.15**	**129.6**	**162.0**	-160.1	-92.0	**1.63**	**264.0**	**0.0**	**4779**	**1.01**	**22.74**
									-282.6	1.09	-568.3	1.18	-183.9	1.18	-1195.7	-486.2	-607.7	-144.9	-870.1	1.63	-990.5	-2186.2	-4333	1.01	3.21	126.5	158.1	-144.9	-71.2	1.63	257.7	0.0	4779	1.01	23.37
U5 - U7	TOP CHORD	2-15C50	LACED L/R=28		7620	3789	3859	4128	-185.2	1.09	-366.8	1.18	-120.4	1.18	-776.7	-432.7	-540.9	-142.0	-795.8	1.63	-881.7	-1658.3	-3789	1.01	3.46	178.5	223.2	-142.0	1.3	1.63	363.7	0.0	4128	1.01	13.60
									-186.8	1.09	-373.0	1.18	-126.8	1.18	-793.3	-451.3	-564.2	-150.8	-834.4	1.63	-919.6	-1712.9	-3789	1.01	3.30	177.1	221.4	-150.8	-14.9	1.63	360.9	0.0	4128	1.01	13.75
U7 - U9	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	26.6	1.09	69.4	1.18	24.9	1.18	140.3	-256.8	-321.0	-67.8	-445.4	1.63	-523.3	-383.0	-2593	1.01	5.27	196.0	245.0	-67.8	145.1	1.63	399.4	539.7	2810	1.01	6.75
									25.2	1.09	60.4	1.18	12.3	1.18	113.2	-288.7	-360.9	-99.2	-538.2	1.63	-588.3	-475.1	-2593	1.01	4.64	204.1	255.1	-99.2	104.5	1.63	415.9	529.1	2810	1.01	6.55
U9 - U11	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	248.7	1.09	528.4	1.18	182.6	1.18	1110.0	-103.3	-129.2	7.2	-123.0	1.63	-210.6	0.0	-3414	1.01	21.64	204.2	255.3	7.2	278.1	1.63	416.1	1526.1	3713	1.01	6.35
									251.5	1.09	530.2	1.18	174.9	1.18	1106.1	-125.4	-156.8	-32.8	-217.1	1.63	-255.6	0.0	-3414	1.01	17.82	227.2	284.0	-32.8	242.8	1.63	463.0	1569.0	3713	1.01	5.71
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14X1/2"**	**-6r**	**3810**	**5940**	**5855**	**6516**	**439.2**	1.09	898.2	1.18	318.4	1.18	**1914.3**	**-64.3**	**-80.4**	39.6	-19.4	**1.63**	**-131.1**	**0.0**	**-5855**	**1.01**	**59.72**	**232.4**	**290.5**	39.6	367.5	**1.63**	**473.5**	**2387.8**	**6516**	**1.01**	**9.86**
L0 - L2	BOT CHORD	2-15C33.9		-6r	7620	2283	2460	2810	122.7	1.09	251.3	1.18	75.6	1.18	519.5	-27.6	-34.5	-27.7	-81.1	1.63	-81.1	0.0	-2283	1.01	34.84	205.1	256.4	-27.7	222.4	1.63	417.9	937.3	2810	1.01	5.55
L2 - L4	BOT CHORD	2-15C50		-6r	7620	3260	3604	4128	232.7	1.09	477.0	1.18	154.5	1.18	998.7	-78.2	-97.8	-75.0	-224.2	1.63	-224.2	0.0	-3260	1.01	19.14	417.0	521.2	-75.0	421.5	1.63	849.6	1848.3	4128	1.01	3.73
L4 - L6	BOT CHORD	2-15C50		-6r	7624	3260	3604	4128	213.1	1.09	436.1	1.18	147.4	1.18	920.8	-139.6	-174.5	-129.7	-393.4	1.63	-393.4	0.0	-3260	1.01	10.71	460.4	575.5	-129.7	389.0	1.63	938.1	1859.0	4128	1.01	3.46
L6 - L8	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	92.4	1.09	184.8	1.18	59.7	1.18	389.2	-189.2	-236.5	-175.9	-533.4	1.63	-533.4	-144.1	-2280	1.01	5.05	354.1	442.6	-175.9	175.1	1.63	721.5	1110.7	2810	1.01	3.39
L8 - L10	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-126.6	1.09	-268.2	1.18	-92.9	1.18	-564.1	-225.6	-282.0	-205.6	-629.3	1.63	-629.3	-1193.4	-2273	1.01	2.75	192.1	240.1	-205.6	-84.6	1.63	391.3	0.0	2810	1.01	8.69
L10 - L12	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7550**	**3273**	**3611**	**4128**	**-384.3**	1.09	-787.7	1.18	-269.2	1.18	**-1666.0**	**-259.4**	**-324.2**	-257.7	-758.3	**1.63**	**-758.3**	**-2424.3**	**-3273**	**1.01**	2.16	**79.8**	**99.7**	-257.7	-316.0	**1.63**	**162.6**	**0.0**	**4128**	**1.01**	**35.89**

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

AXIAL LOAD CAPACITY EVALUATION LEVEL 3 (LEFT TRUSS)

Effective Length Factor = 1.00

Note: For built-up members, the back-to-back spacing of elements were estimated, since dimension is not provided on drawings.

INTERIOR SPAN Member	Description	Shape	Built-up	Built-up	L mm	C_{rx} kN	C_{ry} kN	T_r kN	DL1 kN 5	α_{D1}	DL2 kN 5	α_{D2}	$DL2_{asphalt}$ kN 5	$\alpha_{D2,asphalt}$	$P_{f,DL}$ kN	C_T kN 19	$C_{T,DLA}$ kN	C_{LL} kN 19	$C_{T+LL,f}$ kN	α_L	$C_{f,LL}$ kN	C_f kN	Cr kN	Adjust Factor	LL Capacity Factor	T_T kN 19	$T_{T,DLA}$ kN	T_{LL} kN 19	$T_{T+LL,f}$ kN	α_L	$T_{f,LL}$ kN	T_f kN	Tr kN	Adjust Factor	LL Capacity Factor
U12-L12	VERTICAL	12 WF 53			7620	1743	911	2207	-12.6	1.09	-34.6	1.18	-19.1	1.18	-77.1	-156.9	-196.2	-25.9	-246.9	1.63	-319.8	-396.9	-911	1.01	2.64	13.9	17.4	-25.9	-24.1	1.63	28.4	0.0	2207	1.01	81.24
U14-L14	VERTICAL	12 WF 45			5953	1589	769	1859	-14.0	1.09	-51.8	1.18	-21.7	1.18	-102.0	-166.5	-208.1	-18.0	-246.4	1.63	-339.2	-441.1	-769	1.01	1.99	10.4	13.0	-18.0	-15.8	1.63	21.2	0.0	1859	1.01	93.19
U16-L16	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.9	1.09	-57.2	1.18	-22.7	1.18	-109.4	-174.2	-217.8	-16.4	-254.0	1.63	-355.0	-464.4	-1006	1.01	2.55	11.3	14.2	-16.4	-12.0	1.63	23.1	0.0	1859	1.01	86.07
U18-L18	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.9	1.09	-61.6	1.18	-22.8	1.18	-118.1	-177.3	-221.6	-15.1	-255.8	1.63	-361.2	-479.2	-1173	1.01	2.95	11.8	14.7	-15.1	-9.3	1.63	24.0	0.0	1859	1.01	83.30
U20-L20	VERTICAL	12 WF 45			3810	1705	1232	1859	-21.9	1.09	-65.6	1.18	-23.2	1.18	-128.6	-177.9	-222.4	-17.2	-260.1	1.63	-362.6	-491.2	-1232	1.01	3.08	9.6	12.1	-17.2	-15.5	1.63	19.6	0.0	1859	1.01	102.12
U22-L22	VERTICAL	12 WF 45			4048	1695	1173	1859	-16.7	1.09	-61.2	1.18	-22.9	1.18	-117.6	-177.5	-221.8	-15.1	-256.1	1.63	-361.6	-479.1	-1173	1.01	2.95	11.6	14.5	-15.1	-9.5	1.63	23.6	0.0	1859	1.01	84.48
U24-L24	VERTICAL	12 WF 45			4764	1661	1006	1859	-13.7	1.09	-56.9	1.18	-22.7	1.18	-108.9	-173.0	-216.2	-16.1	-251.7	1.63	-352.4	-461.4	-1006	1.01	2.57	12.8	16.0	-16.1	-9.5	1.63	26.1	0.0	1859	1.01	76.06
U26-L26	VERTICAL	12 WF 45			5953	1589	769	1859	-14.2	1.09	-51.2	1.18	-21.8	1.18	-101.7	-164.9	-206.1	-18.3	-244.8	1.63	-335.9	-437.7	-769	1.01	2.01	11.2	13.9	-18.3	-15.2	1.63	22.7	0.0	1859	1.01	87.10
U28-L28	VERTICAL	12 WF 53			7620	1743	911	2207	-10.4	1.09	-32.3	1.18	-19.4	1.18	-72.4	-156.8	-196.0	-27.4	-249.1	1.63	-319.4	-391.8	-911	1.01	2.65	13.4	16.7	-27.4	-27.3	1.63	27.2	0.0	2207	1.01	84.51
U13-L12	DIAGONAL	2-15C40			8519	2518	2813	3299	-185.6	1.09	-363.5	1.18	-144.1	1.18	-801.2	-310.0	-387.5	-133.9	-622.5	1.63	-631.7	-1432.9	-2518	1.01	2.76	27.9	34.8	-133.9	-181.9	1.63	56.8	0.0	3299	1.01	72.77
U13-L14	DIAGONAL	12 WF 65			7068	2194	1530	2688	167.9	1.09	330.3	1.18	135.8	1.18	733.0	-29.3	-36.6	-31.2	-89.1	1.63	-89.1	0.0	-1530	1.01	25.57	284.9	356.1	-31.2	320.6	1.63	580.4	1313.4	2688	1.01	3.41
U15-L14	DIAGONAL	2-15C40			7068	2722	2927	3299	-180.2	1.09	-385.5	1.18	-144.3	1.18	-821.6	-323.3	-404.2	-136.4	-644.0	1.63	-658.8	-1480.4	-2722	1.01	2.93	34.4	42.9	-136.4	-177.5	1.63	70.0	0.0	3299	1.01	59.33
U15-L16	DIAGONAL	12 WF 65			6100	2295	1744	2688	164.2	1.09	346.9	1.18	133.5	1.18	745.8	-37.3	-46.6	-36.1	-107.4	1.63	-107.4	0.0	-1744	1.01	23.35	300.4	375.5	-36.1	332.9	1.63	612.0	1357.9	2688	1.01	3.22
U17-L16	DIAGONAL	2-15C33.9			6100	2437	2546	2810	-149.4	1.09	-323.6	1.18	-115.6	1.18	-681.1	-308.5	-385.7	-114.0	-588.2	1.63	-628.6	-1309.7	-2437	1.01	2.83	45.7	57.1	-114.0	-126.3	1.63	93.1	0.0	2810	1.01	37.79
U17-L18	DIAGONAL	12 WF 53			5559	1923	1306	2207	130.4	1.09	270.5	1.18	99.4	1.18	578.7	-71.2	-89.1	-34.8	-149.7	1.63	-149.7	0.0	-1306	1.01	12.68	277.4	346.7	-34.8	304.9	1.63	565.1	1143.9	2207	1.01	2.92
U19-L18	DIAGONAL	2-10C25			5559	1577	1790	2076	-68.7	1.09	-150.7	1.18	-52.1	1.18	-314.2	-241.7	-302.1	-67.7	-425.4	1.63	-492.4	-806.6	-1577	1.01	2.60	90.1	112.6	-67.7	7.2	1.63	183.5	0.0	2076	1.01	13.14
U19-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	36.3	1.09	68.3	1.18	25.5	1.18	150.3	-133.7	-167.1	-21.1	-208.7	1.63	-272.4	-122.1	-1050	1.01	4.45	189.8	237.3	-21.1	213.1	1.63	386.8	537.1	1556	1.01	3.67
U21-L20	DIAGONAL	2-8C18.75			5388	1050	1276	1556	44.9	1.09	87.3	1.18	31.7	1.18	189.3	-136.4	-170.5	-1.5	-180.4	1.63	-277.9	-88.6	-1050	1.01	4.50	186.9	233.6	-1.5	241.2	1.63	380.7	570.1	1556	1.01	3.63
U21-L22	DIAGONAL	2-10C25			5559	1577	1790	2076	-71.2	1.09	-168.6	1.18	-58.0	1.18	-345.0	-238.8	-298.5	-41.1	-378.4	1.63	-486.6	-831.7	-1577	1.01	2.56	88.0	109.9	-41.1	47.7	1.63	179.2	0.0	2076	1.01	13.62
U23-L22	DIAGONAL	12 WF 58			5559	2098	1435	2404	130.7	1.09	283.1	1.18	104.3	1.18	599.6	-67.3	-84.2	-15.5	-113.1	1.63	-137.2	0.0	-1435	1.01	14.94	275.9	344.9	-15.5	334.5	1.63	562.2	1161.8	2404	1.01	3.25
U23-L24	DIAGONAL	2-15C40			6100	2839	2988	3299	-148.3	1.09	-335.2	1.18	-120.1	1.18	-698.9	-307.1	-383.9	-99.7	-562.9	1.63	-625.7	-1324.6	-2839	1.01	3.47	41.4	51.7	-99.7	-108.5	1.63	84.3	0.0	3299	1.01	47.82
U25-L24	DIAGONAL	12 WF 65			6100	2295	1744	2688	167.9	1.09	352.1	1.18	136.0	1.18	759.0	-33.9	-42.3	-23.6	-82.6	1.63	-82.6	0.0	-1744	1.01	30.52	297.6	372.1	-23.6	349.7	1.63	606.4	1365.5	2688	1.01	3.22
U25-L26	DIAGONAL	2-15C40			7068	2722	2927	3299	-176.1	1.09	-390.3	1.18	-146.6	1.18	-825.6	-320.6	-400.8	-126.4	-624.1	1.63	-653.2	-1478.8	-2722	1.01	2.94	28.2	35.2	-126.4	-169.3	1.63	57.4	0.0	3299	1.01	72.40
U27-L26	DIAGONAL	12 WF 65			7068	2194	1530	2688	171.4	1.09	330.2	1.18	136.8	1.18	737.9	-26.8	-33.5	-25.3	-76.2	1.63	-76.2	0.0	-1530	1.01	29.97	281.6	352.0	-25.3	326.0	1.63	573.8	1311.7	2688	1.01	3.44
U27-L28	DIAGONAL	2-15C40			8519	2518	2813	3299	-178.8	1.09	-363.6	1.18	-145.1	1.18	-795.2	-307.5	-384.3	-128.8	-610.8	1.63	-626.5	-1421.6	-2518	1.01	2.79	25.4	31.7	-128.8	-176.8	1.63	51.7	0.0	3299	1.01	79.83
U11 - U13	**TOP CHORD**	**2-15C55**	**2-PLs14x1/2**	**-6r**	**3810**	**5940**	**5855**	**6516**	**435.6**	1.09	893.3	1.18	318.9	1.18	**1905.2**	**-67.4**	**-84.2**	33.4	-33.4	**1.63**	**-137.2**	**0.0**	-5855	1.01	56.97	**257.8**	**322.2**	33.4	390.6	**1.63**	**525.2**	**2430.4**	6516	1.01	8.90
U13 - U15	TOP CHORD	2-15C45		-6r	7620	3414	3473	3713	266.3	1.09	553.4	1.18	181.7	1.18	1157.7	-107.7	-134.6	27.5	-95.5	1.63	-219.5	0.0	-3414	1.01	20.99	181.0	226.2	27.5	280.9	1.63	368.8	1526.5	3713	1.01	7.03
									255.9	1.09	541.1	1.18	190.2	1.18	1141.9	-87.9	-109.8	25.2	-73.6	1.63	-179.0	0.0	-3414	1.01	25.64	170.2	212.7	25.2	262.9	1.63	346.7	1488.6	3713	1.01	7.52
U15 - U17	TOP CHORD	2-15C33.9	LACED l/r=27		7620	2593	2628	2810	60.3	1.09	117.9	1.18	29.6	1.18	239.9	-249.3	-311.7	-51.4	-408.9	1.63	-508.0	-268.1	-2593	1.01	5.63	156.4	195.5	-51.4	120.1	1.63	318.7	558.6	2810	1.01	8.15
									55.8	1.09	119.7	1.18	44.2	1.18	254.2	-219.5	-274.4	-7.8	-299.0	1.63	-447.3	-193.1	-2593	1.01	6.42	147.7	184.6	-7.8	179.8	1.63	300.9	555.1	2810	1.01	8.59
U17 - U19	TOP CHORD	2-15C40	LACED l/r=28		7620	3037	3085	3299	-123.5	1.09	-266.4	1.18	-95.4	1.18	-561.5	-399.7	-499.6	-123.9	-723.2	1.63	-814.4	-1376.0	-3037	1.01	3.08	130.6	163.3	-123.9	-31.6	1.63	266.2	0.0	3299	1.01	14.63
									-127.8	1.09	-267.5	1.18	-86.1	1.18	-556.7	-376.6	-470.8	-96.0	-647.6	1.63	-767.4	-1324.1	-3037	1.01	3.27	131.1	163.9	-96.0	14.5	1.63	267.2	0.0	3299	1.01	14.55
U19 - U21	TOP CHORD	2-15C55	LACED l/r=29		7620	4165	4248	4542	-200.2	1.09	-418.9	1.18	-139.7	1.18	-877.4	-464.2	-580.3	-152.6	-854.1	1.63	-945.9	-1823.3	-4165	1.01	3.52	111.9	139.8	-152.6	-102.9	1.63	227.9	0.0	4542	1.01	23.98
									-200.0	1.09	-418.7	1.18	-140.0	1.18	-877.2	-464.3	-580.4	-148.1	-846.8	1.63	-946.0	-1823.2	-4165	1.01	3.52	108.3	135.4	-148.1	-100.1	1.63	220.7	0.0	4542	1.01	24.76
U21 - U23	TOP CHORD	2-15C40	LACED L/R=28		7620	3037	3085	3299	-119.3	1.09	-241.7	1.18	-77.9	1.18	-507.2	-383.2	-479.1	-112.8	-683.7	1.63	-780.9	-1288.0	-3037	1.01	3.28	159.3	199.1	-112.8	23.8	1.63	324.5	0.0	3299	1.01	11.83
									-115.1	1.09	-241.1	1.18	-87.5	1.18	-513.3	-405.4	-506.7	-132.9	-745.2	1.63	-826.0	-1339.2	-3037	1.01	3.09	158.0	197.5	-132.9	-10.5	1.63	321.9	0.0	3299	1.01	11.94
U23 - U25	TOP CHORD	2-15C33.9	LACED L/R=27		7620	2593	2628	2810	69.9	1.09	160.8	1.18	58.2	1.18	334.6	-228.8	-286.0	-31.4	-349.6	1.63	-466.2	-131.6	-2593	1.01	6.34	180.0	225.0	-31.4	183.5	1.63	366.7	701.4	2810	1.01	6.83
									74.8	1.09	160.9	1.18	44.7	1.18	324.2	-256.8	-321.0	-70.0	-449.0	1.63	-523.3	-199.1	-2593	1.01	5.63	189.0	236.3	-70.0	132.4	1.63	385.1	709.3	2810	1.01	6.53
U25 - U27	TOP CHORD	2-15C50		-6r	7620	3789	3859	4128	274.9	1.09	590.1	1.18	208.1	1.18	1241.4	-95.7	-119.6	30.1	-75.6	1.63	-195.0	0.0	-3789	1.01	26.00	193.8	242.3	30.1	301.9	1.63	394.9	1636.3	4128	1.01	7.41
									283.4	1.09	600.5	1.18	199.9	1.18	1253.4	-114.5	-143.1	4.9	-141.3	1.63	-233.3	0.0	-3789	1.01	21.78	214.9	268.6	4.9	288.2	1.63	437.8	1691.2	4128	1.01	6.66
U27 - U29	**TOP CHORD**	**2-15C55**	**2-PLs14X3/8**	**-6r**	**7620**	**5497**	**5687**	**6022**	**456.1**	1.09	940.1	1.18	338.0	1.18	**2005.3**	**-53.6**	**-66.9**	37.4	-8.9	**1.63**	**-109.1**	**0.0**	-5497	1.01	69.25	**247.2**	**309.0**	37.4	383.3	**1.63**	**503.7**	**2509.1**	6022	1.01	8.09
																				1.63										1.63					
L12 - L14	**BOT CHORD**	**2-15C50**	**LACED L/R=62**	**2-PLs14X1/2 ***	**7800**	**3227**	**3586**	**4128**	**-392.2**	1.09	-793.7	1.18	-274.0	1.18	**-1687.3**	**-228.3**	**-285.3**	-250.6	-706.1	**1.63**	**-706.1**	**-2393.4**	-3227	1.01	2.23	**67.7**	**84.6**	-250.6	-320.2	**1.63**	**137.9**	**0.0**	4128	1.01	42.47
L14 - L16	BOT CHORD	2-15C33.9	LACED L/R=54		7712	2273	2454	2810	-146.0	1.09	-297.0	1.18	-105.6	1.18	-634.1	-173.8	-217.3	-97.3	-385.3	1.63	-385.3	-1019.4	-2273	1.01	4.31	160.5	200.6	-97.3	50.6	1.63	327.0	0.0	2810	1.01	10.62
L16- L18	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	57.4	1.09	130.1	1.18	39.0	1.18	262.1	-144.1	-180.1	-119.5	-382.6	1.63	-382.6	-120.5	-2280	1.01	6.70	307.6	384.5	-119.5	206.4	1.63	626.7	888.8	2810	1.01	4.11
L18 - L20	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	165.3	1.09	356.2	1.18	118.8	1.18	740.7	-103.1	-128.9	-133.8	-352.6	1.63	-352.6	0.0	-2954	1.01	10.56	414.9	518.7	-133.8	322.9	1.63	845.4	1586.1	3713	1.01	3.56
L20 - L22	BOT CHORD	2-15C45		-6r	7624	2954	3250	3713	161.3	1.09	342.8	1.18	114.3	1.18	715.3	-125.8	-157.3	-151.7	-411.3	1.63	-411.3	0.0	-2954	1.01	8.99	418.5	523.1	-151.7	298.5	1.63	852.7	1567.9	3713	1.01	3.56
L22 - L24	BOT CHORD	2-15C33.9		-6r	7654	2280	2458	2810	46.1	1.09	94.2	1.18	27.4	1.18	193.7	-177.7	-222.1	-168.6	-506.6	1.63	-506.6	-312.9	-2280	1.01	4.93	318.4	398.0	-168.6	140.4	1.63	648.8	842.5	2810	1.01	4.08
L24 - L26	BOT CHORD	2-15C40	LACED L/R=54		7712	2634	2880	3299	-164.1	1.09	-349.2	1.18	-123.4	1.18	-736.6	-217.4	-271.8	-171.9	-563.7	1.63	-563.7	-1300.3	-2634	1.01	3.41	178.7	223.4	-171.9	-47.2	1.63	364.2	0.0	3299	1.01	11.17
L26 - L28	**BOT CHORD**	**2-15C55**	**LACED L/R=62**	**2-PLs14x1/2 ***	**7800**	**3527**	**3960**	**4542**	-408.9	1.09	-844.8	1.18	-293.1	1.18	-1788.5	-251.9	-314.8	-221.2	-689.1	1.63	-689.1	**-2477.6**	-3527	1.01	2.57	64.3	80.3	-221.2	-276.8	1.63	131.0	**0.0**	4542	1.01	48.69

* 2009 Bridge Inspection, Photo 2608 indicates that plates of the built-up bottom chords adjacent to piers are NOT continuous along entire member.

LOWER GUSSETS

FACTORED GUSSET PLATE LOADS

		EXTERIOR SPAN							INTERIOR SPAN							
UPPER/LOWER		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
SECTION NUMBER		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28
JOINT ID		L0	L2	L4	L6	L8	L10	L12	L14	L16	L18	L20	L22	L24	L26	L28
CENTER TRUSS	UNITS															
EVALUATION 1																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-900.9	559.2	45.4	-525.1	-963.4	-1178.1	-1257.5	1021.1	906.5	626.3	123.3	-498.8	-930.7	-1143.7	-1216.8
$C_{f,LL}$	kN	-1019.4	-282.7	-495.7	-714.4	-895.6	-974.6	-1032.9	-148.3	-264.1	-388.2	-554.0	-792.9	-935.8	-999.6	-1052.0
$T_{f,LL}$	kN	163.7	668.1	526.3	348.3	176.6	81.9	7.5	716.6	723.9	668.8	535.2	330.3	169.5	96.0	64.4
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-138.6	-154.1	-132.5	-155.7	-172.4	-252.7	-177.4	-160.9	-142.1	-159.8	-143.7	-162.0	-176.6	-213.8
$C_{f,LL}$	kN		-499.7	-508.6	-497.7	-495.1	-465.7	-533.2	-474.4	-495.6	-499.6	-508.8	-503.5	-500.5	-477.9	-516.4
$T_{f,LL}$	kN		120.2	124.2	149.2	135.0	95.8	3.4	99.1	133.4	147.5	121.4	145.6	128.5	92.6	0.3
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-387.6	198.3	695.3	964.1	1066.5	-1218.1	-1126.6	-899.5	-456.3	174.1	662.6	933.6	1033.8	-1216.8
$C_{f,LL}$	kN		-802.4	-595.4	-404.8	-266.2	-142.8	-1022.6	-981.3	-937.1	-812.7	-570.9	-392.7	-251.0	-140.9	-1052.0
$T_{f,LL}$	kN		223.2	408.5	609.4	708.0	717.3	78.6	119.5	171.7	319.2	518.4	661.7	732.4	742.3	64.4
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		635.2	1426.9	1268.3	258.8	-717.0	-1650.2	-1678.1	-798.2	70.0	911.9	878.5	0.2	-923.0	-1724.4
$C_{f,LL}$	kN		-128.6	-447.3	-743.2	-787.9	-729.6	-814.9	-735.8	-505.2	-551.1	-623.9	-728.0	-690.5	-601.1	-696.8
$T_{f,LL}$	kN		720.7	1414.3	1525.2	999.5	469.0	206.0	176.7	391.6	831.1	1357.0	1370.1	835.6	369.2	143.1
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		1426.9	1268.3	258.8	-717.0	-1650.2	-1678.1	-798.2	70.0	911.9	878.5	0.2	-923.0	-1724.4	-1724.4
$C_{f,LL}$	kN		-447.3	-743.2	-787.9	-729.6	-814.9	-735.8	-505.2	-551.1	-623.9	-728.0	-690.5	-601.1	-696.8	-696.8
$T_{f,LL}$	kN		1414.3	1525.2	999.5	469.0	206.0	176.7	391.6	831.1	1357.0	1370.1	835.6	369.2	143.1	143.1
EVALUATION 2																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-900.9	559.2	45.4	-525.1	-963.4	-1178.1	-1257.5	1021.1	906.5	626.3	123.3	-498.8	-930.7	-1143.7	-1216.8
$C_{f,LL}$	kN	-925.3	-282.7	-495.7	-680.7	-822.7	-881.4	-935.2	-147.9	-264.1	-376.9	-520.4	-728.0	-849.0	-901.1	-949.9
$T_{f,LL}$	kN	136.6	590.7	474.2	324.0	174.0	81.9	6.4	628.5	635.3	591.1	481.0	307.1	167.5	82.4	54.8
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-138.6	-154.1	-132.5	-155.7	-172.4	-252.7	-177.4	-160.9	-142.1	-159.8	-143.7	-162.0	-176.6	-213.8
$C_{f,LL}$	kN		-499.7	-508.6	-497.7	-495.0	-464.0	-530.1	-472.9	-495.4	-499.6	-508.8	-503.5	-500.3	-476.4	-515.4
$T_{f,LL}$	kN		117.9	116.1	138.6	126.9	95.7	2.9	99.0	125.5	137.7	113.5	135.6	121.7	92.4	0.3
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-387.6	198.3	695.3	964.1	1066.5	-1218.1	-1126.6	-899.5	-456.3	174.1	662.6	933.6	1033.8	-1216.8
$C_{f,LL}$	kN		-734.7	-558.5	-392.4	-266.2	-142.3	-926.0	-883.8	-848.0	-744.4	-535.2	-381.8	-251.0	-139.6	-949.9
$T_{f,LL}$	kN		223.2	401.5	555.2	627.3	629.1	65.6	99.8	164.8	297.3	467.1	586.6	644.2	651.0	54.8
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		635.2	1426.9	1268.3	258.8	-717.0	-1650.2	-1678.1	-798.2	70.0	911.9	878.5	0.2	-923.0	-1724.4
$C_{f,LL}$	kN		-116.3	-404.1	-670.7	-711.1	-658.9	-743.5	-681.0	-451.6	-500.6	-577.9	-665.7	-624.2	-539.4	-640.3
$T_{f,LL}$	kN		654.2	1265.5	1373.1	908.9	456.6	184.4	167.0	391.5	777.6	1226.0	1237.9	780.6	369.2	121.7
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		1426.9	1268.3	258.8	-717.0	-1650.2	-1678.1	-798.2	70.0	911.9	878.5	0.2	-923.0	-1724.4	-1724.4
$C_{f,LL}$	kN		-404.1	-670.7	-711.1	-658.9	-743.5	-681.0	-451.6	-500.6	-577.9	-665.7	-624.2	-539.4	-640.3	-640.3
$T_{f,LL}$	kN		1265.5	1373.1	908.9	456.6	184.4	167.0	391.5	777.6	1226.0	1237.9	780.6	369.2	121.7	121.7
EVALUATION 3																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-900.9	559.2	45.4	-525.1	-963.4	-1178.1	-1257.5	1021.1	906.5	626.3	123.3	-498.8	-930.7	-1143.7	-1216.8
$C_{f,LL}$	kN	-795.2	-282.7	-464.0	-597.3	-703.9	-740.2	-778.0	-147.3	-249.2	-344.6	-458.8	-624.6	-722.0	-753.2	-784.6
$T_{f,LL}$	kN	91.3	483.8	395.9	281.6	160.1	81.9	4.4	511.0	516.6	485.0	401.1	266.5	155.4	71.4	36.9
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-138.6	-154.1	-132.5	-155.7	-172.4	-252.7	-177.4	-160.9	-142.1	-159.8	-143.7	-162.0	-176.6	-213.8
$C_{f,LL}$	kN		-499.7	-507.5	-497.3	-494.1	-463.6	-525.9	-471.0	-494.0	-499.5	-507.8	-502.7	-499.1	-475.8	-512.8
$T_{f,LL}$	kN		93.9	79.1	96.2	88.2	72.5	1.9	73.6	86.9	96.8	77.7	94.3	84.8	66.8	0.2
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-387.6	198.3	695.3	964.1	1066.5	-1218.1	-1126.6	-899.5	-456.3	174.1	662.6	933.6	1033.8	-1216.8
$C_{f,LL}$	kN		-628.1	-491.3	-358.2	-250.7	-141.8	-772.7	-741.6	-720.6	-638.0	-471.4	-349.3	-239.5	-139.1	-784.6
$T_{f,LL}$	kN		223.2	353.7	464.6	512.4	510.5	43.9	82.3	151.9	258.6	390.7	483.4	524.3	528.4	36.9
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		635.2	1426.9	1268.3	258.8	-717.0	-1650.2	-1678.1	-798.2	70.0	911.9	878.5	0.2	-923.0	-1724.4
$C_{f,LL}$	kN		-95.8	-331.8	-549.4	-582.8	-539.8	-621.9	-574.8	-363.5	-407.0	-492.0	-561.1	-512.7	-435.6	-541.1
$T_{f,LL}$	kN		562.2	962.5	1035.6	708.9	391.2	178.9	167.0	343.3	616.5	931.5	940.4	618.7	324.9	111.4
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		1426.9	1268.3	258.8	-717.0	-1650.2	-1678.1	-798.2	70.0	911.9	878.5	0.2	-923.0	-1724.4	-1724.4
$C_{f,LL}$	kN		-331.8	-549.4	-582.8	-539.8	-621.9	-574.8	-363.5	-407.0	-492.0	-561.1	-512.7	-435.6	-541.1	-541.1
$T_{f,LL}$	kN		962.5	1035.6	708.9	391.2	178.9	167.0	343.3	616.5	931.5	940.4	618.7	324.9	111.4	111.4

LOWER GUSSETS

FACTORED GUSSET PLATE LOADS

		EXTERIOR SPAN							INTERIOR SPAN							
UPPER/LOWER		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
SECTION NUMBER		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28
JOINT ID		L0	L2	L4	L6	L8	L10	L12	L14	L16	L18	L20	L22	L24	L26	L28
LEFT TRUSS	UNITS															
EVALUATION 1																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-725.5	563.4	110.8	-382.9	-763.4	-891.8	-850.0	733.0	745.8	578.7	150.3	-345.0	-698.9	-825.6	-795.2
$C_{f,LL}$	kN	-1067.2	-194.2	-307.4	-588.1	-905.6	-1019.1	-990.3	-118.4	-145.7	-198.3	-361.2	-684.5	-929.9	-1000.8	-966.5
$T_{f,LL}$	kN	188.0	895.6	553.0	247.4	56.4	45.7	88.3	907.1	945.3	843.1	549.1	243.2	133.5	100.2	91.1
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-121.0	-133.5	-119.5	-107.5	-96.8	-77.1	-102.0	-109.4	-118.1	-128.6	-117.6	-108.9	-101.7	-72.4
$C_{f,LL}$	kN		-372.9	-375.2	-371.9	-365.1	-342.1	-336.3	-350.9	-365.5	-371.7	-374.8	-372.9	-362.0	-344.5	-336.2
$T_{f,LL}$	kN		25.0	31.5	33.1	32.6	29.0	35.1	27.8	31.4	33.5	29.6	33.1	34.6	28.9	34.5
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-285.2	219.4	666.3	823.8	788.8	-801.2	-821.6	-681.1	-314.2	189.3	599.6	759.0	737.9	-795.2
$C_{f,LL}$	kN		-720.4	-384.2	-126.7	-74.9	-90.8	-976.0	-1010.8	-935.9	-695.4	-368.3	-183.1	-108.8	-102.8	-966.5
$T_{f,LL}$	kN		192.2	414.0	793.3	948.9	920.1	100.5	125.2	166.6	256.9	537.3	836.4	934.8	895.2	91.1
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		519.5	998.7	920.8	389.2	-564.1	-1666.0	-1687.3	-634.1	262.1	740.7	715.3	193.7	-736.6	-1788.5
$C_{f,LL}$	kN		-109.7	-305.1	-537.7	-728.7	-861.7	-1023.9	-932.9	-617.9	-522.6	-452.9	-540.8	-689.5	-792.4	-947.8
$T_{f,LL}$	kN		586.9	1265.0	1393.2	1078.4	568.4	290.9	246.7	437.9	911.1	1239.0	1253.8	948.0	505.3	225.5
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		998.7	920.8	389.2	-564.1	-1666.0	-1687.3	-634.1	262.1	740.7	715.3	193.7	-736.6	-1788.5	-1788.5
$C_{f,LL}$	kN		-305.1	-537.7	-728.7	-861.7	-1023.9	-932.9	-617.9	-522.6	-452.9	-540.8	-689.5	-792.4	-947.8	-947.8
$T_{f,LL}$	kN		1265.0	1393.2	1078.4	568.4	290.9	246.7	437.9	911.1	1239.0	1253.8	948.0	505.3	225.5	225.5
EVALUATION 2																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-725.5	563.4	110.8	-382.9	-763.4	-891.8	-850.0	733.0	745.8	578.7	150.3	-345.0	-698.9	-825.6	-795.2
$C_{f,LL}$	kN	-940.3	-174.4	-294.1	-557.1	-807.9	-892.2	-861.9	-107.8	-131.4	-180.0	-328.8	-612.9	-820.1	-874.0	-840.8
$T_{f,LL}$	kN	156.7	791.0	493.9	229.8	55.6	38.6	73.5	795.5	828.3	743.3	491.5	223.3	113.4	85.1	76.9
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-121.0	-133.5	-119.5	-107.5	-96.8	-77.1	-102.0	-109.4	-118.1	-128.6	-117.6	-108.9	-101.7	-72.4
$C_{f,LL}$	kN		-371.3	-373.0	-369.9	-363.4	-338.8	-329.8	-347.0	-364.3	-370.3	-372.7	-371.2	-360.8	-341.2	-329.6
$T_{f,LL}$	kN		23.8	29.1	30.8	30.5	27.1	32.4	25.9	29.4	31.1	27.5	30.8	32.3	27.2	31.6
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-285.2	219.4	666.3	823.8	788.8	-801.2	-821.6	-681.1	-314.2	189.3	599.6	759.0	737.9	-795.2
$C_{f,LL}$	kN		-644.9	-353.0	-121.9	-68.3	-78.0	-849.0	-882.6	-825.0	-621.6	-336.7	-168.4	-97.6	-93.2	-840.8
$T_{f,LL}$	kN		178.4	406.1	712.3	834.5	808.3	84.7	104.5	139.1	230.7	482.3	738.6	820.4	786.1	76.9
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		519.5	998.7	920.8	389.2	-564.1	-1666.0	-1687.3	-634.1	262.1	740.7	715.3	193.7	-736.6	-1788.5
$C_{f,LL}$	kN		-99.0	-274.8	-483.6	-655.4	-774.7	-925.7	-853.0	-525.3	-473.4	-417.7	-492.3	-621.0	-703.8	-852.2
$T_{f,LL}$	kN		526.3	1136.4	1259.8	975.2	521.8	242.9	205.9	414.6	832.2	1127.4	1137.8	864.1	472.9	191.7
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		998.7	920.8	389.2	-564.1	-1666.0	-1687.3	-634.1	262.1	740.7	715.3	193.7	-736.6	-1788.5	-1788.5
$C_{f,LL}$	kN		-274.8	-483.6	-655.4	-774.7	-925.7	-853.0	-525.3	-473.4	-417.7	-492.3	-621.0	-703.8	-852.2	-852.2
$T_{f,LL}$	kN		1136.4	1259.8	975.2	521.8	242.9	205.9	414.6	832.2	1127.4	1137.8	864.1	472.9	191.7	191.7
EVALUATION 3																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-725.5	563.4	110.8	-382.9	-763.4	-891.8	-850.0	733.0	745.8	578.7	150.3	-345.0	-698.9	-825.6	-795.2
$C_{f,LL}$	kN	-714.4	-148.7	-256.3	-457.0	-623.7	-666.4	-638.6	-89.1	-107.4	-149.7	-272.4	-486.6	-625.7	-653.2	-626.5
$T_{f,LL}$	kN	104.9	597.2	390.5	186.6	50.5	27.4	49.3	580.4	612.0	565.1	386.8	179.2	84.3	57.4	51.7
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-121.0	-133.5	-119.5	-107.5	-96.8	-77.1	-102.0	-109.4	-118.1	-128.6	-117.6	-108.9	-101.7	-72.4
$C_{f,LL}$	kN		-363.7	-362.4	-360.0	-354.2	-333.2	-319.8	-339.2	-355.0	-361.2	-362.6	-361.6	-352.4	-335.9	-319.4
$T_{f,LL}$	kN		21.2	20.6	23.7	24.3	23.1	28.4	21.2	23.1	24.0	19.6	23.6	26.1	22.7	27.2
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-285.2	219.4	666.3	823.8	788.8	-801.2	-821.6	-681.1	-314.2	189.3	599.6	759.0	737.9	-795.2
$C_{f,LL}$	kN		-509.4	-292.5	-109.4	-56.2	-64.1	-631.7	-658.8	-628.6	-492.4	-277.9	-137.2	-82.6	-76.2	-626.5
$T_{f,LL}$	kN		155.2	341.5	553.3	618.9	586.7	56.8	70.0	93.1	183.5	380.7	562.2	606.4	573.8	51.7
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		519.5	998.7	920.8	389.2	-564.1	-1666.0	-1687.3	-634.1	262.1	740.7	715.3	193.7	-736.6	-1788.5
$C_{f,LL}$	kN		-81.1	-224.2	-393.4	-533.4	-629.3	-758.3	-706.1	-385.3	-382.6	-352.6	-411.3	-506.6	-563.7	-689.1
$T_{f,LL}$	kN		417.9	849.6	938.1	721.5	391.3	162.6	137.9	327.0	626.7	845.4	852.7	648.8	364.2	131.0
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		998.7	920.8	389.2	-564.1	-1666.0	-1687.3	-634.1	262.1	740.7	715.3	193.7	-736.6	-1788.5	-1788.5
$C_{f,LL}$	kN		-224.2	-393.4	-533.4	-629.3	-758.3	-706.1	-385.3	-382.6	-352.6	-411.3	-506.6	-563.7	-689.1	-689.1
$T_{f,LL}$	kN		849.6	938.1	721.5	391.3	162.6	137.9	327.0	626.7	845.4	852.7	648.8	364.2	131.0	131.0

LOWER GUSSETS

FACTORED GUSSET PLATE LOADS

		EXTERIOR SPAN							INTERIOR SPAN							
UPPER/LOWER		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
SECTION NUMBER		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28
JOINT ID		L0	L2	L4	L6	L8	L10	L12	L14	L16	L18	L20	L22	L24	L26	L28
RIGHT TRUSS	UNITS															
EVALUATION 1																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-1029.2	764.4	145.7	-489.4	-995.8	-1222.4	-1253.1	1087.8	1022.5	744.4	171.3	-474.4	-957.4	-1176.6	-1212.6
$C_{f,LL}$	kN	-778.4	-187.7	-226.8	-409.3	-666.5	-751.9	-709.8	-123.3	-141.0	-168.9	-278.5	-490.9	-683.2	-731.9	-686.5
$T_{f,LL}$	kN	177.8	688.1	425.1	174.3	33.6	64.5	119.7	685.5	728.8	656.7	418.0	199.5	125.1	93.5	99.5
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-168.1	-174.2	-166.0	-166.1	-170.6	-199.5	-175.1	-167.8	-165.0	-171.2	-166.3	-167.8	-176.5	-201.3
$C_{f,LL}$	kN		-266.5	-275.7	-269.4	-261.9	-240.4	-233.9	-246.7	-262.7	-269.1	-273.4	-268.7	-258.6	-240.5	-234.1
$T_{f,LL}$	kN		17.7	15.7	20.2	22.5	22.8	45.1	21.4	21.8	20.7	15.3	21.1	24.1	22.4	43.7
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-424.3	225.1	815.1	1086.3	1135.0	-1212.0	-1164.7	-928.9	-435.5	218.8	776.7	1043.9	1099.8	-1212.6
$C_{f,LL}$	kN		-529.2	-262.2	-64.5	-64.7	-122.6	-697.2	-743.7	-693.7	-503.7	-265.7	-134.0	-102.8	-107.6	-686.5
$T_{f,LL}$	kN		168.8	297.9	612.1	733.2	698.7	106.6	117.9	157.6	212.1	404.0	645.4	717.3	673.4	99.5
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		593.5	1220.8	1163.6	459.0	-734.6	-2128.8	-2173.5	-841.9	283.6	917.8	886.4	200.5	-973.1	-2315.9
$C_{f,LL}$	kN		-109.8	-301.4	-524.5	-707.4	-823.2	-952.0	-838.0	-560.2	-502.8	-441.8	-528.9	-667.8	-747.1	-871.6
$T_{f,LL}$	kN		493.6	1030.0	1158.7	951.8	555.0	285.1	235.8	420.7	808.9	1049.6	1065.9	849.5	493.8	220.0
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		1220.8	1163.6	459.0	-734.6	-2128.8	-2173.5	-841.9	283.6	917.8	886.4	200.5	-973.1	-2315.9	-2315.9
$C_{f,LL}$	kN		-301.4	-524.5	-707.4	-823.2	-952.0	-838.0	-560.2	-502.8	-441.8	-528.9	-667.8	-747.1	-871.6	-871.6
$T_{f,LL}$	kN		1030.0	1158.7	951.8	555.0	285.1	235.8	420.7	808.9	1049.6	1065.9	849.5	493.8	220.0	220.0
EVALUATION 2																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-1029.2	764.4	145.7	-489.4	-995.8	-1222.4	-1253.1	1087.8	1022.5	744.4	171.3	-474.4	-957.4	-1176.6	-1212.6
$C_{f,LL}$	kN	-694.3	-169.0	-214.7	-383.8	-595.4	-662.8	-628.6	-111.7	-127.5	-147.4	-247.3	-439.3	-606.3	-644.6	-607.8
$T_{f,LL}$	kN	148.3	601.2	376.8	160.7	32.3	54.3	100.4	596.8	631.3	572.4	371.5	179.0	106.4	79.4	84.1
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-168.1	-174.2	-166.0	-166.1	-170.6	-199.5	-175.1	-167.8	-165.0	-171.2	-166.3	-167.8	-176.5	-201.3
$C_{f,LL}$	kN		-263.8	-271.2	-265.6	-258.7	-239.2	-229.2	-243.5	-260.2	-265.8	-269.2	-265.2	-256.0	-239.5	-229.4
$T_{f,LL}$	kN		16.8	14.8	19.2	21.4	20.7	41.3	19.2	20.9	19.7	14.6	20.1	22.8	20.5	39.5
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-424.3	225.1	815.1	1086.3	1135.0	-1212.0	-1164.7	-928.9	-435.5	218.8	776.7	1043.9	1099.8	-1212.6
$C_{f,LL}$	kN		-470.6	-239.6	-60.5	-54.4	-102.9	-617.6	-654.3	-614.8	-450.4	-237.1	-113.9	-93.1	-97.2	-607.8
$T_{f,LL}$	kN		141.3	292.0	548.0	637.9	609.7	89.6	98.4	131.6	188.6	360.3	563.5	622.7	587.2	84.1
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		593.5	1220.8	1163.6	459.0	-734.6	-2128.8	-2173.5	-841.9	283.6	917.8	886.4	200.5	-973.1	-2315.9
$C_{f,LL}$	kN		-99.1	-271.7	-472.7	-637.8	-742.9	-864.7	-772.4	-476.7	-456.6	-408.3	-482.5	-603.0	-670.2	-788.5
$T_{f,LL}$	kN		438.7	918.1	1033.2	846.9	494.2	238.2	196.9	390.3	725.4	940.8	953.8	759.0	450.1	187.0
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		1220.8	1163.6	459.0	-734.6	-2128.8	-2173.5	-841.9	283.6	917.8	886.4	200.5	-973.1	-2315.9	-2315.9
$C_{f,LL}$	kN		-271.7	-472.7	-637.8	-742.9	-864.7	-772.4	-476.7	-456.6	-408.3	-482.5	-603.0	-670.2	-788.5	-788.5
$T_{f,LL}$	kN		918.1	1033.2	846.9	494.2	238.2	196.9	390.3	725.4	940.8	953.8	759.0	450.1	187.0	187.0
EVALUATION 3																
MEMBER A		U1 - L0	U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		2-12C35	12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	-1029.2	764.4	145.7	-489.4	-995.8	-1222.4	-1253.1	1087.8	1022.5	744.4	171.3	-474.4	-957.4	-1176.6	-1212.6
$C_{f,LL}$	kN	-542.7	-137.8	-186.6	-313.4	-447.9	-498.6	-495.0	-92.1	-104.9	-117.6	-194.2	-339.7	-448.1	-504.1	-493.3
$T_{f,LL}$	kN	99.2	446.0	289.2	131.2	27.6	36.3	66.9	427.5	457.5	425.2	284.8	140.4	71.6	53.5	56.6
MEMBER B			U2 - L2	U4 - L4	U6 - L6	U8 - L8	U10 - L10	U12 - L12	U14 - L14	U16 - L16	U18 - L18	U20 - L20	U22 - L22	U24 - L24	U26 - L26	U28 - L28
Shape			12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 45	12 WF 53
$P_{f,DL}$	kN		-168.1	-174.2	-166.0	-166.1	-170.6	-199.5	-175.1	-167.8	-165.0	-171.2	-166.3	-167.8	-176.5	-201.3
$C_{f,LL}$	kN		-246.3	-248.5	-244.0	-239.9	-226.9	-222.2	-230.9	-240.6	-245.1	-247.1	-244.3	-239.1	-228.7	-222.2
$T_{f,LL}$	kN		15.5	11.9	16.9	18.9	18.6	35.5	17.0	18.4	17.4	11.8	17.6	20.1	18.1	33.4
MEMBER C			U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26	U27 - L28
Shape			2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65	2-15C40
$P_{f,DL}$	kN		-424.3	225.1	815.1	1086.3	1135.0	-1212.0	-1164.7	-928.9	-435.5	218.8	776.7	1043.9	1099.8	-1212.6
$C_{f,LL}$	kN		-364.9	-192.9	-52.0	-37.2	-72.8	-501.2	-525.5	-476.1	-346.5	-187.7	-82.6	-75.0	-78.5	-493.3
$T_{f,LL}$	kN		119.9	240.9	413.4	464.1	434.6	60.5	65.9	88.1	146.5	277.5	419.7	451.5	420.5	56.6
MEMBER D			L0 - L2	L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28
Shape			2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55
$P_{f,DL}$	kN		593.5	1220.8	1163.6	459.0	-734.6	-2128.8	-2173.5	-841.9	283.6	917.8	886.4	200.5	-973.1	-2315.9
$C_{f,LL}$	kN		-81.2	-222.2	-386.1	-521.6	-608.1	-717.7	-654.2	-364.6	-370.9	-346.0	-404.7	-494.6	-541.5	-646.7
$T_{f,LL}$	kN		334.1	682.3	749.7	617.0	358.0	159.4	131.8	293.7	534.2	689.5	697.2	557.2	331.3	131.7
MEMBER E			L2 - L4	L4 - L6	L6 - L8	L8 - L10	L10 - L12	L12 - L14	L14 - L16	L16 - L18	L18 - L20	L20 - L22	L22 - L24	L24 - L26	L26 - L28	L26 - L28
Shape			2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C50	2-15C50	2-15C33.9	2-15C33.9	2-15C45	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C55
$P_{f,DL}$	kN		1220.8	1163.6	459.0	-734.6	-2128.8	-2173.5	-841.9	283.6	917.8	886.4	200.5	-973.1	-2315.9	-2315.9
$C_{f,LL}$	kN		-222.2	-386.1	-521.6	-608.1	-717.7	-654.2	-364.6	-370.9	-346.0	-404.7	-494.6	-541.5	-646.7	-646.7
$T_{f,LL}$	kN		682.3	749.7	617.0	358.0	159.4	131.8	293.7	534.2	689.5	697.2	557.2	331.3	131.7	131.7

UPPER GUSSETS

FACTORED GUSSET PLATE

		EXTERIOR SPAN							INTERIOR SPAN						
UPPER/LOWER		U	U	U	U	U	U	U	U	U	U	U	U	U	U
SECTION NUMBER		1	3	5	7	9	11	13	15	17	19	21	23	25	27
JOINT ID		U1	U3	U5	U7	U9	U11	U13	U15	U17	U19	U21	U23	U25	U27
CENTER TRUSS	UNITS														
EVALUATION 1															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	559.2	45.4	-525.1	-963.4	-1178.1	-1257.5	1021.1	906.5	626.3	123.3	-498.8	-930.7	-1143.7	-1216.8
$C_{f,LL}$	kN	-282.7	-495.7	-714.4	-895.6	-974.6	-1032.9	-148.3	-264.1	-388.2	-554.0	-792.9	-935.8	-999.6	-1052.0
$T_{f,LL}$	kN	668.1	526.3	348.3	176.6	81.9	7.5	716.6	723.9	668.8	535.2	330.3	169.5	96.0	64.4
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-900.9	-387.6	198.3	695.3	964.1	1066.5	-1218.1	-1126.6	-899.5	-456.3	174.1	662.6	933.6	1033.8
$C_{f,LL}$	kN	-1019.4	-802.4	-595.4	-404.8	-266.2	-142.8	-1022.6	-981.3	-937.1	-812.7	-570.9	-392.7	-251.0	-140.9
$T_{f,LL}$	kN	163.7	223.2	408.5	609.4	708.0	717.3	78.6	119.5	171.7	319.2	518.4	661.7	732.4	742.3
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	-977.9	-1247.0	-786.9	193.8	1289.8	2343.8	1252.8	165.5	-679.4	-998.6	-540.8	401.1	1461.7	2477.4
$C_{f,LL}$	kN	-932.3	-1281.3	-1187.0	-757.9	-286.2	-252.3	-247.6	-602.8	-1017.7	-1236.0	-1063.5	-641.0	-254.8	-191.9
$T_{f,LL}$	kN	213.3	438.2	632.1	716.0	731.3	718.7	526.1	481.2	397.3	391.3	570.0	658.4	681.1	669.5
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	48.5	-977.9	-1247.0	-786.9	193.8	1289.8	2343.8	1252.8	165.5	-679.4	-998.6	-540.8	401.1	1461.7
$C_{f,LL}$	kN	-30.2	-932.3	-1281.3	-1187.0	-757.9	-286.2	-252.3	-247.6	-602.8	-1017.7	-1236.0	-1063.5	-641.0	-254.8
$T_{f,LL}$	kN	202.9	213.3	438.2	632.1	716.0	731.3	718.7	526.1	481.2	397.3	391.3	570.0	658.4	681.1
EVALUATION 2															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	559.2	45.4	-525.1	-963.4	-1178.1	-1257.5	1021.1	906.5	626.3	123.3	-498.8	-930.7	-1143.7	-1216.8
$C_{f,LL}$	kN	-282.7	-495.7	-680.7	-822.7	-881.4	-935.2	-147.9	-264.1	-376.9	-520.4	-728.0	-849.0	-901.1	-949.9
$T_{f,LL}$	kN	590.7	474.2	324.0	174.0	81.9	6.4	628.5	635.3	591.1	481.0	307.1	167.5	82.4	54.8
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-900.9	-387.6	198.3	695.3	964.1	1066.5	-1218.1	-1126.6	-899.5	-456.3	174.1	662.6	933.6	1033.8
$C_{f,LL}$	kN	-925.3	-734.7	-558.5	-392.4	-266.2	-142.3	-926.0	-883.8	-848.0	-744.4	-535.2	-381.8	-251.0	-139.6
$T_{f,LL}$	kN	136.6	223.2	401.5	555.2	627.3	629.1	65.6	99.8	164.8	297.3	467.1	586.6	644.2	651.0
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	-977.9	-1247.0	-786.9	193.8	1289.8	2343.8	1252.8	165.5	-679.4	-998.6	-540.8	401.1	1461.7	2477.4
$C_{f,LL}$	kN	-829.8	-1158.2	-1088.2	-694.7	-286.2	-210.7	-247.6	-583.5	-929.5	-1133.4	-973.5	-609.0	-254.8	-163.2
$T_{f,LL}$	kN	178.0	365.7	527.6	597.6	609.5	597.3	444.9	408.8	337.7	326.9	476.2	549.9	568.3	556.5
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	48.5	-977.9	-1247.0	-786.9	193.8	1289.8	2343.8	1252.8	165.5	-679.4	-998.6	-540.8	401.1	1461.7
$C_{f,LL}$	kN	-28.7	-829.8	-1158.2	-1088.2	-694.7	-286.2	-210.7	-247.6	-583.5	-929.5	-1133.4	-973.5	-609.0	-254.8
$T_{f,LL}$	kN	195.4	178.0	365.7	527.6	597.6	609.5	597.3	444.9	408.8	337.7	326.9	476.2	549.9	568.3
EVALUATION 3															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	559.2	45.4	-525.1	-963.4	-1178.1	-1257.5	1021.1	906.5	626.3	123.3	-498.8	-930.7	-1143.7	-1216.8
$C_{f,LL}$	kN	-282.7	-464.0	-597.3	-703.9	-740.2	-778.0	-147.3	-249.2	-344.6	-458.8	-624.6	-722.0	-753.2	-784.6
$T_{f,LL}$	kN	483.8	395.9	281.6	160.1	81.9	4.4	511.0	516.6	485.0	401.1	266.5	155.4	71.4	36.9
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-900.9	-387.6	198.3	695.3	964.1	1066.5	-1218.1	-1126.6	-899.5	-456.3	174.1	662.6	933.6	1033.8
$C_{f,LL}$	kN	-795.2	-628.1	-491.3	-358.2	-250.7	-141.8	-772.7	-741.6	-720.6	-638.0	-471.4	-349.3	-239.5	-139.1
$T_{f,LL}$	kN	91.3	223.2	353.7	464.6	512.4	510.5	43.9	82.3	151.9	258.6	390.7	483.4	524.3	528.4
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	-977.9	-1247.0	-786.9	193.8	1289.8	2343.8	1252.8	165.5	-679.4	-998.6	-540.8	401.1	1461.7	2477.4
$C_{f,LL}$	kN	-639.5	-877.9	-822.8	-535.7	-256.0	-140.9	-230.4	-468.0	-715.8	-860.4	-741.4	-486.6	-240.5	-109.8
$T_{f,LL}$	kN	119.0	244.4	352.7	399.3	406.7	397.8	299.0	274.8	227.1	218.6	318.4	367.6	379.6	370.0
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	48.5	-977.9	-1247.0	-786.9	193.8	1289.8	2343.8	1252.8	165.5	-679.4	-998.6	-540.8	401.1	1461.7
$C_{f,LL}$	kN	-26.2	-639.5	-877.9	-822.8	-535.7	-256.0	-140.9	-230.4	-468.0	-715.8	-860.4	-741.4	-486.6	-240.5
$T_{f,LL}$	kN	184.3	119.0	244.4	352.7	399.3	406.7	397.8	299.0	274.8	227.1	218.6	318.4	367.6	379.6

UPPER GUSSETS

FACTORED GUSSET PLATE

		EXTERIOR SPAN							INTERIOR SPAN						
UPPER/LOWER		U	U	U	U	U	U	U	U	U	U	U	U	U	U
SECTION NUMBER		1	3	5	7	9	11	13	15	17	19	21	23	25	27
JOINT ID		U1	U3	U5	U7	U9	U11	U13	U15	U17	U19	U21	U23	U25	U27
LEFT TRUSS	UNITS														
EVALUATION 1															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	563.4	110.8	-382.9	-763.4	-891.8	-850.0	733.0	745.8	578.7	150.3	-345.0	-698.9	-825.6	-795.2
$C_{f,LL}$	kN	-194.2	-307.4	-588.1	-905.6	-1019.1	-990.3	-118.4	-145.7	-198.3	-361.2	-684.5	-929.9	-1000.8	-966.5
$T_{f,LL}$	kN	895.6	553.0	247.4	56.4	45.7	88.3	907.1	945.3	843.1	549.1	243.2	133.5	100.2	91.1
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-725.5	-285.2	219.4	666.3	823.8	788.8	-801.2	-821.6	-681.1	-314.2	189.3	599.6	759.0	737.9
$C_{f,LL}$	kN	-1067.2	-720.4	-384.2	-126.7	-74.9	-90.8	-976.0	-1010.8	-935.9	-695.4	-368.3	-183.1	-108.8	-102.8
$T_{f,LL}$	kN	188.0	192.2	414.0	793.3	948.9	920.1	100.5	125.2	166.6	256.9	537.3	836.4	934.8	895.2
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	1157.7	-1178.0	-776.7	140.3	1110.0	1914.3	1157.7	239.9	-561.5	-877.4	-507.2	334.6	1241.4	2005.3
$C_{f,LL}$	kN	-237.8	-1514.1	-1305.4	-747.5	-251.7	-234.5	-237.8	-670.8	-1188.8	-1389.5	-1142.6	-622.7	-220.4	-190.5
$T_{f,LL}$	kN	643.9	473.4	652.2	715.8	744.7	835.2	643.9	556.9	465.1	407.8	580.5	656.0	705.5	895.1
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	8.6	1157.7	-1178.0	-776.7	140.3	1110.0	1914.3	1157.7	239.9	-561.5	-877.4	-507.2	334.6	1241.4
$C_{f,LL}$	kN	-46.3	-237.8	-1514.1	-1305.4	-747.5	-251.7	-234.5	-237.8	-670.8	-1188.8	-1389.5	-1142.6	-622.7	-220.4
$T_{f,LL}$	kN	195.2	643.9	473.4	652.2	715.8	744.7	835.2	643.9	556.9	465.1	407.8	580.5	656.0	705.5
EVALUATION 2															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	563.4	110.8	-382.9	-763.4	-891.8	-850.0	733.0	745.8	578.7	150.3	-345.0	-698.9	-825.6	-795.2
$C_{f,LL}$	kN	-174.4	-294.1	-557.1	-807.9	-892.2	-861.9	-107.8	-131.4	-180.0	-328.8	-612.9	-820.1	-874.0	-840.8
$T_{f,LL}$	kN	791.0	493.9	229.8	55.6	38.6	73.5	795.5	828.3	743.3	491.5	223.3	113.4	85.1	76.9
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-725.5	-285.2	219.4	666.3	823.8	788.8	-801.2	-821.6	-681.1	-314.2	189.3	599.6	759.0	737.9
$C_{f,LL}$	kN	-940.3	-644.9	-353.0	-121.9	-68.3	-78.0	-849.0	-882.6	-825.0	-621.6	-336.7	-168.4	-97.6	-93.2
$T_{f,LL}$	kN	156.7	178.4	406.1	712.3	834.5	808.3	84.7	104.5	139.1	230.7	482.3	738.6	820.4	786.1
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	1157.7	-1178.0	-776.7	140.3	1110.0	1914.3	1157.7	239.9	-561.5	-877.4	-507.2	334.6	1241.4	2005.3
$C_{f,LL}$	kN	-231.7	-1365.7	-1186.8	-680.3	-239.8	-195.8	-231.7	-645.0	-1080.0	-1266.2	-1038.6	-587.1	-214.2	-161.9
$T_{f,LL}$	kN	546.2	394.8	543.9	596.9	622.1	702.7	546.2	473.0	395.3	340.5	484.7	547.6	589.9	751.2
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	8.6	1157.7	-1178.0	-776.7	140.3	1110.0	1914.3	1157.7	239.9	-561.5	-877.4	-507.2	334.6	1241.4
$C_{f,LL}$	kN	-42.3	-231.7	-1365.7	-1186.8	-680.3	-239.8	-195.8	-231.7	-645.0	-1080.0	-1266.2	-1038.6	-587.1	-214.2
$T_{f,LL}$	kN	181.5	546.2	394.8	543.9	596.9	622.1	702.7	546.2	473.0	395.3	340.5	484.7	547.6	589.9
EVALUATION 3															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	563.4	110.8	-382.9	-763.4	-891.8	-850.0	733.0	745.8	578.7	150.3	-345.0	-698.9	-825.6	-795.2
$C_{f,LL}$	kN	-148.7	-256.3	-457.0	-623.7	-666.4	-638.6	-89.1	-107.4	-149.7	-272.4	-486.6	-625.7	-653.2	-626.5
$T_{f,LL}$	kN	597.2	390.5	186.6	50.5	27.4	49.3	580.4	612.0	565.1	386.8	179.2	84.3	57.4	51.7
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-725.5	-285.2	219.4	666.3	823.8	788.8	-801.2	-821.6	-681.1	-314.2	189.3	599.6	759.0	737.9
$C_{f,LL}$	kN	-714.4	-509.4	-292.5	-109.4	-56.2	-64.1	-631.7	-658.8	-628.6	-492.4	-277.9	-137.2	-82.6	-76.2
$T_{f,LL}$	kN	104.9	155.2	341.5	553.3	618.9	586.7	56.8	70.0	93.1	183.5	380.7	562.2	606.4	573.8
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	1157.7	-1178.0	-776.7	140.3	1110.0	1914.3	1157.7	239.9	-561.5	-877.4	-507.2	334.6	1241.4	2005.3
$C_{f,LL}$	kN	-219.5	-1015.5	-881.7	-523.3	-210.6	-131.1	-219.5	-508.0	-814.4	-945.9	-780.9	-466.2	-195.0	-109.1
$T_{f,LL}$	kN	368.8	264.0	363.7	399.4	416.1	473.5	368.8	318.7	266.2	227.9	324.5	366.7	394.9	503.7
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	8.6	1157.7	-1178.0	-776.7	140.3	1110.0	1914.3	1157.7	239.9	-561.5	-877.4	-507.2	334.6	1241.4
$C_{f,LL}$	kN	-35.0	-219.5	-1015.5	-881.7	-523.3	-210.6	-131.1	-219.5	-508.0	-814.4	-945.9	-780.9	-466.2	-195.0
$T_{f,LL}$	kN	148.7	368.8	264.0	363.7	399.4	416.1	473.5	368.8	318.7	266.2	227.9	324.5	366.7	394.9

UPPER GUSSETS

FACTORED GUSSET PLATE

		EXTERIOR SPAN							INTERIOR SPAN						
UPPER/LOWER		U	U	U	U	U	U	U	U	U	U	U	U	U	U
SECTION NUMBER		1	3	5	7	9	11	13	15	17	19	21	23	25	27
JOINT ID		U1	U3	U5	U7	U9	U11	U13	U15	U17	U19	U21	U23	U25	U27
RIGHT TRUSS	UNITS														
EVALUATION 1															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	764.4	145.7	-489.4	-995.8	-1222.4	-1253.1	1087.8	1022.5	744.4	171.3	-474.4	-957.4	-1176.6	-1212.6
$C_{f,LL}$	kN	-187.7	-226.8	-409.3	-666.5	-751.9	-709.8	-123.3	-141.0	-168.9	-278.5	-490.9	-683.2	-731.9	-686.5
$T_{f,LL}$	kN	688.1	425.1	174.3	33.6	64.5	119.7	685.5	728.8	656.7	418.0	199.5	125.1	93.5	99.5
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-1029.2	-424.3	225.1	815.1	1086.3	1135.0	-1212.0	-1164.7	-928.9	-435.5	218.8	776.7	1043.9	1099.8
$C_{f,LL}$	kN	-778.4	-529.2	-262.2	-64.5	-64.7	-122.6	-697.2	-743.7	-693.7	-503.7	-265.7	-134.0	-102.8	-107.6
$T_{f,LL}$	kN	177.8	168.8	297.9	612.1	733.2	698.7	106.6	117.9	157.6	212.1	404.0	645.4	717.3	673.4
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	-1180.2	-1464.1	-941.2	182.0	1410.4	2513.5	1395.6	213.3	-745.3	-1084.5	-607.4	439.9	1605.9	2663.6
$C_{f,LL}$	kN	-940.9	-1284.1	-1148.7	-691.4	-253.9	-228.5	-209.2	-561.5	-1015.9	-1208.3	-1014.4	-580.4	-213.9	-181.6
$T_{f,LL}$	kN	239.2	463.9	639.3	693.2	692.1	689.0	556.9	525.5	457.1	401.1	568.6	631.8	649.4	728.7
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	82.5	-1180.2	-1464.1	-941.2	182.0	1410.4	2513.5	1395.6	213.3	-745.3	-1084.5	-607.4	439.9	1605.9
$C_{f,LL}$	kN	-64.6	-940.9	-1284.1	-1148.7	-691.4	-253.9	-228.5	-209.2	-561.5	-1015.9	-1208.3	-1014.4	-580.4	-213.9
$T_{f,LL}$	kN	133.0	239.2	463.9	639.3	693.2	692.1	689.0	556.9	525.5	457.1	401.1	568.6	631.8	649.4
EVALUATION 2															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	764.4	145.7	-489.4	-995.8	-1222.4	-1253.1	1087.8	1022.5	744.4	171.3	-474.4	-957.4	-1176.6	-1212.6
$C_{f,LL}$	kN	-169.0	-214.7	-383.8	-595.4	-662.8	-628.6	-111.7	-127.5	-147.4	-247.3	-439.3	-606.3	-644.6	-607.8
$T_{f,LL}$	kN	601.2	376.8	160.7	32.3	54.3	100.4	596.8	631.3	572.4	371.5	179.0	106.4	79.4	84.1
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-1029.2	-424.3	225.1	815.1	1086.3	1135.0	-1212.0	-1164.7	-928.9	-435.5	218.8	776.7	1043.9	1099.8
$C_{f,LL}$	kN	-694.3	-470.6	-239.6	-60.5	-54.4	-102.9	-617.6	-654.3	-614.8	-450.4	-237.1	-113.9	-93.1	-97.2
$T_{f,LL}$	kN	148.3	141.3	292.0	548.0	637.9	609.7	89.6	98.4	131.6	188.6	360.3	563.5	622.7	587.2
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	-1180.2	-1464.1	-941.2	182.0	1410.4	2513.5	1395.6	213.3	-745.3	-1084.5	-607.4	439.9	1605.9	2663.6
$C_{f,LL}$	kN	-829.2	-1148.5	-1032.5	-615.4	-242.2	-190.9	-196.6	-536.3	-915.2	-1087.8	-908.9	-528.9	-206.4	-154.3
$T_{f,LL}$	kN	199.5	387.1	533.4	578.4	577.7	579.7	472.9	446.4	388.5	335.0	474.9	527.7	542.6	613.7
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	82.5	-1180.2	-1464.1	-941.2	182.0	1410.4	2513.5	1395.6	213.3	-745.3	-1084.5	-607.4	439.9	1605.9
$C_{f,LL}$	kN	-57.2	-829.2	-1148.5	-1032.5	-615.4	-242.2	-190.9	-196.6	-536.3	-915.2	-1087.8	-908.9	-528.9	-206.4
$T_{f,LL}$	kN	123.2	199.5	387.1	533.4	578.4	577.7	579.7	472.9	446.4	388.5	335.0	474.9	527.7	542.6
EVALUATION 3															
MEMBER A		U1 - L2	U3 - L4	U5 - L6	U7 - L8	U9 - L10	U11 - L12	U13 - L14	U15 - L16	U17 - L18	U19 - L20	U21 - L22	U23 - L24	U25 - L26	U27 - L28
Shape		12 WF 50	2-8C13.75	2-10C25	2-15C35	2-15C45	2-15C45	12 WF 65	12 WF 65	12 WF 53	2-8C18.75	2-10C25	2-15C40	2-15C40	2-15C40
$P_{f,DL}$	kN	764.4	145.7	-489.4	-995.8	-1222.4	-1253.1	1087.8	1022.5	744.4	171.3	-474.4	-957.4	-1176.6	-1212.6
$C_{f,LL}$	kN	-137.8	-186.6	-313.4	-447.9	-498.6	-495.0	-92.1	-104.9	-117.6	-194.2	-339.7	-448.1	-504.1	-493.3
$T_{f,LL}$	kN	446.0	289.2	131.2	27.6	36.3	66.9	427.5	457.5	425.2	284.8	140.4	71.6	53.5	56.6
MEMBER B															
Shape															
$P_{f,DL}$	kN														
$C_{f,LL}$	kN														
$T_{f,LL}$	kN														
MEMBER C		U1 - L0	U3 - L2	U5 - L4	U7 - L6	U9 - L8	U11 - L10	U13 - L12	U15 - L14	U17 - L16	U19 - L18	U21 - L20	U23 - L22	U25 - L24	U27 - L26
Shape		2-12C35	2-10C20	2-8C13.75	12 WF 53	12 WF 65	12 WF 65	2-15C40	2-15C40	2-15C33.9	2-10C25	2-8C18.75	12 WF 58	12 WF 65	12 WF 65
$P_{f,DL}$	kN	-1029.2	-424.3	225.1	815.1	1086.3	1135.0	-1212.0	-1164.7	-928.9	-435.5	218.8	776.7	1043.9	1099.8
$C_{f,LL}$	kN	-542.7	-364.9	-192.9	-52.0	-37.2	-72.8	-501.2	-525.5	-476.1	-346.5	-187.7	-82.6	-75.0	-78.5
$T_{f,LL}$	kN	99.2	119.9	240.9	413.4	464.1	434.6	60.5	65.9	88.1	146.5	277.5	419.7	451.5	420.5
MEMBER D		U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27	U27 - U29
Shape		2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50	2-15C55
$P_{f,DL}$	kN	-1180.2	-1464.1	-941.2	182.0	1410.4	2513.5	1395.6	213.3	-745.3	-1084.5	-607.4	439.9	1605.9	2663.6
$C_{f,LL}$	kN	-605.6	-840.2	-754.2	-456.2	-191.8	-127.7	-168.4	-416.3	-679.9	-798.0	-669.5	-403.0	-169.0	-103.9
$T_{f,LL}$	kN	133.4	258.8	356.6	386.7	386.8	390.9	318.8	300.8	261.7	224.2	317.8	353.2	363.7	410.3
MEMBER E		U0 - U1	U1 - U3	U3 - U5	U5 - U7	U7 - U9	U9 - U11	U11 - U13	U13 - U15	U15 - U17	U17 - U19	U19 - U21	U21 - U23	U23 - U25	U25 - U27
Shape		2-15C45	2-15C45	2-15C40	2-15C50	2-15C33.9	2-15C45	2-15C55	2-15C45	2-15C33.9	2-15C40	2-15C55	2-15C40	2-15C33.9	2-15C50
$P_{f,DL}$	kN	82.5	-1180.2	-1464.1	-941.2	182.0	1410.4	2513.5	1395.6	213.3	-745.3	-1084.5	-607.4	439.9	1605.9
$C_{f,LL}$	kN	-42.4	-605.6	-840.2	-754.2	-456.2	-191.8	-127.7	-168.4	-416.3	-679.9	-798.0	-669.5	-403.0	-169.0
$T_{f,LL}$	kN	100.9	133.4	258.8	356.6	386.7	386.8	390.9	318.8	300.8	261.7	224.2	317.8	353.2	363.7

Truss Bridge: Gusset Plate Load Rating Evaluation

14.12.2 System behavior S2

14.12.3 Element behavior E1

14.12.4 Inspection level INSP2

∴ $\beta = 3.50$ {Table 14.5}

D1 = 1.09 ✓
D2 = 1.18 ✓
D3 = 1.45
} Table 14.7, α_D

All Spans = 1.63 } Table 14.8, α_L ✓

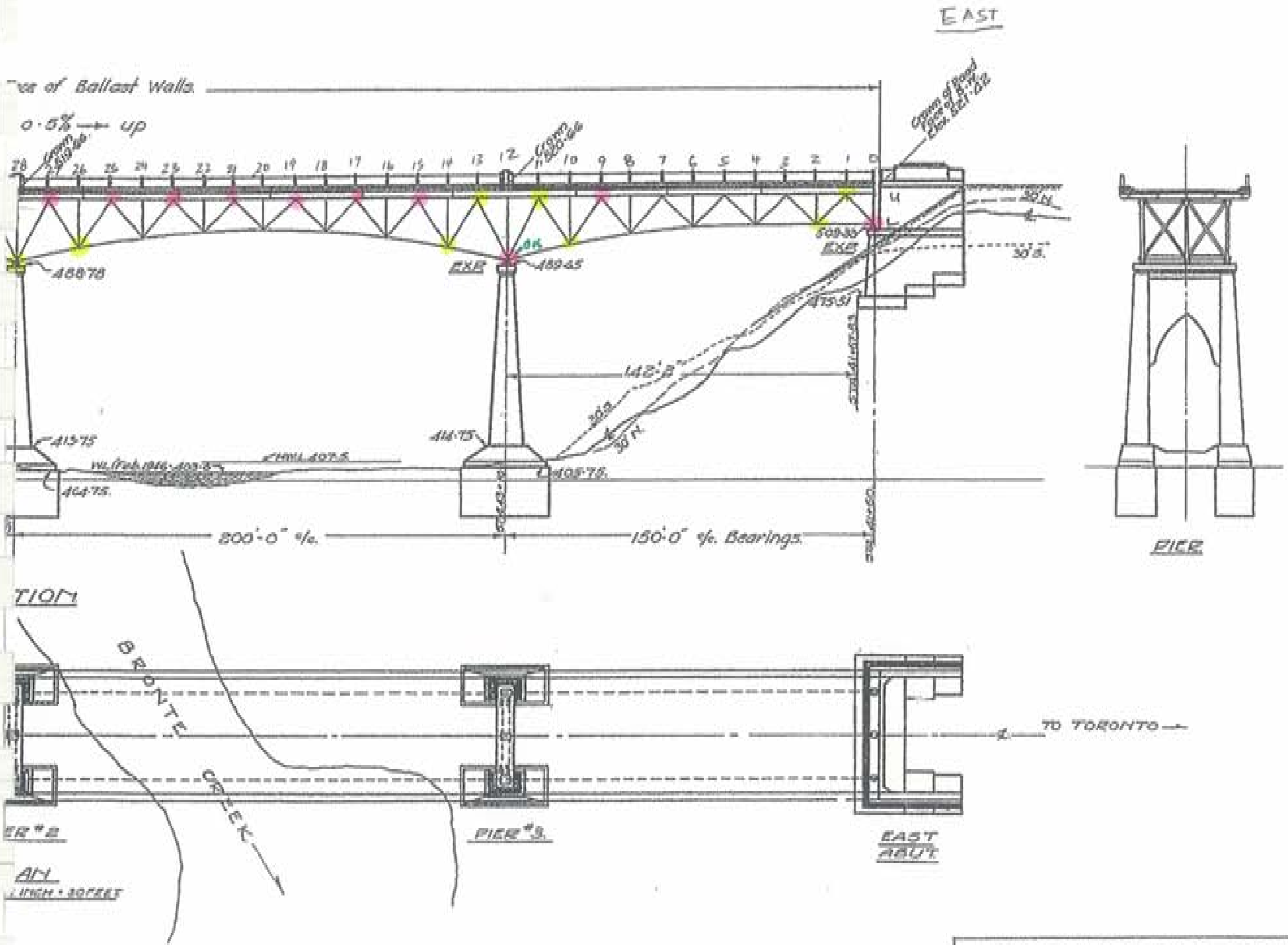
Gusset Plate Properties for Whitmore Sections

		L6E		L8E				L10E			
		A	B	A	B	D	E	A	B	D	E
RATIO	Unit	6.2	6.2	5.8	5.8	5.8	5.8	6.6	6.6	6.6	6.6
WIDTH	mm	385.1	462.1	681.9	641.1	547.9	536.2	682.9	689.6	596.7	517.2
L1	mm	129.4	175.6	46.6	0.0	128.2	128.2	0.0	0.0	145.9	145.9
L2	mm	308.1	178.7	355.5	174.9	128.2	128.2	424.3	205.5	145.9	145.9
L3	mm	104.7	200.3	0.0	0.0	128.2	128.2	126.0	0.0	145.9	145.9
t	mm	10.0	10.0	10.2	10.2	10.2	10.2	10.9	10.9	10.9	10.9
loss	mm	1	1	0	0	0	0	1	2	2	2

		L14E
		C
RATIO	Unit	6.4
WIDTH	mm	730.7
L1	mm	0.0
L2	mm	423.0
L3	mm	133.4
t	mm	10.0
loss	mm	0.0

		L16E				L18E			L20E		
		B	C	D	E	B	C	D	A	B	C
RATIO	Unit	6.1	6.1	6.1	6.1	5.8	5.8	5.8	4.8	4.8	4.8
WIDTH	mm	669.0	700.0	583.0	614.0	500.7	483.4	546.7	326.6	348.2	321.8
L1	mm	0.0	58.3	141.2	141.2	0.0	100.7	135.2	103.3	180.1	168.1
L2	mm	187.2	417.3	141.2	141.2	166.9	293.5	135.2	273.8	180.1	273.8
L3	mm	0.0	24.6	141.2	141.2	166.9	57.6	135.2	163.3	180.1	100.9
t	mm	10.3	10.3	10.3	10.3	10.0	10.0	10.0	12.5	12.5	12.5
loss	mm	0	0	0	0	1	1	1	0	0	0

		L22E			L24E				L26E
		A	B	E	A	B	D	E	A
RATIO	Unit	5.9	5.9	5.9	5.7	5.7	5.7	5.7	5.9
WIDTH	mm	485.6	533.0	615.9	655.1	640.7	534.4	459.7	721.4
L1	mm	112.5	159.9	139.2	8.6	0.0	132.2	132.2	0
L2	mm	308.0	177.7	139.2	356.3	172.4	132.2	132.2	428.2
L3	mm	65.2	0.0	139.2	46.0	0.0	132.2	132.2	117.3
t	mm	7.6	7.6	7.6	10.0	10.0	10.0	10.0	10.6
loss	mm	0	0	0	1.0	1.0	1.0	1.0	1.0



DEPARTMENT OF HIGHWAYS – ONTARIO.
BRIDGE OFFICE

TANSLEY BRIDGE
OVER
BRONTE CREEK.
THE KING'S HIGHWAY No5. DIV. No 4.
TORONTO TO HAMILTON.
TWP.-NELSON. LOT 3. CON. I N.D.S. CO.-HALTON.

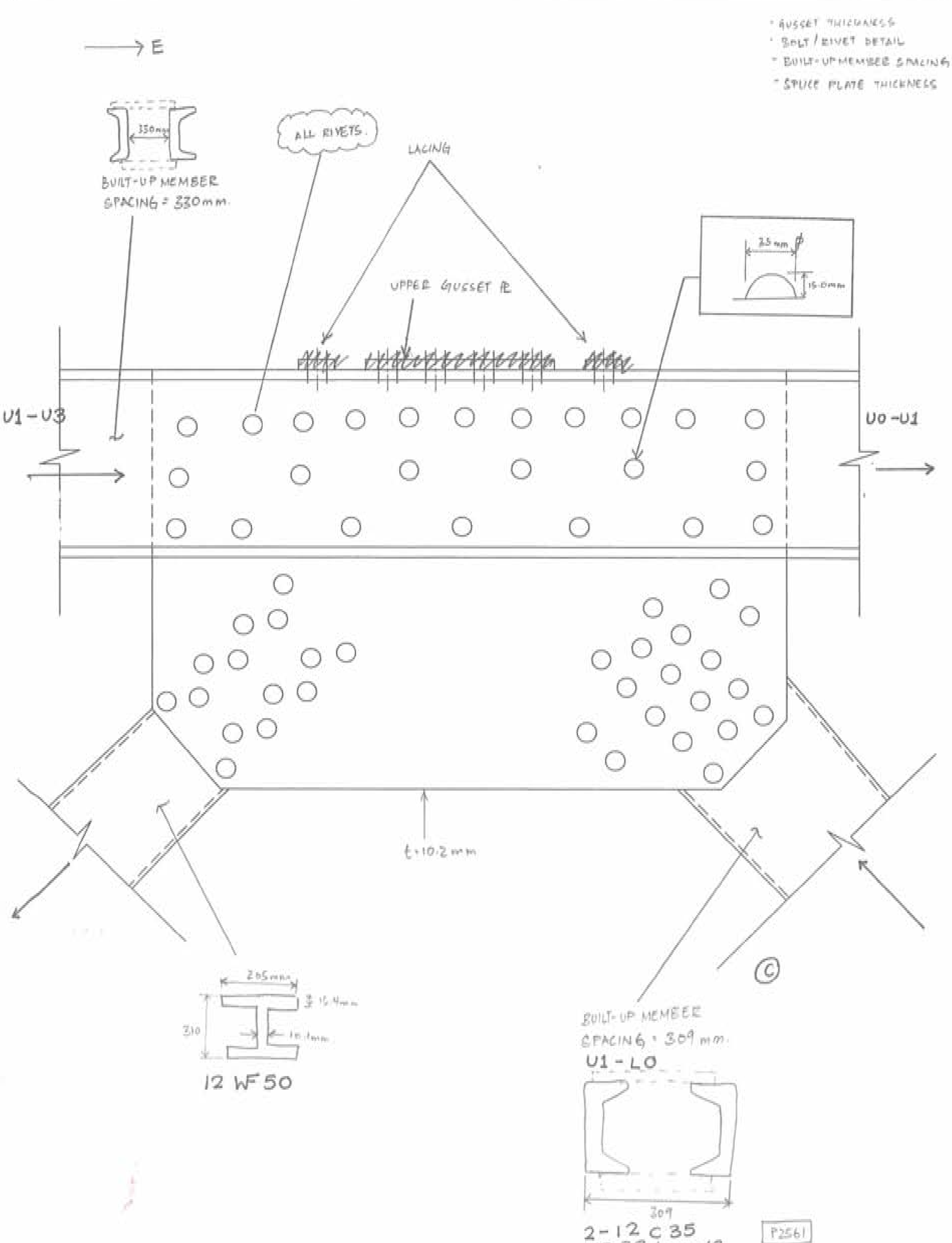
GENERAL PLAN

APPROVED

CHIEF ENGINEER. CHIEF BRIDGE ENGINEER.

DESIGN	LOCH			LOADING H20.	CONTRACT SUBSTRUCTURE 46-62. SUPERSTRUCTURE.
TRACE	RAHY				
				TORONTO JULY 1946	DRAWING D8884

1337-22-1



MRC McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

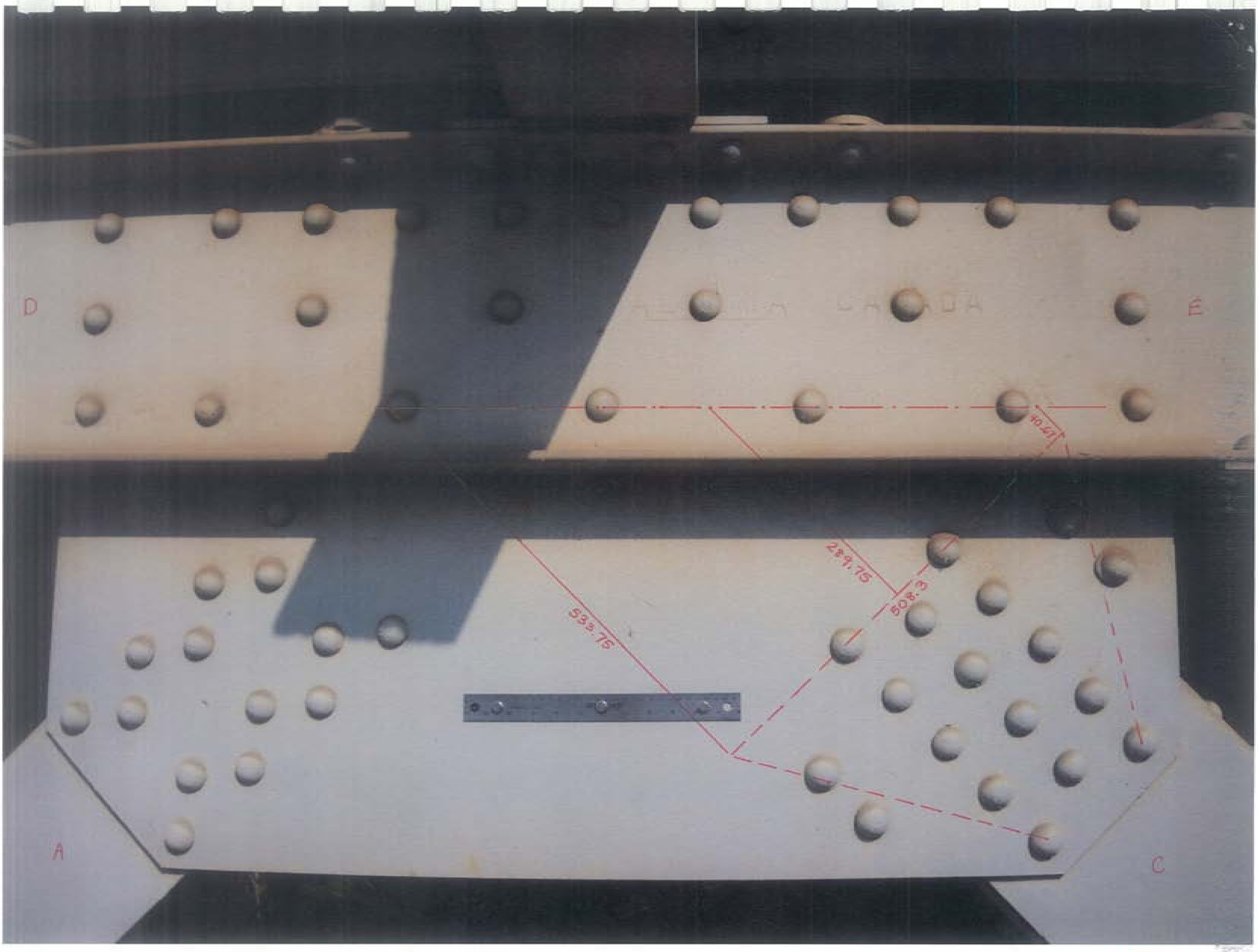
DRAWING:

U1E

3

SPAN EVT

TRUSS NORTH


D
E
10.67
289.75
508.3
533.75
A
C

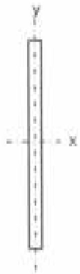
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

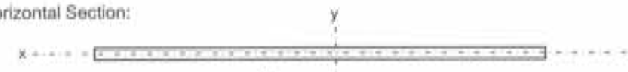
ϕ_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	9.4	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1308 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

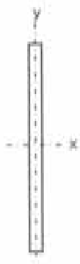
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	508.3	mm	I_x =	1.41E+08	mm^4	I_y =	1.12E+08	mm^4
t =	10.2	mm	r_x =	165.03	mm	r_y =	146.73	mm
A =	5184.66	mm^2	S_x =	2.77E+07	mm^3	S_y =	4.39E+05	mm^3
d =	165	mm						

Vertical Section:



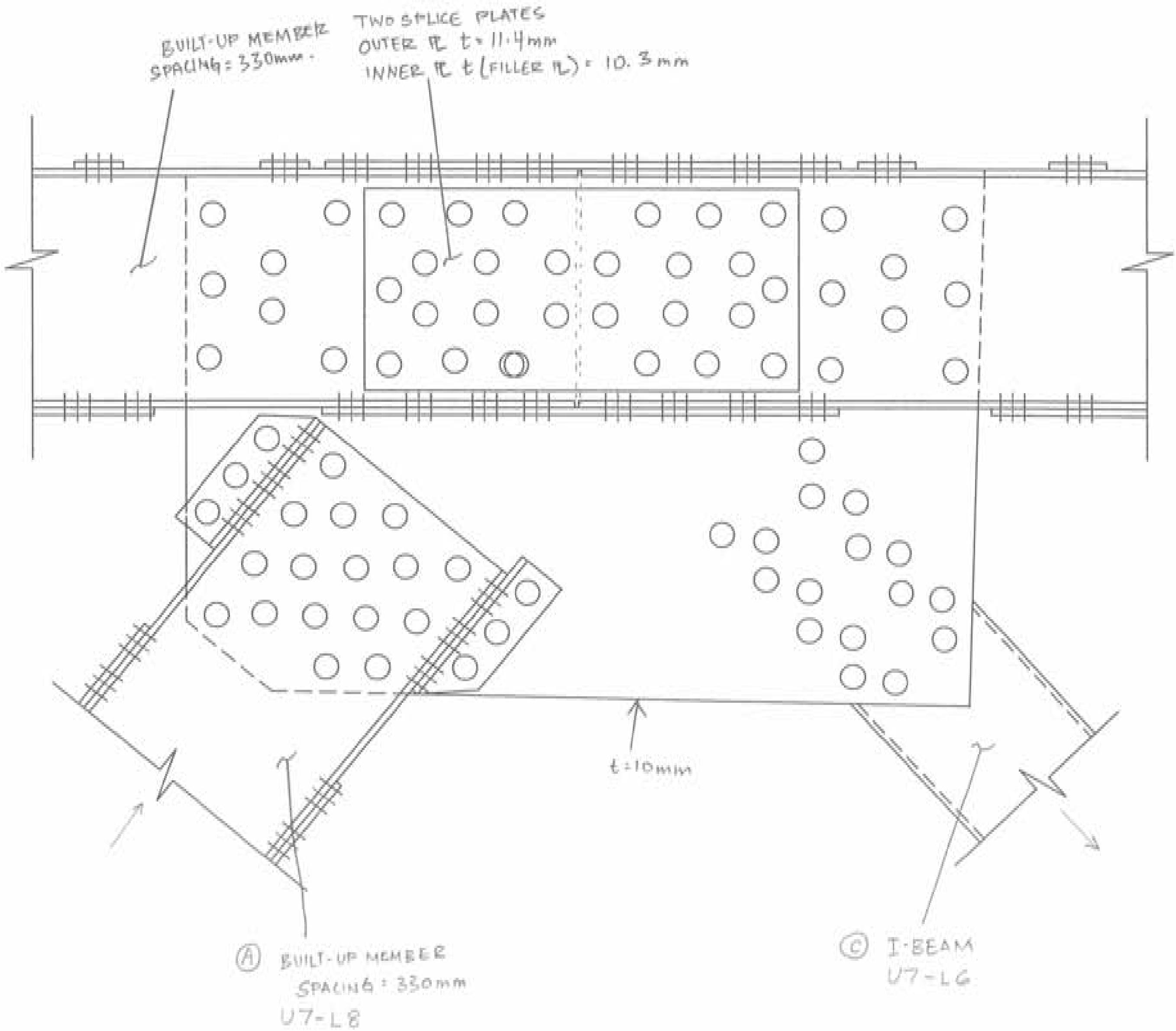
h =	508.3	mm	I_x =	1.12E+08	mm^4	I_y =	1.41E+08	mm^4
t =	10.2	mm	r_x =	146.73	mm	r_y =	165.03	mm
A =	5184.66	mm^2	S_x =	4.39E+05	mm^3	S_y =	2.77E+07	mm^3
d =	165	mm						

Effective length factor, K =	1.00		L_1 =	40.67	mm
Unbraced length, L =	288.1	mm	L_2 =	289.75	mm
r_{min} =	146.73	mm	L_3 =	533.75	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0212$$

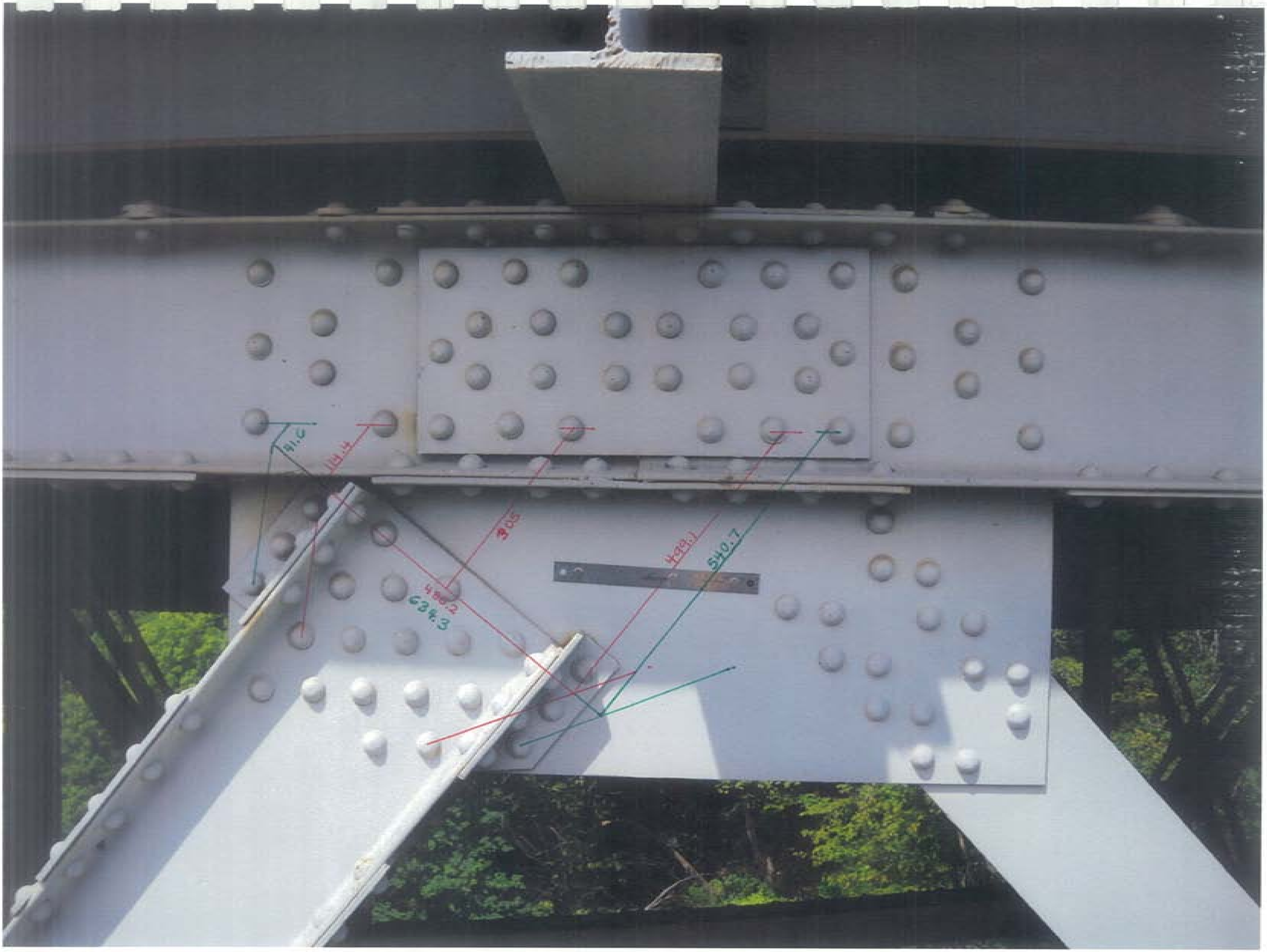
ϕ_s =	0.9	
Effective width, L_w =	508.3	mm
Thickness, t =	9.4	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 989 \text{ kN}$$



D2591

McCORMICK RANKIN CORPORATION	TRUSS REPAIR ON TANSLEY BRIDGE DUNDAS –BRONTE CREEK	DATE: DECEMBER 2008 DRAWING: U7E SPAN EXT TRUSS ~~NORTH~~ 3



91.6
118.4
305
480.2
634.3
499.1
540.7

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5300	mm^2	2935.5	mm^2	= 1799 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2172 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4400	mm^2	2003	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1799 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4950	mm^2	2935.5	mm^2	= 1723 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4		= 2128 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4270	mm^2	2003	mm^2	
ϕ_s =	0.95				

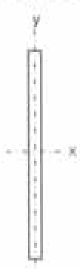
Factored tensile resistance = 1723 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	634.3	mm	I_x =	5.29E+04	mm^4	I_y =	2.13E+08	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	183.11	mm
A =	6343	mm^2	S_x =	1.06E+04	mm^3	S_y =	6.71E+05	mm^3
d =	0	mm						

Vertical Section:



h =	634.3	mm	I_x =	2.13E+08	mm^4	I_y =	5.29E+04	mm^4
t =	10	mm	r_x =	183.11	mm	r_y =	2.89	mm
A =	6343	mm^2	S_x =	6.71E+05	mm^3	S_y =	1.06E+04	mm^3
d =	0	mm						

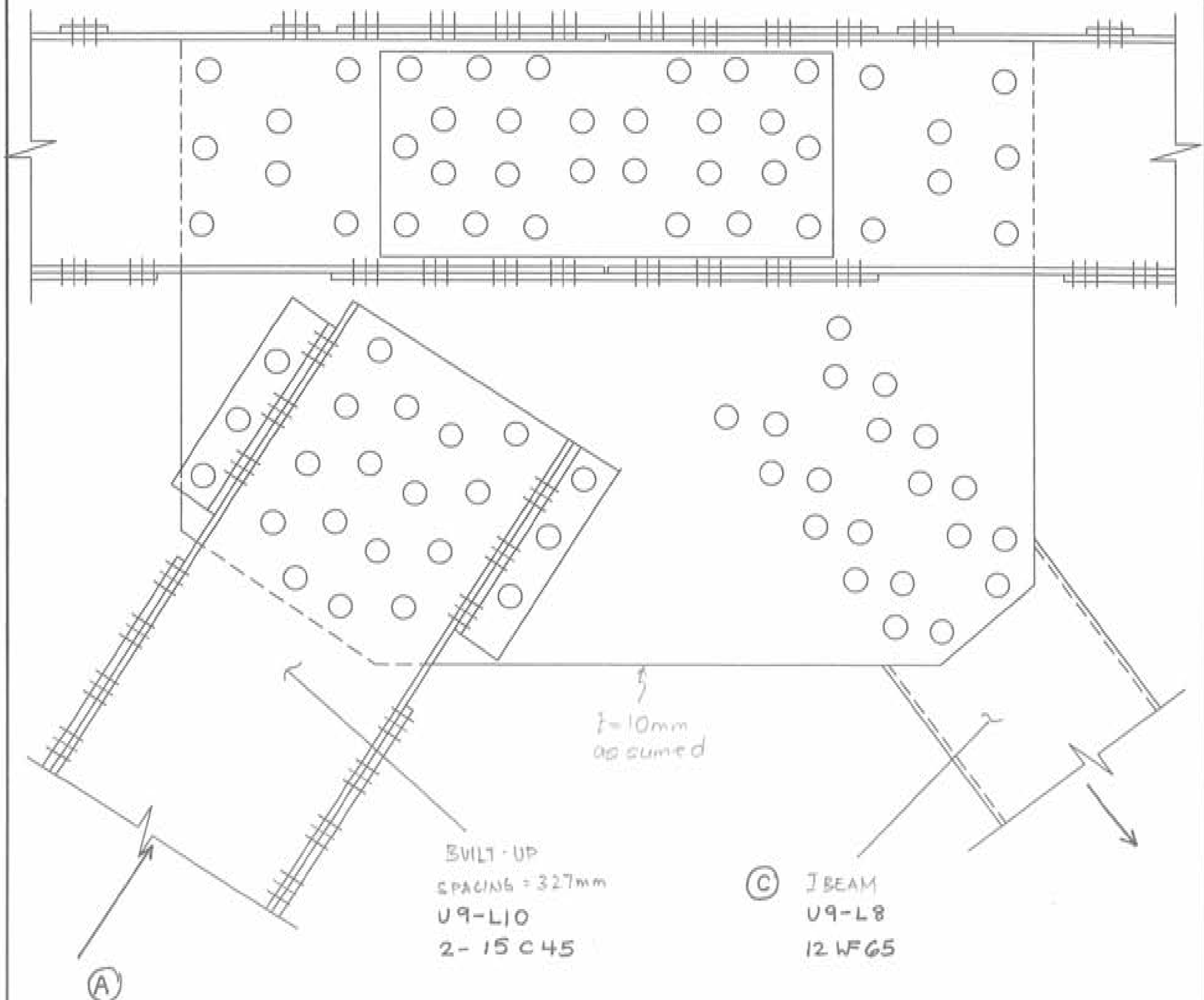
Effective length factor, K =	1.00		L_1 =	41.6	mm
Unbraced length, L =	295.8	mm	L_2 =	305	mm
r_{min} =	2.89	mm	L_3 =	540.7	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.1060$$

ϕ_s =	0.9	
Effective width, L_w =	634.3	mm
Thickness, t =	10	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$

= 703 kN



P 2090

MRC

McCORMICK RANKIN
CORPORATION

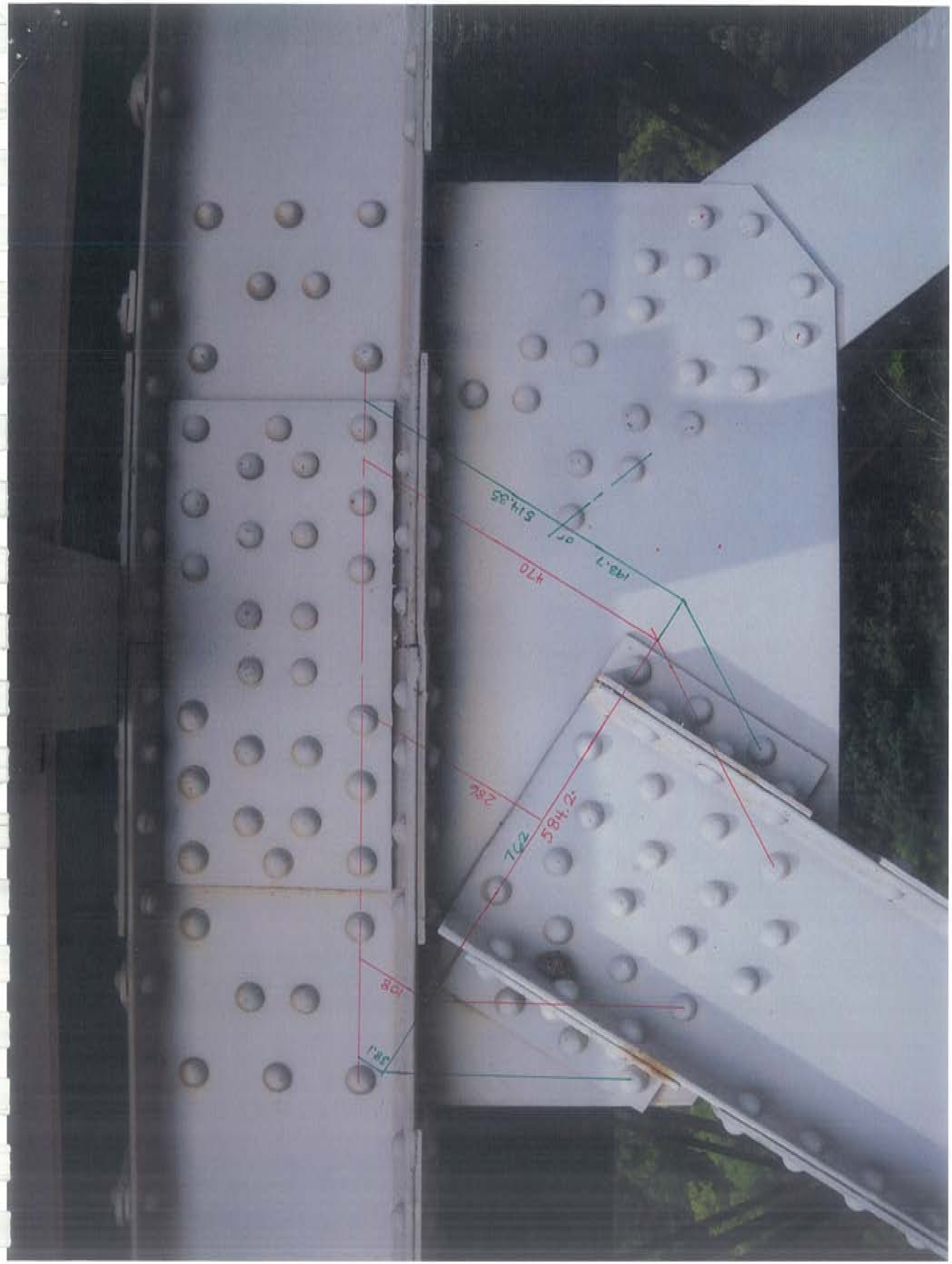
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

U9E

SPAN EXT TRUSS ~~NORTH~~ 3


514.35
149.7
470
286
584.2
762
108
38.1

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5300	mm^2	2280	mm^2	= 1656 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\, \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2020 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4400	mm^2	1556	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1656 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4950	mm^2	2280	mm^2	= 1580 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\, \phi_s A_{ne} F_u$
holes =	4.0		4		= 1976 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4270	mm^2	1556	mm^2	
ϕ_s =	0.95				

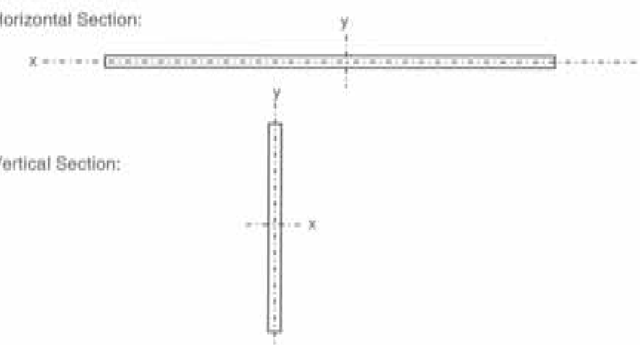
Factored tensile resistance = 1580 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Vertical Section:



Horizontal Section:

b =	584.2	mm	I_x =	4.87E+04	mm^4	I_y =	1.66E+08	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	168.64	mm
A =	5842	mm^2	S_x =	9.74E+03	mm^3	S_y =	5.69E+05	mm^3
d =	0	mm						

Vertical Section:

h =	584.2	mm	I_x =	1.66E+08	mm^4	I_y =	4.87E+04	mm^4
t =	10	mm	r_x =	168.64	mm	r_y =	2.89	mm
A =	5842	mm^2	S_x =	5.69E+05	mm^3	S_y =	9.74E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	108	mm
Unbraced length, L =	288.0	mm	L_2 =	286	mm
r_{min} =	2.89	mm	L_3 =	470	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.0769$$

ϕ_s =	0.9	
Effective width, L_w =	584.2	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 667 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	530	mm	300	mm
Gross area, A_g =	5300	mm^2	2280	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$

$= 1656$ kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4400	mm^2	1556	mm^2
ϕ_s =	0.95			

$T_r = 0.85\ \phi_s A_{ne} F_u$

$= 2020$ kN

Factored tensile resistance = 1656 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	495	mm	300	mm
Gross area, A_g =	4950	mm^2	2280	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$

$= 1580$ kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	522	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4270	mm^2	1556	mm^2
ϕ_s =	0.95			

$T_r = 0.85\ \phi_s A_{ne} F_u$

$= 1976$ kN

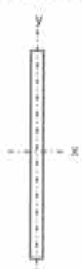
Factored tensile resistance = 1580 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:

b =	762	mm	I_x =	6.35E+04	mm^4	I_y =	3.69E+08	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	219.97	mm
A =	7620	mm^2	S_x =	1.27E+04	mm^3	S_y =	9.68E+05	mm^3
d =	0	mm						

Vertical Section:



h =	762	mm	I_x =	3.69E+08	mm^4	I_y =	6.35E+04	mm^4
t =	10	mm	r_x =	219.97	mm	r_y =	2.89	mm
A =	7620	mm^2	S_x =	9.68E+05	mm^3	S_y =	1.27E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	38.1	mm
Unbraced length, L =	279.5	mm	L_2 =	286	mm
r_{min} =	2.89	mm	L_3 =	514.35	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.0451$$

ϕ_s =	0.9	
Effective width, L_w =	762	mm
Thickness, t =	10	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$

$= 899$ kN

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5300	mm^2	2280	mm^2	= 1656 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2020 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4400	mm^2	1556	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1656 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4950	mm^2	2280	mm^2	= 1580 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4		= 1976 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4270	mm^2	1556	mm^2	
ϕ_s =	0.95				

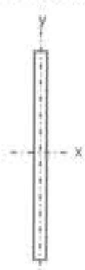
Factored tensile resistance = 1580 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	762	mm	I_x =	6.35E+04	mm^4	I_y =	3.69E+08	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	219.97	mm
A =	7620	mm^2	S_x =	1.27E+04	mm^3	S_y =	9.68E+05	mm^3
d =	0	mm						

Vertical Section:



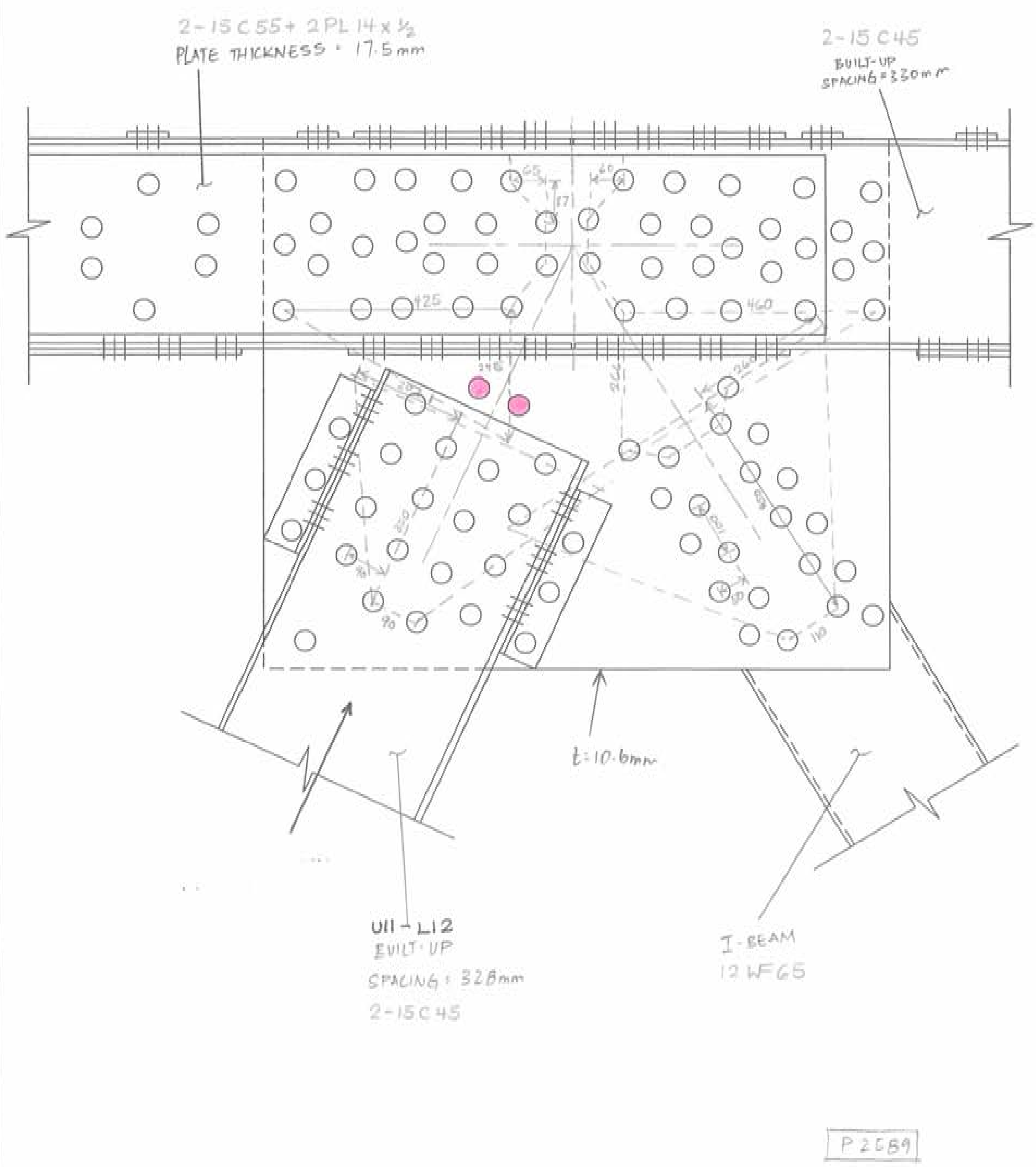
h =	762	mm	I_x =	3.69E+08	mm^4	I_y =	6.35E+04	mm^4
t =	10	mm	r_x =	219.97	mm	r_y =	2.89	mm
A =	7620	mm^2	S_x =	9.68E+05	mm^3	S_y =	1.27E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	38.1	mm
Unbraced length, L =	279.5	mm	L_2 =	286	mm
r_{min} =	2.89	mm	L_3 =	514.35	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.0451$$

ϕ_s =	0.9	
Effective width, L_w =	762	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 899 \text{ kN}$$



McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: U11E

SPAN EXT TRUSS 3 NORTH


93.5
616.9
96.0

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	530	mm	300	mm
Gross area, A_g =	4982	mm^2	3150	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$
= 1777 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4136	mm^2	2150	mm^2
ϕ_s =	0.95			

$T_r = 0.85\, \phi_s A_{ne} F_u$
= 2132 kN

Factored tensile resistance = 1777 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	495	mm	300	mm
Gross area, A_g =	4653	mm^2	3150	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$
= 1705 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	522	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4014	mm^2	2150	mm^2
ϕ_s =	0.95			

$T_r = 0.85\, \phi_s A_{ne} F_u$
= 2090 kN

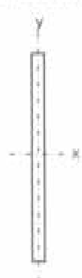
Factored tensile resistance = 1705 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:

Δb =	0	mm						
b =	493.5	mm	I_x =	1.41E+08	mm^4	I_y =	1.06E+08	mm^4
t =	10.6	mm	r_x =	164.03	mm	r_y =	142.46	mm
A =	5231.1	mm^2	S_x =	2.66E+07	mm^3	S_y =	4.30E+05	mm^3
d =	164	mm						

Vertical Section:



h =	493.5	mm	I_x =	1.06E+08	mm^4	I_y =	1.41E+08	mm^4
t =	10.6	mm	r_x =	142.46	mm	r_y =	164.03	mm
A =	5231.1	mm^2	S_x =	4.30E+05	mm^3	S_y =	2.66E+07	mm^3
d =	164	mm						

Effective length factor, K =	1.00		L_1 =	137.1	mm
Unbraced length, L =	163.4	mm	L_2 =	257	mm
r_{min} =	142.46	mm	L_3 =	96	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0124$$

ϕ_s =	0.9	
Effective width, L_w =	493.5	mm
Thickness, t =	9.4	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$
= 960 kN

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4982	mm^2	3150	mm^2	= 1777 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2132 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4136	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1777 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4653	mm^2	3150	mm^2	= 1705 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4		= 2090 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4014	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1705 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Δb =	0	mm						
b =	616.9	mm	I_x =	1.76E+08	mm^4	I_y =	2.07E+08	mm^4
t =	10.6	mm	r_x =	164.03	mm	r_y =	178.08	mm
A =	6539.14	mm^2	S_x =	3.32E+07	mm^3	S_y =	6.72E+05	mm^3
d =	164	mm						

Vertical Section:

h =	616.9	mm	I_x =	2.07E+08	mm^4	I_y =	1.76E+08	mm^4
t =	10.6	mm	r_x =	178.08	mm	r_y =	164.03	mm
A =	6539.14	mm^2	S_x =	6.72E+05	mm^3	S_y =	3.32E+07	mm^3
d =	164	mm						

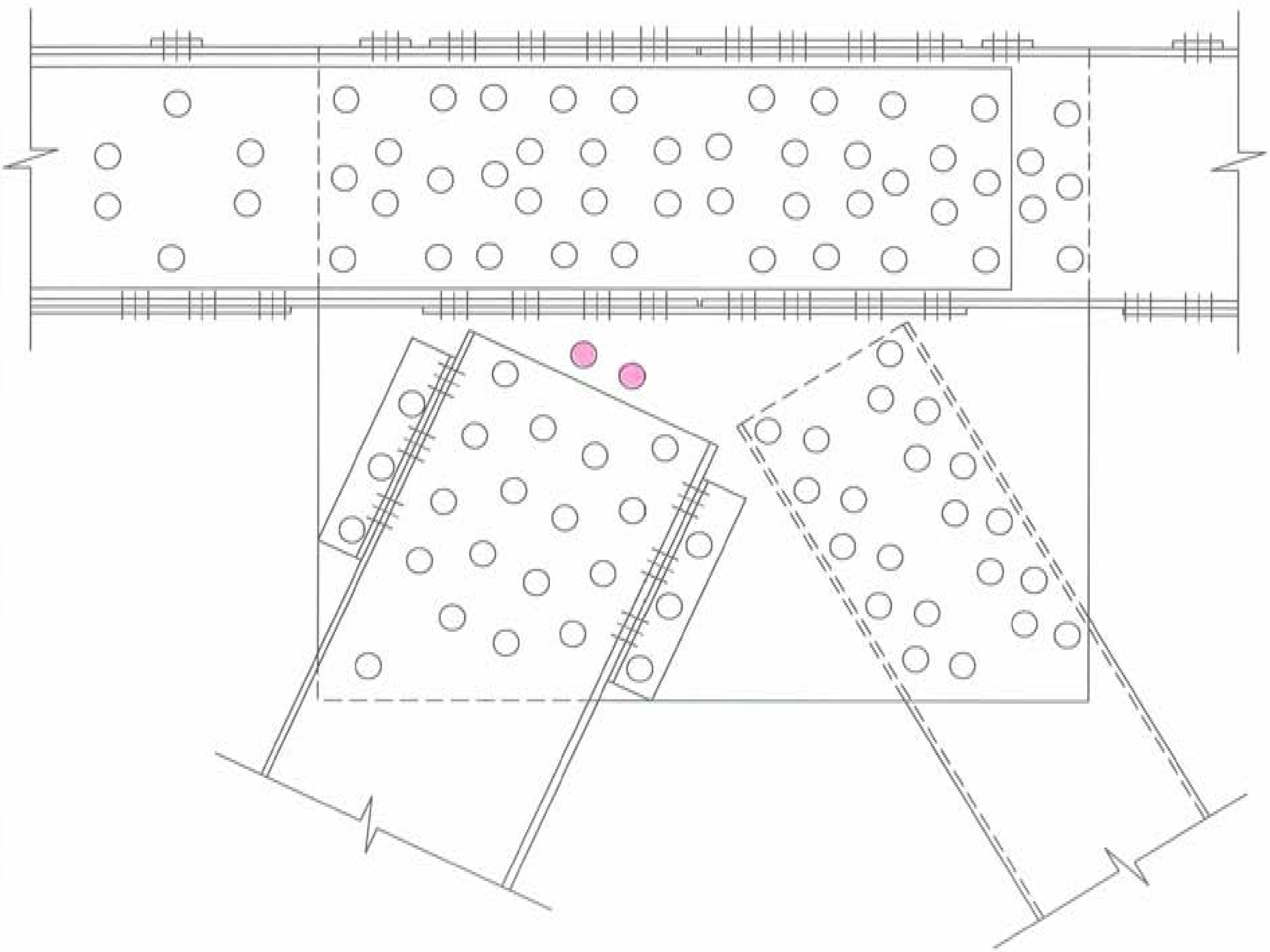
Effective length factor, K =	1.00		L_1 =	113.1	mm
Unbraced length, L =	141.6	mm	L_2 =	257	mm
r_{min} =	164.03	mm	L_3 =	54.83	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0093$$

ϕ_s =	0.9	
Effective width, L_w =	616.9	mm
Thickness, t =	9.4	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$

= 1200 kN



McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

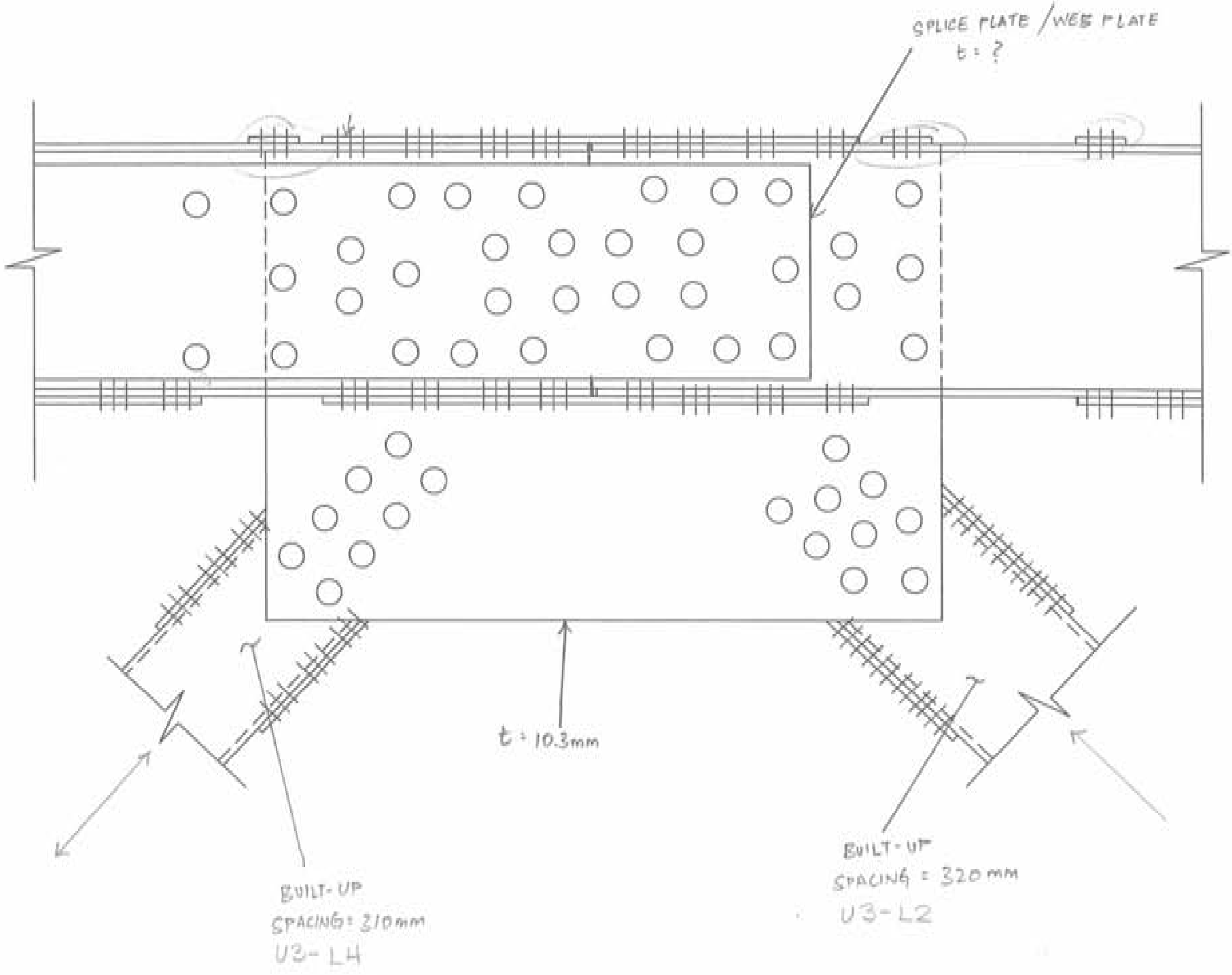
DRAWING:

U11E W

SPAN

TRUSS NORTH

East Exterior Span



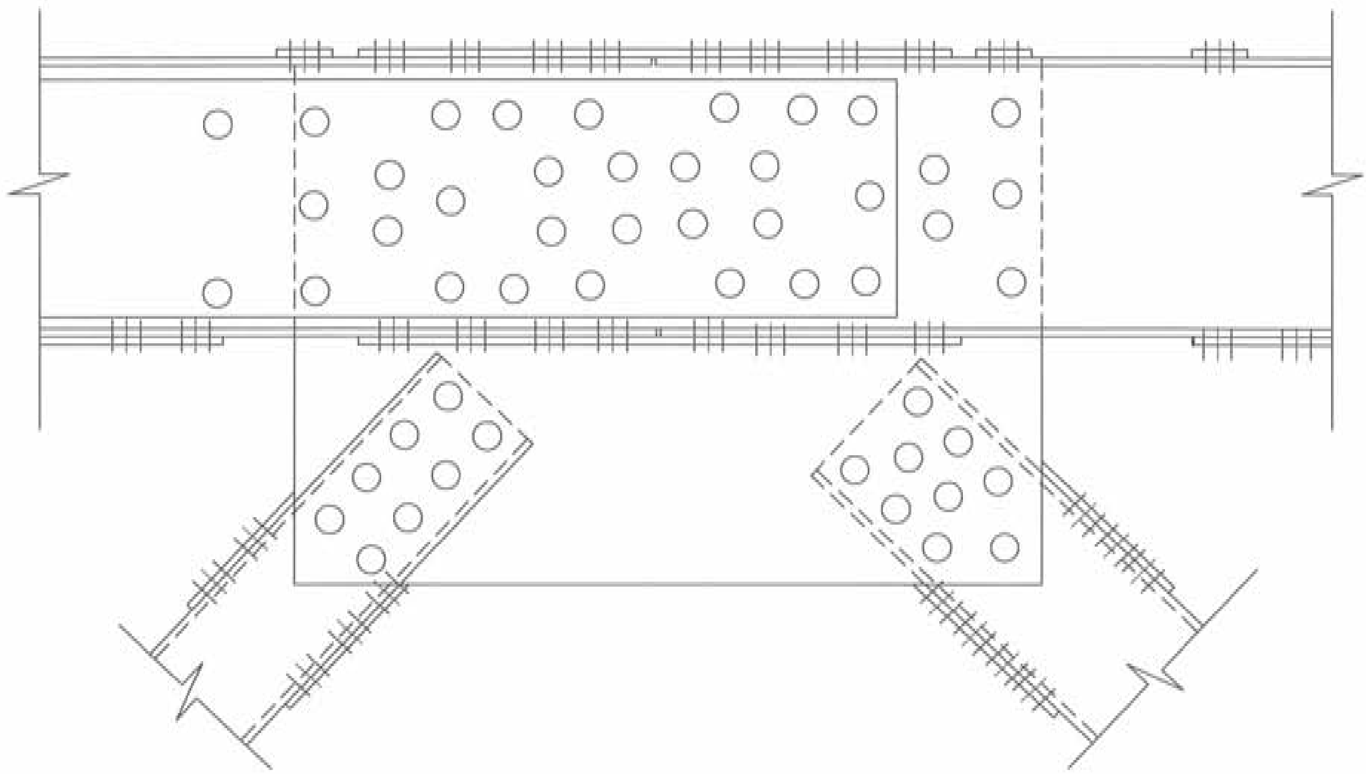
McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: U3E

SPAN EXT TRUSS NORTH



McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS —BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

U3~~E~~ W

SPAN______ TRUSS NORTH

D
E
A
C
120.85
290.6
299.25
466.13
463.25
402.83
Realistic compression starts along this edge
t= 9.8mm

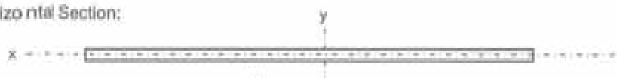
GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

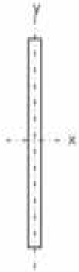
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

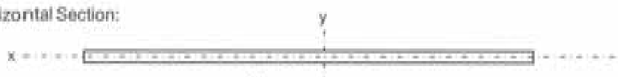
ϕ_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1391 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

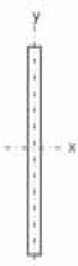
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	316.51	mm	I_x =	2.64E+04	mm^4	I_y =	2.64E+07	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	91.37	mm
A =	3165.1	mm^2	S_x =	5.28E+03	mm^3	S_y =	1.67E+05	mm^3
d =	0	mm						

Vertical Section:



h =	316.51	mm	I_x =	2.64E+07	mm^4	I_y =	2.64E+04	mm^4
t =	10	mm	r_x =	91.37	mm	r_y =	2.89	mm
A =	3165.1	mm^2	S_x =	1.67E+05	mm^3	S_y =	5.28E+03	mm^3
d =	0	mm						

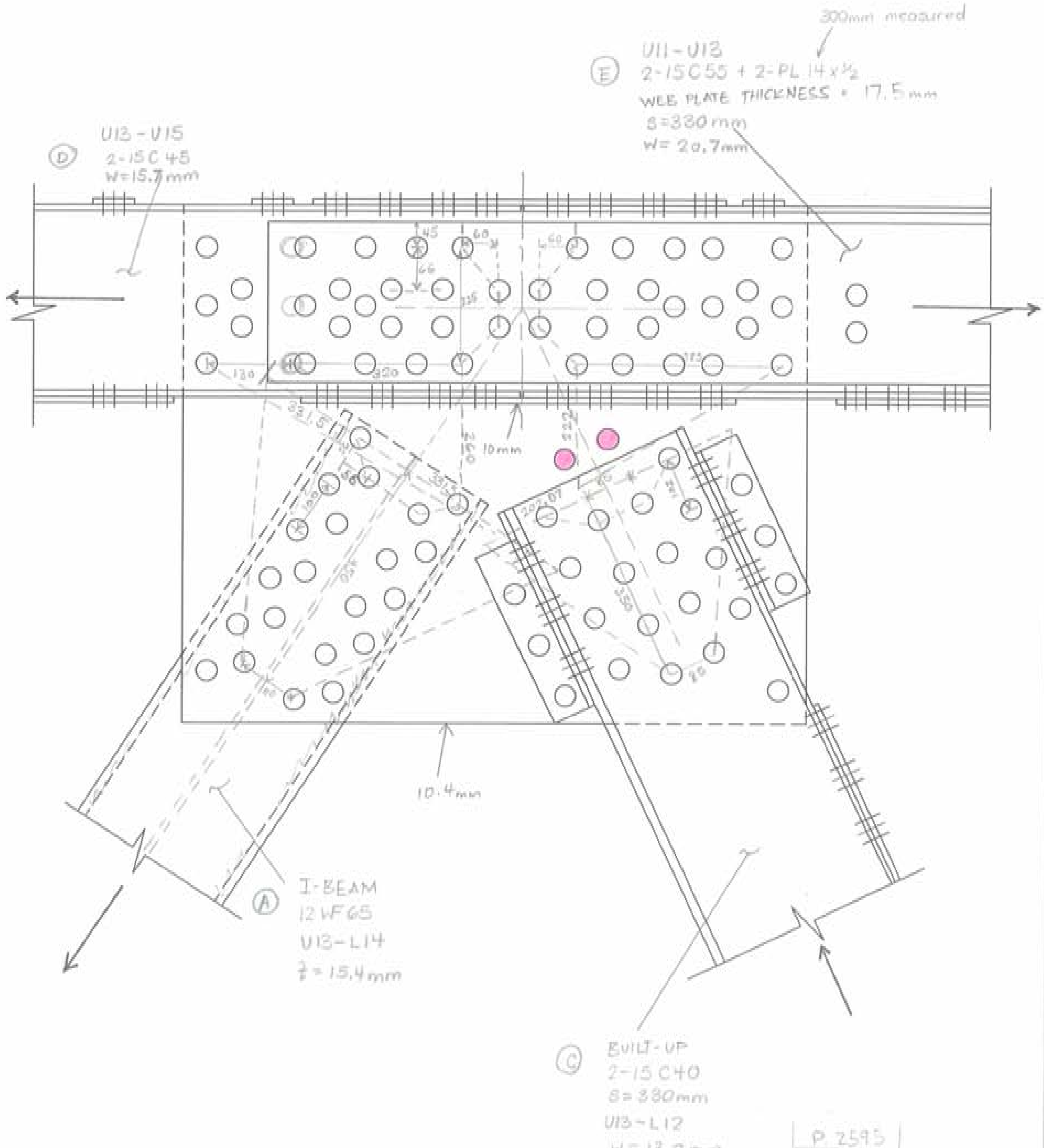
Effective length factor, K =	1.00		L_1 =	100.71	mm
Unbraced length, L =	280.1	mm	L_2 =	276.23	mm
r_{min} =	2.89	mm	L_3 =	463.25	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.0472$$

ϕ_s =	0.9	
Effective width, L_w =	316.51	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 372 \text{ kN}$$

East Interior Span



McCORMICK RANKIN CORPORATION	TRUSS REPAIR ON TANSLEY BRIDGE DUNDAS – BRONTE CREEK	DATE: DECEMBER 2008 DRAWING: U13E SPAN ______ TRUSS NORTH


124.7
504
217.5
663

3.0 Resistance Summary

Location @ End of Member	Shear Resistance of Fasteners (kN)	Gross Yield Tension (kN)	Net Fracture Tension (kN)	Block Shear Rupture (kN)	Compressive Buckling (kN)	Controlling Resistance (kN)
U13-L14	1403.5 [2598]	1507 [1522]	2101	2326	—	1507
U13-L12	1123	1145	1496		-1085	-1085
U13-U15	1614 [2421]	2037 [2057]	2434		—	2037 w/ ½ ℄ incl.
U11-U13	1474 [2027.5]	1957 [1977]	2388		—	1957 " " "

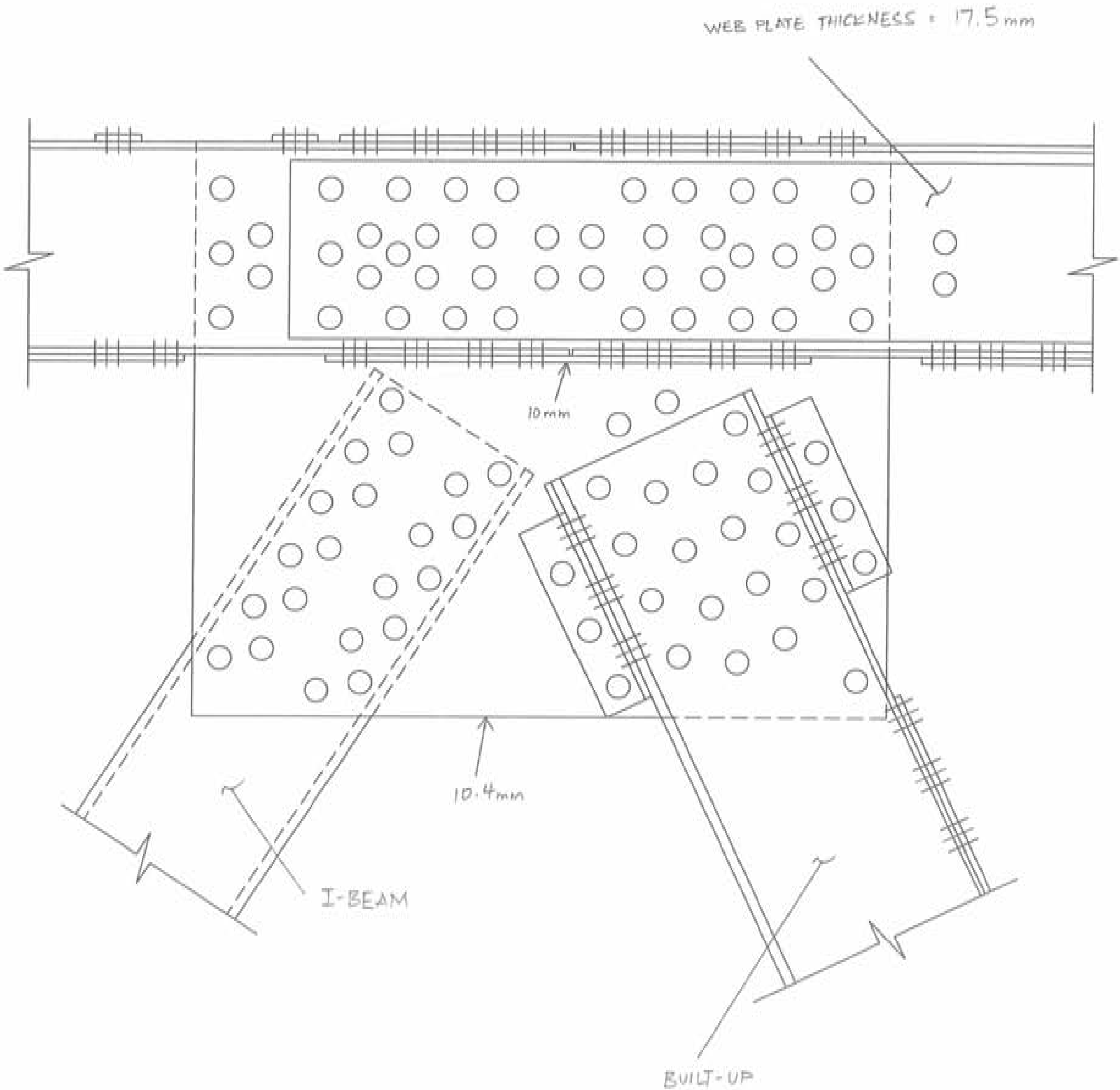
Results above apply to one plate

4.0 Inventory and Operating Rating Factors

Member	DL_F (kN)	LL_F (kN)	U	R_r (kN)	LL Capacity Factor, F
U13-L14	893.69	734.7	1.01	2(1507)	2.93
U13-L12	-1067.9	-1063.4	1.01	2(-1085)	1.06 ←
U13-U15	1142.6	589.6	1.01	2(2037)	5.04
U11-U13	2096.9	716.5	1.01	2(1957)	2.59

∴ the controlling LL Capacity Factor for U13E Gusset Plate is 1.06, governed by compressive buckling at the end of member U13-L12.

* WEST INTERIOR SPAN
GUSSET PL SECTION LOSS

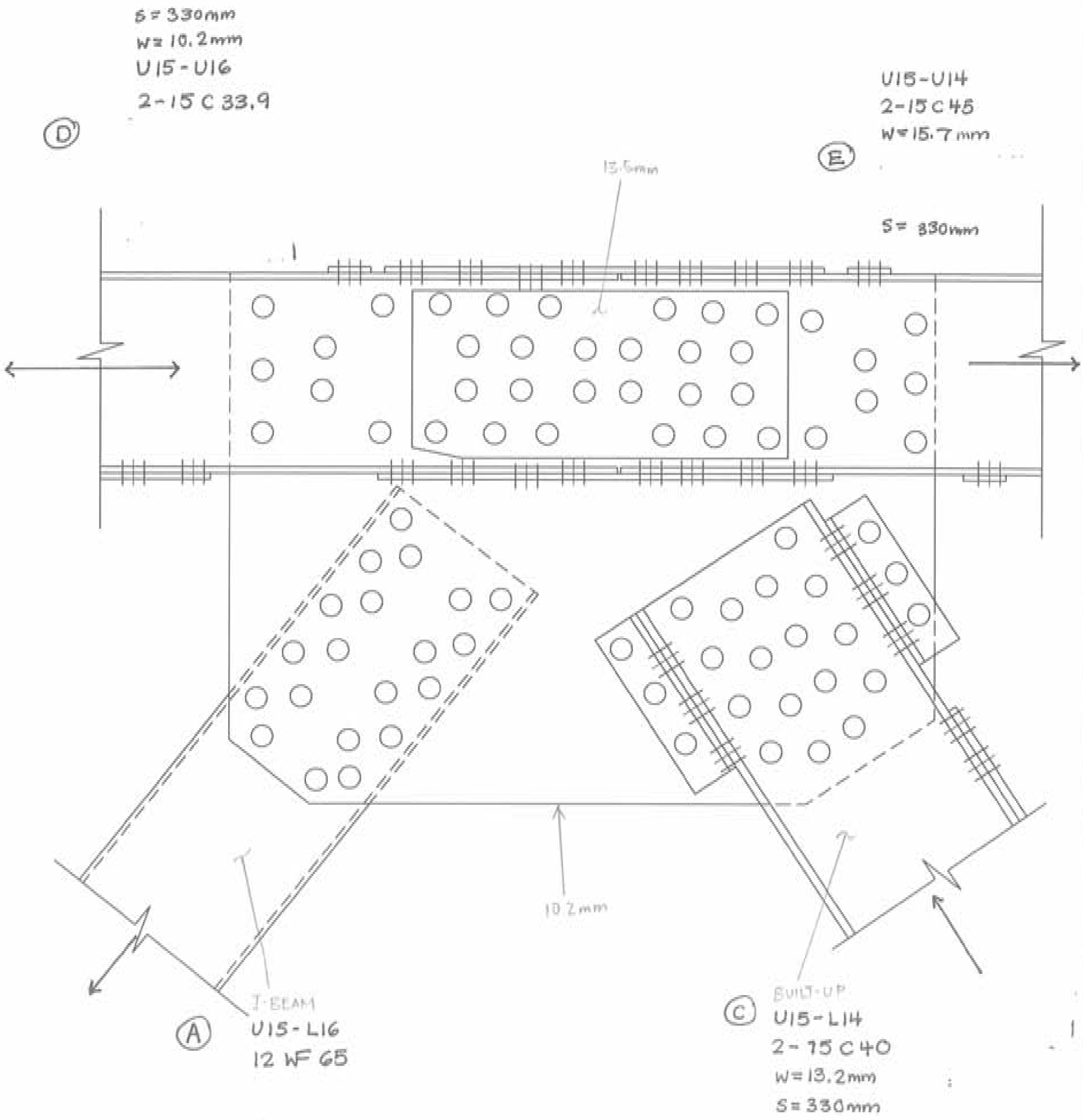


P. 2595

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008
DRAWING:
U13E W
SPAN
TRUSS NORTH

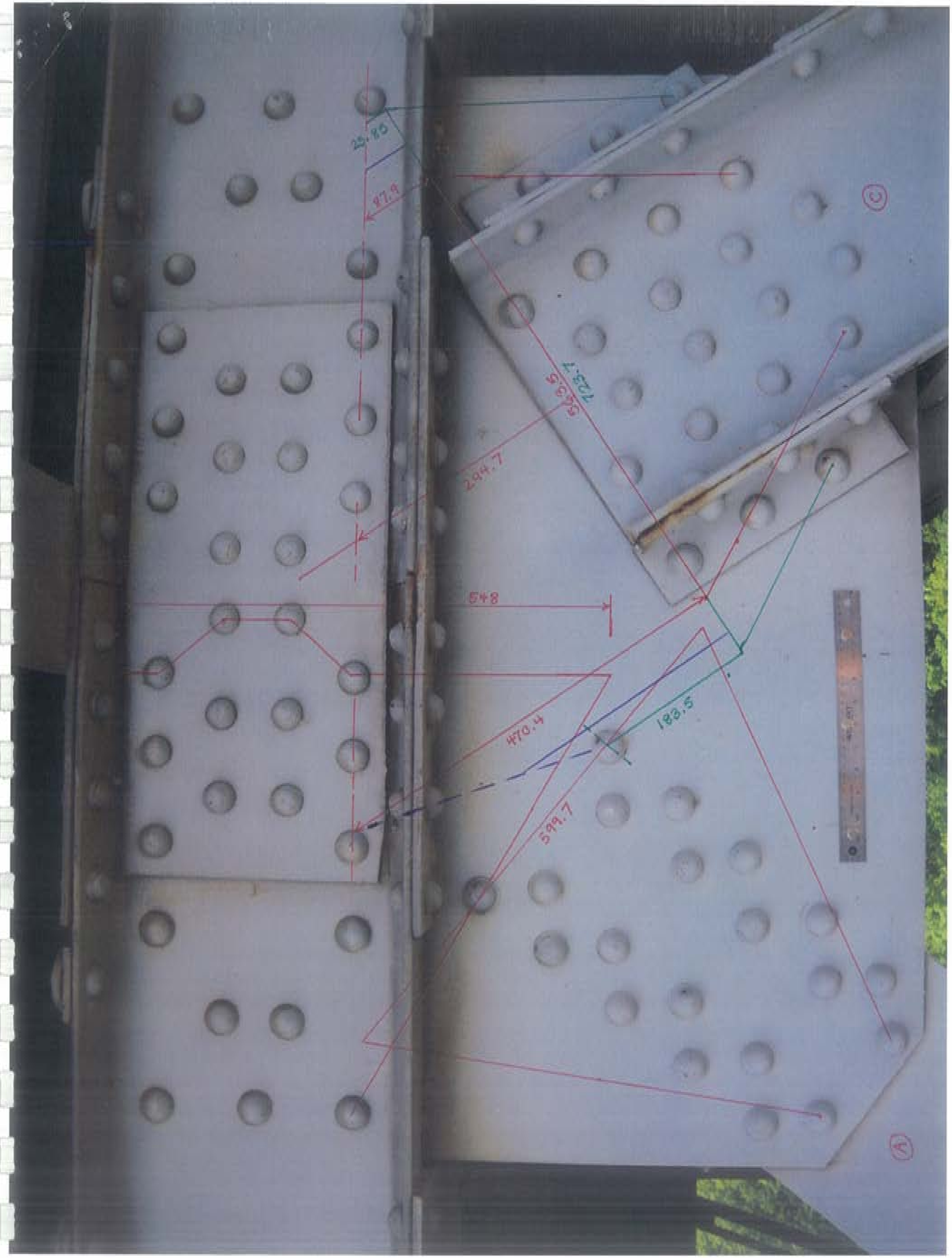


P. 259B

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008
DRAWING: U15E
SPAN
TRUSS NORTH



25.85
87.9
563.5
723.7
294.7
548
470.4
183.5
599.7
C
A

MRC

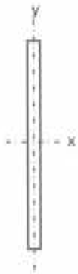
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	1250	mm	I_x =	7.59E+04	mm^4	I_y =	1.46E+09	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	360.84	mm
A =	11250	mm^2	S_x =	1.69E+04	mm^3	S_y =	2.34E+06	mm^3

Vertical Section:



h =	635	mm	I_x =	1.92E+08	mm^4	I_y =	3.86E+04	mm^4
t =	9	mm	r_x =	183.31	mm	r_y =	2.60	mm
A =	5715	mm^2	S_x =	6.05E+05	mm^3	S_y =	8.57E+03	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	2.60	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

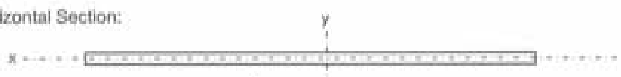
ϕ_s =	0.9	
Effective width, L_w =	602	mm
Thickness, t =	10.2	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1271 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

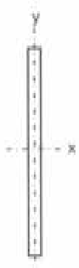
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	643.6	mm	I_x =	5.69E+04	mm^4	I_y =	2.27E+08	mm^4
t =	10.2	mm	r_x =	2.94	mm	r_y =	185.79	mm
A =	6564.72	mm^2	S_x =	1.12E+04	mm^3	S_y =	7.04E+05	mm^3

Vertical Section:



h =	643.6	mm	I_x =	2.27E+08	mm^4	I_y =	5.69E+04	mm^4
t =	10.2	mm	r_x =	185.79	mm	r_y =	2.94	mm
A =	6564.72	mm^2	S_x =	7.04E+05	mm^3	S_y =	1.12E+04	mm^3

Effective length factor, K =	1.00		L_1 =	326.95	mm
Unbraced length, L =	215.8	mm	L_2 =	294.7	mm
r_{min} =	2.94	mm	L_3 =	25.85	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7912$$

ϕ_s =	0.9	
Effective width, L_w =	643.6	mm
Thickness, t =	10.2	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 987 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	1250	mm	I_x =	7.59E+04	mm^4	I_y =	1.46E+09	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	360.84	mm
A =	11250	mm^2	S_x =	1.69E+04	mm^3	S_y =	2.34E+06	mm^3

Vertical Section:

h =	635	mm	I_x =	1.92E+08	mm^4	I_y =	3.86E+04	mm^4
t =	9	mm	r_x =	183.31	mm	r_y =	2.60	mm
A =	5715	mm^2	S_x =	6.05E+05	mm^3	S_y =	8.57E+03	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	2.60	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

ϕ_s =	0.9	
Effective width, L_w =	602	mm
Thickness, t =	10.2	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1271 \text{ kN}$$

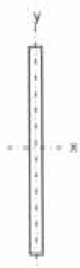
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	563.5	mm	I_x =	4.98E+04	mm^4	I_y =	1.52E+08	mm^4
t =	10.2	mm	r_x =	2.94	mm	r_y =	162.67	mm
A =	5747.7	mm^2	S_x =	9.77E+03	mm^3	S_y =	5.40E+05	mm^3

Vertical Section:



h =	563.5	mm	I_x =	1.52E+08	mm^4	I_y =	4.98E+04	mm^4
t =	10.2	mm	r_x =	162.67	mm	r_y =	2.94	mm
A =	5747.7	mm^2	S_x =	5.40E+05	mm^3	S_y =	9.77E+03	mm^3

Effective length factor, K =	1.00		L_1 =	87.9	mm
Unbraced length, L =	284.3	mm	L_2 =	294.7	mm
r_{min} =	2.94	mm	L_3 =	470.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.0424$$

ϕ_s =	0.9	
Effective width, L_w =	563.5	mm
Thickness, t =	10.2	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 680 \text{ kN}$$

MRC

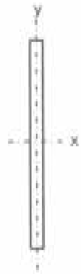
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	1250	mm	I_x =	7.59E+04	mm^4	I_y =	1.46E+09	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	360.84	mm
A =	11250	mm^2	S_x =	1.69E+04	mm^3	S_y =	2.34E+06	mm^3

Vertical Section:



h =	635	mm	I_x =	1.92E+08	mm^4	I_y =	3.86E+04	mm^4
t =	9	mm	r_x =	183.31	mm	r_y =	2.60	mm
A =	5715	mm^2	S_x =	6.05E+05	mm^3	S_y =	8.57E+03	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	2.60	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

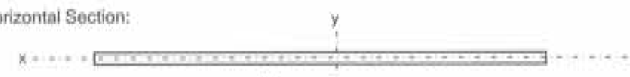
ϕ_s =	0.9	
Effective width, L_w =	602	mm
Thickness, t =	10.2	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1271 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

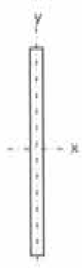
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	723.7	mm	I_x =	6.40E+04	mm^4	I_y =	3.22E+08	mm^4
t =	10.2	mm	r_x =	2.94	mm	r_y =	208.91	mm
A =	7381.74	mm^2	S_x =	1.25E+04	mm^3	S_y =	8.90E+05	mm^3

Vertical Section:



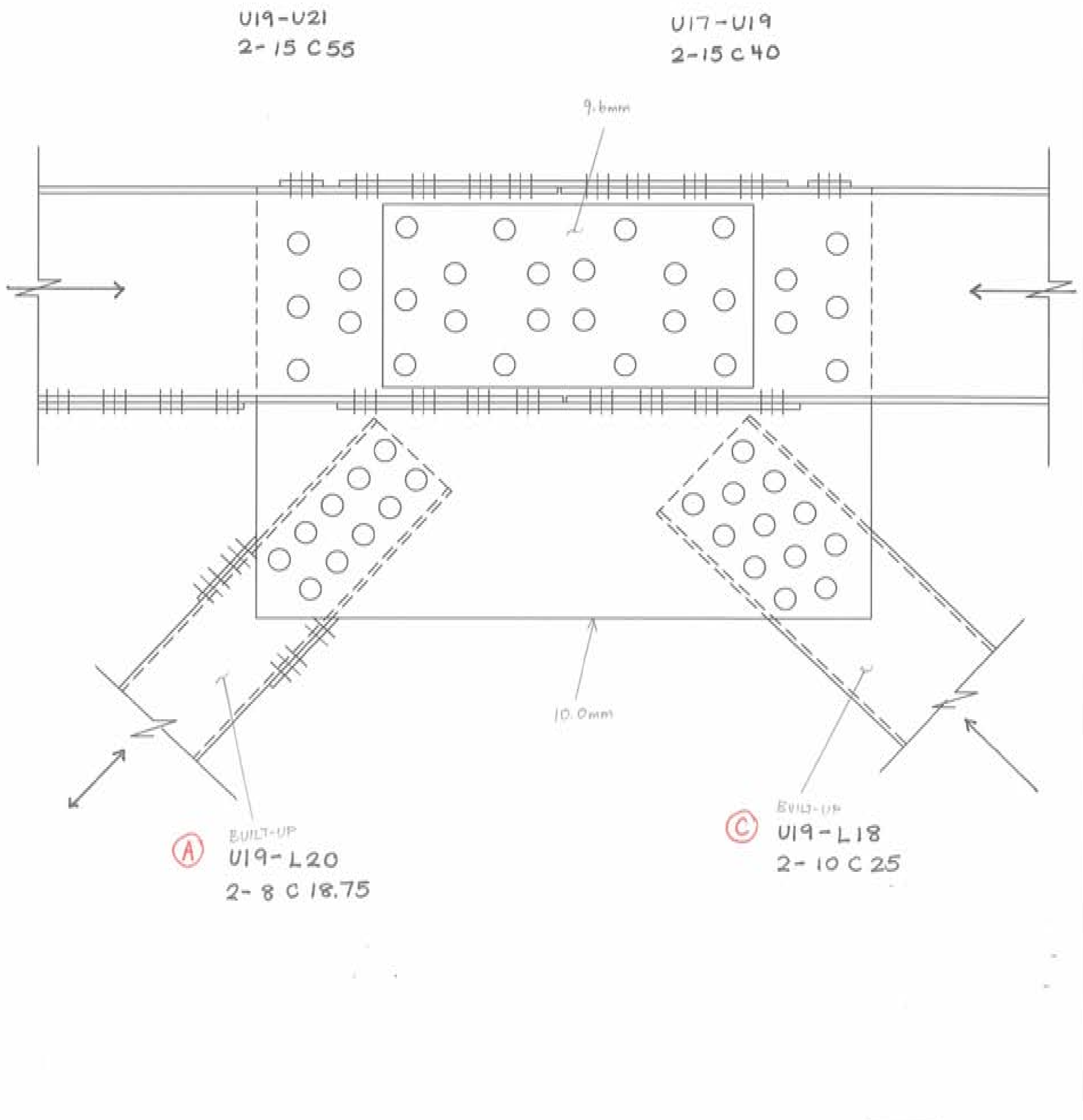
h =	723.7	mm	I_x =	3.22E+08	mm^4	I_y =	6.40E+04	mm^4
t =	10.2	mm	r_x =	208.91	mm	r_y =	2.94	mm
A =	7381.74	mm^2	S_x =	8.90E+05	mm^3	S_y =	1.25E+04	mm^3

Effective length factor, K =	1.00		L_1 =	183.5	mm
Unbraced length, L =	168.0	mm	L_2 =	294.7	mm
r_{min} =	2.94	mm	L_3 =	25.85	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6159$$

ϕ_s =	0.9	
Effective width, L_w =	723.7	mm
Thickness, t =	10.2	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1276 \text{ kN}$$



McCORMICK RANKIN CORPORATION

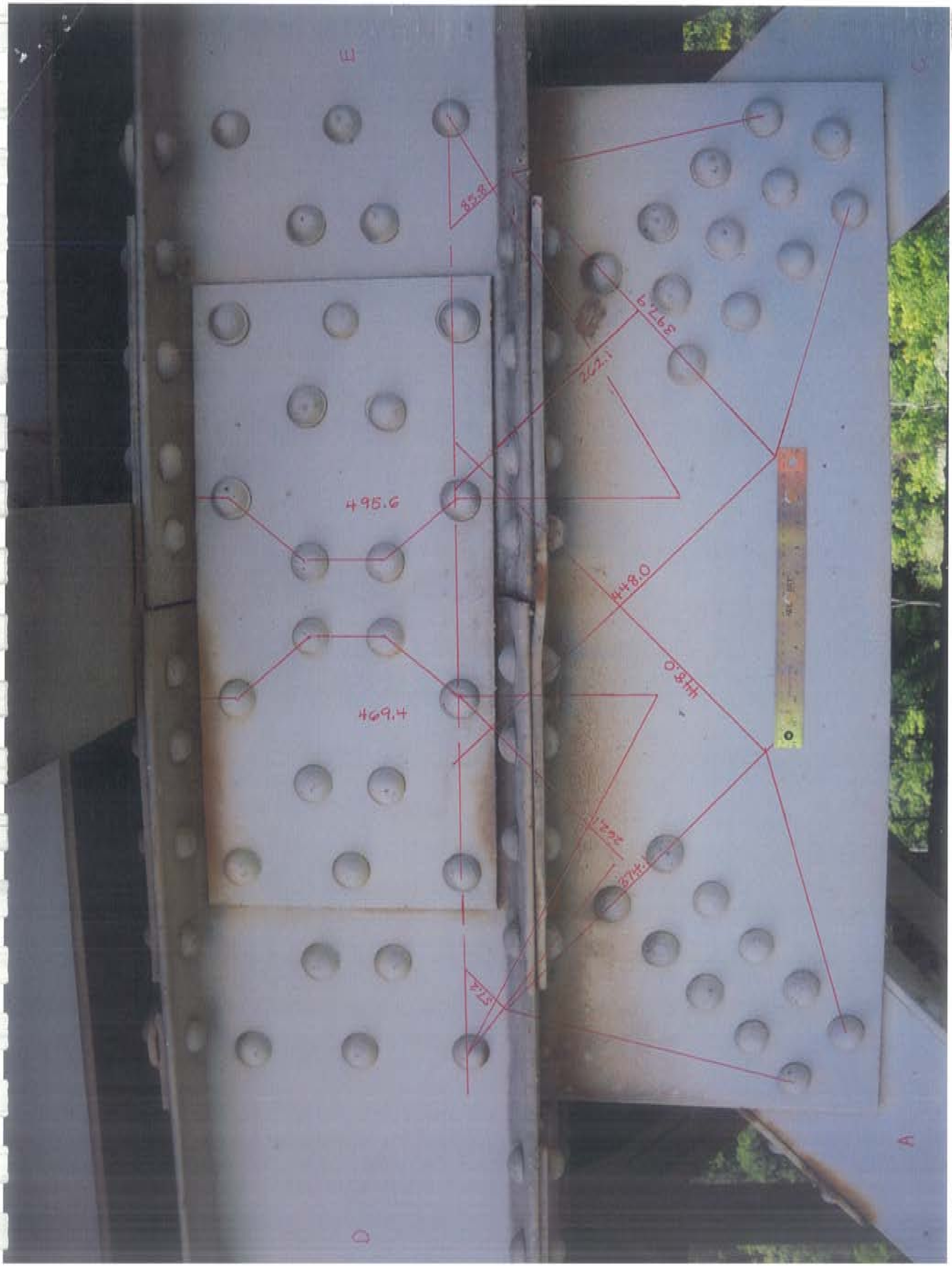
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

U19E

SPAN________ TRUSS NORTH



495.6
469.4
448.0
262.1

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge
Gusset Node: U19E

Material Properties For Gusset Plate

Gusset Plate:				Splice Plate:						
	F_y =	230	MPa		F_y =	230	MPa			
	F_u =	420	MPa		F_u =	420	MPa			
	E =	200,000	MPa		E =	200,000	MPa			
	t =	10	mm		t =	8.64	mm	orig. t =	9.6	mm
					h =		mm	section loss =	10	%

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 550 mm
Gross area, A_g = 5500 mm^2
ϕ_s = 0.95

$T_r = \phi_s A_g F_y$
= 1202 kN

B) Net Section Fracture

Effective width, w_e = 550 mm
holes = 3.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 4786 mm^2
ϕ_s = 0.95

$T_r = 0.85\ \phi_s A_{ne} F_u$
= 1623 kN

Factored tensile resistance = 1202 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 602 mm
Gross area, A_g = 6020 mm^2
ϕ_s = 0.95

$T_r = \phi_s A_g F_y$
= 1315 kN

B) Net Section Fracture

Effective width, w_e = 602 mm
holes = 3.0
gap = 2 mm
dia. = 22 mm
Net area, A_{ne} = 5300 mm^2
ϕ_s = 0.95

$T_r = 0.85\ \phi_s A_{ne} F_u$
= 1797 kN

Factored tensile resistance = 1315 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 377 mm
Gross area, A_g = 3768 mm^2
ϕ_s = 0.95

$T_r = \phi_s A_g F_y$
= 823 kN

B) Net Section Fracture

Effective width, w_e = 377 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 3292 mm^2
ϕ_s = 0.95

$T_r = 0.85\ \phi_s A_{ne} F_u$
= 1116 kN

Factored tensile resistance = 823 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

GUSSET PLATE INVESTIGATION - Whitmore Method

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	530	mm	300	mm
Gross area, A_g =	5300	mm^2	2592	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

$= 1724$ kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4400	mm^2	1769	mm^2
f_s =	0.95			

$T_r = 0.85\ f_s A_{ne} F_u$

$= 2092$ kN

Factored tensile resistance = 1724 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	495	mm	300	mm
Gross area, A_g =	4950	mm^2	2592	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

$= 1648$ kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	522	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4270	mm^2	1769	mm^2
f_s =	0.95			

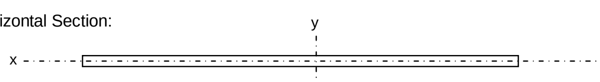
$T_r = 0.85\ f_s A_{ne} F_u$

$= 2048$ kN

Factored tensile resistance = 1648 kN **Thus, gross section yielding governs**

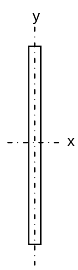
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	374.1	mm	I_x =	3.12E+04	mm^4	I_y =	4.36E+07	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	107.99	mm
A =	3741	mm^2	S_x =	6.24E+03	mm^3	S_y =	2.33E+05	mm^3
d =	0	mm						

Vertical Section:



h =	374.1	mm	I_x =	4.36E+07	mm^4	I_y =	3.12E+04	mm^4
t =	10	mm	r_x =	107.99	mm	r_y =	2.89	mm
A =	3741	mm^2	S_x =	2.33E+05	mm^3	S_y =	6.24E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	57.2	mm
Unbraced length, L =	255.8	mm	L_2 =	262.1	mm
r_{min} =	2.89	mm	L_3 =	448	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.9564$$

f_s =	0.9	
Effective width, L_w =	374.1	mm
Thickness, t =	10	mm
n =	1.34	

$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$

$= 482$ kN

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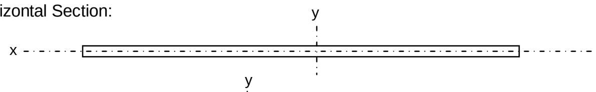
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

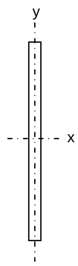
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

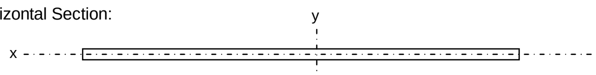
f_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1391 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

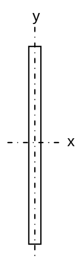
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	397.9	mm	I_x =	3.32E+04	mm^4	I_y =	5.25E+07	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	114.86	mm
A =	3979	mm^2	S_x =	6.63E+03	mm^3	S_y =	2.64E+05	mm^3
d =	0	mm						

Vertical Section:



h =	397.9	mm	I_x =	5.25E+07	mm^4	I_y =	3.32E+04	mm^4
t =	10	mm	r_x =	114.86	mm	r_y =	2.89	mm
A =	3979	mm^2	S_x =	2.64E+05	mm^3	S_y =	6.63E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	85.8	mm
Unbraced length, L =	265.3	mm	L_2 =	262.1	mm
r_{min} =	2.89	mm	L_3 =	448	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.9920$$

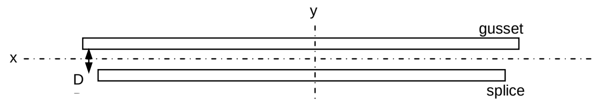
f_s =	0.9	
Effective width, L_w =	397.9	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 495 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D

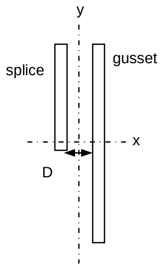
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



	(splice plate)													
b =	300	mm	b =	469.4	mm	D =	20.7	mm	I_x =	1.56E+06	mm^4	I_y =	1.18E+08	mm^4
t =	8.64	mm	t =	10	mm	y_b =	23.66	mm	r_x =	14.63	mm	r_y =	127.05	mm
A =	2592	mm^2	A =	4694	mm^2	x_L =	204.57	mm	S_{xb} =	1.32E+05	mm^3	S_{yL} =	1.15E+06	mm^3

Vertical Section:



	(splice plate)													
h =	300	mm	h =	469.4	mm	D =	20.7	mm	I_x =	1.18E+08	mm^4	I_y =	1.56E+06	mm^4
t =	8.64	mm	t =	10	mm	y_b =	264.83	mm	r_x =	127.05	mm	r_y =	14.63	mm
A =	2592	mm^2	A =	4694	mm^2	x_L =	23.66	mm	S_{xb} =	8.88E+05	mm^3	S_{yL} =	1.32E+05	mm^3

Effective length factor, K =	1.00		L_1 =	80	mm
Unbraced length, L =	80.0	mm	L_2 =	80	mm
r_{min} =	14.63	mm	L_3 =	80	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0590$$

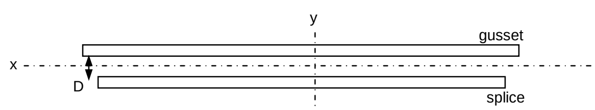
			(splice plate)	
f_s =	0.9			
Effective width, L_w =	469.4	mm	300	mm
Thickness, t =	10	mm	8.64	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1508 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E

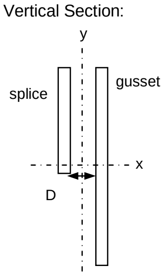
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



	(splice plate)													
b =	300	mm	b =	495.6	mm	D =	13.2	mm	I_x =	9.21E+05	mm^4	I_y =	1.37E+08	mm^4
t =	8.64	mm	t =	10	mm	y_b =	19.11	mm	r_x =	11.04	mm	r_y =	134.80	mm
A =	2592	mm^2	A =	4956	mm^2	x_L =	214.22	mm	S_{xb} =	9.64E+04	mm^3	S_{yL} =	1.28E+06	mm^3

Vertical Section:



	(splice plate)													
h =	300	mm	h =	495.6	mm	D =	13.2	mm	I_x =	1.37E+08	mm^4	I_y =	9.21E+05	mm^4
t =	8.64	mm	t =	10	mm	y_b =	281.38	mm	r_x =	134.80	mm	r_y =	11.04	mm
A =	2592	mm^2	A =	4956	mm^2	x_L =	19.11	mm	S_{xb} =	9.75E+05	mm^3	S_{yL} =	9.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	80	mm
Unbraced length, L =	80.0	mm	L_2 =	80	mm
r_{min} =	11.04	mm	L_3 =	80	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0782$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	495.6	mm	300	mm
Thickness, t =	10	mm	8.64	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1561 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

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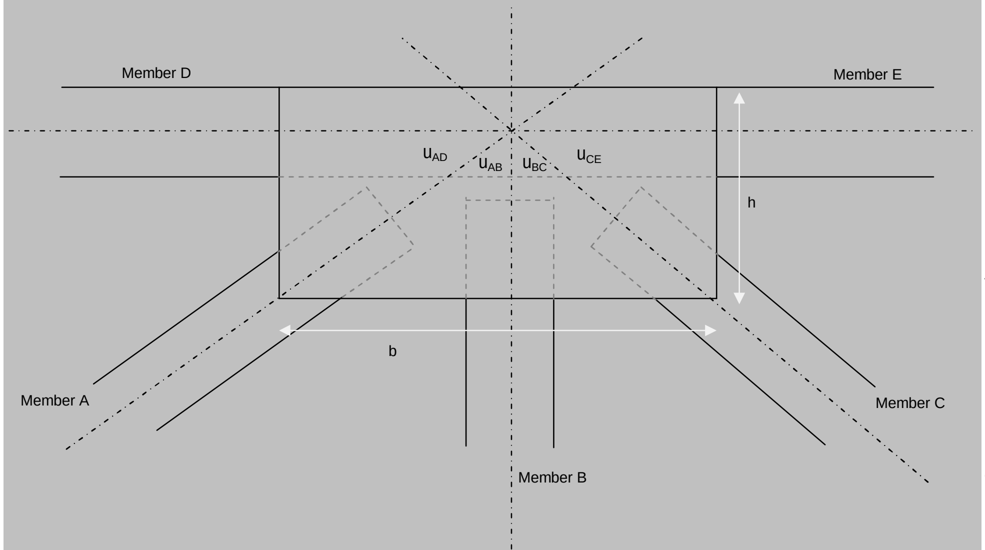
RESISTANCE SUMMARY (one gusset plate)

Member A								
	Factored applied tensile force =	327.2	kN	<	1202	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	244.8	kN	<	482	kN	Compressive resistance	**ok!**
Member B								
	Factored applied tensile force =	0	kN	<	1315	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	0	kN	<	1391	kN	Compressive resistance	**ok!**
Member C								
	Factored applied tensile force =	0	kN	<	823	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	628.9	kN	>	495	kN	Compressive resistance	**no good!**
Member D								
	Factored applied tensile force =	0	kN	<	1724	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	1073.7	kN	<	1508	kN	Compressive resistance	**ok!**
Member E								
	Factored applied tensile force =	0	kN	<	1648	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	826.6	kN	<	1561	kN	Compressive resistance	**ok!**

Gusset Plate Geometry



	b =	1130	mm
	h =	900	mm
	t =	10.1	mm
	u_{AD} =	65	deg
	u_{AB} =	25	deg
	u_{BC} =	30	deg
	u_{CE} =	60	deg

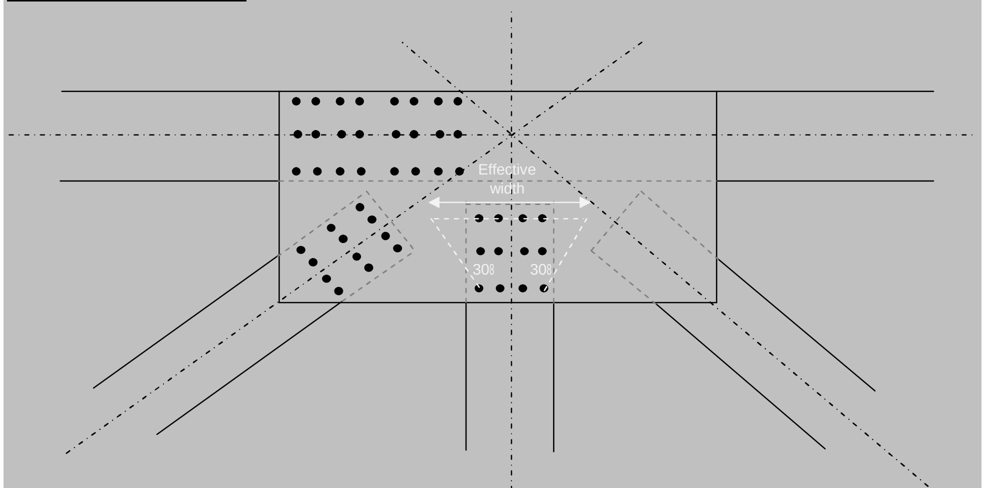
Tensile forces:

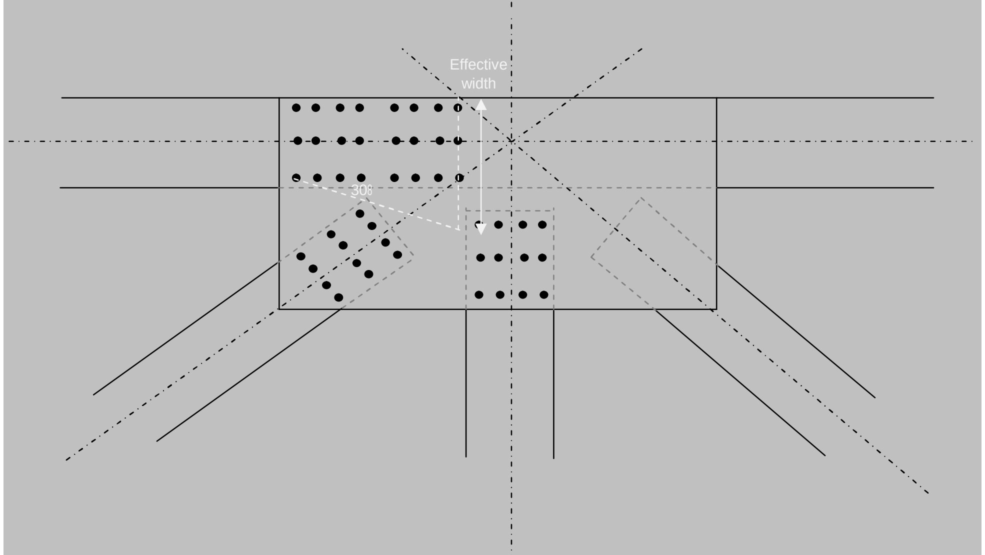
A	F1 =	654.4	kN
B	F2 =	0	kN
C	F3 =	0	kN
D	F4 =	0	kN
E	F5 =	0	kN

Compressive forces:

A	F1 =	489.6	kN
B	F2 =	0	kN
C	F3 =	1257.8	kN
D	F4 =	2147.4	kN
E	F5 =	1653.2	kN

Whitmore Effective Width Method



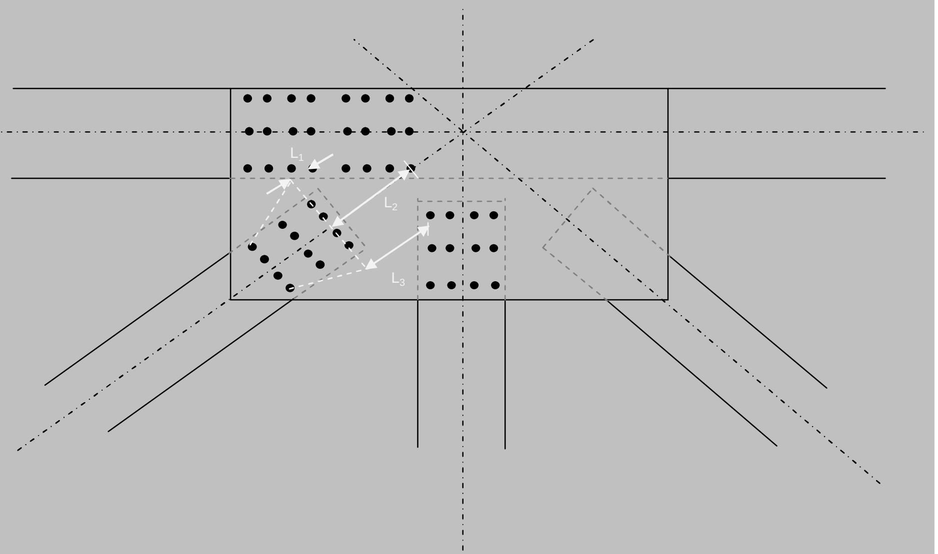


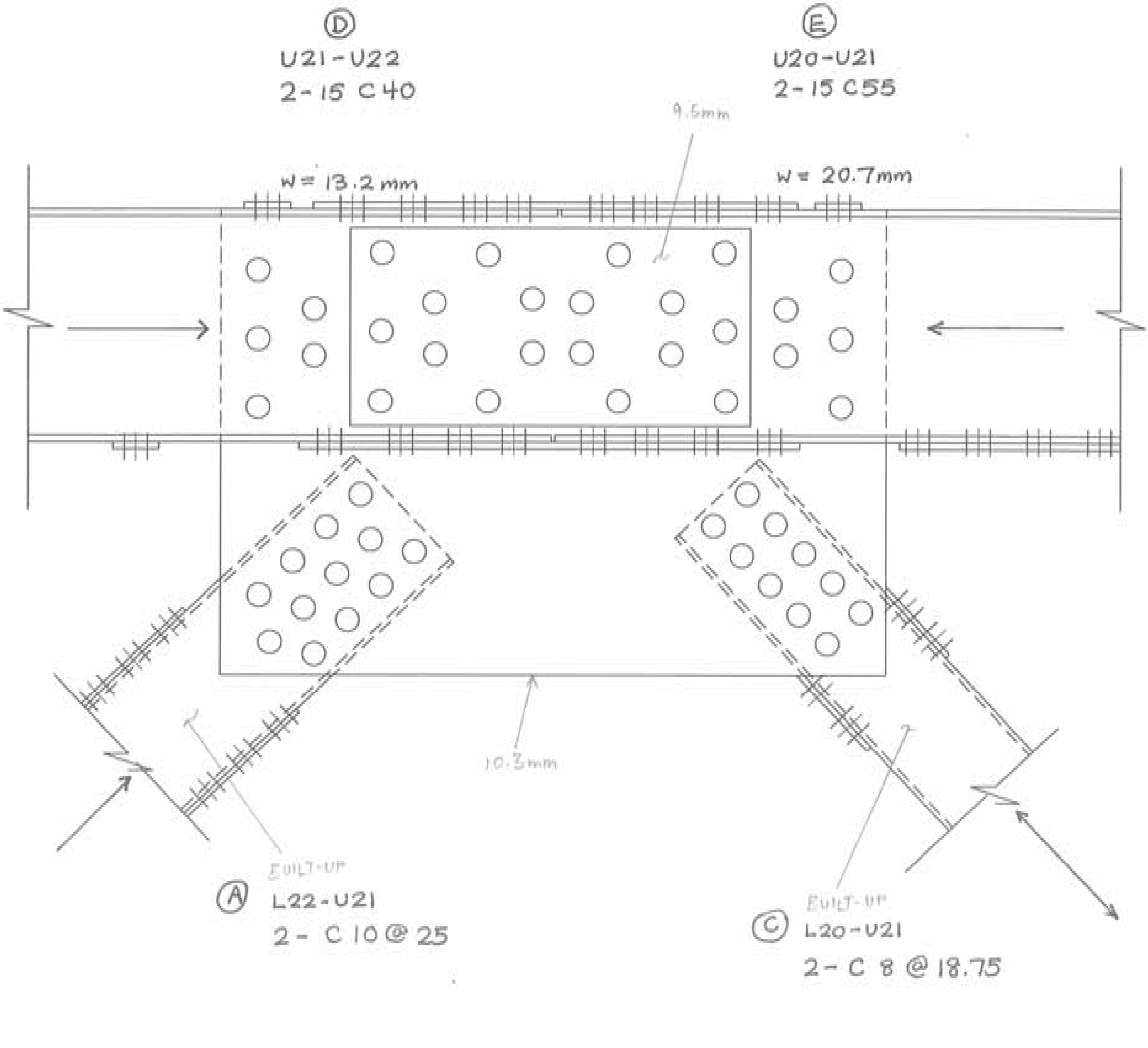
* The *effective width* is measured across the last row of fasteners in the connection under consideration. The effective width is bound on either side by the closer of the nearest adjacent plate edges or lines constructed starting from the external fasteners within the first row and extending from these fasteners at an angle of 30 degrees with respect to the line of action of the axial force. Bolt/rivet holes are not subtracted from the width.

L_2 = The distance from the last row of fasteners in the compression member under consideration, to the first row of fasteners in the closest adjacent member, measured along the line of action of the compressive axial force.

Gusset Plate Geometry

L_1 & L_3 = The distance from each of the ends of the Whitmore width to the first row of fasteners in the closest adjacent member, measured parallel to the line of action of the compressive axial force.





P.2602

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McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008	
DRAWING:	U21E
SPAN	TRUSS NORTH

D
E
71.7
258.9
446
446
A
C

GUSSET PLATE INVESTIGATION - Whitmore Method

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge

Gusset Node: U21E

Material Properties For Gusset Plate

Gusset Plate:	F_y =	230	MPa	Splice Plate:	F_y =	230	MPa		
	F_u =	420	MPa		F_u =	420	MPa	
	E =	200,000	MPa		E =	200,000	MPa	
	t =	10.3	mm		t =	8.55	mm	orig. t = 9.5 mm
					h =		mm	section loss = 10 %

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 550 mm
Gross area, A_g = 5665 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1238 kN

B) Net Section Fracture

Effective width, w_e = 550 mm
holes = 3.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 4929 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1672 kN

Factored tensile resistance = 1238 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 602 mm
Gross area, A_g = 6200.6 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1355 kN

B) Net Section Fracture

Effective width, w_e = 602 mm
holes = 3.0
gap = 2 mm
dia. = 22 mm
Net area, A_{ne} = 5459 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1851 kN

Factored tensile resistance = 1355 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 377 mm
Gross area, A_g = 3881.04 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 848 kN

B) Net Section Fracture

Effective width, w_e = 377 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 3391 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1150 kN

Factored tensile resistance = 848 kN **Thus, gross section yielding governs**

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WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	5459	mm^2	2565	mm^2	= 1753 kN
f_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	4.0		4.0		= 2131 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4532	mm^2	1751	mm^2	
f_s =	0.95				

Factored tensile resistance = 1753 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	5098.5	mm^2	2565	mm^2	= 1674 kN
f_s =	0.95				

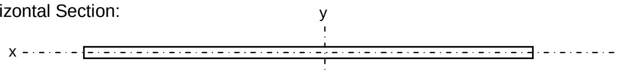
B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	4.0		4		= 2085 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4398	mm^2	1751	mm^2	
f_s =	0.95				

Factored tensile resistance = 1674 kN **Thus, gross section yielding governs**

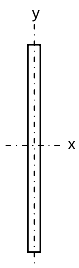
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	399.8 mm	I_x =	3.64E+04	mm^4	I_y =	5.49E+07	mm^4
t =	10.3 mm	r_x =	2.97	mm	r_y =	115.41	mm
A =	4117.94 mm^2	S_x =	7.07E+03	mm^3	S_y =	2.74E+05	mm^3
d =	0 mm						

Vertical Section:



h =	399.8 mm	I_x =	5.49E+07	mm^4	I_y =	3.64E+04	mm^4
t =	10.3 mm	r_x =	115.41	mm	r_y =	2.97	mm
A =	4117.94 mm^2	S_x =	2.74E+05	mm^3	S_y =	7.07E+03	mm^3
d =	0 mm						

Effective length factor, K =	1.00		L_1 =	66.6	mm
Unbraced length, L =	259.7	mm	L_2 =	266.6	mm
r_{min} =	2.97	mm	L_3 =	446	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.9429$$

f_s =	0.9	
Effective width, L_w =	399.8	mm
Thickness, t =	10.3	mm
n =	1.34	

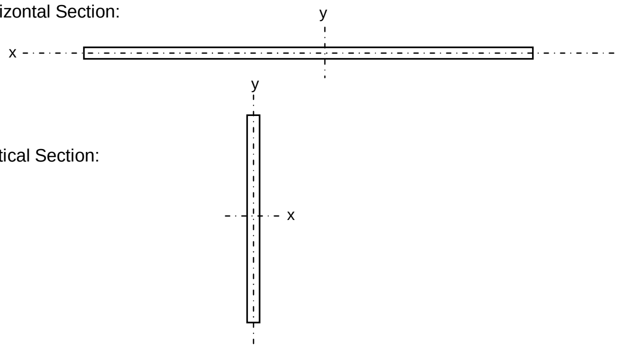
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 538 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Vertical Section:



Horizontal Section								
b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section								
h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

f_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	10.3	mm
n =	1.34	

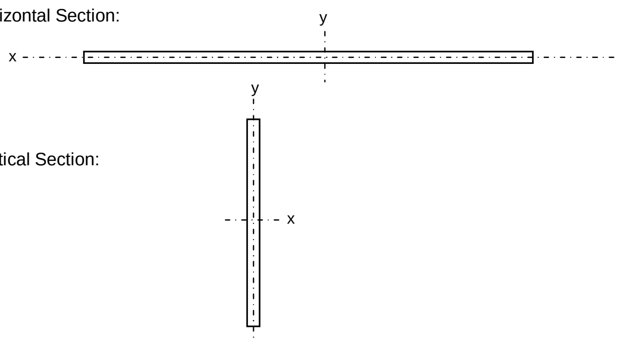
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1433 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Vertical Section:



Horizontal Section								
b =	376.8	mm	I_x =	3.43E+04	mm^4	I_y =	4.59E+07	mm^4
t =	10.3	mm	r_x =	2.97	mm	r_y =	108.77	mm
A =	3881.04	mm^2	S_x =	6.66E+03	mm^3	S_y =	2.44E+05	mm^3
d =	0	mm						

Vertical Section								
h =	376.8	mm	I_x =	4.59E+07	mm^4	I_y =	3.43E+04	mm^4
t =	10.3	mm	r_x =	108.77	mm	r_y =	2.97	mm
A =	3881.04	mm^2	S_x =	2.44E+05	mm^3	S_y =	6.66E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	71.7	mm
Unbraced length, L =	258.9	mm	L_2 =	258.9	mm
r_{min} =	2.97	mm	L_3 =	446	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.9398$$

f_s =	0.9	
Effective width, L_w =	376.8	mm
Thickness, t =	10.3	mm
n =	1.34	

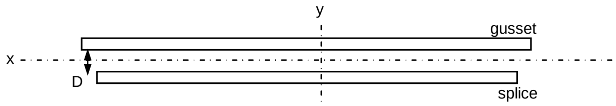
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 508 \text{ kN}$$

MRC

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D

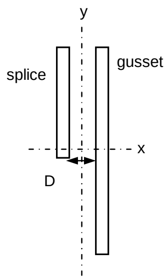
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	676	mm	D =	13.2	mm	I_x =	1.04E+06	mm^4	I_y =	3.51E+08	mm^4
t =	8.55	mm	t =	10.3	mm	y_b =	20.81	mm	r_x =	10.43	mm	r_y =	191.84	mm
A =	2565	mm^2	A =	6962.8	mm^2	x_L =	287.39	mm	S_{xb} =	9.96E+04	mm^3	S_{yL} =	2.44E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	676	mm	D =	13.2	mm	I_x =	3.51E+08	mm^4	I_y =	1.04E+06	mm^4
t =	8.55	mm	t =	10.3	mm	y_b =	388.61	mm	r_x =	191.84	mm	r_y =	10.43	mm
A =	2565	mm^2	A =	6962.8	mm^2	x_L =	20.81	mm	S_{xb} =	1.80E+06	mm^3	S_{yL} =	9.96E+04	mm^3

Effective length factor, K =	1.00		L_1 =	98	mm
Unbraced length, L =	98.0	mm	L_2 =	98	mm
r_{min} =	10.43	mm	L_3 =	98	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.1014$$

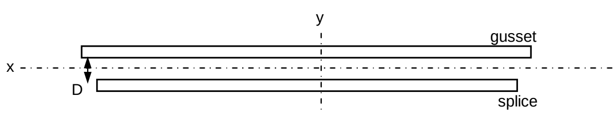
			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	10.3	mm	8.55	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1969 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E

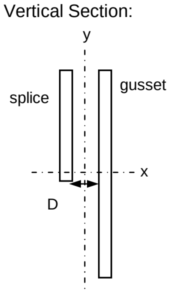
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	676	mm	D =	20.7	mm	I_x =	2.89E+06	mm^4	I_y =	4.15E+08	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	28.36	mm	r_x =	15.79	mm	r_y =	189.27	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	276.17	mm	S_{xb} =	2.04E+05	mm^3	S_{yL} =	3.01E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	676	mm	D =	30.3	mm	I_x =	4.15E+08	mm^4	I_y =	4.73E+06	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	399.83	mm	r_x =	189.27	mm	r_y =	20.21	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	34.80	mm	S_{xb} =	2.08E+06	mm^3	S_{yL} =	2.72E+05	mm^3

Effective length factor, K =	1.00		L_1 =	98	mm
Unbraced length, L =	98.0	mm	L_2 =	98	mm
r_{min} =	15.79	mm	L_3 =	98	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0670$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	10.3	mm	8.55	mm
n =	1.34			

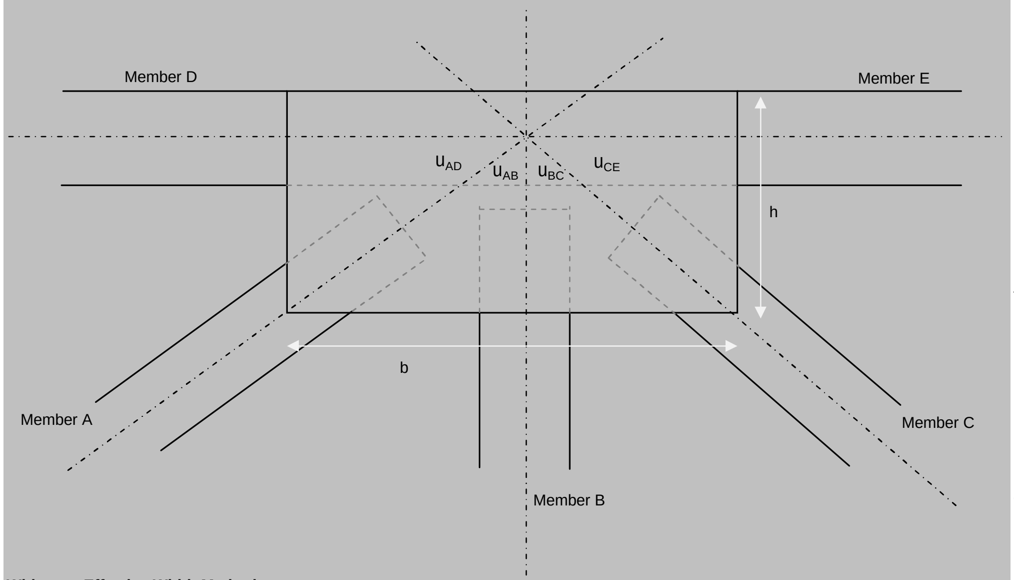
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1971 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

RESISTANCE SUMMARY (one gusset plate)

Member A								
	Factored applied tensile force =	0	kN	<	1238	kN	Tensile resistance	ok!
	Factored applied compressive force =	638.9	kN	>	538	kN	Compressive resistance	no good!
Member B								
	Factored applied tensile force =	0	kN	<	1355	kN	Tensile resistance	ok!
	Factored applied compressive force =	0	kN	<	1433	kN	Compressive resistance	ok!
Member C								
	Factored applied tensile force =	341.25	kN	<	848	kN	Tensile resistance	ok!
	Factored applied compressive force =	229.3	kN	<	508	kN	Compressive resistance	ok!
Member D								
	Factored applied tensile force =	0	kN	<	1753	kN	Tensile resistance	ok!
	Factored applied compressive force =	822.1	kN	<	1969	kN	Compressive resistance	ok!
Member E								
	Factored applied tensile force =	0	kN	<	1674	kN	Tensile resistance	ok!
	Factored applied compressive force =	1073.7	kN	<	1971	kN	Compressive resistance	ok!

Gusset Plate Geometry



	b =	1130	mm
	h =	900	mm
	t =	10.1	mm
	u_{AD} =	65	deg
	u_{AB} =	25	deg
	u_{BC} =	30	deg
	u_{CE} =	60	deg

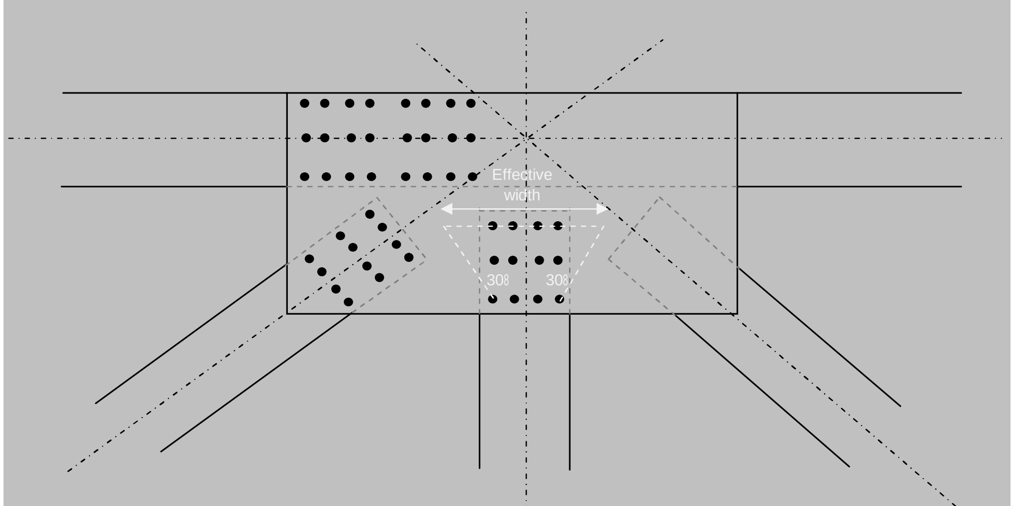
Tensile forces:

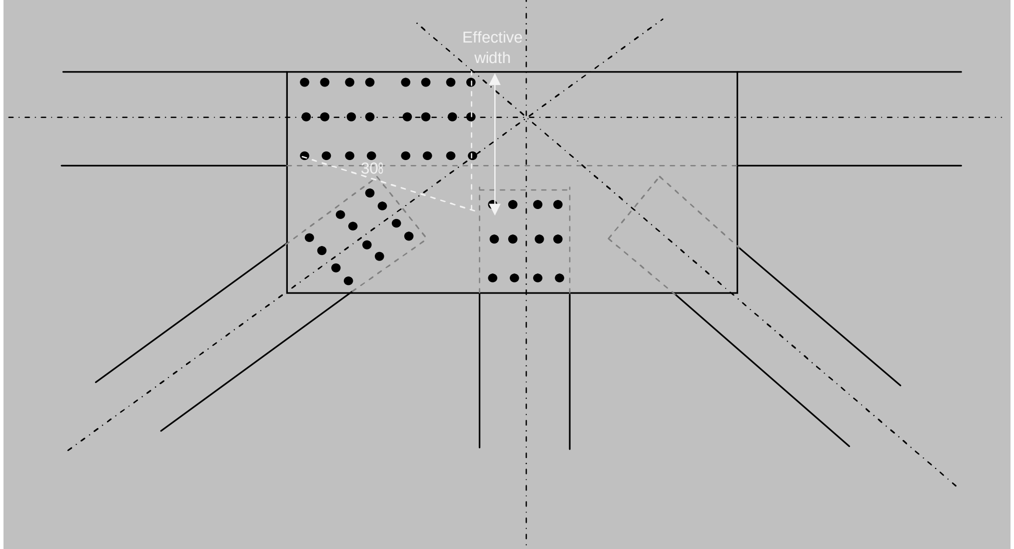
A	F1 =	0	kN
B	F2 =	0	kN
C	F3 =	682.5	kN
D	F4 =	0	kN
E	F5 =	0	kN

Compressive forces:

A	F1 =	1277.8	kN
B	F2 =	0	kN
C	F3 =	458.6	kN
D	F4 =	1644.2	kN
E	F5 =	2147.4	kN

Whitmore Effective Width Method



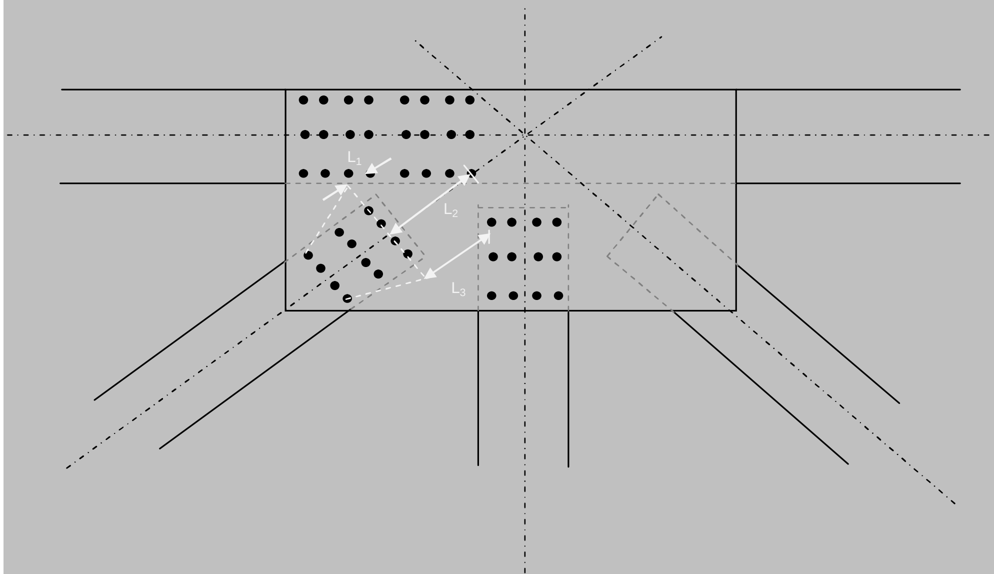


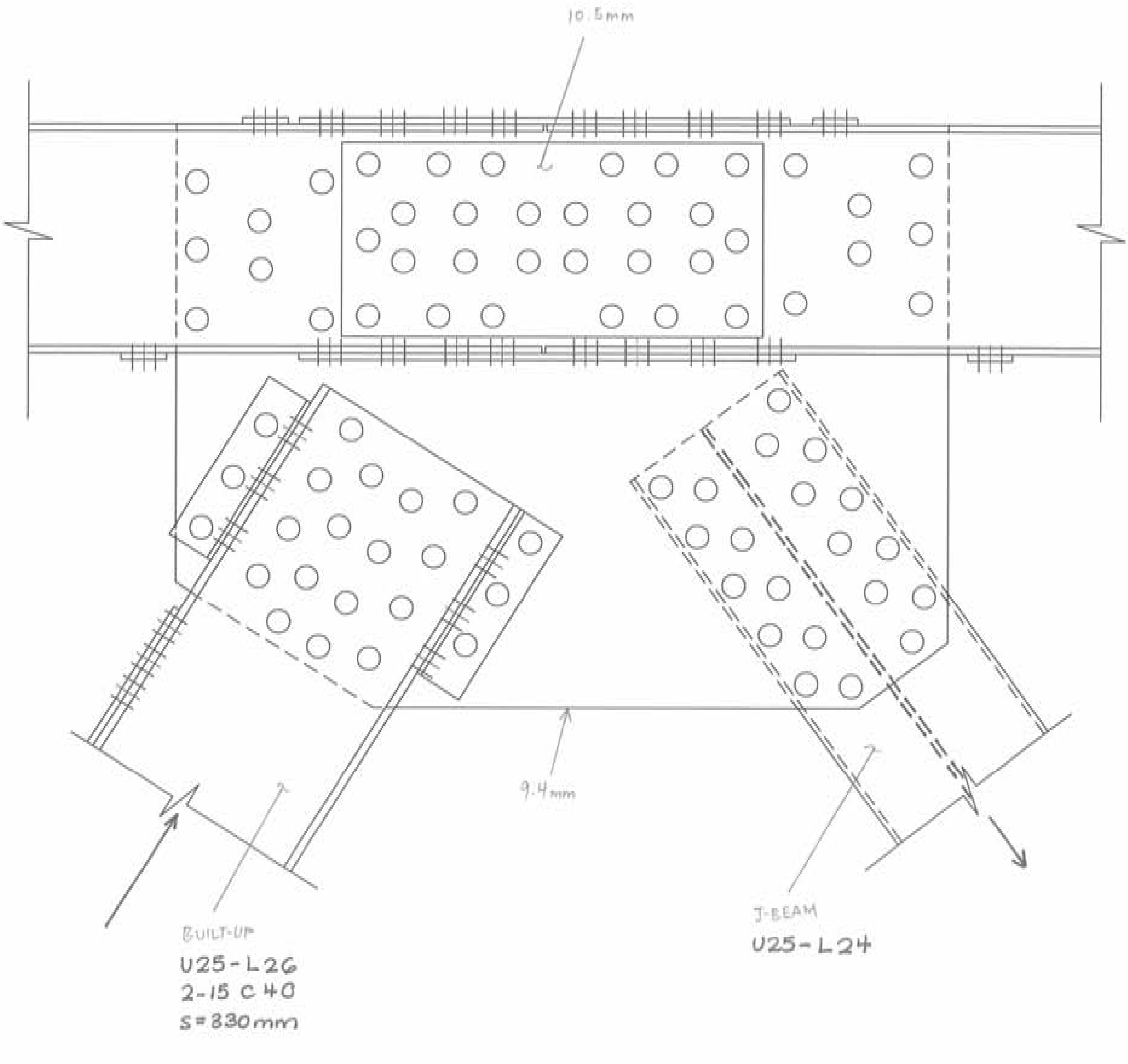
* The *effective width* is measured across the last row of fasteners in the connection under consideration. The effective width is bound on either side by the closer of the nearest adjacent plate edges or lines constructed starting from the external fasteners within the first row and extending from these fasteners at an angle of 30 degrees with respect to the line of action of the axial force. Bolt/rivet holes are not subtracted from the width.

Gusset Plate Geometry

L_2 = The distance from the last row of fasteners in the compression member under consideration, to the first row of fasteners in the closest adjacent member, measured along the line of action of the compressive axial force.

L_1 & L_3 = The distance from each of the ends of the Whitmore width to the first row of fasteners in the closest adjacent member, measured parallel to the line of action of the compressive axial force.





P.2604

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

U25E

SPAN

TRUSS NORTH


519.83
482.70
185.7
440.3
286.43
467
578
753.2
105.09
31.83

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4982	mm^2	3150	mm^2	= 1777 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\, \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2132 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4136	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1777 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4653	mm^2	3150	mm^2	= 1705 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\, \phi_s A_{ne} F_u$
holes =	4.0		4		= 2090 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4014	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1705 kN **Thus, gross section yielding governs**

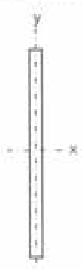
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Δb =	0	mm						
b =	753.2	mm	I_x =	5.21E+04	mm^4	I_y =	3.35E+08	mm^4
t =	9.4	mm	r_x =	2.71	mm	r_y =	217.43	mm
A =	7080.08	mm^2	S_x =	1.11E+04	mm^3	S_y =	8.89E+05	mm^3
d =	0	mm						

Vertical Section:



h =	753.2	mm	I_x =	3.35E+08	mm^4	I_y =	5.21E+04	mm^4
t =	9.4	mm	r_x =	217.43	mm	r_y =	2.71	mm
A =	7080.08	mm^2	S_x =	8.89E+05	mm^3	S_y =	1.11E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	31.83	mm
Unbraced length, L =	279.4	mm	L_2 =	286.43	mm
r_{min} =	2.71	mm	L_3 =	519.83	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.1113$$

ϕ_s =	0.9	
Effective width, L_w =	753.2	mm
Thickness, t =	9.4	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 780 \text{ kN}$$

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	530	mm	300	mm
Gross area, A_g =	4982	mm^2	3150	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$
$= 1777$ kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4136	mm^2	2150	mm^2
ϕ_s =	0.95			

$T_r = 0.85\ \phi_s A_{ne} F_u$
$= 2132$ kN

Factored tensile resistance = 1777 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	495	mm	300	mm
Gross area, A_g =	4653	mm^2	3150	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$
$= 1705$ kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	522	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4014	mm^2	2150	mm^2
ϕ_s =	0.95			

$T_r = 0.85\ \phi_s A_{ne} F_u$
$= 2090$ kN

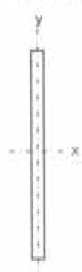
Factored tensile resistance = 1705 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:

Δb =	0	mm						
b =	467	mm	I_x =	3.23E+04	mm^4	I_y =	7.98E+07	mm^4
t =	9.4	mm	r_x =	2.71	mm	r_y =	134.81	mm
A =	4389.8	mm^2	S_x =	6.88E+03	mm^3	S_y =	3.42E+05	mm^3
d =	0	mm						

Vertical Section:



h =	467	mm	I_x =	7.98E+07	mm^4	I_y =	3.23E+04	mm^4
t =	9.4	mm	r_x =	134.81	mm	r_y =	2.71	mm
A =	4389.8	mm^2	S_x =	3.42E+05	mm^3	S_y =	6.88E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	132.6	mm
Unbraced length, L =	286.4	mm	L_2 =	286.43	mm
r_{min} =	2.71	mm	L_3 =	440.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.1395$$

ϕ_s =	0.9	
Effective width, L_w =	467	mm
Thickness, t =	9.4	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$
$= 470$ kN

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4982	mm^2	3150	mm^2	= 1777 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2132 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4136	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1777 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4653	mm^2	3150	mm^2	= 1705 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4		= 2090 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4014	mm^2	2150	mm^2	
ϕ_s =	0.95				

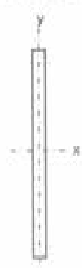
Factored tensile resistance = 1705 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Δb =	0	mm						
b =	578.17	mm	I_x =	4.00E+04	mm^4	I_y =	1.51E+08	mm^4
t =	9.4	mm	r_x =	2.71	mm	r_y =	166.90	mm
A =	5434.798	mm^2	S_x =	8.51E+03	mm^3	S_y =	5.24E+05	mm^3
d =	0	mm						

Vertical Section:



h =	578.17	mm	I_x =	1.51E+08	mm^4	I_y =	4.00E+04	mm^4
t =	9.4	mm	r_x =	166.90	mm	r_y =	2.71	mm
A =	5434.798	mm^2	S_x =	5.24E+05	mm^3	S_y =	8.51E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	106.09	mm
Unbraced length, L =	291.7	mm	L_2 =	286.43	mm
r_{min} =	2.71	mm	L_3 =	482.7	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.1605$$

ϕ_s =	0.9	
Effective width, L_w =	578.17	mm
Thickness, t =	9.4	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 569 \text{ kN}$$

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4982	mm^2	3150	mm^2	= 1777 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\, \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2132 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4136	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1777 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4653	mm^2	3150	mm^2	= 1705 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\, \phi_s A_{ne} F_u$
holes =	4.0		4		= 2090 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4014	mm^2	2150	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1705 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Vertical Section:

Δb =	0	mm						
b =	753.2	mm	I_x =	5.21E+04	mm^4	I_y =	3.35E+08	mm^4
t =	9.4	mm	r_x =	2.71	mm	r_y =	217.43	mm
A =	7080.08	mm^2	S_x =	1.11E+04	mm^3	S_y =	8.89E+05	mm^3
d =	0	mm						
h =	753.2	mm	I_x =	3.35E+08	mm^4	I_y =	5.21E+04	mm^4
t =	9.4	mm	r_x =	217.43	mm	r_y =	2.71	mm
A =	7080.08	mm^2	S_x =	8.89E+05	mm^3	S_y =	1.11E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	31.83	mm
Unbraced length, L =	168.0	mm	L_2 =	286.43	mm
r_{min} =	2.71	mm	L_3 =	185.7	mm

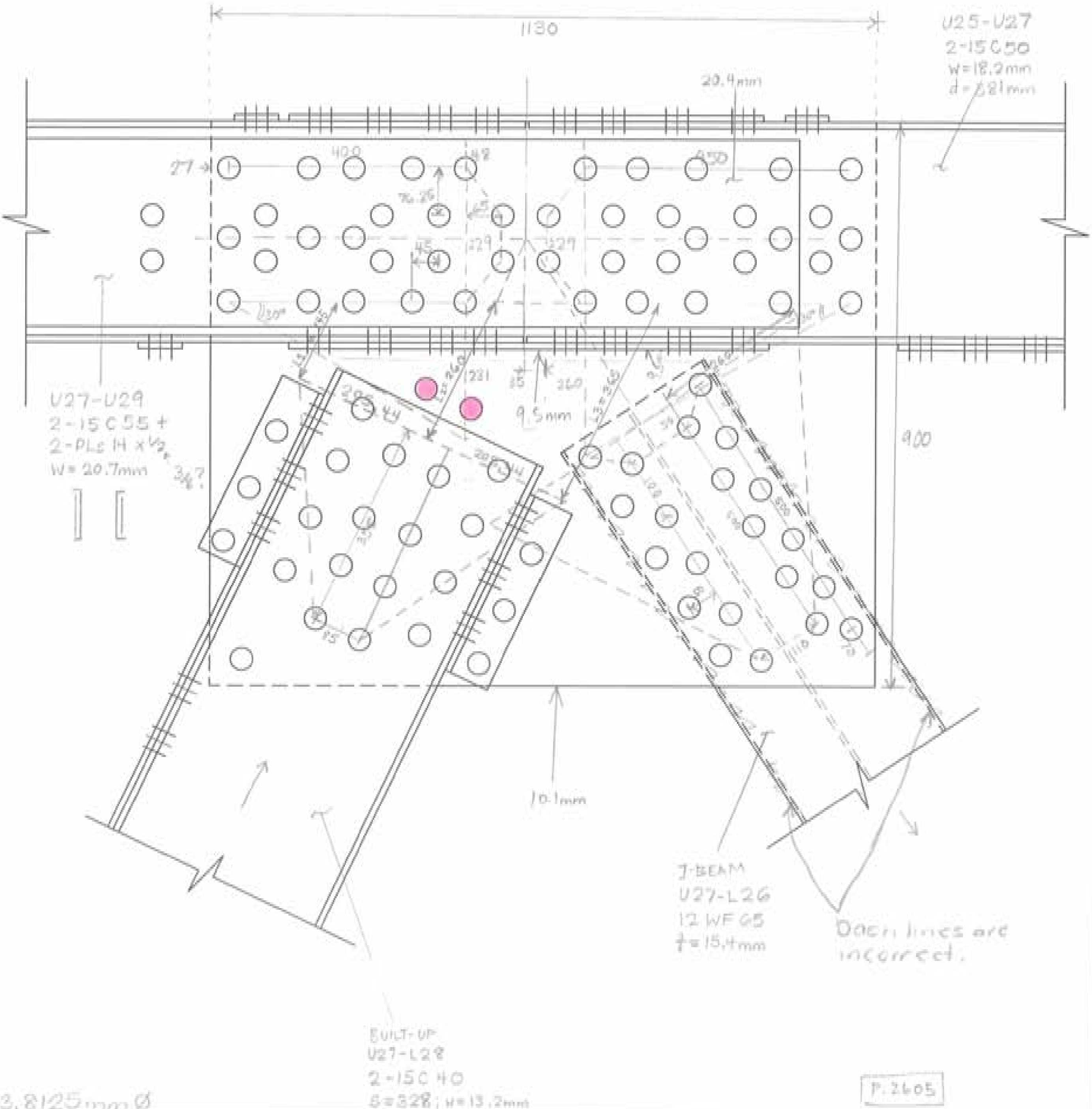
$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6682$$

ϕ_s =	0.9	
Effective width, L_w =	753.2	mm
Thickness, t =	9.4	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1178 \text{ kN}$$

East Interior Span

● Rivets indicate that back-to-back Channels are used to reinforce gusset PL in weak bending. See photo 2610 for example.



McCORMICK RANKIN CORPORATION	TRUSS REPAIR ON TANSLEY BRIDGE DUNDAS – BRONTE CREEK	DATE: DECEMBER 2008
		DRAWING: U27E
		SPAN ___ TRUSS NORTH

Pinned lateral bracing (3)
DL1 Load Case

404	322
290	222
182	142

Pinned Deck Outriggers (2)
DL1 Load Case

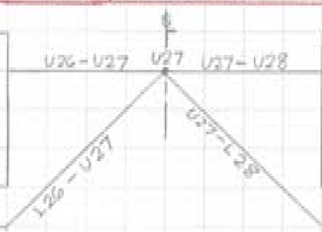
487.4	475.0
348.2	331.7
218.4	209.6
1054.0	1016.3

Fixed Deck Outriggers (1)
DL1 load case

401.36	318.71
287.66	218.98
180.61	139.59
869.63kN	677.28 kN

Gusset ℞ U27 (E), Middle Truss

+ : Tension
- : Compression



D1 = 379.43kN
D2 = 936.47kN
LL_{max} = 709.85kN
LL_{min} = -297.23kN

D1 = 644.15kN
D2 = 1568.11 kN
LL_{max} = 704.32kN
LL_{min} = -235.81kN

D1 = 278.13 kN
D2 = 625.62kN
LL_{max} = 770.16kN
LL_{min} = -152.2kN

D1 = -295.86kN
D2 = -769.96kN
LL_{max} = 72.84kN
LL_{min} = -1102.06kN

Notes:
1. Structural Steel: Medium Grade '46
2. Rivets $\frac{7}{8}"\varnothing$ = 22.225mm $\varnothing$
3. See photo 2605
4. Rivet F_u = 360MPa {S6-06, Cl.14.7.4.6}
5. Steel F_y = 230MPa, F_u = 420MPa
6. $\frac{15}{16}"\varnothing$ rivet holes = 23.8125mm

1 Resistance of Fasteners

1.1 Fasteners at End of Members U26-U27 & U27-U28

Shear Resistance of Fasteners {S6-06, Cl.14.14.1.4.2}

$$V_r = 0.75\,\varnothing_r\, n m A_r F_u$$
$$= 0.75(0.67)(1)(1)(\pi)\left(\tfrac{22.225\text{mm}}{2}\right)^2(360\text{MPa})$$
$$V_r = 70.18\text{kN per rivet}$$

Plate Bearing Resistance at Fasteners {S6-06, Cl.14.14.1.4.2}

$$B_r = \varnothing_{mc} t n e F_u \le 3\varnothing_{mc} t n d F_u \qquad e = 1\tfrac{5}{8}" - \tfrac{7}{8}"\left(\tfrac{1}{2}\right) = 30.2\text{mm}$$
$$= 0.67(10.1\text{mm})(1)(30.2\text{mm})(420\text{MPa}) \le 3(0.67)(10.1\text{mm})(1)(22.225)(420)$$
$$B_r = 85.83\text{kN} \le 189.5\text{kN on U26-U27}$$

∴ rivet shear governs

The resistance of all rivets on:
i) U27-U29 is P_r = 21(70.18kN) = 1473.78kN
ii) U25-U27 is P_r = 18(70.18 kN) = 1263.24kN

McCORMICK RANKIN CORPORATION

PROJECT: Gusset ℞ U27 (E) W.O. No. 7108.300
DESIGNED: KWS DATE: Sep. 24/09
CHECKED: DATE:

1.2 Fasteners at End of Member L26-U27 (12 WF65)

Shear Resistance of Fasteners {S6-06, Cl.14.14.1.4.2}

$V_r = 0.75\,\phi_r\, n\, m\, A_r\, F_u = 70.18\,kN$ per rivet

Plate Bearing Resistance at Fasteners

$B_r = \phi_{mc}\, t\, n\, e\, F_u \leq 3\,\phi_{mc}\, t\, n\, d\, F_u$ $\quad e \doteq 1\frac{5}{8}" - (\frac{7}{8}")(\frac{1}{2}) = 30.2\,mm$

$= (0.67)(10.1\,mm)(1)(30.2\,mm)(420\,MPa)$

$B_r = 85.83\,kN$ per rivet

∴ rivet shear governs

The resistance of all rivets on U27-L26 is:

$\therefore P_r = 21(70.18\,kN) = 1473.78\,kN$

1.3 Fasteners at End of Member U27-L28 (2-15C40)

Shear Resistance of Fasteners

$V_r = 70.18\,kN$ per rivet

Plate Bearing Resistance at Fasteners

$B_r = \phi_{mc}\, t\, n\, e\, F_u \leq 3\,\phi_{mc}\, t\, n\, d\, F_u$ $\quad e \doteq 1\frac{5}{8}" - \frac{7}{8}"(\frac{1}{2}) = 30.2\,mm$

$= (0.67)(10.1\,mm)(1)(30.2\,mm)(420\,MPa) < 189.5\,kN$

$B_r = 85.83\,kN$

∴ rivet shear governs

The resistance of all rivets on U27-L28 is:

$\therefore P_r = 17(70.18\,kN) = 1193.06\,kN$

2 Resistance of Gusset Plate

2.1 Gusset Plate Tension at Members U25-U27 & U27-U29

Gross Section Yielding Resistance {S6-06, Cl. 10.8.2(a)}

$P_r = \phi_s F_y A_s$

$= 0.95(230MPa)(10.1mm)(508mm)$ + {2 Splice Plates (Web)}

i) $P_r = 1121.08kN$ in Member U27-U29, + 1973.54kN

ii) $P_r = 1185.08kN$ in Member U25-U27

Net Section Fracture {S6-06, Cl. 10.8.2(b) & (c)}

$P_r = 0.85\,\phi_s A_{ne} F_u$

$P_r = 0.85(0.95)(420MPa)(10.1mm)(48 + 229 + 2(65^2/(4 \times 76.33)) + 231 - 23.8125(4))$

($W_n = 440.4$)

$P_r = 1508.6kN$ + {2 * 1175.9} (2 Splice PLs)

Block Shear Rupture Resistance

$A_{ne} = \sum A_n$

$= t * \sum W_n$

$= t\left[36.094 + 2\left(80 - 23.8125 + \frac{45^2}{4(80)}\right) + 80 - 23.8125 + 0.60(400 + 27 - 4.5 * 23.8125)\right]$

$= t(217.313 + 191.91)$

$A_{ne} = 4133.11mm^2$

$P_r = 0.85(0.95)(420MPa)(4133.11mm^2)$ + 2 Splice PLs

$P_r = 1401.75kN$ + 2 Splice PLs

∴ $P_r = 1121.08kN$ in Member U27-U29 } governed by yielding
$P_r = 1185.08kN$ " " U25-U27 }

2.2 Gusset Plate in Tension at Member L26-U27

Gross Section Yielding Resistance

$P_r = \phi_s F_y A_g$
$= (0.95)(230MPa)(10.1mm)(2 \times 260mm + 110mm)$
$= 1390.3\ kN$

Net Section Fracture Resistance

$W_n = 2(210mm) + 2(50 + \frac{50^2}{4(50)}) + 110mm - 4(23.8125mm)$
$= 655mm - 95.25mm$
$= 559.75mm$

$P_r = 0.85 \phi_s F_u A_{ne}$
$= 0.85(0.95)(420MPa)(559.75mm)(10.1mm)$
$= 1917.4\ kN$

Block Shear Rupture Resistance

$A_{ne} = t[110 - 23.8125 + 2\{50 - 23.8125 + \frac{50^2}{4(50)}\} + 0.60(570 - 6 \times 23.8125) + 0.6(460 - 5(23.8125))]$
$= t[86.19 + 2(38.69) + 406.84]$
$= (10.1mm)(624.41mm)$
$= 6306.52\ mm^2$

$P_r = 0.85 \phi_s F_u A_{ne}$
$= 2138.9\ kN$

$\therefore P_r = 1390.3kN$ in Member L26-U27, governed by yielding

2.3 Gusset Plate Subject to Vertical Shear [S6-06, Cl. 10.18.5.2]

Gross Section Shear Yielding Resistance

$V_r = 0.50 \phi_s A_g F_y$ on the gross section
$= 0.50(0.95)(10.1mm)(900mm)(230MPa)$
$V_r = 993.1\ kN$

Net Section Shear Fracture Resistance

$V_r = 0.50 \phi_s A_n F_u$ on the net section
$= 0.50(0.95)(10.1mm)(900 - 7 \times 23.8125)(420MPa)$
$= 1477.6\ kN$

2.4 Gusset Plate Subject to Horizontal Shear

Gross Section Shear Yielding Resistance

$V_r = 0.50\,\phi_s A_g F_y$

$= 0.50(0.95)(10.1\,mm)(1130\,mm)(230\,MPa)$

$V_r = 1246.9\,kN$

Net Section Shear Fracture Resistance

$V_r = 0.50\,\phi_s A_n F_u$

$= 0.50(0.95)(420\,MPa)(1130\,mm - 10 \times 23.8125)(10.1\,mm)$

$V_r = 1797.1\,kN$

2.5 Gusset Plate in Compression at Member U27-L28

$L_1 = 145\,mm$

$L_2 = 260\,mm$

$L_3 = 365\,mm$

$L_c = \frac{\Sigma L_i}{3} = 257\,mm$

$930t/\sqrt{F_y} = 930(10.1\,mm)/\sqrt{230\,MPa} = 619.36\,mm$

{S6-06, Cl. 10.18.5.2}

$K = 1.0$

$b = 496\,mm$

$t = 10.1\,mm$

1 plate → $A = 5008.40\,mm^2$

$s = 328\,mm$

$I_s = 2(102\,083\,541\,mm^4) = 204\,167\,082\,mm^4$, $r_s = 142.9\,mm$ } 2 plates

$I_w = 2[42500 + 4999.5(\frac{328}{2})^2] = 269\,018\,104\,mm^4$, $r_w = 164.0\,mm$ } 2 plates

$$\lambda = \frac{kL_c}{r_s}\sqrt{\frac{F_y}{\pi^2 E}} = \left(\frac{1.0 \times 257\,mm}{142.9\,mm}\right)\sqrt{\frac{230\,MPa}{200\,000\,MPa(\pi)^2}} = 0.0194$$

$$C_r = \phi_s A F_y (1+\lambda^{2n})^{-1/n}$$

$$= (0.90)(2)(5008.40\,mm^2)(230\,MPa)(1 + 0.0194^{(2\times1.34)})^{-1/1.34}$$

$= 2073.43\,kN$ for 2 plates

3.0 Resistance Summary

Location @ End of Member	Resistance of Fasteners (kN) Fastener Shear	Axial Resistance of 1 Gusset Plate (kN) Gross Section Yield (Tension)	Net Section Fracture in Tension	Block Shear Rupture	Compressive Buckling	Controlling Resistance kN
U26-U27	1263.24	1185.08	1608.0	1401.75	—	1185.08
U27-U28	1473.78	1121.08+1972.54	1508.6+2351.80	1401.75+	—	1473.78
L26-U27	1473.78	1390.30	1917.40	2138.85	—	1390.30
U27-L28	-1193.06	—	—	—	-1036.72	-1036.72

Section Orientation	Shear Resistance of 1 Gusset Plate (kN) Gross Section Yielding in Shear	Net Section Fracture in Shear	Controlling Shear Resistance (kN)
Vertical	993.1	1477.6	993.1
Horizontal	1246.9	1797.1	1246.9

4.0 Inventory and Operating Rating Factors

Member	DL_f (kN)	LL_f (kN)	U	Load Factor	R_r (kN)	LL Cap. Factor, F
U26-U27	379.43+936.45=1315.88	709.9	1.01	1	1185.08(2)	1.52
U27-U28	644.19+1568.1=2212.29	704.3	1.81	1	1473.78	4.43
c) L26-U27	278.17+625.64=903.81	770.2	1.01	1	1390.30(2)	2.47
U27-L28	-295.83-769.95=-1065.78	-1102.1	1.01	1	-1036.72(2)	0.93 ←
			1.81	1	-1193.06(2)	2.95

$$F = \frac{UR_r - \Sigma \alpha_D D - \Sigma \alpha_A A}{\alpha_L L(1 + DLA)}$$

∴ Gusset ℞ U27E is governed by compressive buckling at the end of member U27-L28, where F = 0.93.

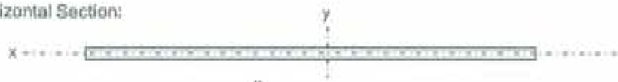
STRUCTURAL EVALUATION REPORT
VOLUME 2

REVISED CALCULATIONS
FOR

GUSSET PLATE
U27

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	701.5	mm	I_x =	1.81E+08	mm^4	I_y =	2.76E+08	mm^4
t =	9.595	mm	r_x =	164.02	mm	r_y =	202.51	mm
A =	6730.8925	mm^2	S_x =	3.77E+07	mm^3	S_y =	7.87E+05	mm^3
d =	164	mm						

Vertical Section:

h =	701.5	mm	I_x =	2.76E+08	mm^4	I_y =	1.81E+08	mm^4
t =	9.595	mm	r_x =	202.51	mm	r_y =	164.02	mm
A =	6730.8925	mm^2	S_x =	7.87E+05	mm^3	S_y =	3.77E+07	mm^3
d =	164	mm						

Effective length factor, K =	1.00		L_1 =	183	mm
Unbraced length, L =	194.8	mm	L_2 =	259	mm
r_{min} =	164.02	mm	L_3 =	142.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0128$$

ϕ_s =	0.9	
Effective width, L_w =	701.5	mm
Thickness, t =	9.595	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$

C_r = 1393 kN

Back-to-back stiffening channels are considered in compressive resistance calculation.

C_{DL} = −1217 kN
C_{LL} = −1052 kN

∴ F = 1.62 for Evaluation 1. Thus Gusset Plate U27 is okay.

Horizontal Section:

b =	701.5	mm	I_x =	5.16E+04	mm^4	I_y =	2.76E+08	mm^4
t =	9.595	mm	r_x =	2.77	mm	r_y =	202.51	mm
A =	6730.8925	mm^2	S_x =	1.08E+04	mm^3	S_y =	7.87E+05	mm^3
d =	0	mm						

Vertical Section:

h =	701.5	mm	I_x =	2.76E+08	mm^4	I_y =	5.16E+04	mm^4
t =	9.595	mm	r_x =	202.51	mm	r_y =	2.77	mm
A =	6730.8925	mm^2	S_x =	7.87E+05	mm^3	S_y =	1.08E+04	mm^3
d =	0	mm						

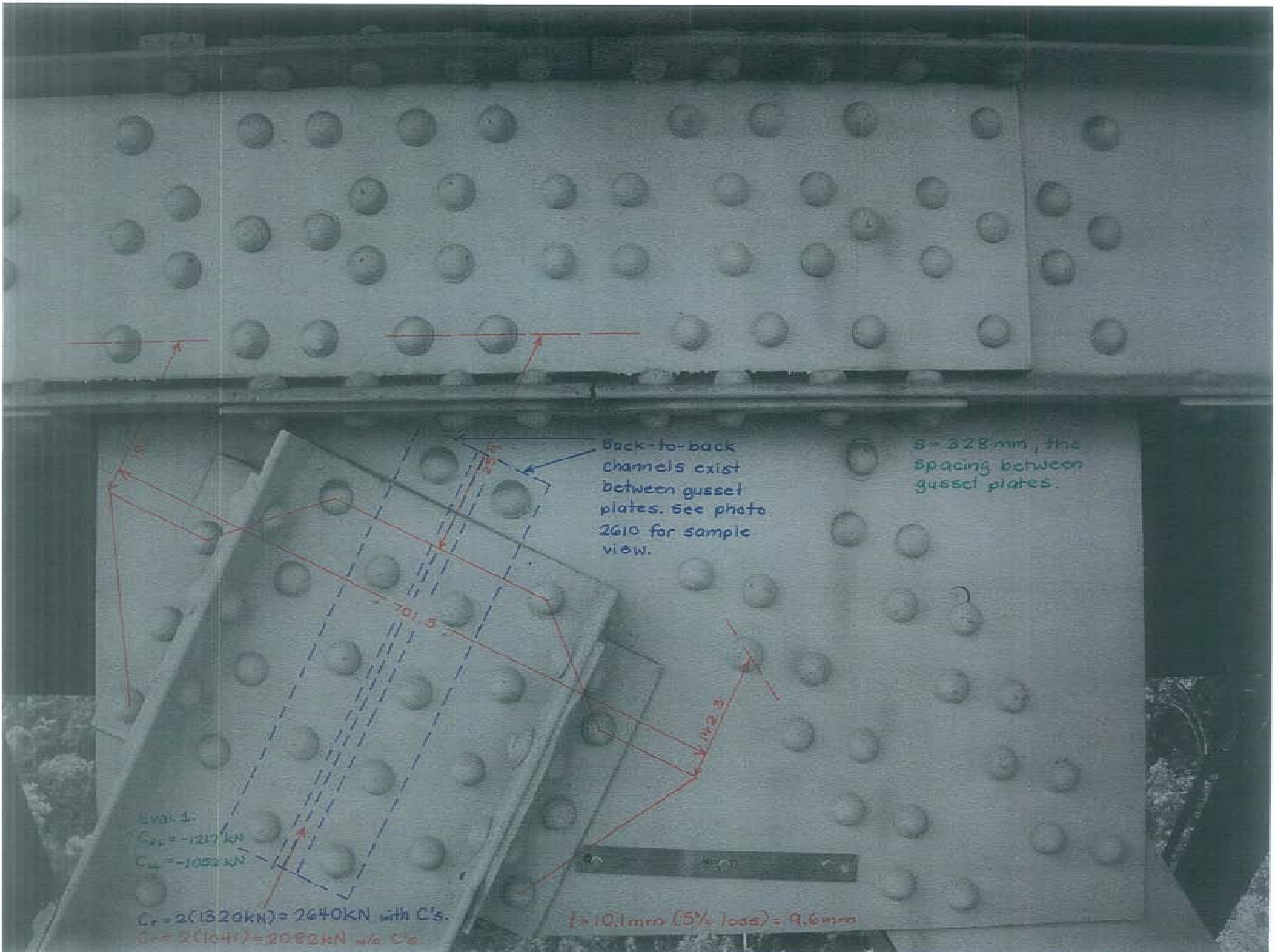
Effective length factor, K =	1.00		L_1 =	183	mm
Unbraced length, L =	194.9	mm	L_2 =	259.25	mm
r_{min} =	2.77	mm	L_3 =	142.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7594$$

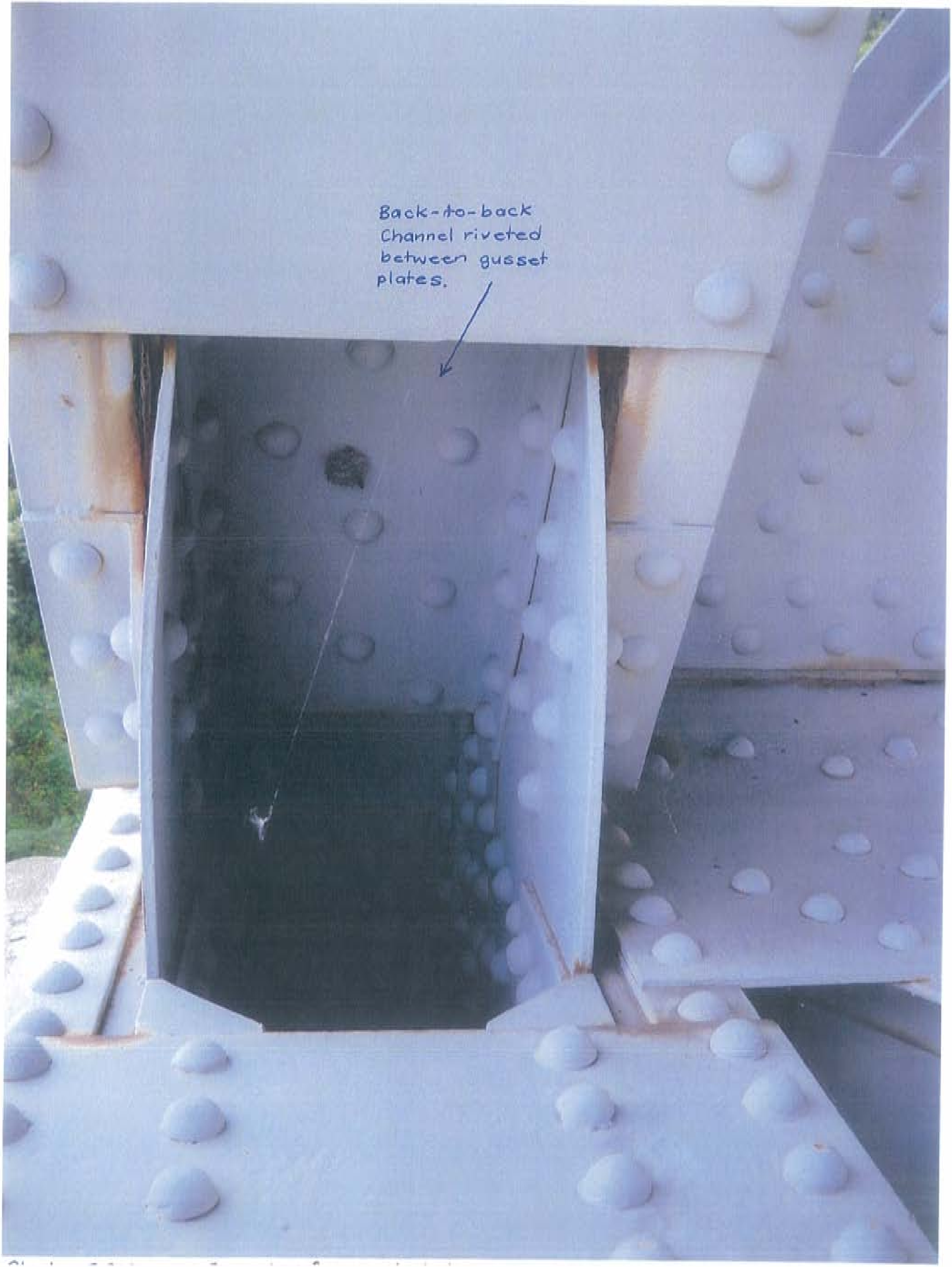
ϕ_s =	0.9	
Effective width, L_w =	701.5	mm
Thickness, t =	9.595	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1041 \text{ kN}$$

Back-to-back channels are not considered.

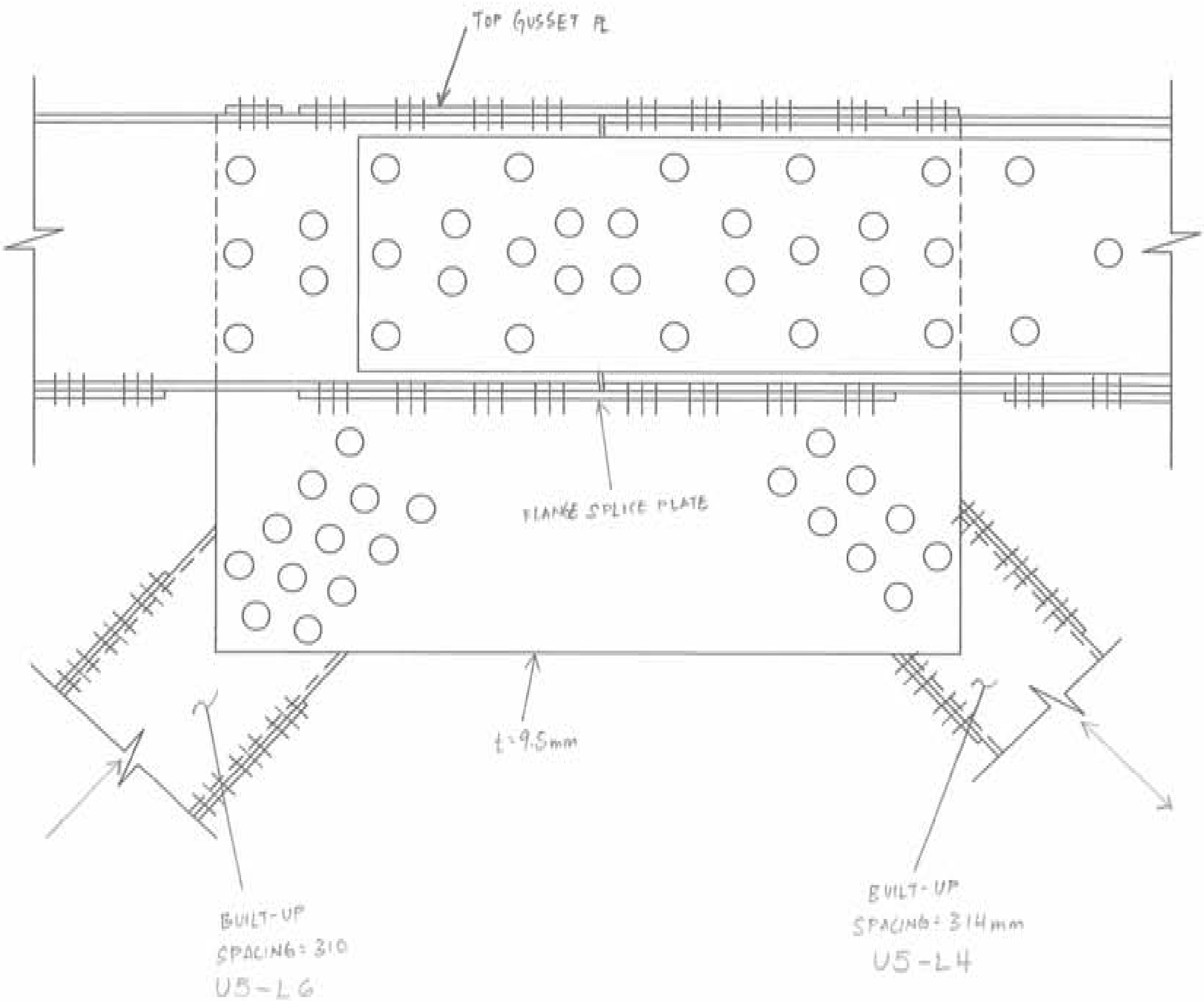


Back-to-back channels exist between gusset plates. See photo 2610 for sample view.
S = 328 mm, the spacing between gusset plates.
701.5
142.3
Eval 1:
C = -1217 kN
C = -1052 kN
Cr = 2(1320kN) = 2640kN with C's.
Cr = 2(1041) = 2082kN w/o C's.
t = 10.1mm (5% loss) = 9.6mm


Back-to-back
Channel riveted
between gusset
plates.

Orientation of Section	DL_f kN	LL_f kN	V_r	LL Cap. Factor F
Vertical				
Horizontal				

East Exterior Span



P2592

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS —BRONTE CREEK

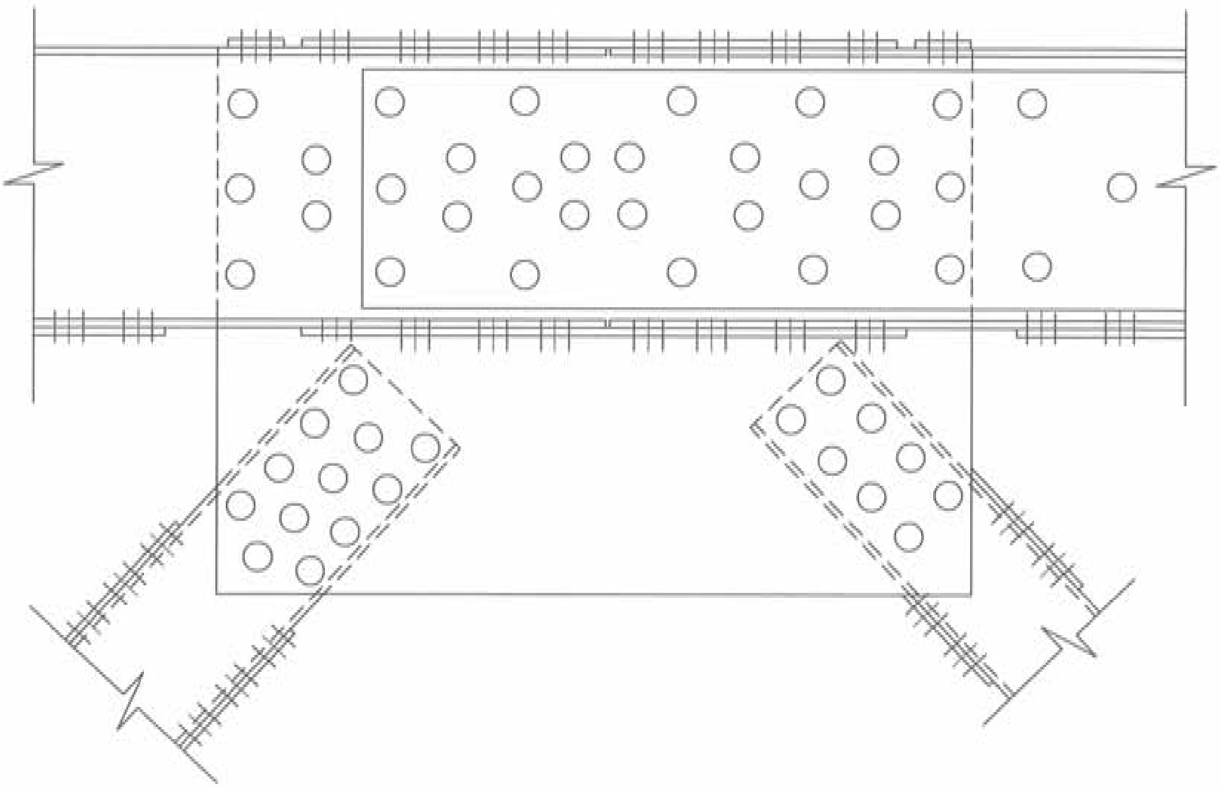
DATE: DECEMBER 2008

DRAWING:

U5E

SPAN EXT

TRUSS ~~NORTH~~ 3



MRC

McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

U5EW

SPAN

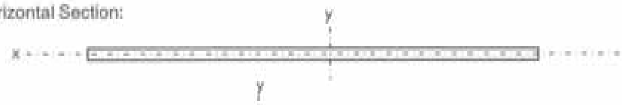
TRUSS NORTH

12.33
337.2
408.6
484.91
429.26
395.4
403.5
254.2
Actual compression starts along this edge.
t=9.5mm
A
C

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

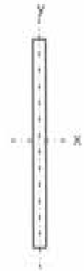
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	741.9 mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5 mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85 mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9 mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5 mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85 mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4 mm
Unbraced length, L =	148.4	mm	L_2 =	148.4 mm
r_{min} =	3.32	mm	L_3 =	148.4 mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

ϕ_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	9.5	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1321 \text{ kN}$$

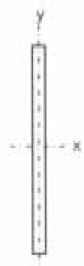
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	409.5 mm	I_x =	2.93E+04	mm^4	I_y =	5.44E+07	mm^4
t =	9.5 mm	r_x =	2.74	mm	r_y =	118.21	mm
A =	3890.25 mm^2	S_x =	6.16E+03	mm^3	S_y =	2.66E+05	mm^3
d =	0 mm						

Vertical Section:



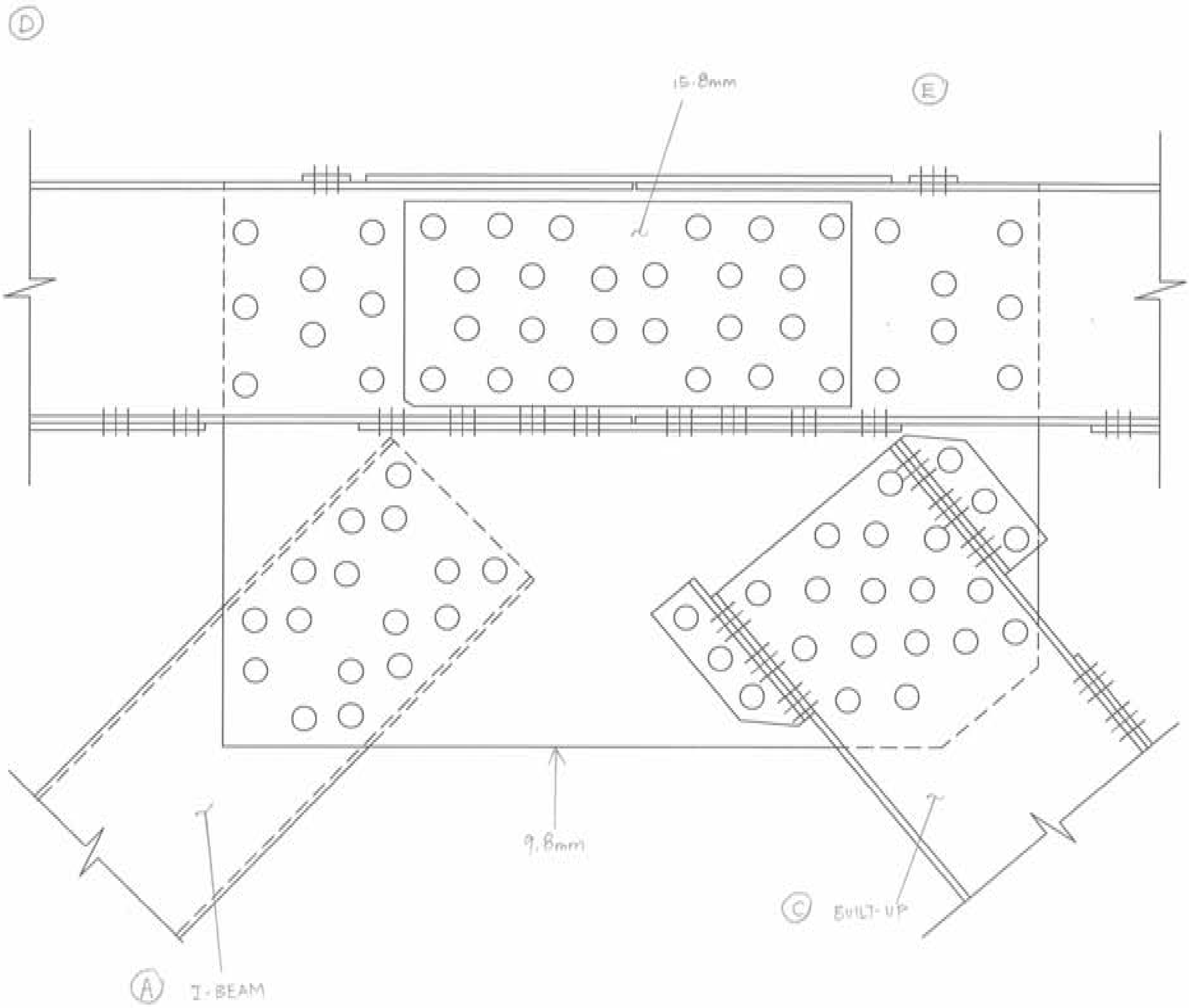
h =	409.5 mm	I_x =	5.44E+07	mm^4	I_y =	2.93E+04	mm^4
t =	9.5 mm	r_x =	118.21	mm	r_y =	2.74	mm
A =	3890.25 mm^2	S_x =	2.66E+05	mm^3	S_y =	6.16E+03	mm^3
d =	0 mm						

Effective length factor, K =	1.00		L_1 =	50.83 mm
Unbraced length, L =	241.0	mm	L_2 =	242.9 mm
r_{min} =	2.74	mm	L_3 =	429.3 mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.9486$$

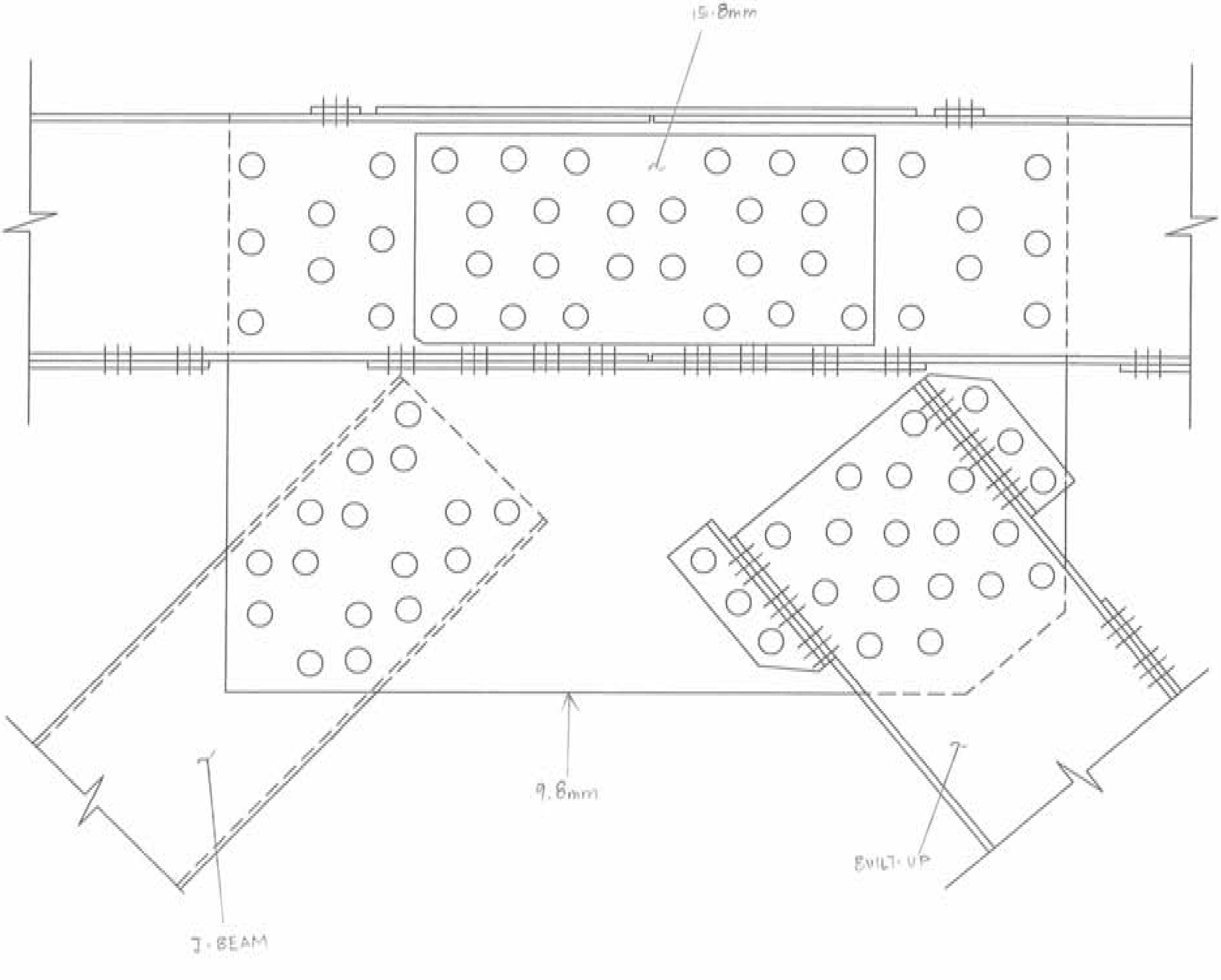
ϕ_s =	0.9	
Effective width, L_w =	409.5	mm
Thickness, t =	9.5	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 505 \text{ kN}$$



P. 2599

McCORMICK RANKIN CORPORATION	TRUSS REPAIR ON TANSLEY BRIDGE DUNDAS –BRONTE CREEK	DATE: DECEMBER 2008 DRAWING: U17E SPAN ______ TRUSS NORTH



P. 2599

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS -BRONTE CREEK

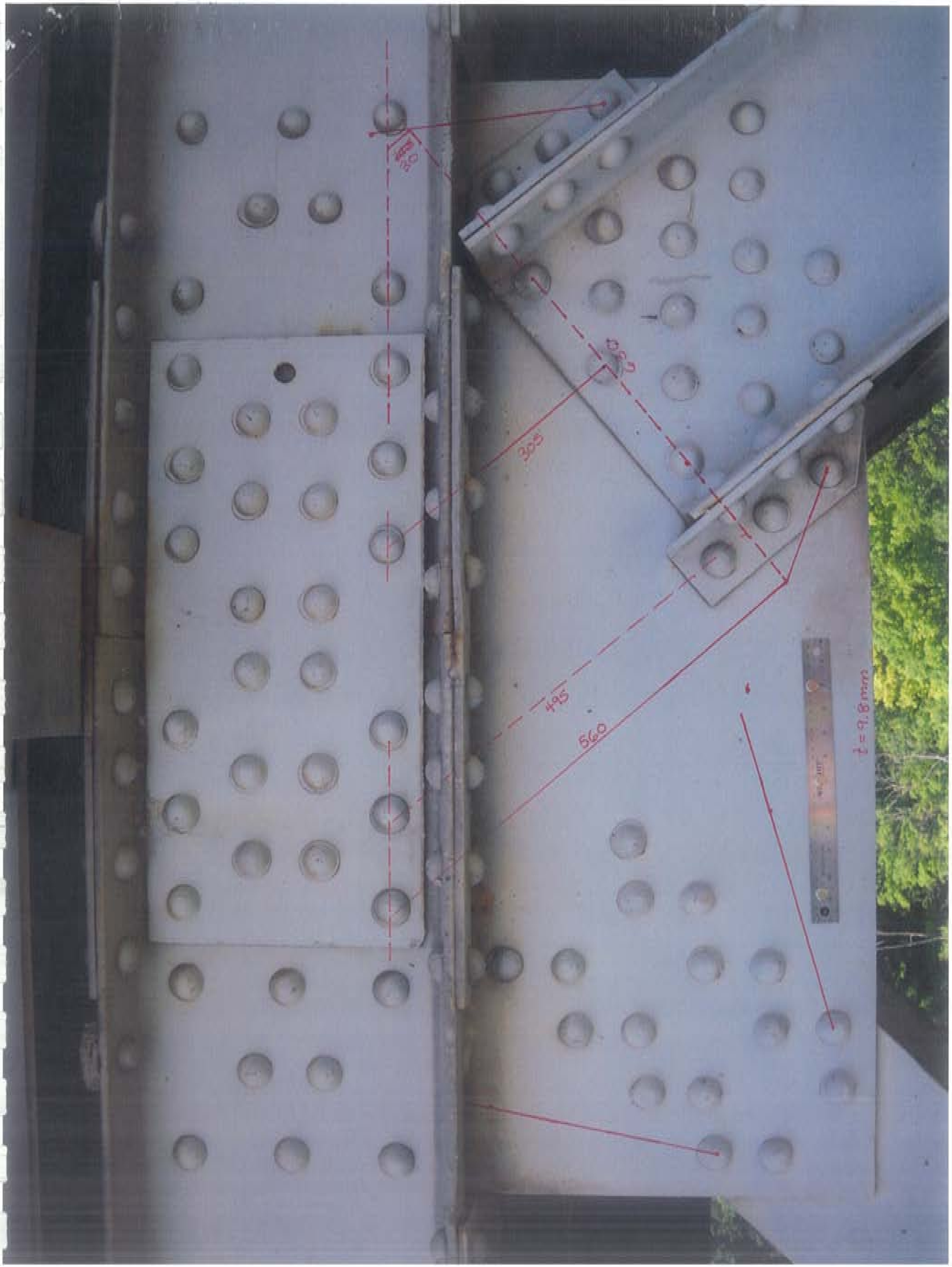
DATE: DECEMBER 2008

DRAWING:

U17EW

SPAN

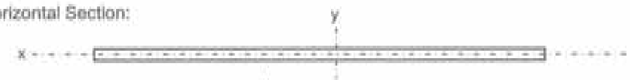
TRUSS NORTH


305
495
560
t = 9.8mm

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

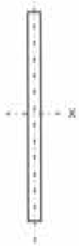
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

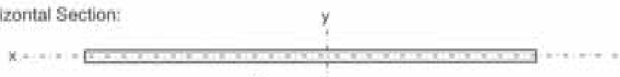
ϕ_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	9.8	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1363 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

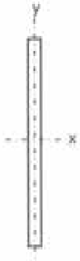
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	630	mm	I_x =	4.94E+04	mm^4	I_y =	2.04E+08	mm^4
t =	9.8	mm	r_x =	2.83	mm	r_y =	181.87	mm
A =	6174	mm^2	S_x =	1.01E+04	mm^3	S_y =	6.48E+05	mm^3
d =	0	mm						

Vertical Section:



h =	630	mm	I_x =	2.04E+08	mm^4	I_y =	4.94E+04	mm^4
t =	9.8	mm	r_x =	181.87	mm	r_y =	2.83	mm
A =	6174	mm^2	S_x =	6.48E+05	mm^3	S_y =	1.01E+04	mm^3
d =	0	mm						

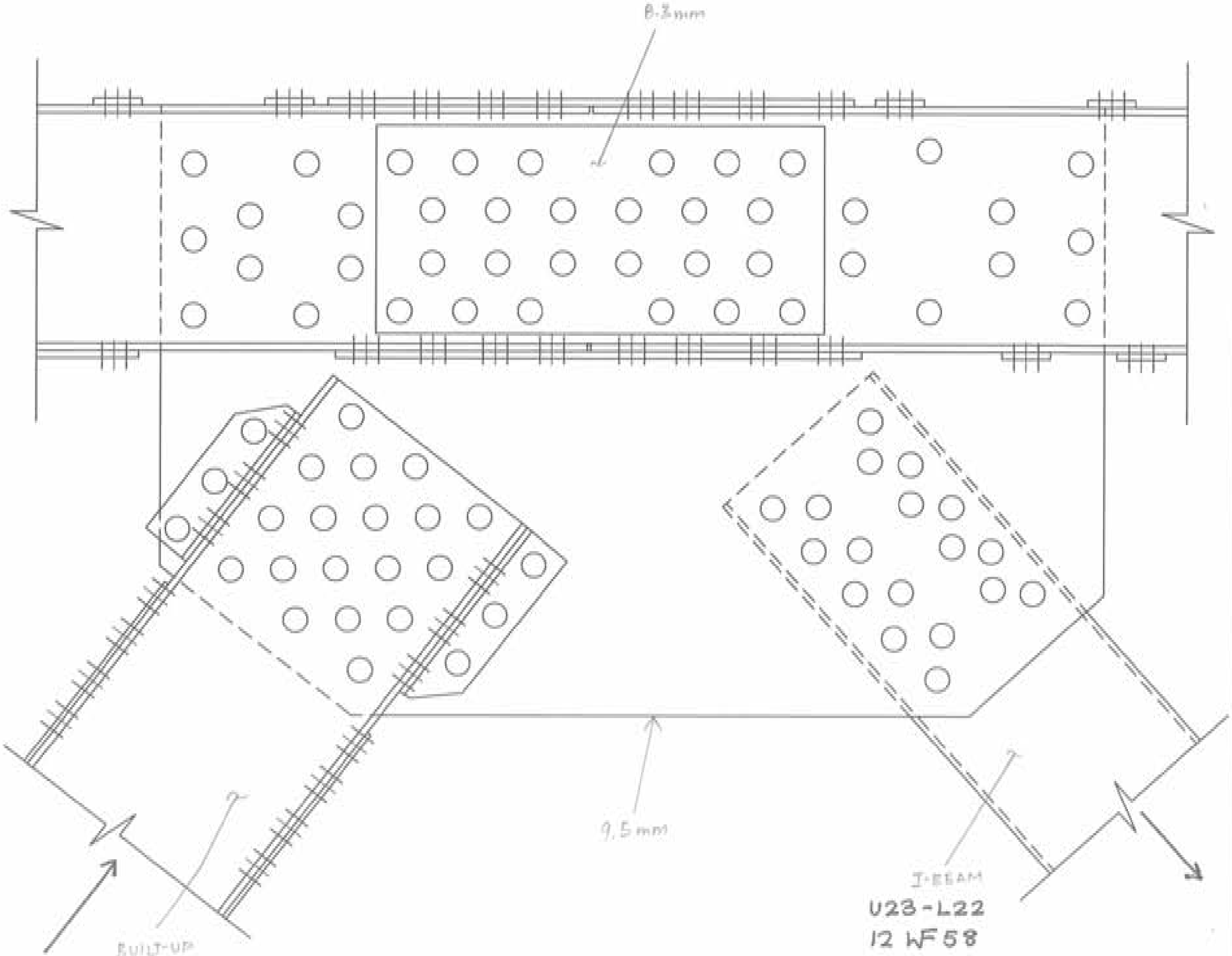
Effective length factor, K =	1.00		L_1 =	30	mm
Unbraced length, L =	287.5	mm	L_2 =	305	mm
r_{min} =	2.83	mm	L_3 =	527.5	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.0970$$

ϕ_s =	0.9	
Effective width, L_w =	630	mm
Thickness, t =	9.8	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 691 \text{ kN}$$

East Interior Span

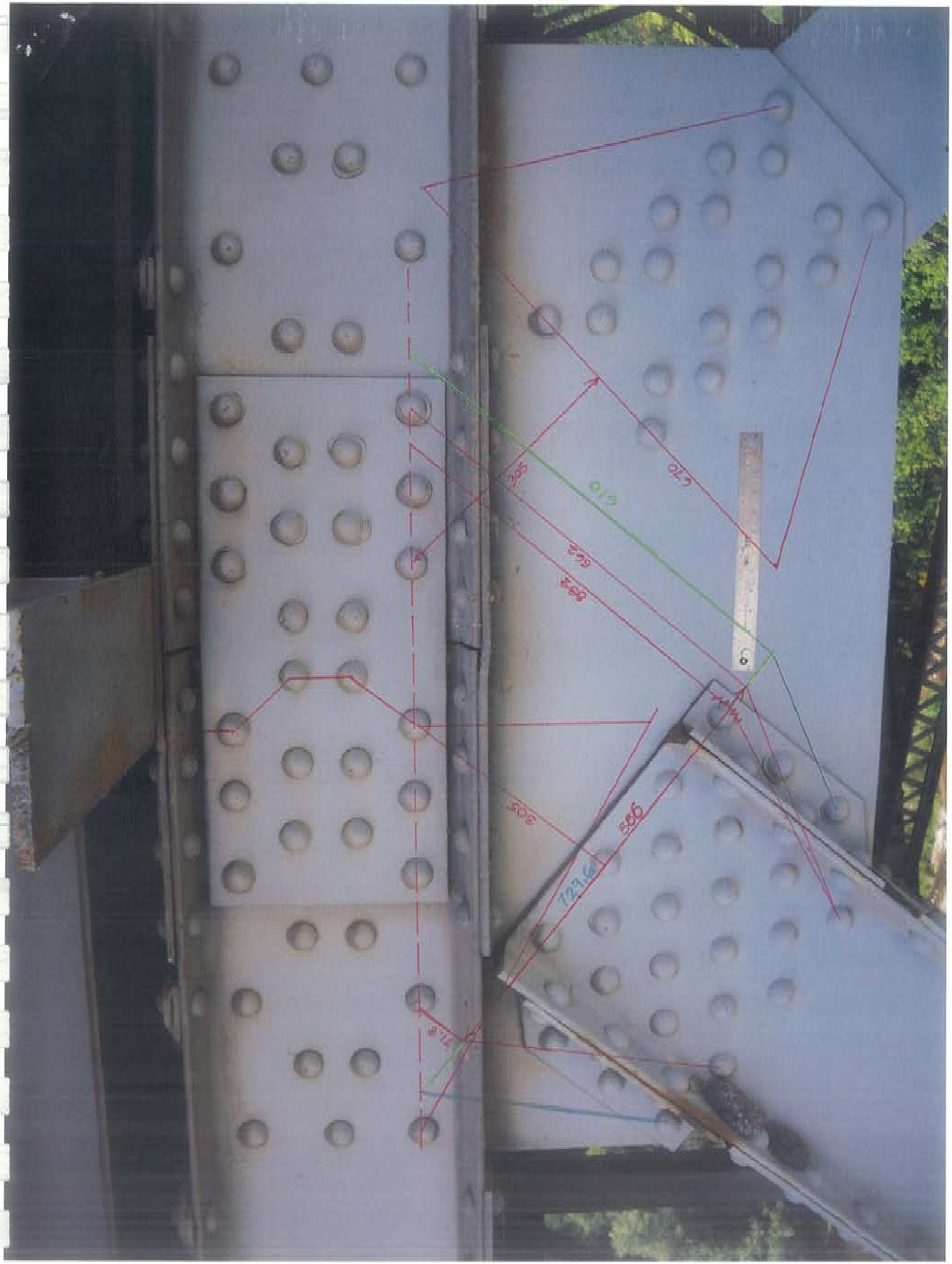


P.2603

MRC McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS —BRONTE CREEK

DATE: DECEMBER 2008
DRAWING:
U23E
SPAN______ TRUSS NORTH



305
610
670
305
589
729.6
71.8

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D (Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5035	mm^2	2365.5	mm^2	= 1617 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\,\phi_s A_{ne} F_u$
holes =	4.0		4.0		= 1965 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4180	mm^2	1614	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = ~~1617~~ kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E (Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4702.5	mm^2	2365.5	mm^2	= 1544 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\,\phi_s A_{ne} F_u$
holes =	4.0		4		= 1923 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4057	mm^2	1614	mm^2	
ϕ_s =	0.95				

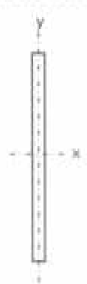
Factored tensile resistance = ~~1544~~ kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A (Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Δb =	108.65	mm						
b =	694.65	mm	I_x =	4.96E+04	mm^4	I_y =	2.65E+08	mm^4
t =	9.5	mm	r_x =	2.74	mm	r_y =	200.53	mm
A =	6599.175	mm^2	S_x =	1.04E+04	mm^3	S_y =	7.64E+05	mm^3
d =	0	mm						

Vertical Section:



h =	694.65	mm	I_x =	2.65E+08	mm^4	I_y =	4.96E+04	mm^4
t =	9.5	mm	r_x =	200.53	mm	r_y =	2.74	mm
A =	6599.175	mm^2	S_x =	7.64E+05	mm^3	S_y =	1.04E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	35.9	mm
Unbraced length, L =	301.0	mm	L_2 =	305	mm
r_{min} =	2.74	mm	L_3 =	562	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.1846$$

ϕ_s =	0.9	
Effective width, L_w =	694.65	mm
Thickness, t =	9.5	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n} = 674 \text{ kN}$$

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	530	mm	300	mm
Gross area, A_g =	5035	mm^2	2365.5	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$

= 1617 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4180	mm^2	1614	mm^2
ϕ_s =	0.95			

$T_r = 0.85\ \phi_s A_{ne} F_u$

= 1965 kN

Factored tensile resistance = ~~1617~~ **kN** **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	495	mm	300	mm
Gross area, A_g =	4702.5	mm^2	2365.5	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$

= 1544 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	522	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4057	mm^2	1614	mm^2
ϕ_s =	0.95			

$T_r = 0.85\ \phi_s A_{ne} F_u$

= 1923 kN

Factored tensile resistance = ~~1544~~ **kN** **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

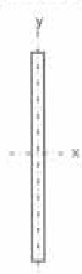
(Cl.10.9.3 & Whitmore Section)

Δb = 0 mm

Horizontal Section:

b =	586	mm	I_x =	4.19E+04	mm^4	I_y =	1.59E+08	mm^4
t =	9.5	mm	r_x =	2.74	mm	r_y =	169.16	mm
A =	5567	mm^2	S_x =	8.81E+03	mm^3	S_y =	5.44E+05	mm^3
d =	0	mm						

Vertical Section:



h =	586	mm	I_x =	1.59E+08	mm^4	I_y =	4.19E+04	mm^4
t =	9.5	mm	r_x =	169.16	mm	r_y =	2.74	mm
A =	5567	mm^2	S_x =	5.44E+05	mm^3	S_y =	8.81E+03	mm^3
d =	0	mm						

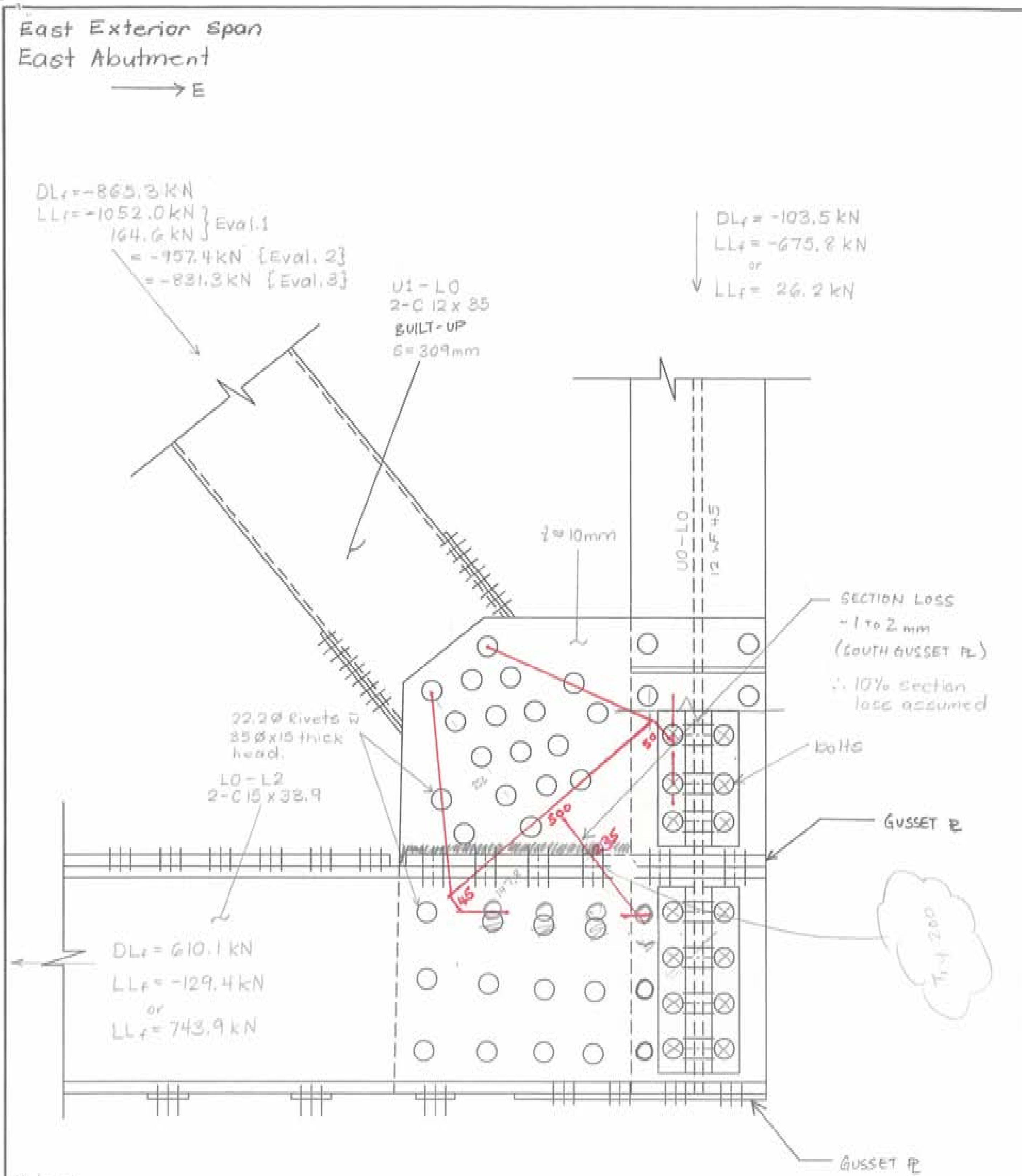
Effective length factor, K =	1.00		L_1 =	71.8	mm
Unbraced length, L =	312.9	mm	L_2 =	305	mm
r_{min} =	2.74	mm	L_3 =	562	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.2317$$

ϕ_s =	0.9	
Effective width, L_w =	586	mm
Thickness, t =	9.5	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$

= 542 kN



Notes:

1. Structural steel: Medium Grade. Rivets 7/8"Ø. (1946)
2. Specifications: D.H.O. General Specifications for Highway Bridges 1935.
3. See photo 3015.-3027. See also p. 2967.

MRC McCORMICK RANKIN CORPORATION

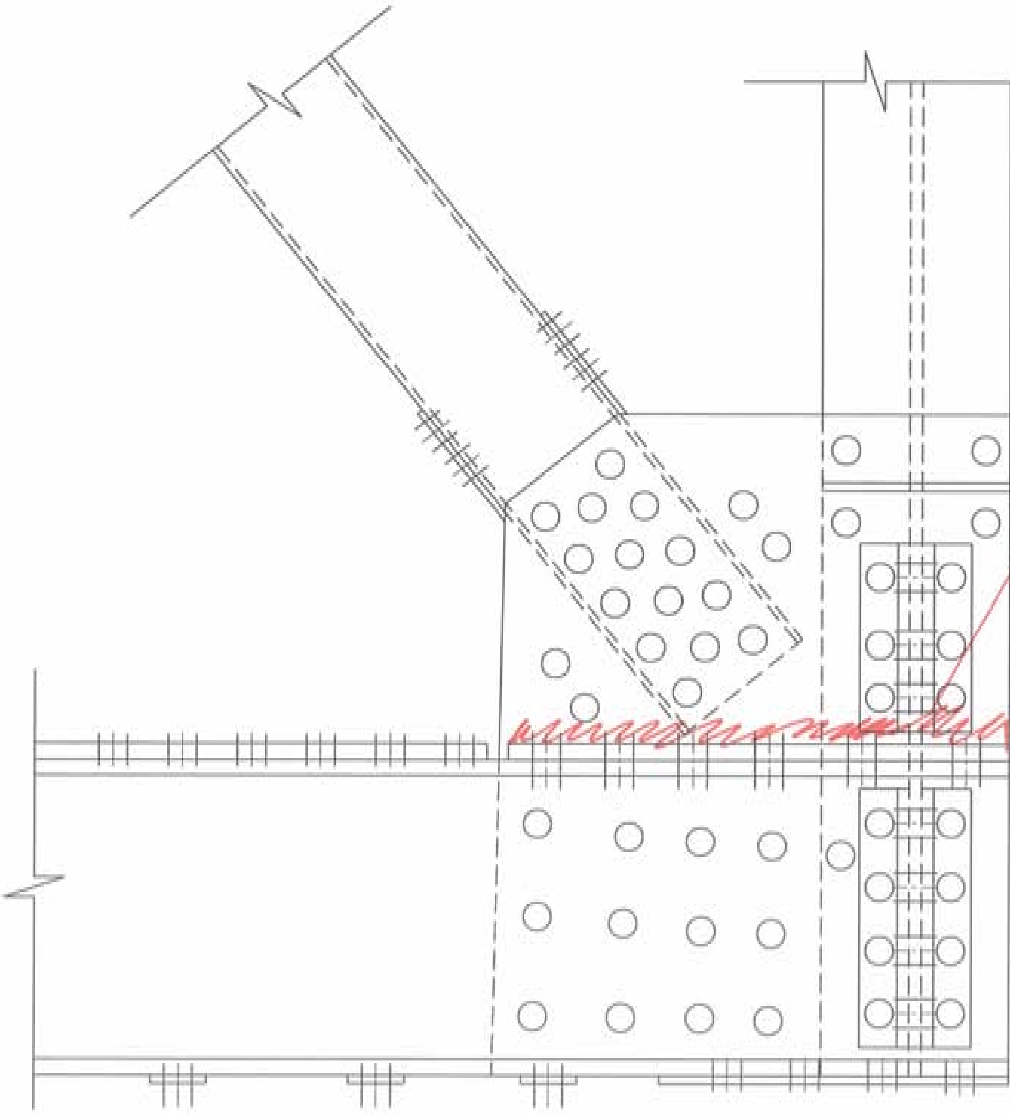
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: LOE

SPAN Ext TRUSS ~~NORTH~~ 3

* WEST EXTERIOR SPAN
GUSSET PL SECTION LOSS



p. 2967 - 2973

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

DATE: DECEMBER 2008
DRAWING:
LOW
SPAN
TRUSS NORTH

Resistance of Fasteners @ Member U1 - L0

Shear Resistance {S6-06, Cl. 14.14.1.4.2}

$V_r = 0.75\,\phi_r\, n m A_r F_u$
$= 70.18\text{ kN}$ per rivet

Plate Bearing Resistance

$B_r = \phi_{mc}\, t n e F_u \leq 3\,\phi_{mc}\, t n d F_u$ $\quad e = 45 - \frac{22.225}{2} = 33.89\text{mm}$
$= 0.67(0.90 * 10\text{mm})(1)(33.89\text{mm})(420\text{MPa})$
$= 85.83\text{ kN}$ per rivet (including section loss of 10%)

$\therefore$ rivet shear governs & $P_r = 14(70.18\text{kN}) = 982.52\text{kN}$ for the rivet group

Gusset Plate in Compression at Member U1 - L0

$L_1 = 45$
$L_2 = 235$
$L_3 = 50$

$L_c = \frac{45 + 235 + 50}{3} = 110\text{mm}$

$930\,t/\sqrt{F_y} = 552\text{mm}$ {S6-06, Cl. 10.18.5.2}

$K = 1.0$ $\quad I_c = 93750\,000\text{ mm}^4$ $\quad r_c = 144.34\text{mm}$

1 PL: $b = 500\text{mm}$ $\quad I_w = 30\,375\text{ mm}^4$ $\quad r_w = 2.60\text{mm}$
$t = 10(0.9) = 9\text{mm}$
$A = 4500\text{mm}^2$
$S = 350\text{ mm}$

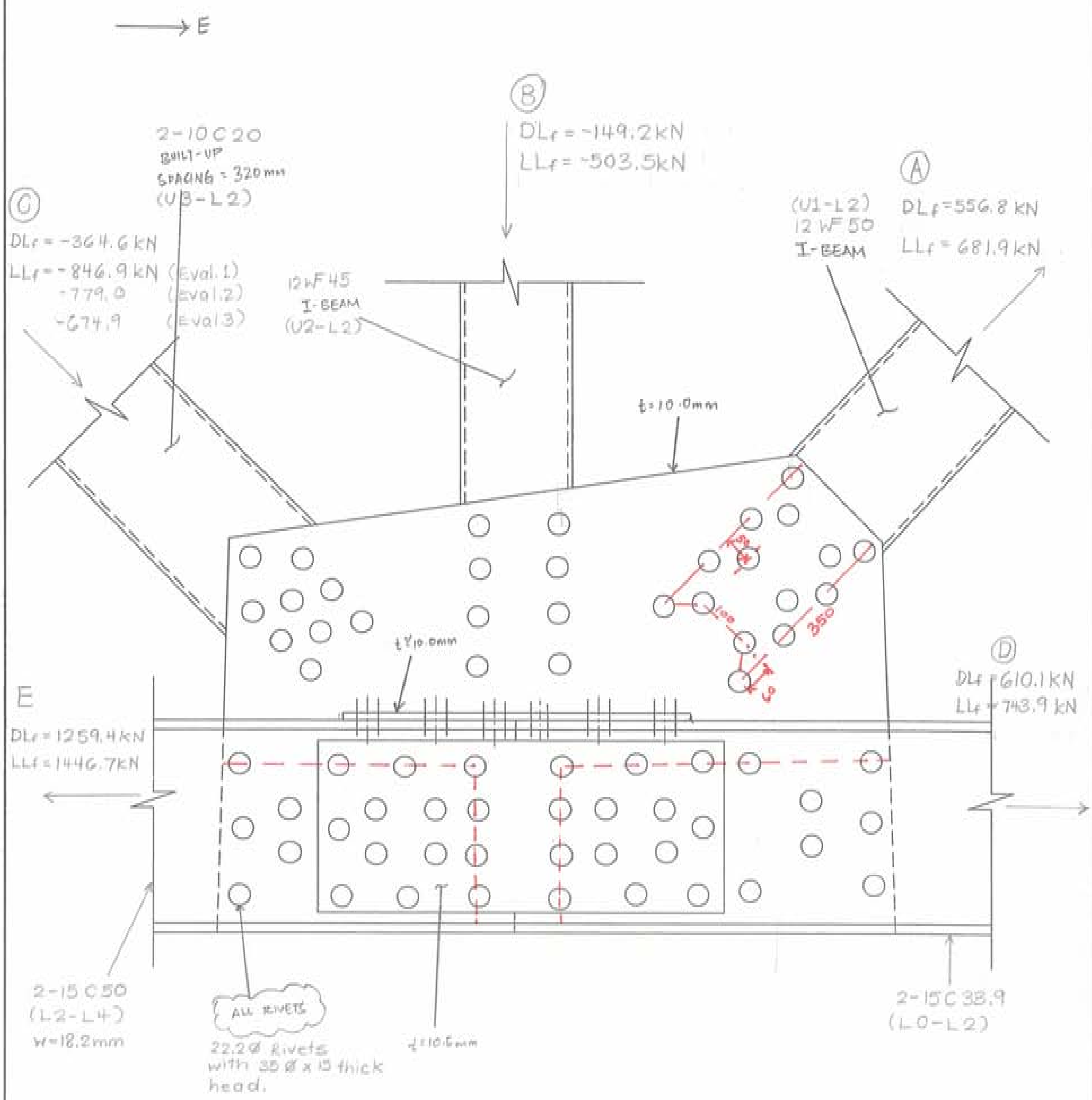
If $L_2 = 200$, $L_c = 98.33\text{mm}$,
$\lambda = 0.408$
$C_r = 1746.2\text{kN}$

$\lambda = \frac{(1.0)(110\text{mm})}{2.60\text{mm}}\sqrt{\frac{230\text{ MPa}}{\pi^2(200\,000\text{MPa})}}$
$= 0.4567$

$C_r = 0.90(2)(4500\text{mm}^2)(230\text{MPa})(1 + 0.4567^{2.68})^{-1/1.34}$
$C_r = 1709.2$ kN for 2 plates

$F = \frac{U R_r - \sum \alpha_D D}{\alpha_L L(1 + DLA)} = \frac{(1.01)(1709.18\text{kN}) - 865.3\text{kN}}{1052.0\text{ kN}}$
$F = 0.8184$


SPAN
TRUSS



Notes:

1. Structural Steel: Medium Grade. Rivets 7/8" Ø. (1946) {F_y = 230MPa, F_u = 420MPa}
2. Specifications: D.H.O. General Specifications for Highway Bridges 1935.
3. See photo 2562-2563.

McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

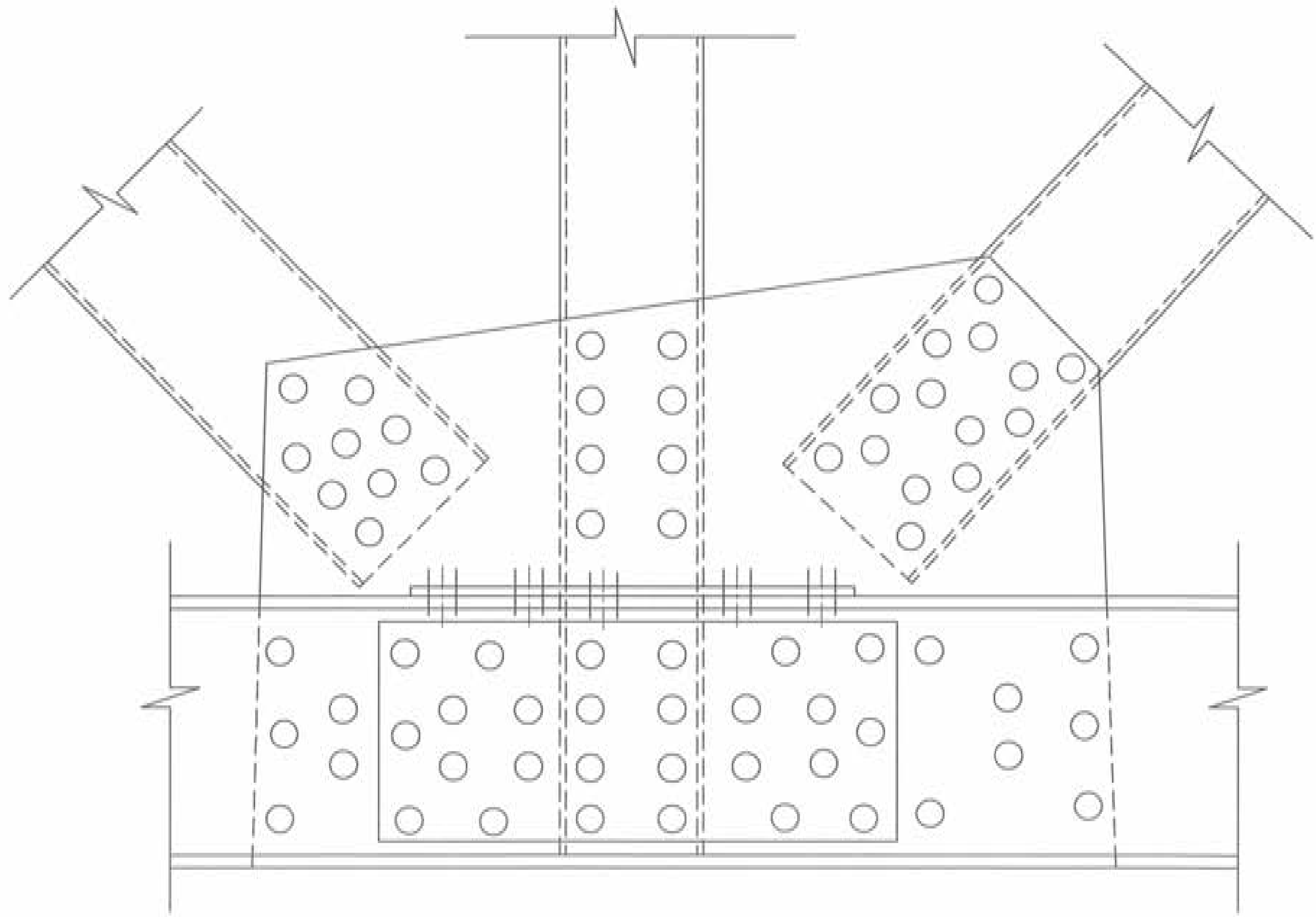
DATE: DECEMBER 2008

DRAWING:

L2E

SPAN EXT

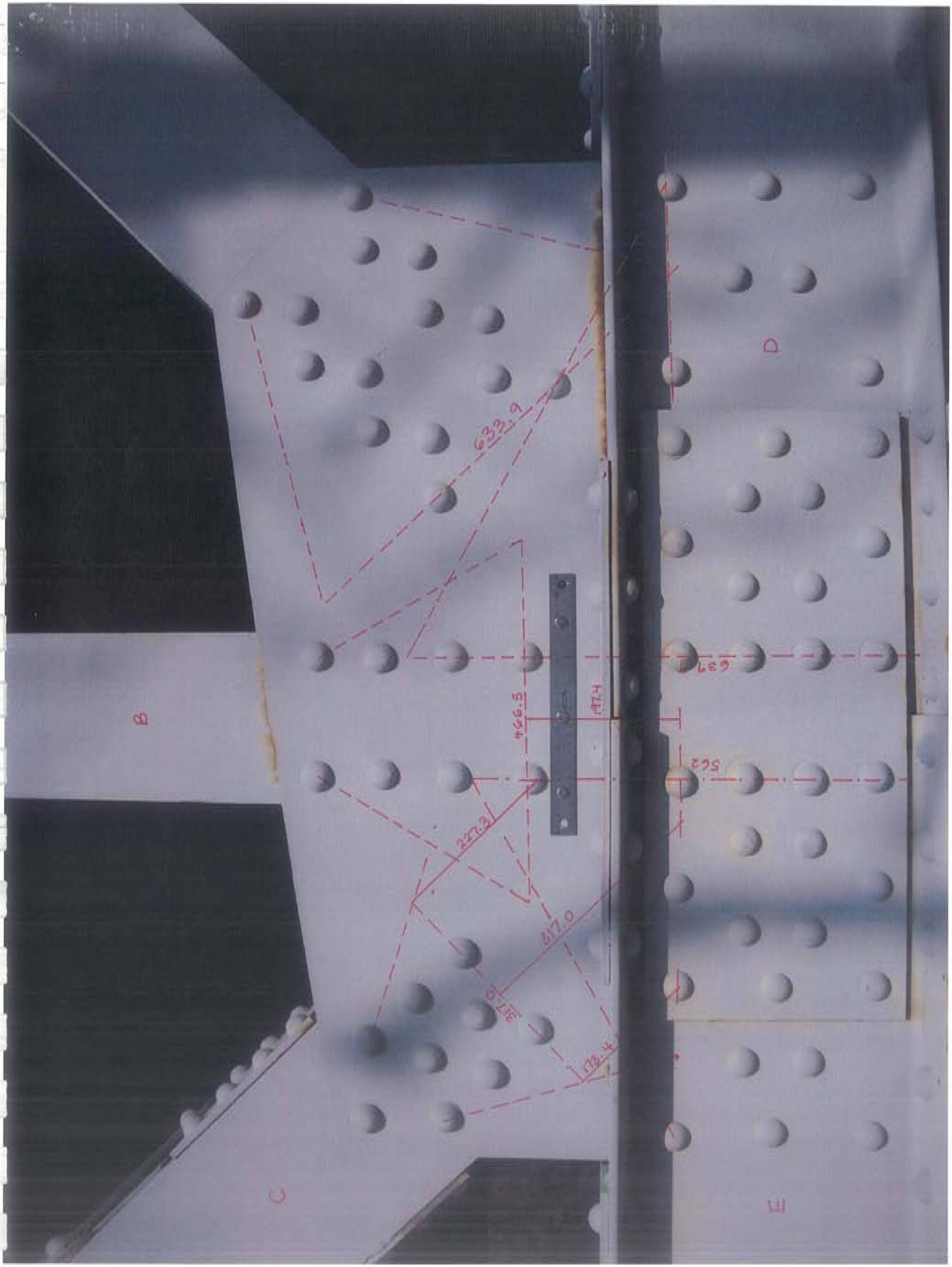
TRUSS ~~NORTH~~ 3



McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008	
DRAWING:	L2E/W
SPAN	TRUSS NORTH



633.9
B
466.5
197.4
697
562
227.3
817.0
311.0
173.4
D
C
E

GUSSET PLATE INVESTIGATION - Whitmore Method

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge

Gusset Node: L2E

Material Properties For Gusset Plate

Gusset Plate:	F_y = 230 MPa	Splice Plate:	F_y = 230 MPa				
	F_u = 420 MPa		F_u = 420 MPa				
	E = 200,000 MPa		E = 200,000 MPa				
	t = 10 mm		t = 9.975 mm	orig. t = 10.5 mm			
			h = mm	section loss = 5 %			

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 634 mm
Gross area, A_g = 6339 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1385 kN

B) Net Section Fracture

Effective width, w_e = 634 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 5863 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1988 kN

Factored tensile resistance = 1385 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 467 mm
Gross area, A_g = 4665 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1019 kN

B) Net Section Fracture

Effective width, w_e = 467 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 4189 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1421 kN

Factored tensile resistance = 1019 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 317 mm
Gross area, A_g = 3170 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 693 kN

B) Net Section Fracture

Effective width, w_e = 317 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 2694 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 914 kN

Factored tensile resistance = 693 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	6399	mm^2	2992.5	mm^2	= 2052 kN
f_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	6.0		4.0		= 2378 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4970	mm^2	2042	mm^2	
f_s =	0.95				

Factored tensile resistance = 2052 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	5620	mm^2	2992.5	mm^2	= 1882 kN
f_s =	0.95				

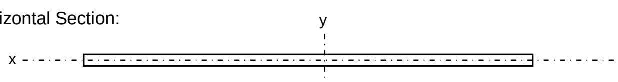
B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	5.0		4		= 2195 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4429	mm^2	2042	mm^2	
f_s =	0.95				

Factored tensile resistance = 1882 kN **Thus, gross section yielding governs**

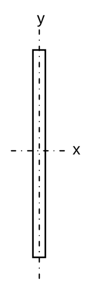
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	633.9	mm	I_x =	5.28E+04	mm^4	I_y =	2.12E+08	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	182.99	mm
A =	6339	mm^2	S_x =	1.06E+04	mm^3	S_y =	6.70E+05	mm^3
d =	0	mm						

Vertical Section:



h =	633.9	mm	I_x =	2.12E+08	mm^4	I_y =	5.28E+04	mm^4
t =	10	mm	r_x =	182.99	mm	r_y =	2.89	mm
A =	6339	mm^2	S_x =	6.70E+05	mm^3	S_y =	1.06E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	148.5	mm	L_2 =	98.7	mm
r_{min} =	2.89	mm	L_3 =	346.9	mm

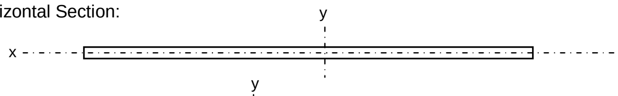
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.5554$$

f_s =	0.9	
Effective width, L_w =	633.9	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1140 \text{ kN}$$

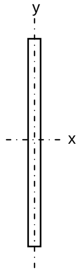
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	466.5	mm	I_x =	3.89E+04	mm^4	I_y =	8.46E+07	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	134.67	mm
A =	4665	mm^2	S_x =	7.78E+03	mm^3	S_y =	3.63E+05	mm^3

Vertical Section:



h =	466.5	mm	I_x =	8.46E+07	mm^4	I_y =	3.89E+04	mm^4
t =	10	mm	r_x =	134.67	mm	r_y =	2.89	mm
A =	4665	mm^2	S_x =	3.63E+05	mm^3	S_y =	7.78E+03	mm^3

Effective length factor, K =	1.00		L_1 =	197.4	mm
Unbraced length, L =	197.4	mm	L_2 =	197.4	mm
r_{min} =	2.89	mm	L_3 =	197.4	mm

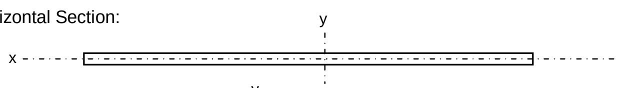
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7381$$

f_s =	0.9	
Effective width, L_w =	466.5	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 734 \text{ kN}$$

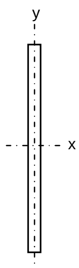
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	317	mm	I_x =	2.64E+04	mm^4	I_y =	2.65E+07	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	91.51	mm
A =	3170	mm^2	S_x =	5.28E+03	mm^3	S_y =	1.67E+05	mm^3
d =		mm						

Vertical Section:



h =	317	mm	I_x =	2.65E+07	mm^4	I_y =	2.64E+04	mm^4
t =	10	mm	r_x =	91.51	mm	r_y =	2.89	mm
A =	3170	mm^2	S_x =	1.67E+05	mm^3	S_y =	5.28E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	227.3	mm
Unbraced length, L =	239.2	mm	L_2 =	317	mm
r_{min} =	2.89	mm	L_3 =	173.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.8946$$

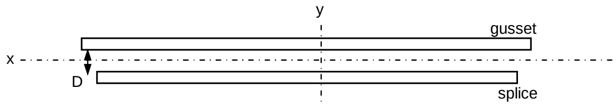
f_s =	0.9	
Effective width, L_w =	317	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 434 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

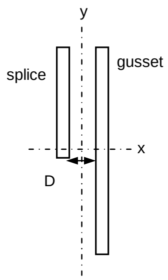
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	560	mm	D =	13.2	mm	I_x =	9.34E+05	mm^4	I_y =	2.02E+08	mm^4
t =	8	mm	t =	10.6	mm	y_b =	20.02	mm	r_x =	10.58	mm	r_y =	155.67	mm
A =	2400	mm^2	A =	5936	mm^2	x_L =	242.57	mm	S_{xb} =	9.33E+04	mm^3	S_{yL} =	1.67E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	560	mm	D =	13.2	mm	I_x =	2.02E+08	mm^4	I_y =	9.34E+05	mm^4
t =	8	mm	t =	10.6	mm	y_b =	317.43	mm	r_x =	155.67	mm	r_y =	10.58	mm
A =	2400	mm^2	A =	5936	mm^2	x_L =	20.02	mm	S_{xb} =	1.27E+06	mm^3	S_{yL} =	9.33E+04	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	10.58	mm	L_3 =	0	mm

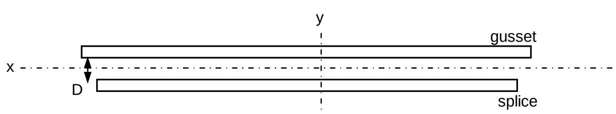
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	560	mm	300	mm
Thickness, t =	10	mm	9.975	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1779 \text{ kN}$$

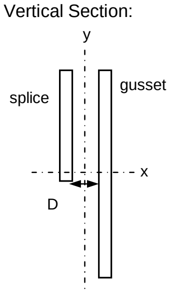
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	676	mm	D =	30.3	mm	I_x =	4.73E+06	mm^4	I_y =	4.15E+08	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	34.80	mm	r_x =	20.21	mm	r_y =	189.27	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	276.17	mm	S_{xb} =	2.72E+05	mm^3	S_{yL} =	3.01E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	676	mm	D =	30.3	mm	I_x =	4.15E+08	mm^4	I_y =	4.73E+06	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	399.83	mm	r_x =	189.27	mm	r_y =	20.21	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	34.80	mm	S_{xb} =	2.08E+06	mm^3	S_{yL} =	2.72E+05	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	20.21	mm	L_3 =	0	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	10	mm	9.975	mm
n =	1.34			

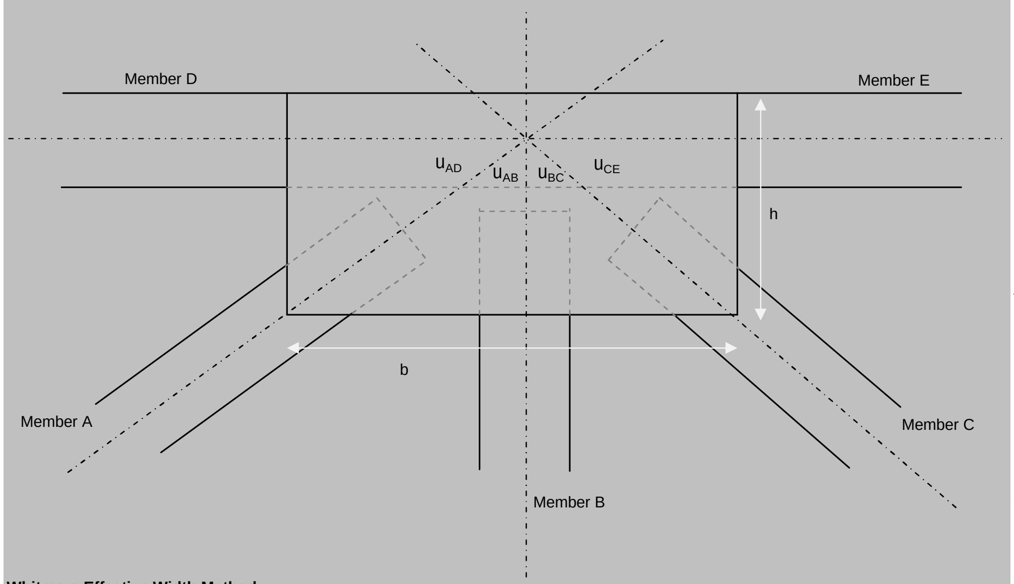
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 2019 \text{ kN}$$

MRC

RESISTANCE SUMMARY (one gusset plate)

Member A							
Factored applied tensile force =	619.35	kN	<	1385	kN	Tensile resistance	**ok!**
Factored applied compressive force =	0	kN	<	1140	kN	Compressive resistance	**ok!**
Member B							
Factored applied tensile force =	0	kN	<	1019	kN	Tensile resistance	**ok!**
Factored applied compressive force =	326.35	kN	<	734	kN	Compressive resistance	**ok!**
Member C							
Factored applied tensile force =	0	kN	<	693	kN	Tensile resistance	**ok!**
Factored applied compressive force =	605.75	kN	>	434	kN	Compressive resistance	**no good!**
Member D							
Factored applied tensile force =	677	kN	<	2052	kN	Tensile resistance	**ok!**
Factored applied compressive force =	0	kN	<	1779	kN	Compressive resistance	**ok!**
Member E							
Factored applied tensile force =	1353.05	kN	<	1882	kN	Tensile resistance	**ok!**
Factored applied compressive force =	0	kN	<	2019	kN	Compressive resistance	**ok!**

Gusset Plate Geometry



b = 1130	mm
h = 900	mm
t = 10.1	mm

u_{AD} =	65	deg
u_{AB} =	25	deg
u_{BC} =	30	deg
u_{CE} =	60	deg

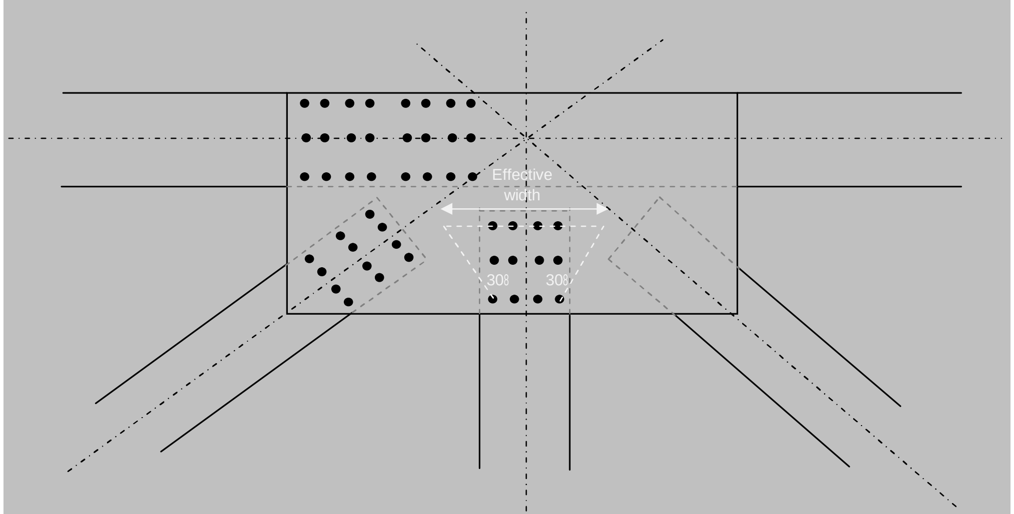
Tensile forces:

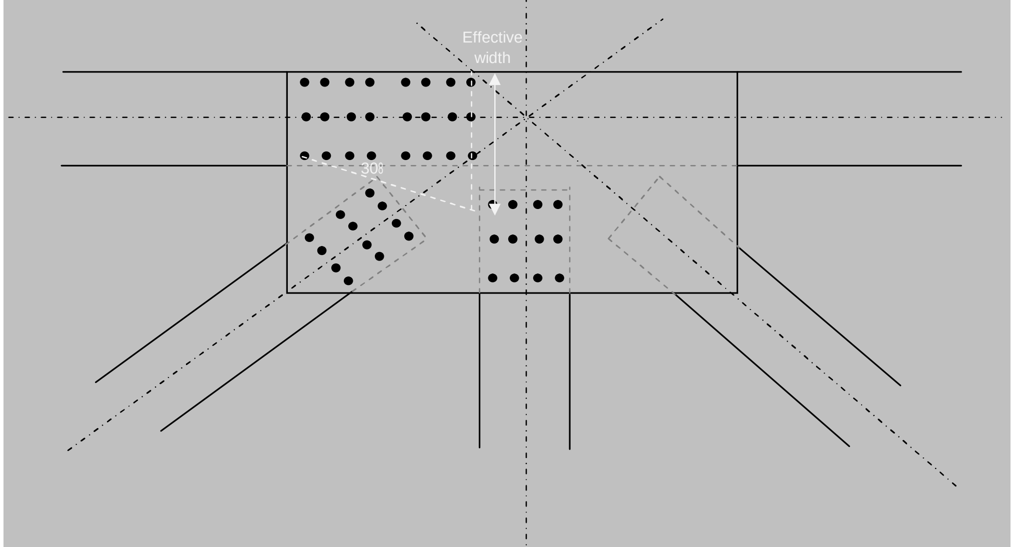
A	F1 =	1238.7	kN
B	F2 =	0	kN
C	F3 =	0	kN
D	F4 =	1354	kN
E	F5 =	2706.1	kN

Compressive forces:

A	F1 =	0	kN
B	F2 =	652.7	kN
C	F3 =	1211.5	kN
D	F4 =	0	kN
E	F5 =	0	kN

Whitmore Effective Width Method



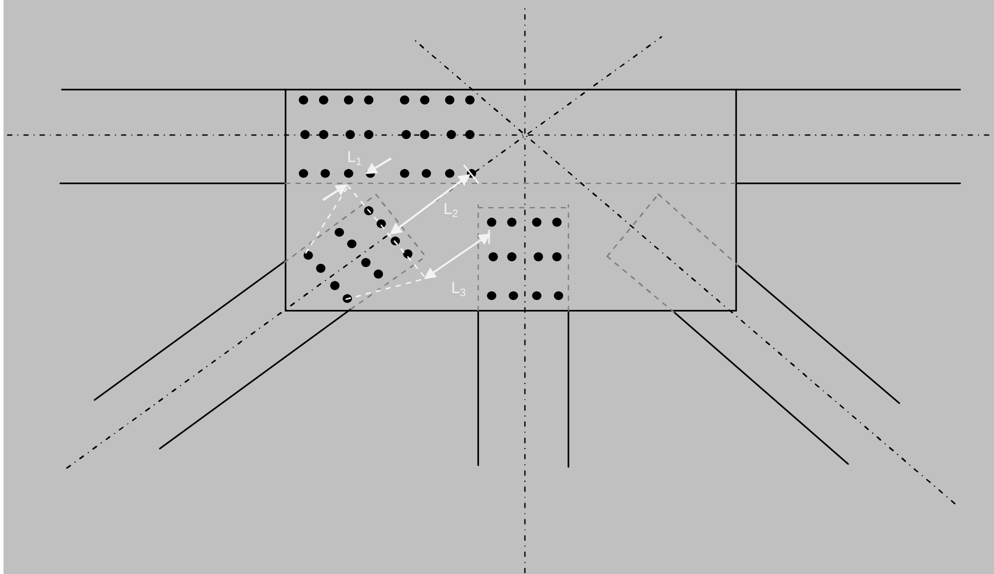


* The *effective width* is measured across the last row of fasteners in the connection under consideration. The effective width is bound on either side by the closer of the nearest adjacent plate edges or lines constructed starting from the external fasteners within the first row and extending from these fasteners at an angle of 30 degrees with respect to the line of action of the axial force. Bolt/rivet holes are not subtracted from the width.

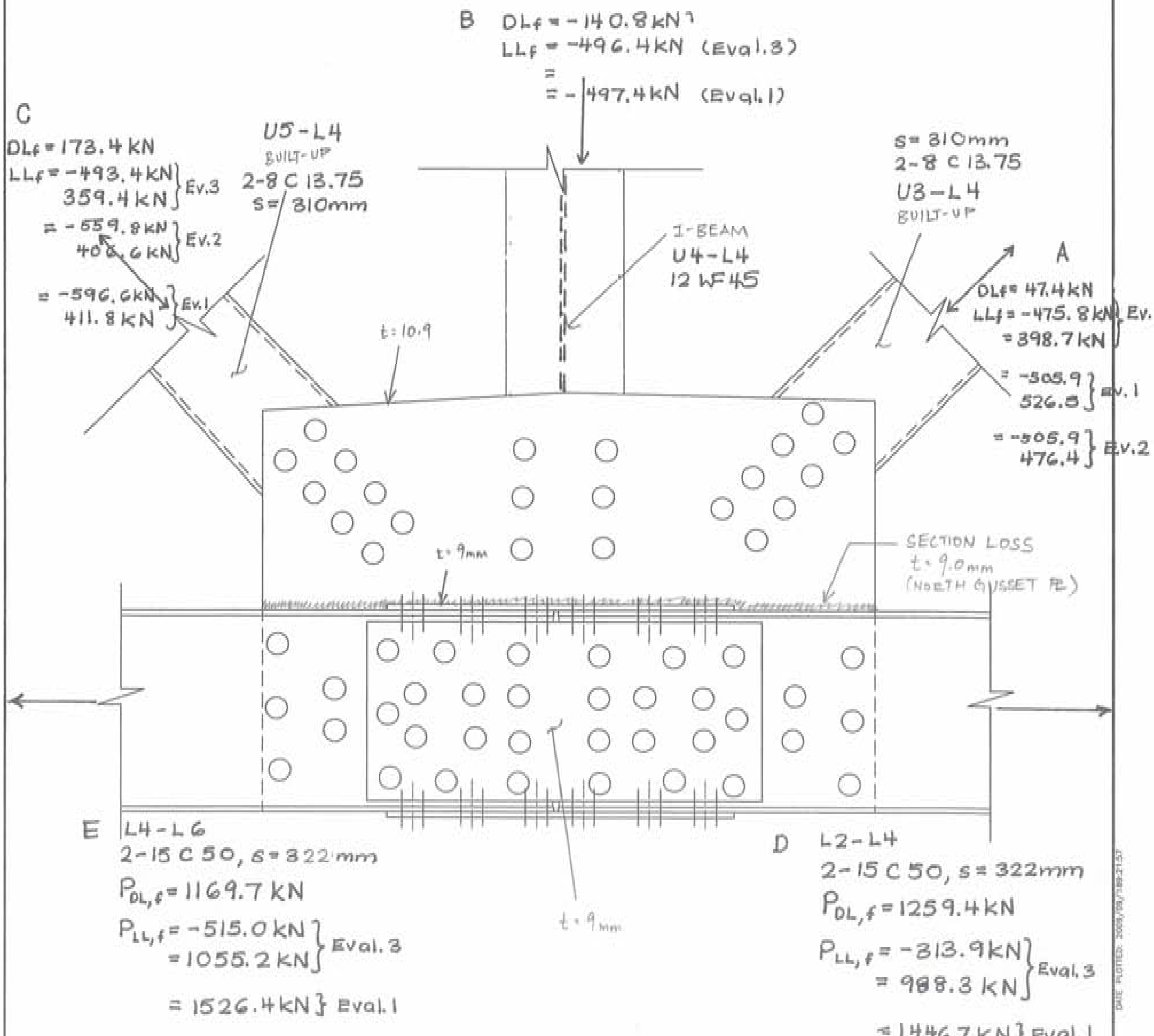
Gusset Plate Geometry

L_2 = The distance from the last row of fasteners in the compression member under consideration, to the first row of fasteners in the closest adjacent member, measured along the line of action of the compressive axial force.

L_1 & L_3 = The distance from each of the ends of the Whitmore width to the first row of fasteners in the closest adjacent member, measured parallel to the line of action of the compressive axial force.



East Exterior Span

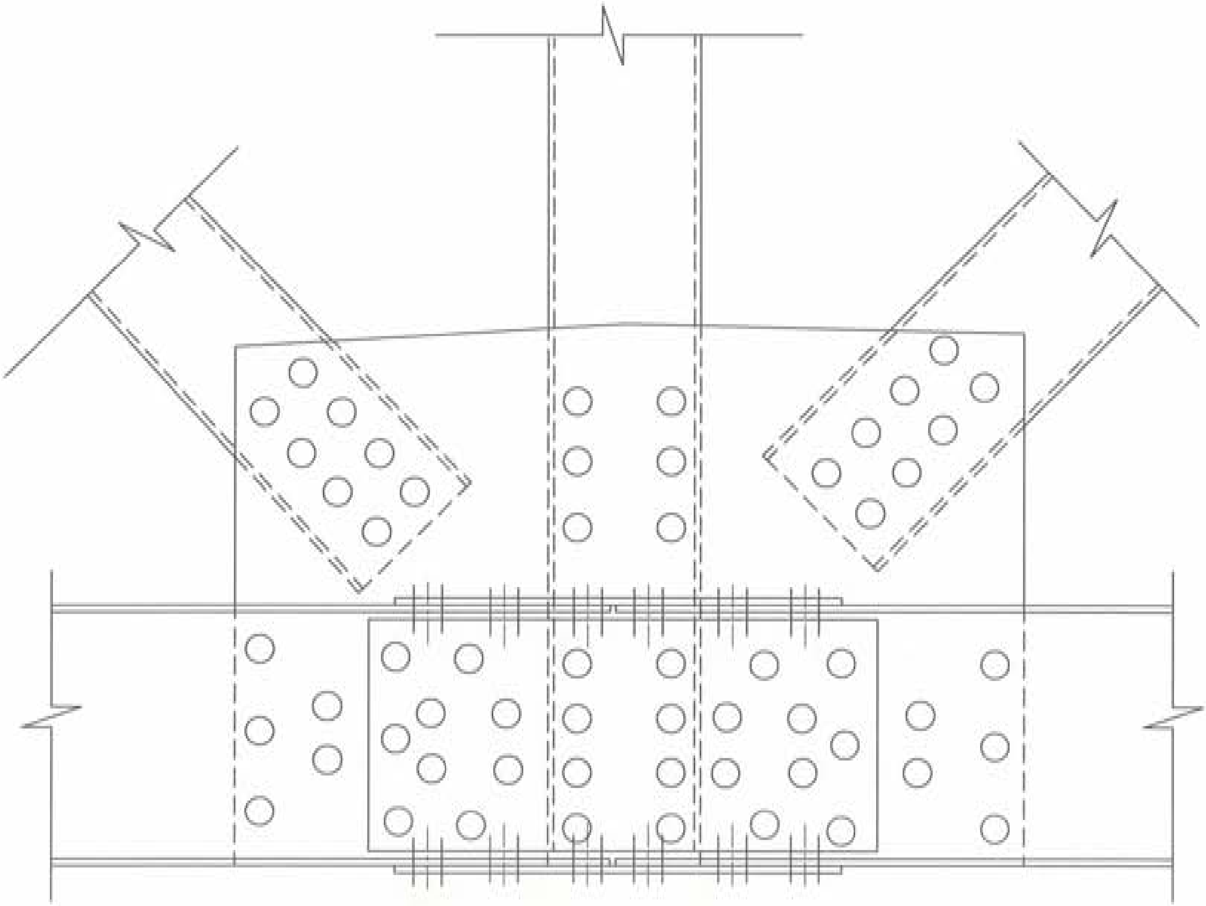


P 2566

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

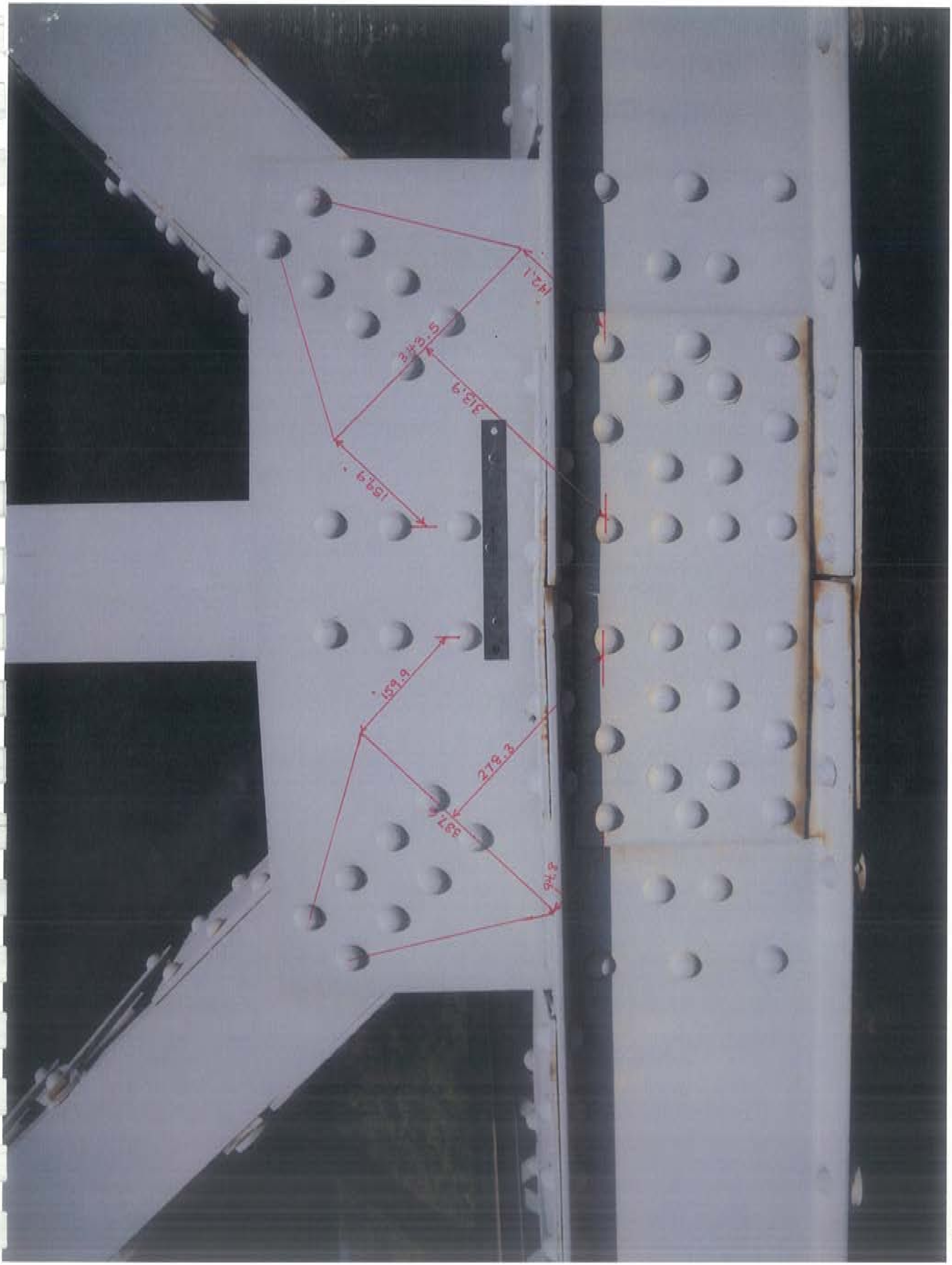
DATE: DECEMBER 2008
DRAWING:
L4E
3
SPAN EXT TRUSS NORTH



McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008	
DRAWING: L4~~E~~W	
SPAN	TRUSS NORTH


142.1
343.5
313.9
159.9
159.9
278.3

GUSSET PLATE INVESTIGATION - Whitmore Method

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge
Gusset Node: L4E

Material Properties For Gusset Plate

Gusset Plate:	F_y =	230	MPa	Splice Plate:	F_y =	230	MPa	
	F_u =	420	MPa		F_u =	420	MPa	
	E =	200,000	MPa		E =	200,000	MPa	
	t =	10.9	mm		t =	8.55	mm	orig. t = 9 mm
					h =		mm	section loss = 5 %

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

Effective width, w_e =	344	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	3744.15	mm^2	= 818 kN
f_s =	0.95		

B) Net Section Fracture

Effective width, w_e =	344	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	2.0		= 1094 kN
gap =	1.5875	mm	
dia. =	22.225	mm	
Net area, A_{ne} =	3225	mm^2	
f_s =	0.95		

Factored tensile resistance = 818 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

Effective width, w_e =	710	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	7735.73	mm^2	= 1690 kN
f_s =	0.95		

B) Net Section Fracture

Effective width, w_e =	602	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	3.0		= 1961 kN
gap =	1.5875	mm	
dia. =	22.225	mm	
Net area, A_{ne} =	5783	mm^2	
f_s =	0.95		

Factored tensile resistance = 1690 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

Effective width, w_e =	338	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	3679.84	mm^2	= 804 kN
f_s =	0.95		

B) Net Section Fracture

Effective width, w_e =	338	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	2.0		= 1072 kN
gap =	1.5875	mm	
dia. =	22.225	mm	
Net area, A_{ne} =	3161	mm^2	
f_s =	0.95		

Factored tensile resistance = 804 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	640	mm	300	mm
Gross area, A_g =	6974.91	mm^2	2565	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

= 2084 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	640	mm	300	mm
holes =	6.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	5418	mm^2	1751	mm^2
f_s =	0.95			

$T_r = 0.85\ f_s A_{ne} F_u$

= 2431 kN

Factored tensile resistance = 2084 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	562	mm	300	mm
Gross area, A_g =	6125.8	mm^2	2565	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

= 1899 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	562	mm	300	mm
holes =	5.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4828	mm^2	1751	mm^2
f_s =	0.95			

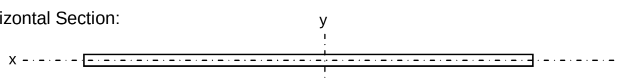
$T_r = 0.85\ f_s A_{ne} F_u$

= 2231 kN

Factored tensile resistance = 1899 kN **Thus, gross section yielding governs**

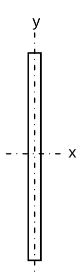
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	343.5	mm	I_x =	3.71E+04	mm^4	I_y =	3.68E+07	mm^4
t =	10.9	mm	r_x =	3.15	mm	r_y =	99.16	mm
A =	3744.15	mm^2	S_x =	6.80E+03	mm^3	S_y =	2.14E+05	mm^3
d =	0	mm						

Vertical Section:



h =	343.5	mm	I_x =	3.68E+07	mm^4	I_y =	3.71E+04	mm^4
t =	10.9	mm	r_x =	99.16	mm	r_y =	3.15	mm
A =	3744.15	mm^2	S_x =	2.14E+05	mm^3	S_y =	6.80E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	159.9	mm
Unbraced length, L =	205.3	mm	L_2 =	313.9	mm
r_{min} =	3.15	mm	L_3 =	142.1	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7043$$

f_s =	0.9	
Effective width, L_w =	343.5	mm
Thickness, t =	10.9	mm
n =	1.34	

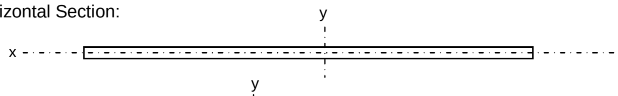
$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$

= 606 kN

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

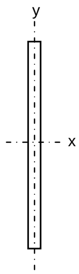
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	466.5	mm	I_x =	5.03E+04	mm^4	I_y =	9.22E+07	mm^4
t =	10.9	mm	r_x =	3.15	mm	r_y =	134.67	mm
A =	5084.85	mm^2	S_x =	9.24E+03	mm^3	S_y =	3.95E+05	mm^3

Vertical Section:



h =	466.5	mm	I_x =	9.22E+07	mm^4	I_y =	5.03E+04	mm^4
t =	10.9	mm	r_x =	134.67	mm	r_y =	3.15	mm
A =	5084.85	mm^2	S_x =	3.95E+05	mm^3	S_y =	9.24E+03	mm^3

Effective length factor, K =	1.00		L_1 =	197.4	mm
Unbraced length, L =	197.4	mm	L_2 =	197.4	mm
r_{min} =	3.15	mm	L_3 =	197.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6772$$

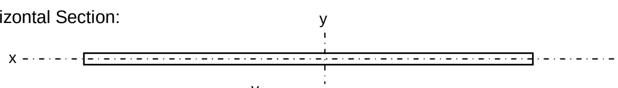
f_s =	0.9	
Effective width, L_w =	466.5	mm
Thickness, t =	10.9	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 841 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

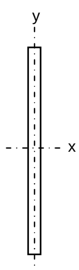
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	337.6	mm	I_x =	3.64E+04	mm^4	I_y =	3.50E+07	mm^4
t =	10.9	mm	r_x =	3.15	mm	r_y =	97.46	mm
A =	3679.84	mm^2	S_x =	6.69E+03	mm^3	S_y =	2.07E+05	mm^3
d =	0	mm						

Vertical Section:



h =	337.6	mm	I_x =	3.50E+07	mm^4	I_y =	3.64E+04	mm^4
t =	10.9	mm	r_x =	97.46	mm	r_y =	3.15	mm
A =	3679.84	mm^2	S_x =	2.07E+05	mm^3	S_y =	6.69E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	227.3	mm
Unbraced length, L =	239.2	mm	L_2 =	317	mm
r_{min} =	3.15	mm	L_3 =	173.4	mm

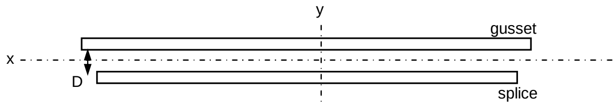
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.8207$$

f_s =	0.9	
Effective width, L_w =	337.6	mm
Thickness, t =	10.9	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 539 \text{ kN}$$

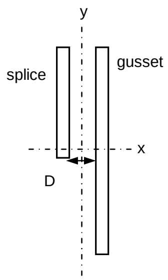
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



	(splice plate)													
b =	300	mm	b =	560	mm	D =	13.2	mm	I_x =	9.34E+05	mm^4	I_y =	2.02E+08	mm^4
t =	8	mm	t =	10.6	mm	y_b =	20.02	mm	r_x =	10.58	mm	r_y =	155.67	mm
A =	2400	mm^2	A =	5936	mm^2	x_L =	242.57	mm	S_{xb} =	9.33E+04	mm^3	S_{yL} =	1.67E+06	mm^3

Vertical Section:



	(splice plate)													
h =	300	mm	h =	560	mm	D =	13.2	mm	I_x =	2.02E+08	mm^4	I_y =	9.34E+05	mm^4
t =	8	mm	t =	10.6	mm	y_b =	317.43	mm	r_x =	155.67	mm	r_y =	10.58	mm
A =	2400	mm^2	A =	5936	mm^2	x_L =	20.02	mm	S_{xb} =	1.27E+06	mm^3	S_{yL} =	9.33E+04	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	10.58	mm	L_3 =	0	mm

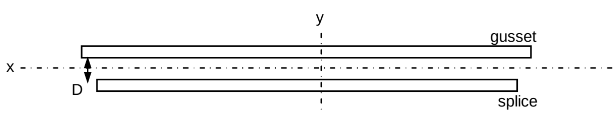
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	560	mm	300	mm
Thickness, t =	10.9	mm	8.55	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1794 \text{ kN}$$

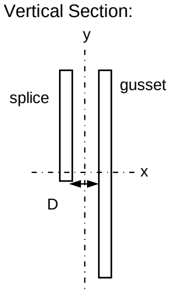
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



	(splice plate)													
b =	300	mm	b =	676	mm	D =	30.3	mm	I_x =	4.73E+06	mm^4	I_y =	4.15E+08	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	34.80	mm	r_x =	20.21	mm	r_y =	189.27	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	276.17	mm	S_{xb} =	2.72E+05	mm^3	S_{yL} =	3.01E+06	mm^3

Vertical Section:



	(splice plate)													
h =	300	mm	h =	676	mm	D =	30.3	mm	I_x =	4.15E+08	mm^4	I_y =	4.73E+06	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	399.83	mm	r_x =	189.27	mm	r_y =	20.21	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	34.80	mm	S_{xb} =	2.08E+06	mm^3	S_{yL} =	2.72E+05	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	20.21	mm	L_3 =	0	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	10.9	mm	8.55	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 2056 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

RESISTANCE SUMMARY (one gusset plate)

Member A

Factored applied tensile force =	286.95	kN	<	818	kN	Tensile resistance	ok!
Factored applied compressive force =	229.25	kN	<	606	kN	Compressive resistance	ok!

Member B

Factored applied tensile force =	0	kN	<	1690	kN	Tensile resistance	ok!
Factored applied compressive force =	319.1	kN	<	841	kN	Compressive resistance	ok!

Member C

Factored applied tensile force =	292.6	kN	<	804	kN	Tensile resistance	ok!
Factored applied compressive force =	211.6	kN	<	539	kN	Compressive resistance	ok!

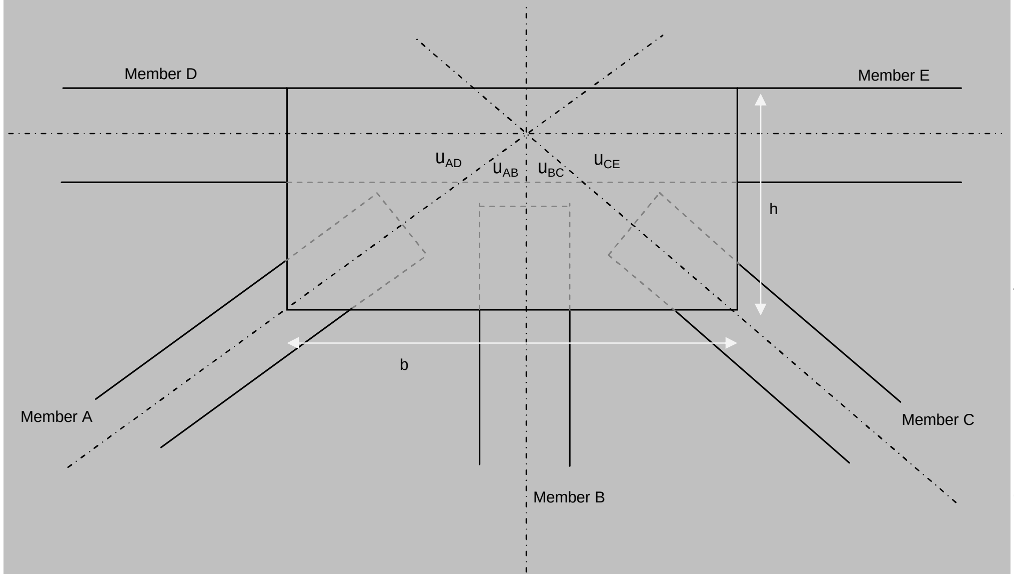
Member D

Factored applied tensile force =	1353.05	kN	<	2084	kN	Tensile resistance	ok!
Factored applied compressive force =	0	kN	<	1794	kN	Compressive resistance	ok!

Member E

Factored applied tensile force =	1348.05	kN	<	1899	kN	Tensile resistance	ok!
Factored applied compressive force =	0	kN	<	2056	kN	Compressive resistance	ok!

Gusset Plate Geometry



b =	1130	mm
h =	900	mm
t =	10.1	mm
u_{AD} =	65	deg
u_{AB} =	25	deg
u_{BC} =	30	deg
u_{CE} =	60	deg

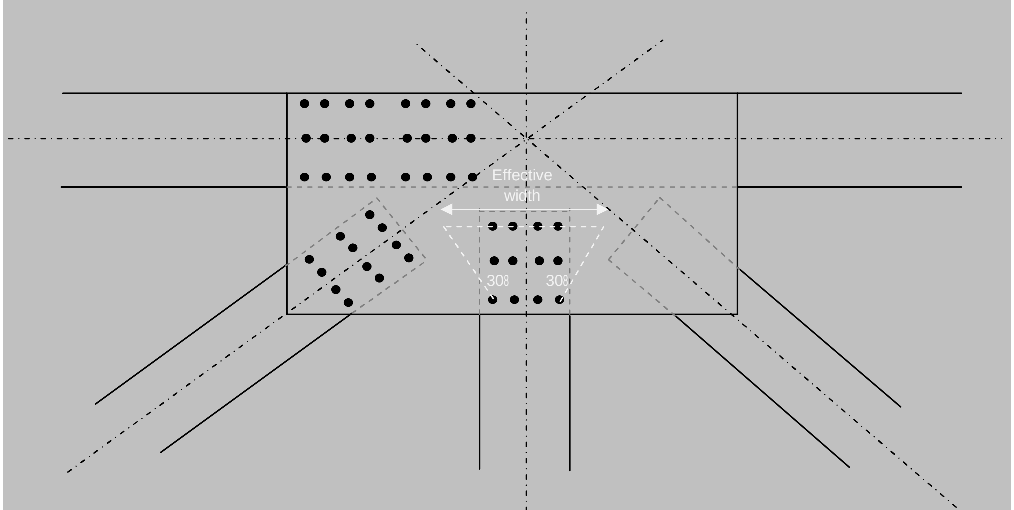
Tensile forces:

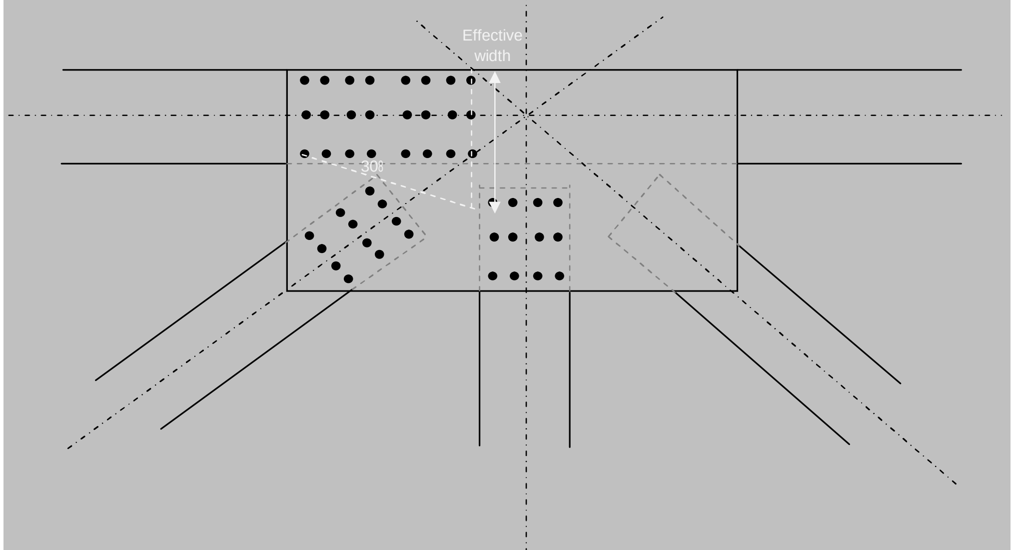
A	F1 =	573.9	kN
B	F2 =	0	kN
C	F3 =	585.2	kN
D	F4 =	2706.1	kN
E	F5 =	2696.1	kN

Compressive forces:

A	F1 =	458.5	kN
B	F2 =	638.2	kN
C	F3 =	423.2	kN
D	F4 =	0	kN
E	F5 =	0	kN

Whitmore Effective Width Method



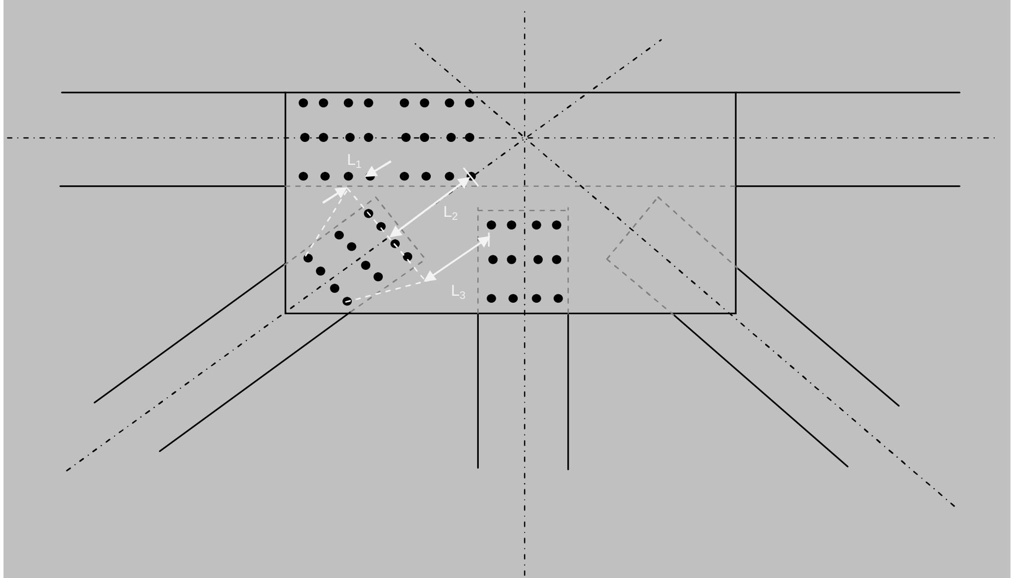


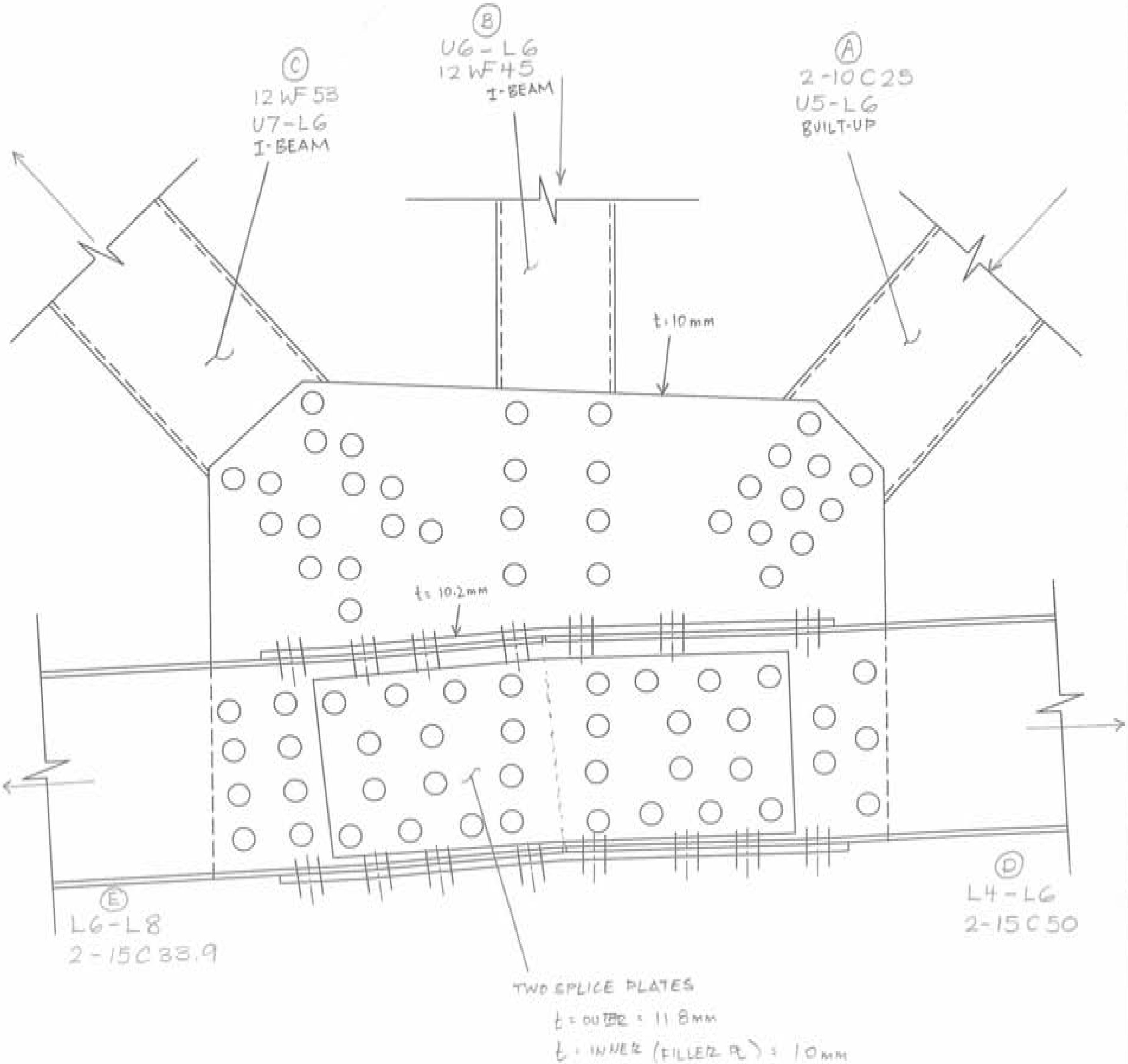
* The *effective width* is measured across the last row of fasteners in the connection under consideration. The effective width is bound on either side by the closer of the nearest adjacent plate edges or lines constructed starting from the external fasteners within the first row and extending from these fasteners at an angle of 30 degrees with respect to the line of action of the axial force. Bolt/rivet holes are not subtracted from the width.

Gusset Plate Geometry

L_2 = The distance from the last row of fasteners in the compression member under consideration, to the first row of fasteners in the closest adjacent member, measured along the line of action of the compressive axial force.

L_1 & L_3 = The distance from each of the ends of the Whitmore width to the first row of fasteners in the closest adjacent member, measured parallel to the line of action of the compressive axial force.



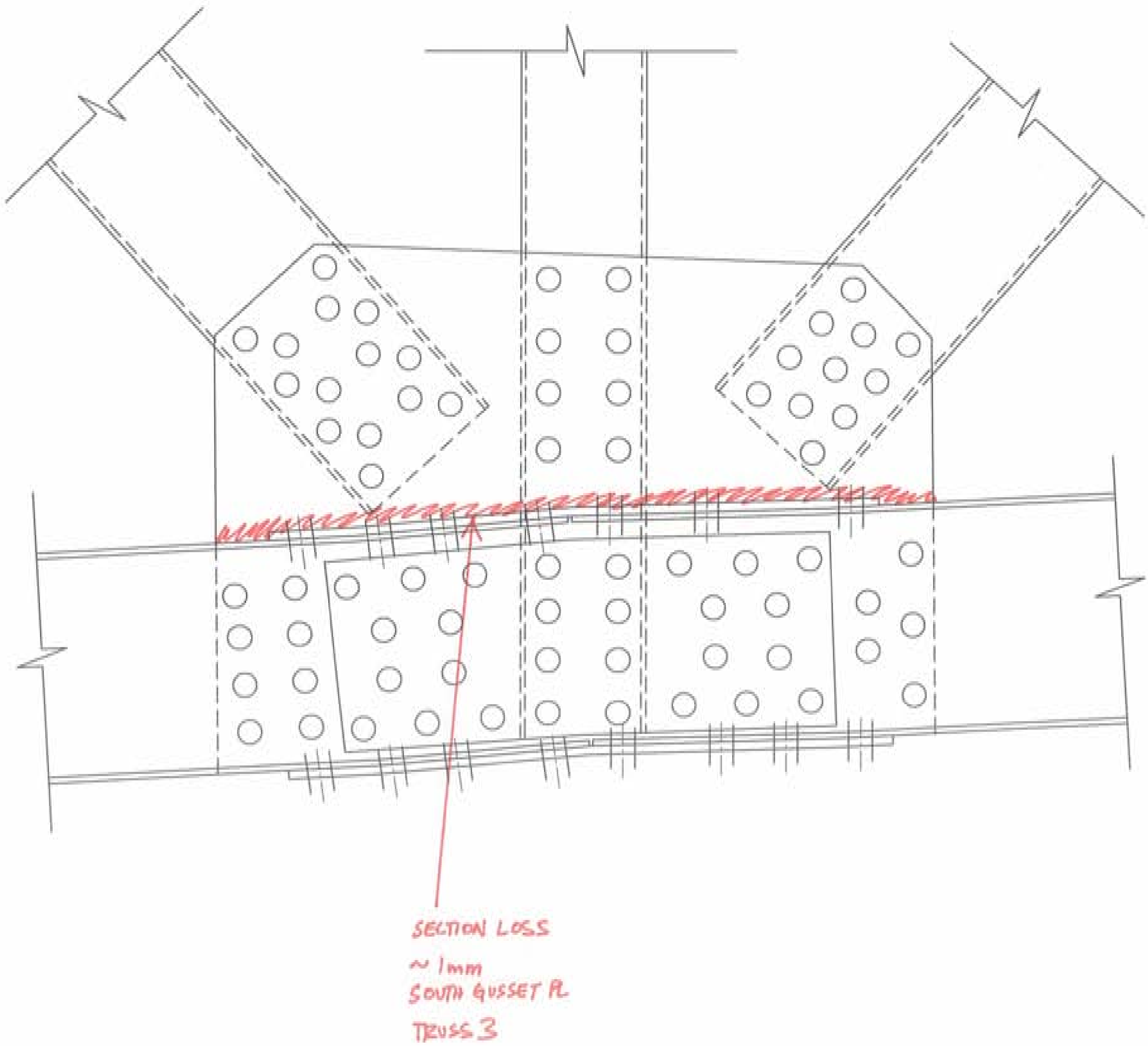


P 2567

MRC McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008	
DRAWING: L6E	3
SPAN EXT	TRUSS ~~NORTH~~



McCORMICK RANKIN CORPORATION

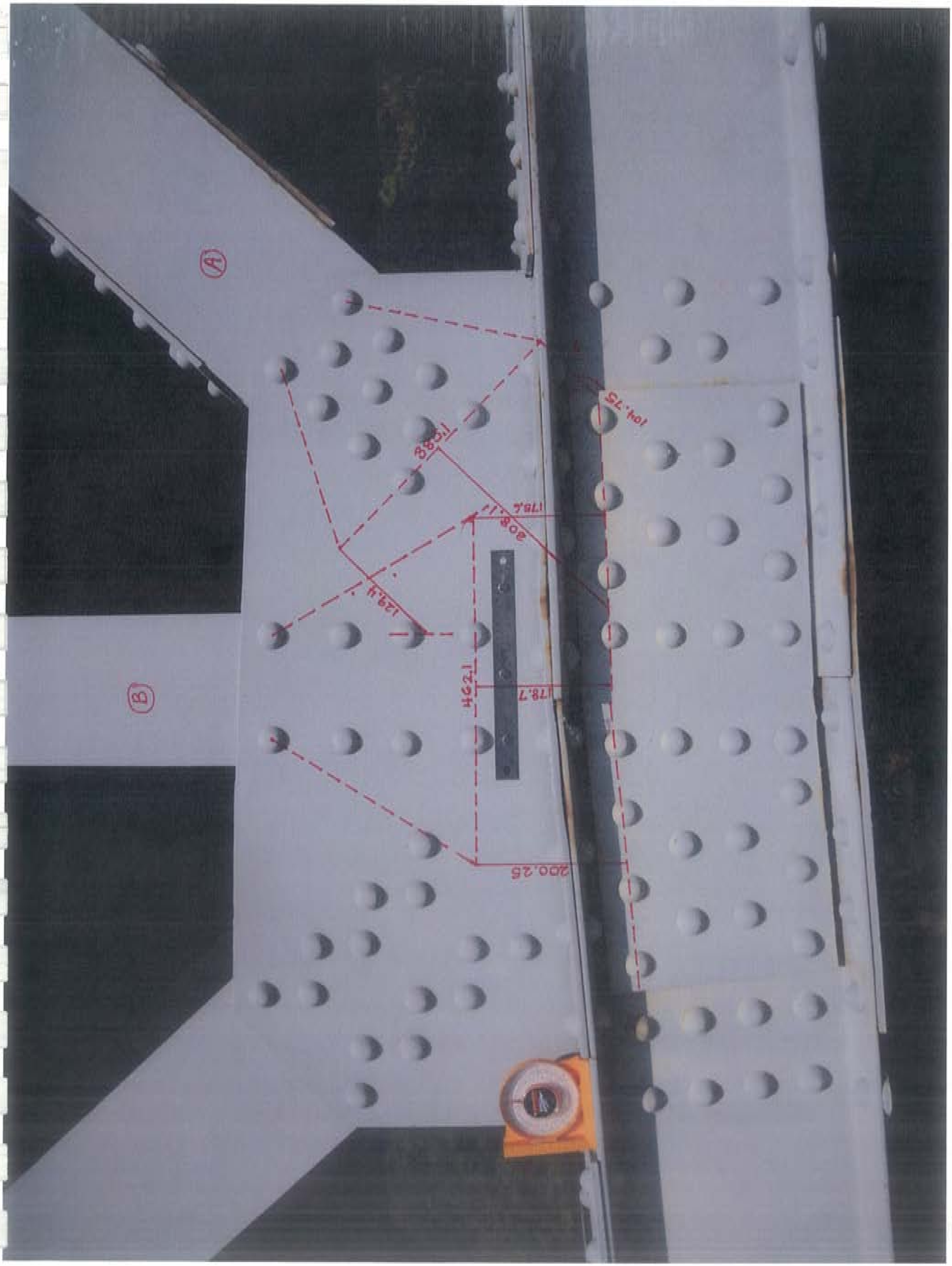
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L6E W

SPAN

TRUSS NORTH


A
B
385.1
178.6
208
129.4
462.1
178.7
200.25
104.75

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5759.1	mm^2	2565	mm^2	= 1819 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = 0.85\ \phi_x A_{ne} F_u$
holes =	8.0		4.0		= 2111 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4473	mm^2	1751	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = ~~1819 kN~~ **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = \phi_x A_g F_y$
Gross area, A_g =	5058	mm^2	2565	mm^2	= 1666 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = 0.85\ \phi_x A_{ne} F_u$
holes =	5.0		4		= 1946 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	3986	mm^2	1751	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = ~~1666 kN~~ **Thus, gross section yielding governs**

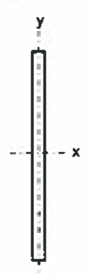
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	385.1	mm	I_x =	2.34E+04	mm^4	I_y =	4.28E+07	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	111.17	mm
A =	3465.9	mm^2	S_x =	5.20E+03	mm^3	S_y =	2.22E+05	mm^3
d =	0	mm						

Vertical Section:



h =	385.1	mm	I_x =	4.28E+07	mm^4	I_y =	2.34E+04	mm^4
t =	9	mm	r_x =	111.17	mm	r_y =	2.60	mm
A =	3465.9	mm^2	S_x =	2.22E+05	mm^3	S_y =	5.20E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	129.4	mm
Unbraced length, L =	180.7	mm	L_2 =	308.1	mm
r_{min} =	2.60	mm	L_3 =	104.7	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7509$$

ϕ_s =	0.9	
Effective width, L_w =	385.1	mm
Thickness, t =	9	mm
n =	1.34	

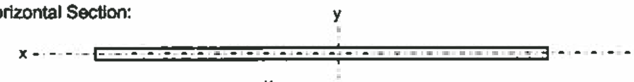
$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 540 \text{ kN}$$

MRC

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

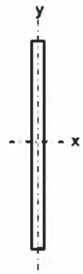
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	462.1	mm	I_x =	2.81E+04	mm^4	I_y =	7.40E+07	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	133.40	mm
A =	4158.9	mm^2	S_x =	6.24E+03	mm^3	S_y =	3.20E+05	mm^3

Vertical Section:



h =	462.1	mm	I_x =	7.40E+07	mm^4	I_y =	2.81E+04	mm^4
t =	9	mm	r_x =	133.40	mm	r_y =	2.60	mm
A =	4158.9	mm^2	S_x =	3.20E+05	mm^3	S_y =	6.24E+03	mm^3

Effective length factor, K =	1.00		L_1 =	175.6	mm
Unbraced length, L =	164.9	mm	L_2 =	178.7	mm
r_{min} =	2.60	mm	L_3 =	200.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7661$$

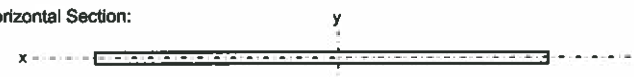
ϕ_s =	0.9	
Effective width, L_w =	462.1	mm
Thickness, t =	9	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 638 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

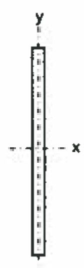
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	337.6	mm	I_x =	2.05E+04	mm^4	I_y =	2.89E+07	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	97.46	mm
A =	3038.4	mm^2	S_x =	4.56E+03	mm^3	S_y =	1.71E+05	mm^3
d =	0	mm						

Vertical Section:



h =	337.6	mm	I_x =	2.89E+07	mm^4	I_y =	2.05E+04	mm^4
t =	9	mm	r_x =	97.46	mm	r_y =	2.60	mm
A =	3038.4	mm^2	S_x =	1.71E+05	mm^3	S_y =	4.56E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	227.3	mm
Unbraced length, L =	239.2	mm	L_2 =	317	mm
r_{min} =	2.60	mm	L_3 =	173.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.9940$$

ϕ_x =	0.9	
Effective width, L_w =	337.6	mm
Thickness, t =	9	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 377 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	6399	mm^2	2565	mm^2	= 1959 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = 0.65\ \phi_s A_{ne} F_u$
holes =	6.0		4.0		= 2279 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4970	mm^2	1751	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = ~~1959~~ kN Thus, gross section yielding governs

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5620	mm^2	2565	mm^2	= 1788 kN
ϕ_s =	0.95				

B) Net Section Fracture

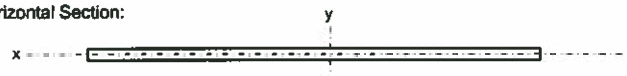
			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	5.0		4		= 2096 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4429	mm^2	1751	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = ~~1788~~ kN Thus, gross section yielding governs

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

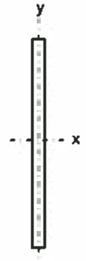
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	385.1	mm	I_x =	3.21E+04	mm^4	I_y = 4.76E+07	mm^4
t =	10	mm	r_x =	2.88	mm	r_y = 111.17	mm
A =	3851	mm^2	S_x =	6.42E+03	mm^3	S_y = 2.47E+05	mm^3
d =	0	mm					

Vertical Section:



h =	385.1	mm	I_x =	4.76E+07	mm^4	I_y = 3.21E+04	mm^4
t =	10	mm	r_x =	111.17	mm	r_y = 2.89	mm
A =	3851	mm^2	S_x =	2.47E+05	mm^3	S_y = 6.42E+03	mm^3
d =	0	mm					

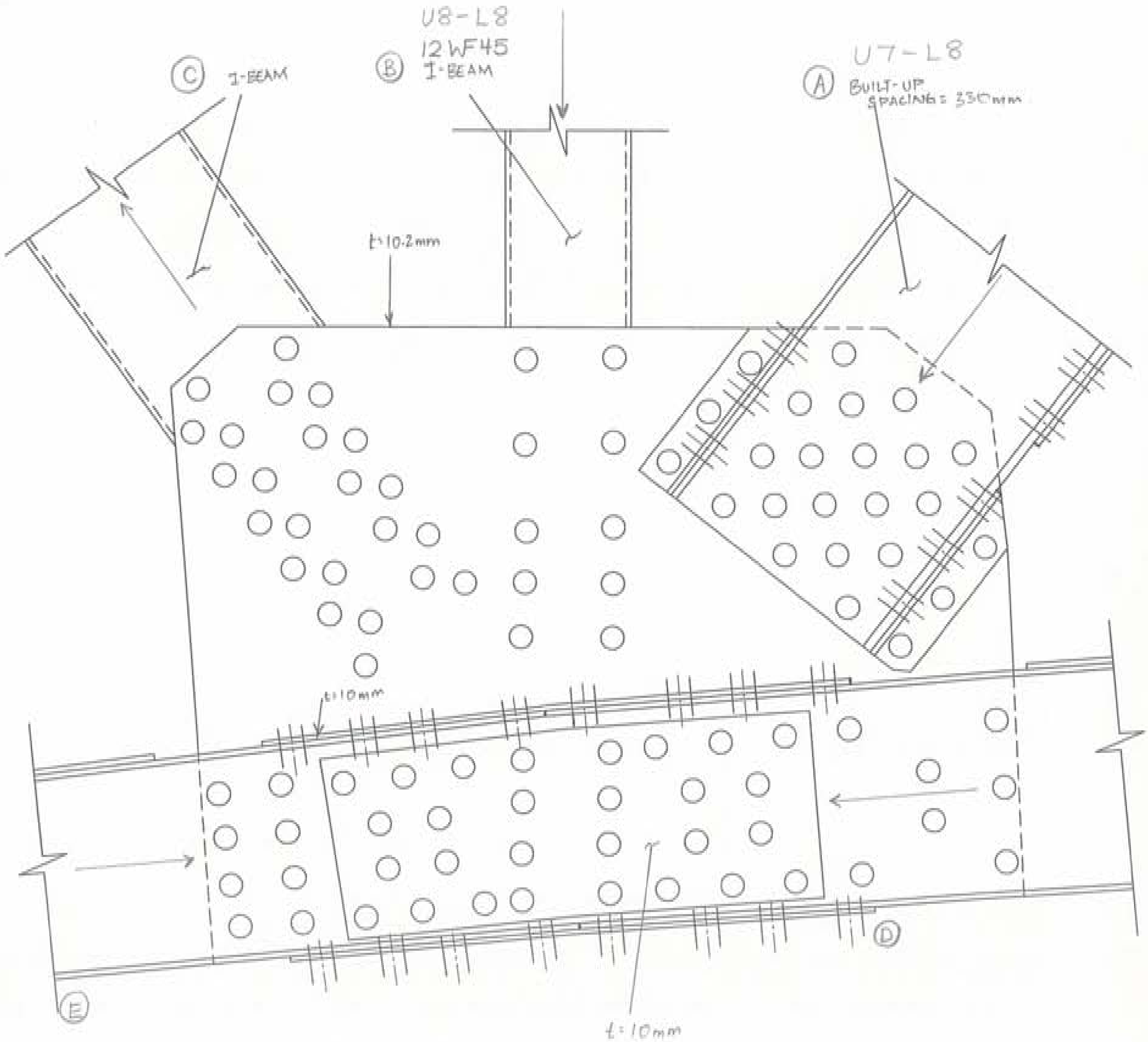
Effective length factor, K =	1.00		L_1 =	129.4	mm
Unbraced length, L =	190.7	mm	L_2 =	308.1	mm
r_{min} =	2.89	mm	L_3 =	104.7	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6758$$

ϕ_s =	0.9	
Effective width, L_w =	385.1	mm
Thickness, t =	10	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$

= 637 kN



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MRC

McCORMICK RANKIN CORPORATION

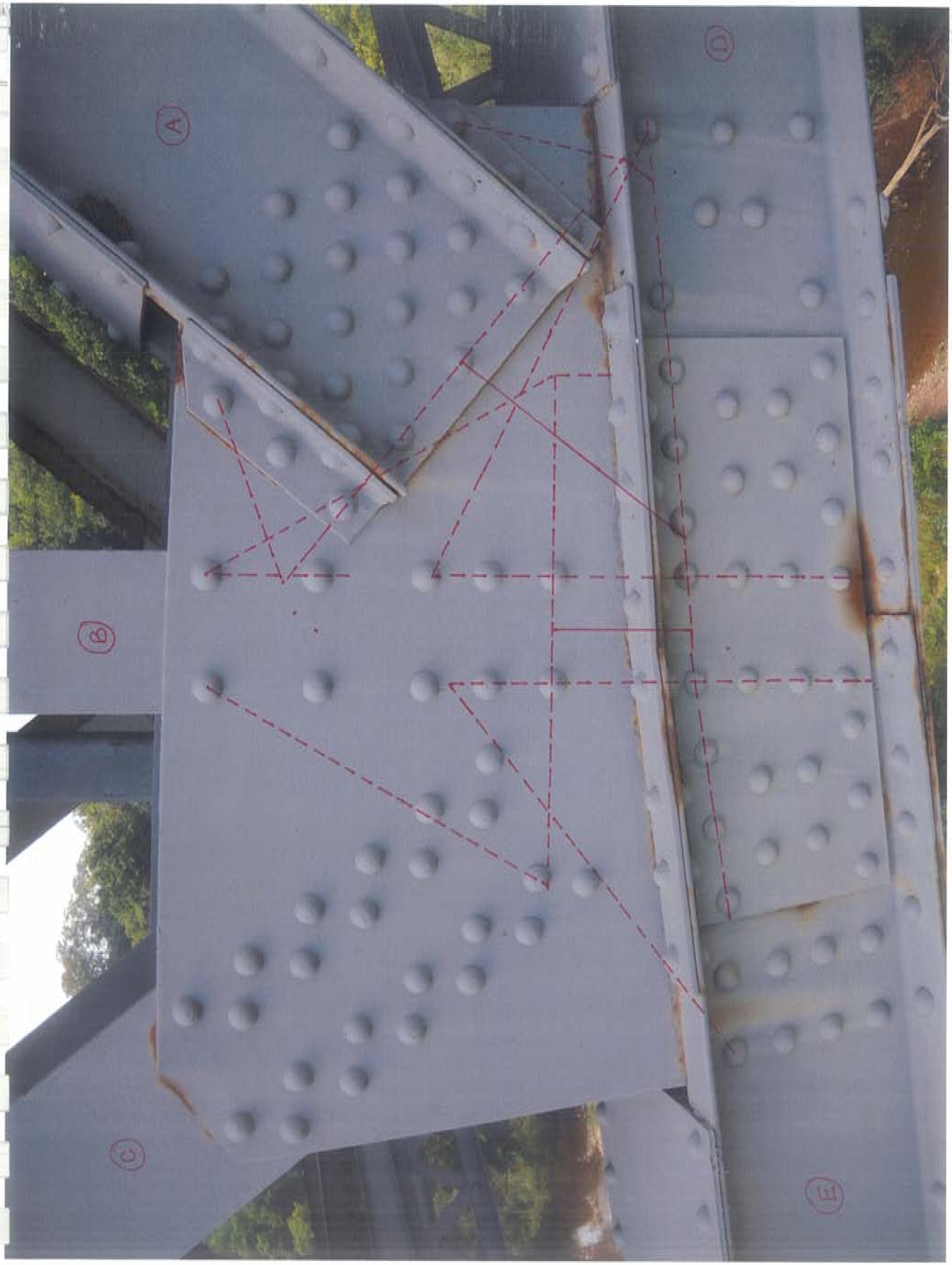
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

L8E 3

SPAN EXT TRUSS ~~NORTH~~


A
B
C
D
E

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	640	mm	300	mm
Gross area, A_g =	6526.98	mm^2	2565	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$
= 1987 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	640	mm	300	mm
holes =	6.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	5070	mm^2	1751	mm^2
ϕ_s =	0.95			

$T_r = 0.85\, \phi_s A_{ne} F_u$
= 2313 kN

Factored tensile resistance = ~~1987 kN~~ **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	562	mm	300	mm
Gross area, A_g =	5732.4	mm^2	2565	mm^2
ϕ_s =	0.95			

$T_r = \phi_s A_g F_y$
= 1813 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	562	mm	300	mm
holes =	5.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	4518	mm^2	1751	mm^2
ϕ_s =	0.95			

$T_r = 0.85\, \phi_s A_{ne} F_u$
= 2126 kN

Factored tensile resistance = ~~1813 kN~~ **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	681.9	mm	I_x =	6.03E+04	mm^4	I_y =	2.70E+08	mm^4
t =	10.2	mm	r_x =	2.94	mm	r_y =	196.85	mm
A =	6955.38	mm^2	S_x =	1.18E+04	mm^3	S_y =	7.90E+05	mm^3
d =	0	mm						

Vertical Section:

h =	681.9	mm	I_x =	2.70E+08	mm^4	I_y =	6.03E+04	mm^4
t =	10.2	mm	r_x =	196.85	mm	r_y =	2.94	mm
A =	6955.38	mm^2	S_x =	7.90E+05	mm^3	S_y =	1.18E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	3.4	mm	L_2 =	10.2	mm
r_{min} =	2.94	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0125$$

ϕ_s =	0.9	
Effective width, L_w =	681.9	mm
Thickness, t =	10.2	mm
n =	1.34	

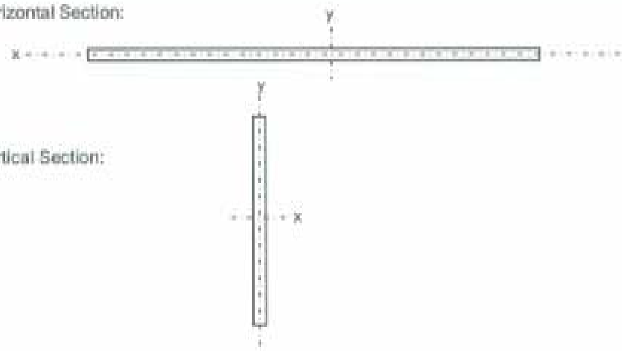
$C_r = \phi_s A F_y (1+\lambda^{2n})^{-1/n}$
= 1440 kN

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Vertical Section:



b =	641.1	mm	I_x =	5.67E+04	mm^4	I_y =	2.24E+08	mm^4
t =	10.2	mm	r_x =	2.94	mm	r_y =	185.07	mm
A =	6539.22	mm^2	S_x =	1.11E+04	mm^3	S_y =	6.99E+05	mm^3

h =	641.1	mm	I_x =	2.24E+08	mm^4	I_y =	5.67E+04	mm^4
t =	10.2	mm	r_x =	185.07	mm	r_y =	2.94	mm
A =	6539.22	mm^2	S_x =	6.99E+05	mm^3	S_y =	1.11E+04	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	3.4	mm	L_2 =	10.2	mm
r_{min} =	2.94	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0125$$

ϕ_s =	0.9	
Effective width, L_w =	641.1	mm
Thickness, t =	10.2	mm
n =	1.34	

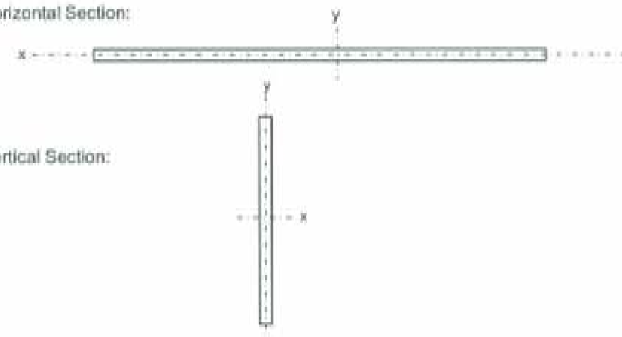
$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1354 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Vertical Section:



b =	337.6	mm	I_x =	2.99E+04	mm^4	I_y =	3.27E+07	mm^4
t =	10.2	mm	r_x =	2.94	mm	r_y =	97.46	mm
A =	3443.52	mm^2	S_x =	5.85E+03	mm^3	S_y =	1.94E+05	mm^3
d =	0	mm						

h =	337.6	mm	I_x =	3.27E+07	mm^4	I_y =	2.99E+04	mm^4
t =	10.2	mm	r_x =	97.46	mm	r_y =	2.94	mm
A =	3443.52	mm^2	S_x =	1.94E+05	mm^3	S_y =	5.85E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	227.3	mm
Unbraced length, L =	239.2	mm	L_2 =	317	mm
r_{min} =	2.94	mm	L_3 =	173.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.8770$$

ϕ_s =	0.9	
Effective width, L_w =	337.6	mm
Thickness, t =	10.2	mm
n =	1.34	

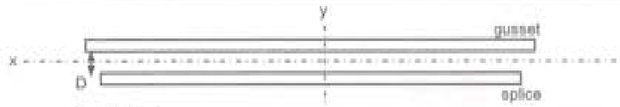
~~$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$~~

~~= 479 kN~~

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D

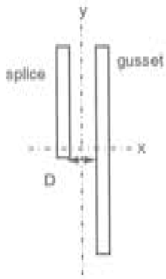
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)										
b = 300 mm	b = 547.9 mm	D = 20.4 mm	I_x = 1.62E+06 mm^4	I_y = 1.86E+08 mm^4
t = 8.55 mm	t = 10.2 mm	y_b = 24.68 mm	r_x = 14.11 mm	r_y = 151.06 mm
A = 2565 mm^2	A = 5588.58 mm^2	x_L = 234.96 mm	S_{xb} = 1.31E+05 mm^3	S_{yL} = 1.58E+06 mm^3

Vertical Section:



(splice plate)				
h = 300 mm	h = 547.9 mm	D = 20.4 mm	I_x = 1.86E+08 mm^4	I_y = 1.62E+06 mm^4
t = 8.55 mm	t = 10.2 mm	y_b = 312.94 mm	r_x = 151.06 mm	r_y = 14.11 mm
A = 2565 mm^2	A = 5588.58 mm^2	x_L = 24.68 mm	S_{xb} = 1.19E+06 mm^3	S_{yL} = 1.31E+05 mm^3

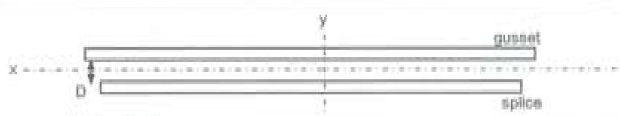
Effective length factor, K = 1.00	L_1 = 128.2 mm	
Unbraced length, L = 128.2 mm	L_2 = 128.2 mm	$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}}$ = 0.0981
r_{min} = 14.11 mm	L_3 = 128.2 mm	

	(splice plate)	
ϕ_s = 0.9		$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$
Effective width, L_w = 547.9 mm	300 mm	= 1685 kN
Thickness, t = 10.2 mm	8.55 mm	
n = 1.34		

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E

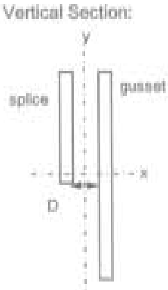
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)				
b = 300 mm	b = 536.2 mm	D = 20.4 mm	I_x = 1.61E+06 mm^4	I_y = 1.75E+08 mm^4
t = 8.55 mm	t = 10.2 mm	y_b = 24.54 mm	r_x = 14.16 mm	r_y = 147.43 mm
A = 2565 mm^2	A = 5469.24 mm^2	x_L = 230.40 mm	S_{xb} = 1.31E+05 mm^3	S_{yL} = 1.52E+06 mm^3

Vertical Section:



(splice plate)				
h = 300 mm	h = 536.2 mm	D = 20.4 mm	I_x = 1.75E+08 mm^4	I_y = 1.61E+06 mm^4
t = 8.55 mm	t = 10.2 mm	y_b = 305.80 mm	r_x = 147.43 mm	r_y = 14.16 mm
A = 2565 mm^2	A = 5469.24 mm^2	x_L = 24.54 mm	S_{xb} = 1.14E+06 mm^3	S_{yL} = 1.31E+05 mm^3

Effective length factor, K = 1.00	L_1 = 128.2 mm	
Unbraced length, L = 128.2 mm	L_2 = 128.2 mm	$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}}$ = 0.0977
r_{min} = 14.16 mm	L_3 = 128.2 mm	

	(splice plate)	
ϕ_s = 0.9		$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$
Effective width, L_w = 536.2 mm	300 mm	= 1661 kN
Thickness, t = 10.2 mm	8.55 mm	
n = 1.34		

RESISTANCE SUMMARY (one gusset plate)

Member A

Factored applied tensile force =	286.95	kN	<	766	kN	Tensile resistance	ok!
Factored applied compressive force =	957.25	kN	<	1440	kN	Compressive resistance	ok!

Member B

Factored applied tensile force =	0	kN	<	1582	kN	Tensile resistance	ok!
Factored applied compressive force =	332.8	kN	<	1354	kN	Compressive resistance	ok!

Member C

Factored applied tensile force =	292.6	kN	<	752	kN	Tensile resistance	ok!
Factored applied compressive force =	0	kN	<	479	kN	Compressive resistance	ok!

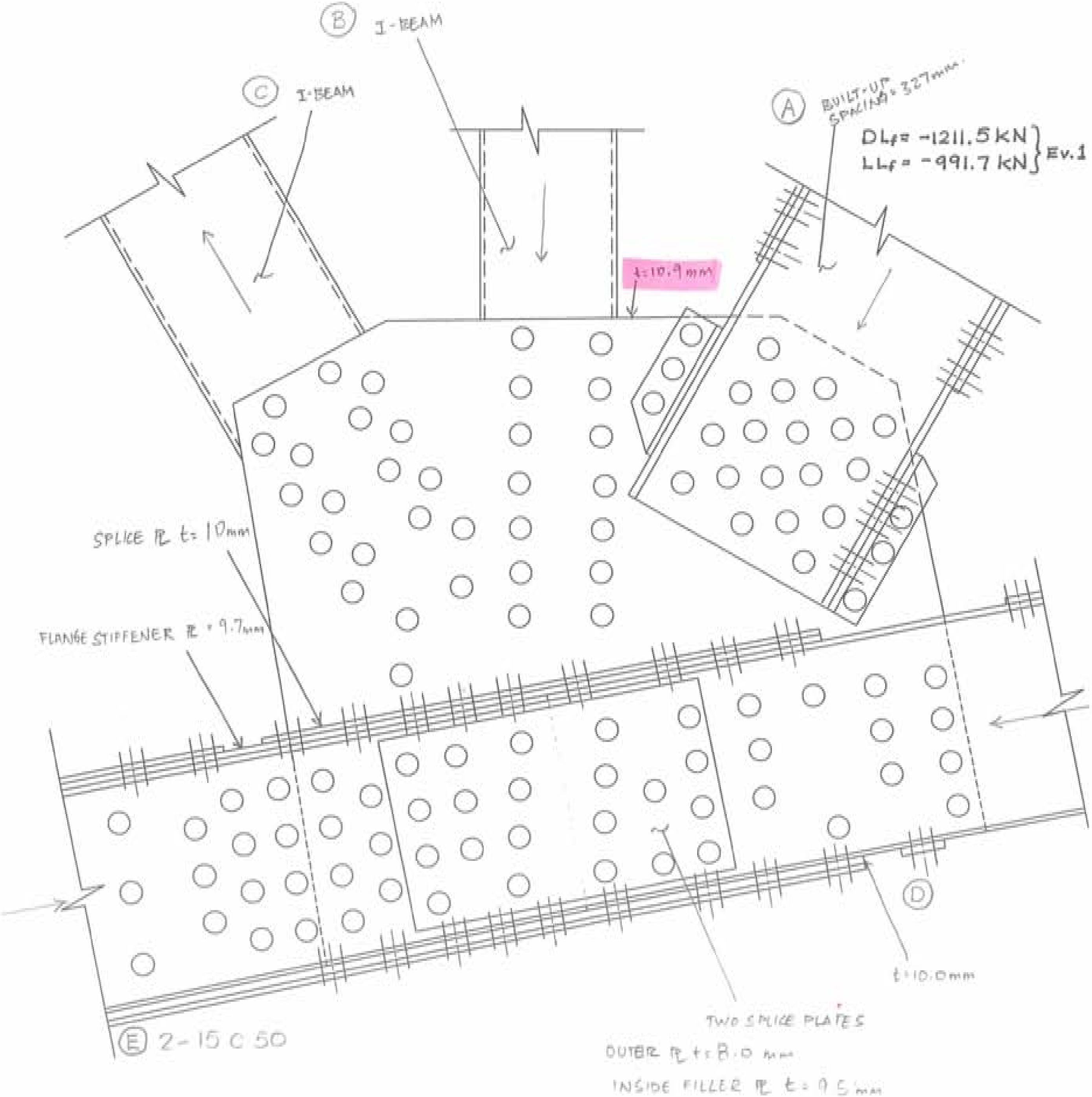
Member D

Factored applied tensile force =	1353.05	kN	<	1987	kN	Tensile resistance	ok!
Factored applied compressive force =	175	kN	<	1685	kN	Compressive resistance	ok!

Member E

Factored applied tensile force =	1348.05	kN	<	1813	kN	Tensile resistance	ok!
Factored applied compressive force =	802.95	kN	<	1661	kN	Compressive resistance	ok!

OK! See L14E



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McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

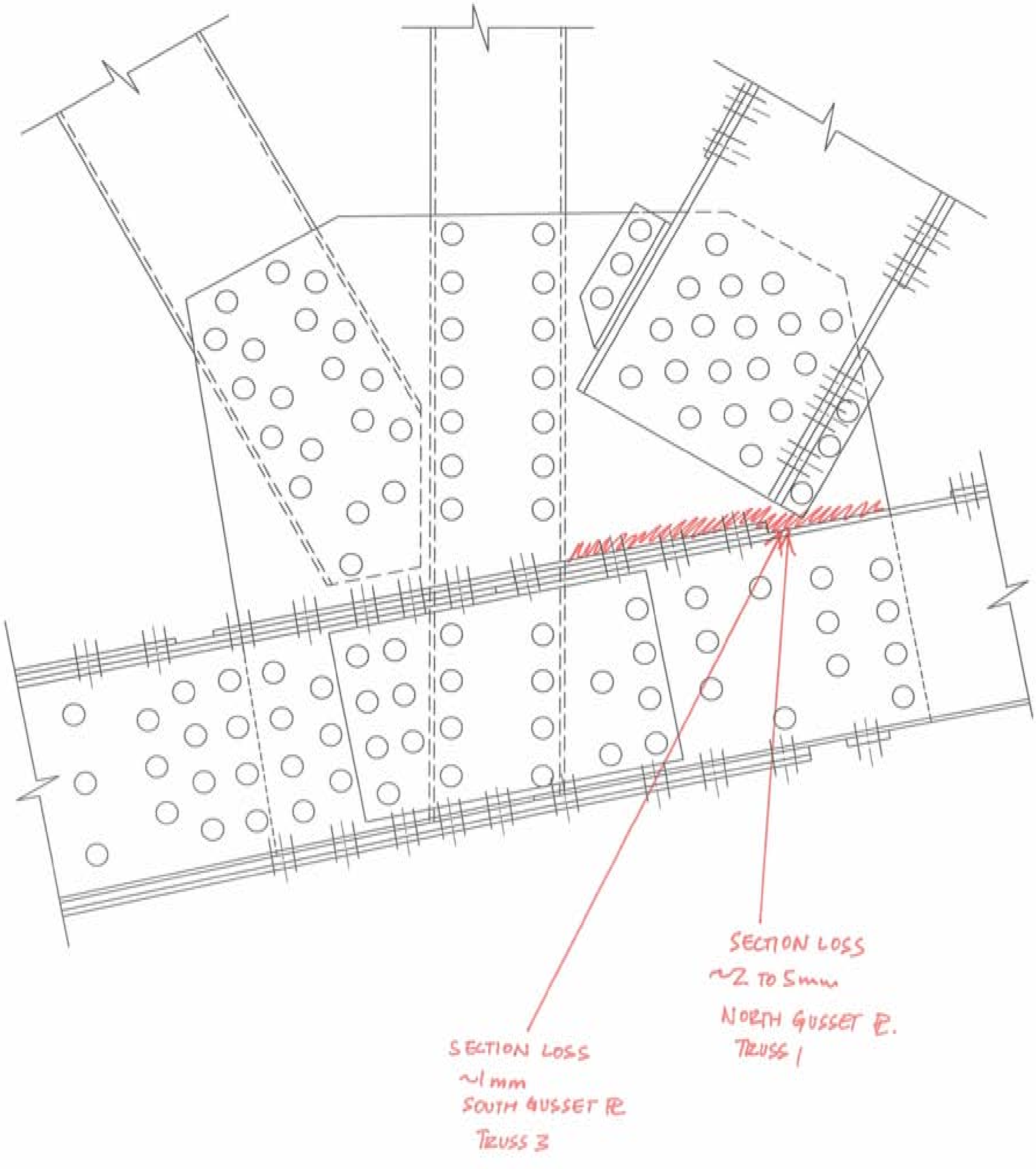
DATE: DECEMBER 2008

DRAWING:

L10E

SPAN: EXT

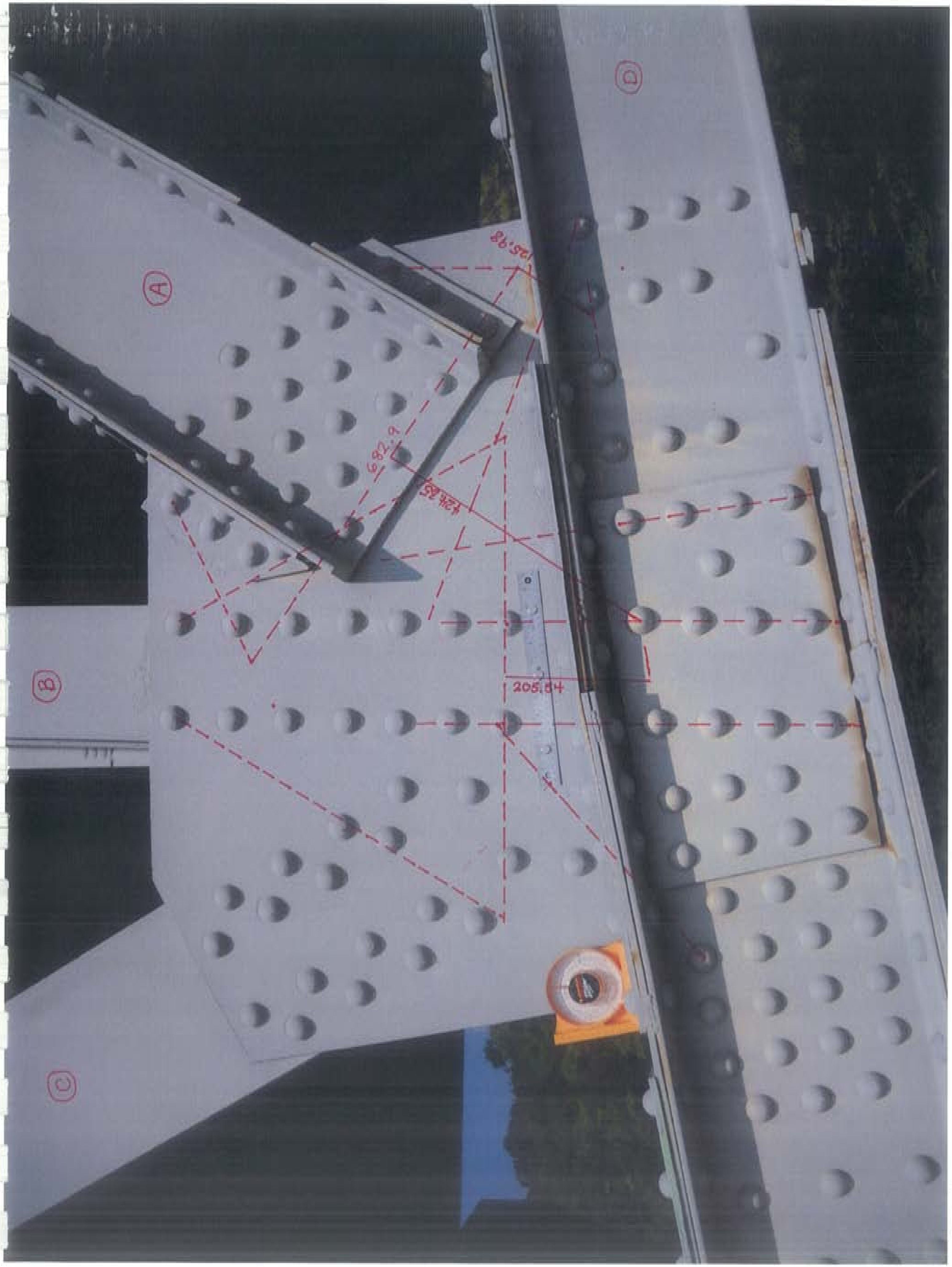
TRUSS ~~NORTH~~ 3



McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008
DRAWING:
L10E W
SPAN
TRUSS NORTH


A
B
C
D
682.9
205.54

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	6335.01	mm^2	4800	mm^2	= 2433 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	6.0		4.0		= 2780 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4921	mm^2	3276	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 2433 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5563.8	mm^2	4800	mm^2	= 2264 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	5.0		4		= 2598 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4385	mm^2	3276	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 2264 kN **Thus, gross section yielding governs**

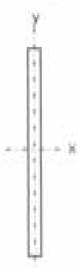
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	682.9	mm	I_x =	5.52E+04	mm^4	I_y =	2.63E+08	mm^4
t =	9.9	mm	r_x =	2.86	mm	r_y =	197.14	mm
A =	6760.71	mm^2	S_x =	1.12E+04	mm^3	S_y =	7.69E+05	mm^3
d =	0	mm						

Vertical Section:



h =	682.9	mm	I_x =	2.63E+08	mm^4	I_y =	5.52E+04	mm^4
t =	9.9	mm	r_x =	197.14	mm	r_y =	2.86	mm
A =	6760.71	mm^2	S_x =	7.69E+05	mm^3	S_y =	1.12E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	183.4	mm	L_2 =	424.3	mm
r_{min} =	2.86	mm	L_3 =	126	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6928$$

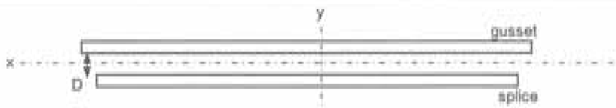
ϕ_s =	0.9	
Effective width, L_w =	682.9	mm
Thickness, t =	9.9	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1104 \text{ kN}$$

MRC

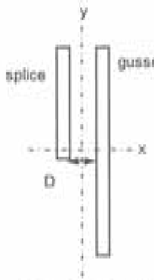
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



(splice plate)														
b =	300	mm	b =	596.7	mm	D =	29.9	mm	I_x =	4.66E+06	mm^4	I_y =	2.49E+08	mm^4
t =	16	mm	t =	8.9	mm	y_b =	30.24	mm	r_x =	21.47	mm	r_y =	156.95	mm
A =	4800	mm^2	A =	5310.63	mm^2	x_L =	227.92	mm	S_{xb} =	3.08E+05	mm^3	S_{yL} =	2.19E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	596.7	mm	D =	29.9	mm	I_x =	2.49E+08	mm^4	I_y =	4.66E+06	mm^4
t =	16	mm	t =	8.9	mm	y_b =	368.78	mm	r_x =	156.95	mm	r_y =	21.47	mm
A =	4800	mm^2	A =	5310.63	mm^2	x_L =	30.24	mm	S_{xb} =	1.35E+06	mm^3	S_{yL} =	3.08E+05	mm^3

Effective length factor, K =	1.00		L_1 =	145.9	mm
Unbraced length, L =	145.9	mm	L_2 =	145.9	mm
r_{min} =	21.47	mm	L_3 =	145.9	mm

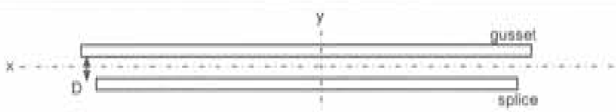
$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0734$$

			(splice plate)	
ϕ_s =	0.9			
Effective width, L_w =	596.7	mm	300	mm
Thickness, t =	8.9	mm	16	mm
n =	1.34			

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 2091 \text{ kN}$$

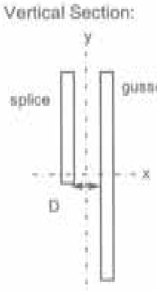
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



(splice plate)														
b =	300	mm	b =	517.2	mm	D =	29.9	mm	I_x =	4.35E+06	mm^4	I_y =	1.66E+08	mm^4
t =	16	mm	t =	8.9	mm	y_b =	28.73	mm	r_x =	21.50	mm	r_y =	133.00	mm
A =	4800	mm^2	A =	4603.08	mm^2	x_L =	203.16	mm	S_{xb} =	3.03E+05	mm^3	S_{yL} =	1.64E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	517.2	mm	D =	29.9	mm	I_x =	1.66E+08	mm^4	I_y =	4.35E+06	mm^4
t =	16	mm	t =	8.9	mm	y_b =	314.04	mm	r_x =	133.00	mm	r_y =	21.50	mm
A =	4800	mm^2	A =	4603.08	mm^2	x_L =	28.73	mm	S_{xb} =	1.06E+06	mm^3	S_{yL} =	3.03E+05	mm^3

Effective length factor, K =	1.00		L_1 =	145.9	mm
Unbraced length, L =	145.9	mm	L_2 =	145.9	mm
r_{min} =	21.50	mm	L_3 =	145.9	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0732$$

			(splice plate)	
ϕ_s =	0.9			
Effective width, L_w =	517.2	mm	300	mm
Thickness, t =	8.9	mm	16	mm
n =	1.34			

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1945 \text{ kN}$$

RESISTANCE SUMMARY (one gusset plate)

Member A

Factored applied tensile force =	286.95	kN	<	668	kN	Tensile resistance	ok!
Factored applied compressive force =	1101.6	kN	>	922	kN	Compressive resistance	no good!

Member B

Factored applied tensile force =	0	kN	<	1380	kN	Tensile resistance	ok!
Factored applied compressive force =	322.45	kN	<	1238	kN	Compressive resistance	ok!

Member C

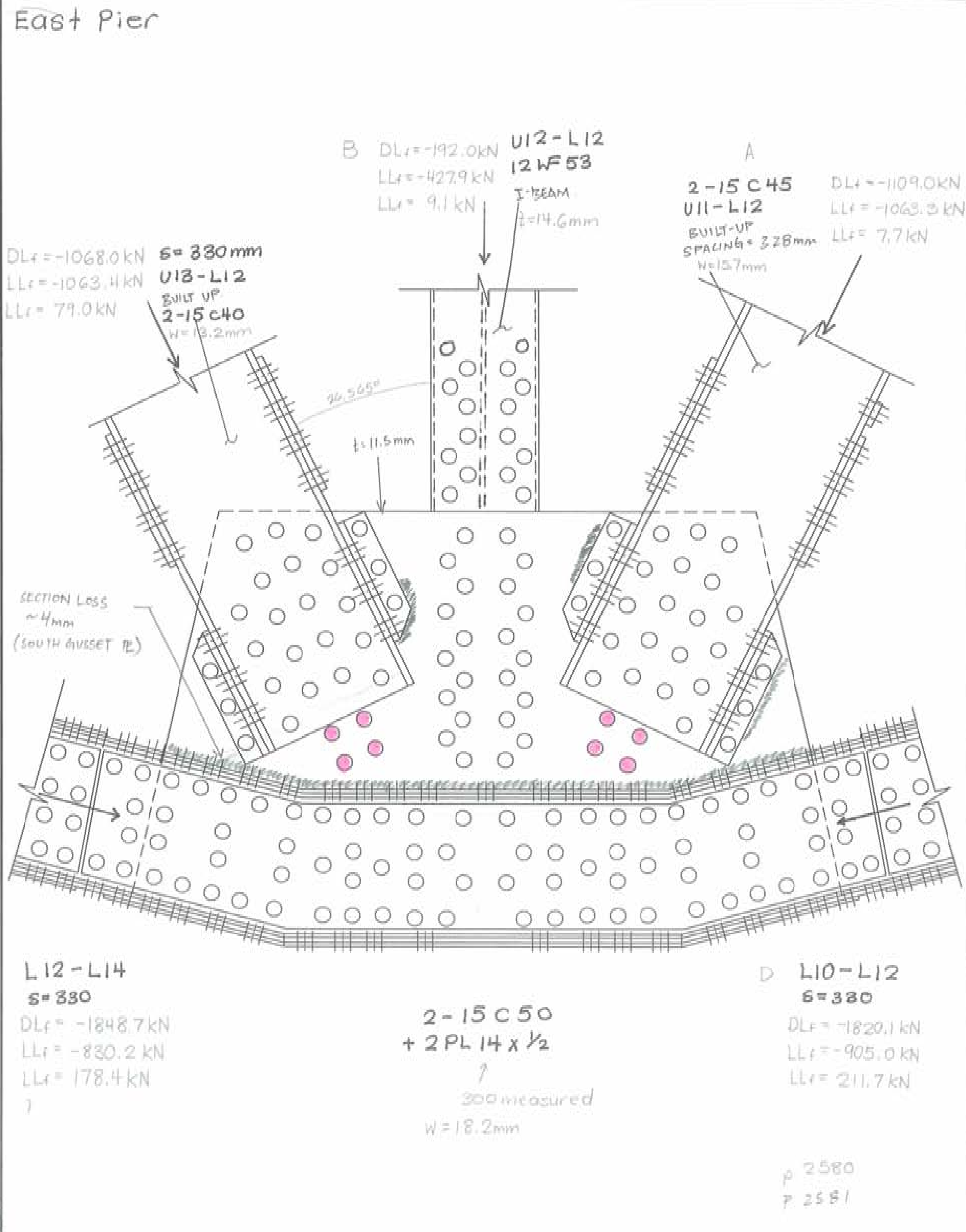
Factored applied tensile force =	292.6	kN	<	657	kN	Tensile resistance	ok!
Factored applied compressive force =	0	kN	<	369	kN	Compressive resistance	ok!

Member D

Factored applied tensile force =	1353.05	kN	<	2293	kN	Tensile resistance	ok!
Factored applied compressive force =	802.95	kN	<	2091	kN	Compressive resistance	ok!

Member E

Factored applied tensile force =	1348.05	kN	<	2142	kN	Tensile resistance	ok!
Factored applied compressive force =	1488.9	kN	<	1945	kN	Compressive resistance	ok!



Calculations in spreadsheet

McCORMICK RANKIN CORPORATION

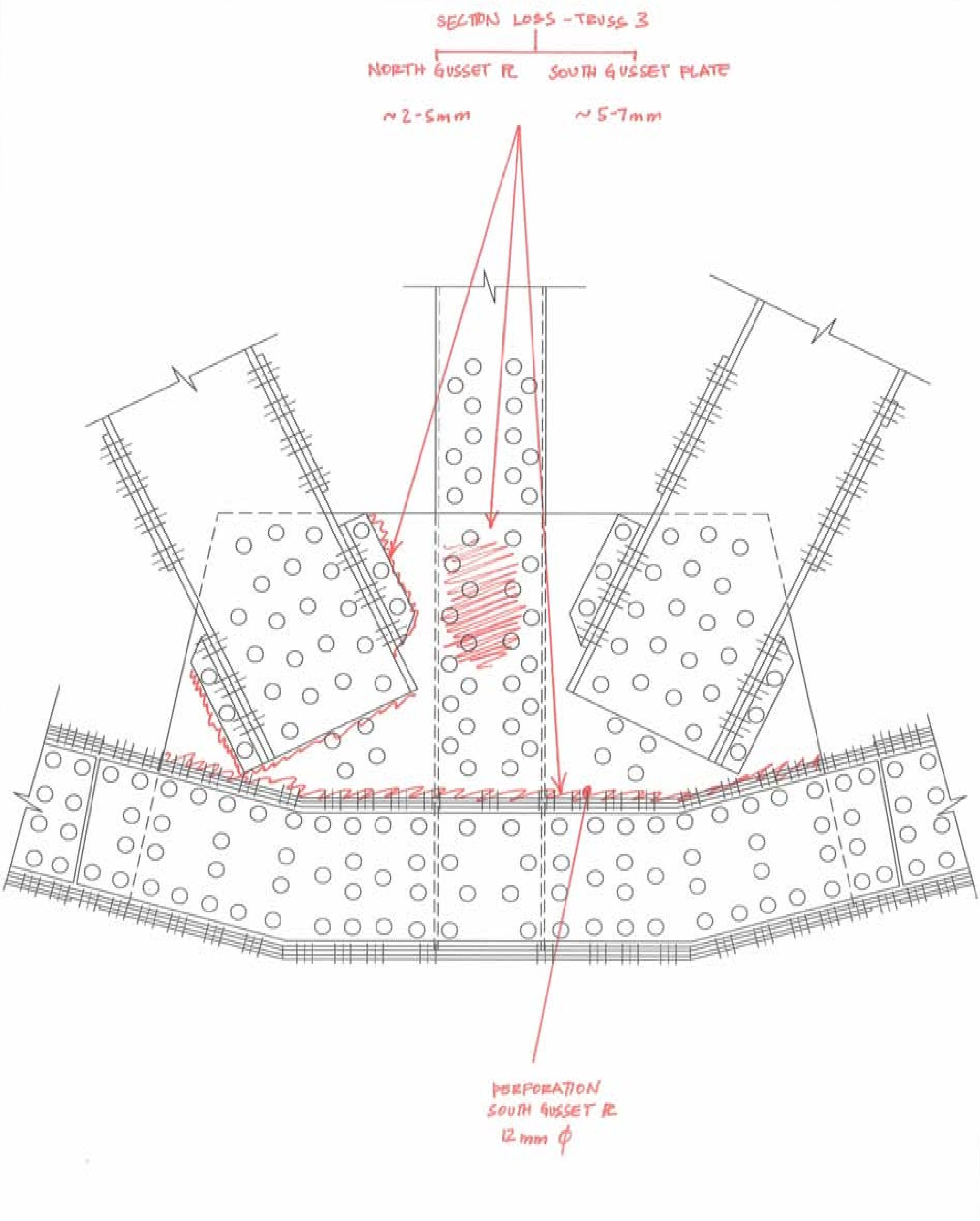
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

L12E

SPAN EXT. TRUSS ~~NORTH~~ 3



McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

L12E W

SPAN

TRUSS NORTH

Check of Gusset Plate Gross Section Under Compression (accounting for 4mm section loss).

$r = 164mm$
$L_c = 148.4mm$
$\lambda = 0.00977$
$n = 1.34$

$b = 1650mm$ (taken along section that's lossed 4mm).
$t = 11.5mm - 4mm = 7.5mm$

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$
$= (0.90)(2)(1650mm)(7.5mm)(230MPa)(1 + \lambda^{2n})^{-1/n}$
$C_r = 5123.2kN$

$C_f = P_A + P_B + P_C$
$= 1942.965 + 619.9 + 1845.847$
$C_f = 4408.7 kN < C_r$

∴ gross section okay in compression

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge
Gusset Node: L12E

Material Properties For Gusset Plate

Gusset Plate:	F_y = 230 MPa	Splice Plate:	F_y = 230 MPa				
	F_u = 420 MPa		F_u = 420 MPa				
	E = 200,000 MPa		E = 200,000 MPa				
	t = 7.5 mm		t = 11.43 mm	orig. t =	12.7	mm	
			h = mm	section loss =	10	%	

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 618 mm
Gross area, A_g = 4635 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1013 kN

B) Net Section Fracture

Effective width, w_e = 687 mm
holes = 4.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 4442 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1506 kN

Factored tensile resistance = 1013 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 602 mm
Gross area, A_g = 4515 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 987 kN

B) Net Section Fracture

Effective width, w_e = 602 mm
holes = 3.0
gap = 2 mm
dia. = 22 mm
Net area, A_{ne} = 3975 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1348 kN

Factored tensile resistance = 987 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 504 mm
Gross area, A_g = 3780 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 826 kN

B) Net Section Fracture

Effective width, w_e = 519 mm
holes = 4.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 3180 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1079 kN

Factored tensile resistance = 826 kN **Thus, gross section yielding governs**

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	530	mm	300	mm
Gross area, A_g =	3975	mm^2	3429	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

= 1618 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	3300	mm^2	2340	mm^2
f_s =	0.95			

$T_r = 0.85\ f_s A_{ne} F_u$

= 1913 kN

Factored tensile resistance = 1618 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	495	mm	300	mm
Gross area, A_g =	3712.5	mm^2	3429	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

= 1560 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	522	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	3203	mm^2	2340	mm^2
f_s =	0.95			

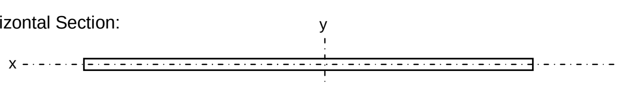
$T_r = 0.85\ f_s A_{ne} F_u$

= 1880 kN

Factored tensile resistance = 1560 kN **Thus, gross section yielding governs**

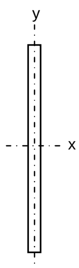
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	618	mm	I_x =	1.91E+08	mm^4	I_y =	2.26E+08	mm^4
t =	11.5	mm	r_x =	164.03	mm	r_y =	178.40	mm
A =	7107	mm^2	S_x =	3.33E+07	mm^3	S_y =	7.32E+05	mm^3
d =	164	mm						

Vertical Section:



h =	618	mm	I_x =	2.26E+08	mm^4	I_y =	1.91E+08	mm^4
t =	11.5	mm	r_x =	178.40	mm	r_y =	164.03	mm
A =	7107	mm^2	S_x =	7.32E+05	mm^3	S_y =	3.33E+07	mm^3
d =	164	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	142.9	mm	L_2 =	313.2	mm
r_{min} =	164.03	mm	L_3 =	115.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0094$$

f_s =	0.9	
Effective width, L_w =	618	mm
Thickness, t =	7.5	mm
n =	1.34	

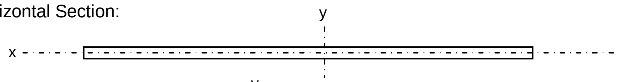
$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$

= 959 kN

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

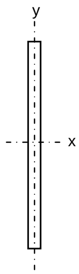
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

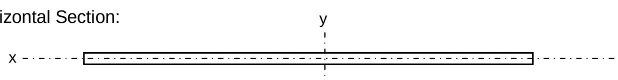
f_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	7.5	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1043 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

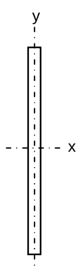
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	618	mm	I_x =	1.94E+08	mm^4	I_y =	2.26E+08	mm^4
t =	11.5	mm	r_x =	165.03	mm	r_y =	178.40	mm
A =	7107	mm^2	S_x =	3.37E+07	mm^3	S_y =	7.32E+05	mm^3
d =	165	mm						

Vertical Section:



h =	618	mm	I_x =	2.26E+08	mm^4	I_y =	1.94E+08	mm^4
t =	11.5	mm	r_x =	178.40	mm	r_y =	165.03	mm
A =	7107	mm^2	S_x =	7.32E+05	mm^3	S_y =	3.37E+07	mm^3
d =	165	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	142.9	mm	L_2 =	313.2	mm
r_{min} =	165.03	mm	L_3 =	115.4	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0093$$

f_s =	0.9	
Effective width, L_w =	618	mm
Thickness, t =	7.5	mm
n =	1.34	

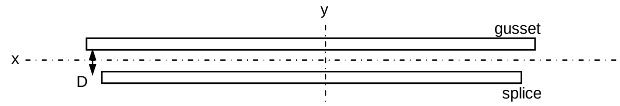
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 959 \text{ kN}$$

MRC

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D

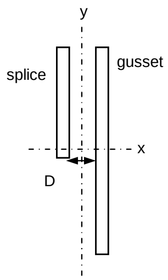
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



	(splice plate)													
b =	300	mm	b =	676	mm	D =	30.3	mm	I_x =	4.73E+06	mm^4	I_y =	4.15E+08	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	34.80	mm	r_x =	20.21	mm	r_y =	189.27	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	276.17	mm	S_{xb} =	2.72E+05	mm^3	S_{yL} =	3.01E+06	mm^3

Vertical Section:



	(splice plate)													
h =	300	mm	h =	676	mm	D =	30.3	mm	I_x =	4.15E+08	mm^4	I_y =	4.73E+06	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	399.83	mm	r_x =	189.27	mm	r_y =	20.21	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	34.80	mm	S_{xb} =	2.08E+06	mm^3	S_{yL} =	2.72E+05	mm^3

Effective length factor, K =	1.00		L_1 =	98	mm
Unbraced length, L =	98.0	mm	L_2 =	98	mm
r_{min} =	20.21	mm	L_3 =	98	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0523$$

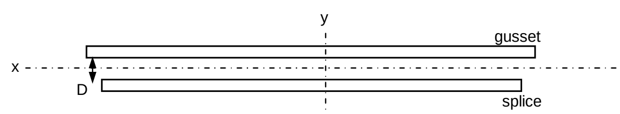
			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	7.5	mm	11.43	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1759 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E

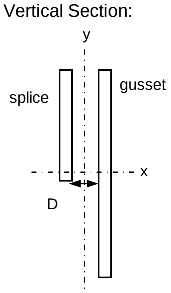
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



	(splice plate)													
b =	300	mm	b =	676	mm	D =	30.3	mm	I_x =	4.73E+06	mm^4	I_y =	4.15E+08	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	34.80	mm	r_x =	20.21	mm	r_y =	189.27	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	276.17	mm	S_{xb} =	2.72E+05	mm^3	S_{yL} =	3.01E+06	mm^3

Vertical Section:



	(splice plate)													
h =	300	mm	h =	676	mm	D =	30.3	mm	I_x =	4.15E+08	mm^4	I_y =	4.73E+06	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	399.83	mm	r_x =	189.27	mm	r_y =	20.21	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	34.80	mm	S_{xb} =	2.08E+06	mm^3	S_{yL} =	2.72E+05	mm^3

Effective length factor, K =	1.00		L_1 =	98	mm
Unbraced length, L =	98.0	mm	L_2 =	98	mm
r_{min} =	20.21	mm	L_3 =	98	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0523$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	7.5	mm	11.43	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1759 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

RESISTANCE SUMMARY (one gusset plate)

Member A

Factored applied tensile force =	0	kN	<	1013	kN	Tensile resistance	**ok!**
Factored applied compressive force =	1086.15	kN	>	959	kN	Compressive resistance	**no good!**

Member B

Factored applied tensile force =	0	kN	<	987	kN	Tensile resistance	**ok!**
Factored applied compressive force =	309.95	kN	<	1043	kN	Compressive resistance	**ok!**

Member C

Factored applied tensile force =	0	kN	<	826	kN	Tensile resistance	**ok!**
Factored applied compressive force =	1065.7	kN	>	959	kN	Compressive resistance	**no good!**

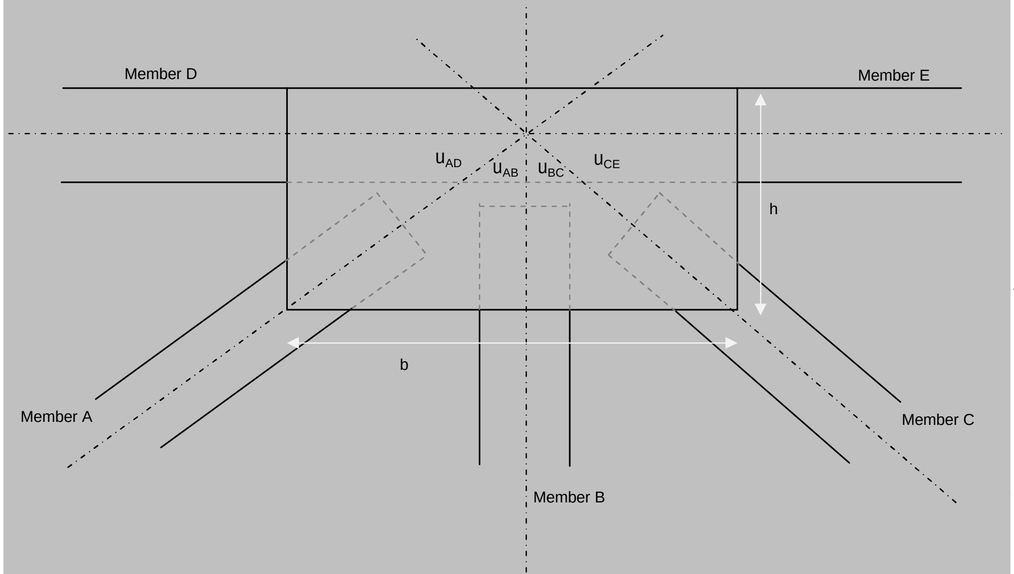
Member D

Factored applied tensile force =	0	kN	<	1618	kN	Tensile resistance	**ok!**
Factored applied compressive force =	1362.55	kN	<	1759	kN	Compressive resistance	**ok!**

Member E

Factored applied tensile force =	0	kN	<	1560	kN	Tensile resistance	**ok!**
Factored applied compressive force =	1339.45	kN	<	1759	kN	Compressive resistance	**ok!**

Gusset Plate Geometry



	b =	1130	mm
	h =	900	mm
	t =	10.1	mm
	u_{AD} =	65	deg
	u_{AB} =	25	deg
	u_{BC} =	30	deg
	u_{CE} =	60	deg

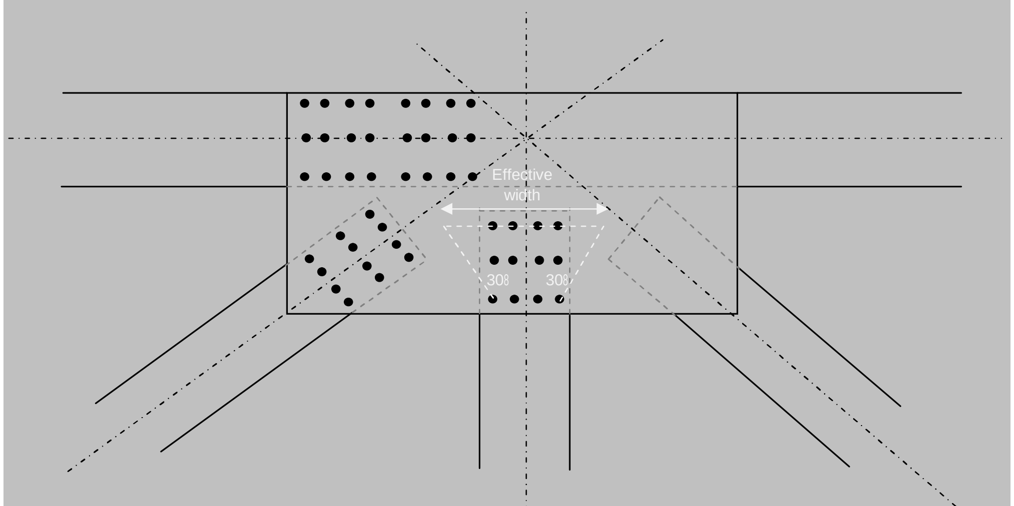
Tensile forces:

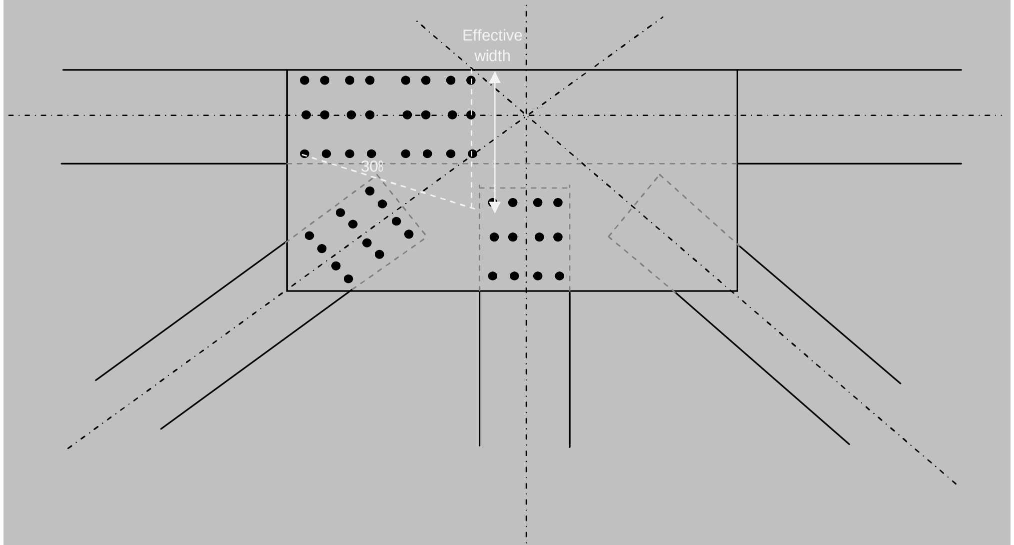
A	F1 =	0	kN
B	F2 =	0	kN
C	F3 =	0	kN
D	F4 =	0	kN
E	F5 =	0	kN

Compressive forces:

A	F1 =	2172.3	kN
B	F2 =	619.9	kN
C	F3 =	2131.4	kN
D	F4 =	2725.1	kN
E	F5 =	2678.9	kN

Whitmore Effective Width Method



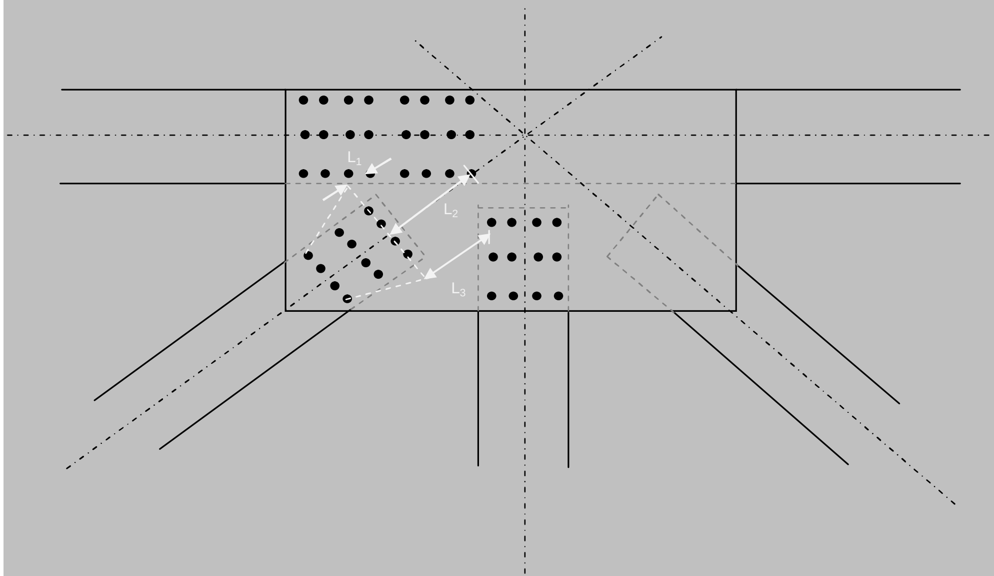


* The *effective width* is measured across the last row of fasteners in the connection under consideration. The effective width is bound on either side by the closer of the nearest adjacent plate edges or lines constructed starting from the external fasteners within the first row and extending from these fasteners at an angle of 30 degrees with respect to the line of action of the axial force. Bolt/rivet holes are not subtracted from the width.

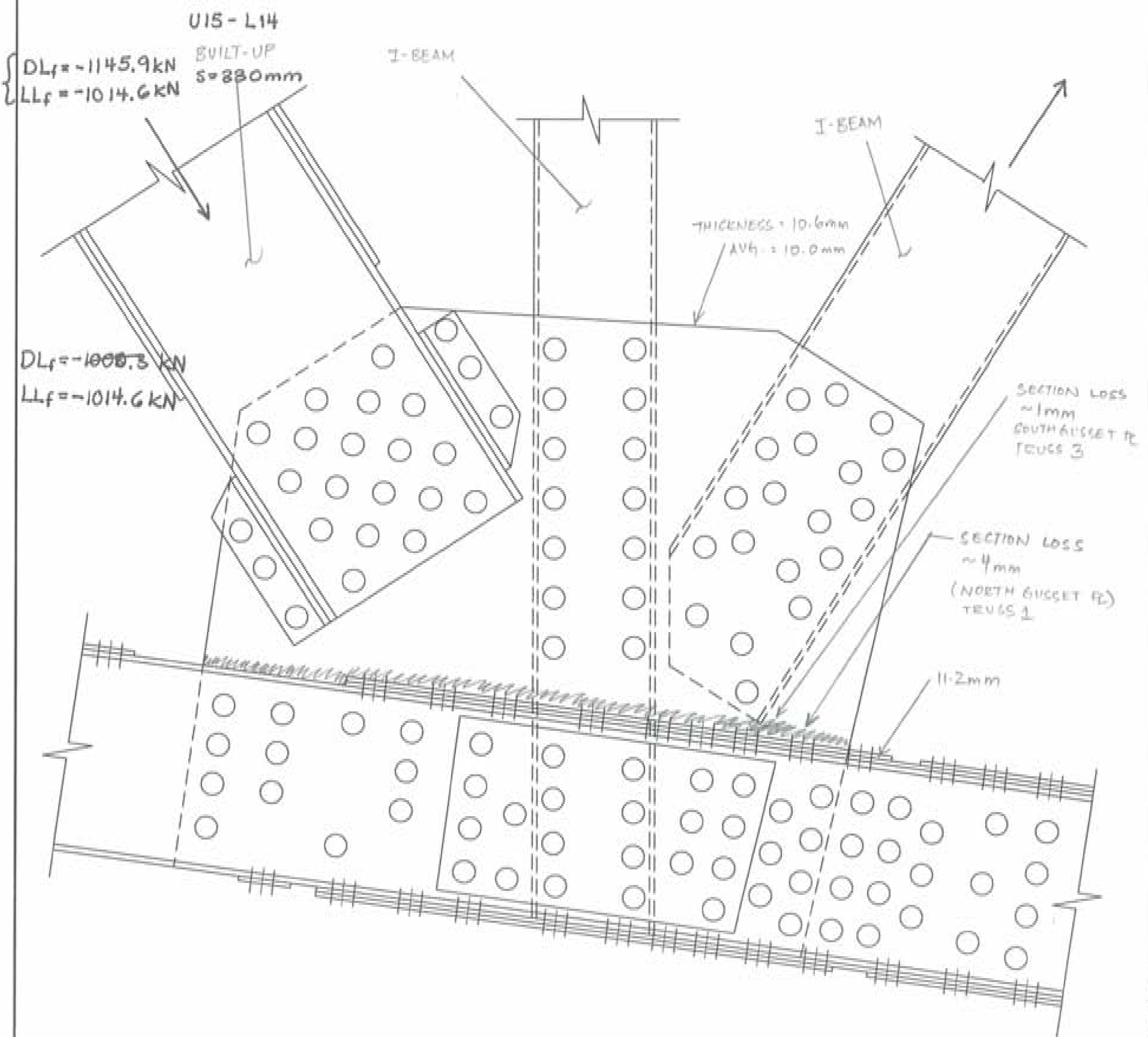
Gusset Plate Geometry

L_2 = The distance from the last row of fasteners in the compression member under consideration, to the first row of fasteners in the closest adjacent member, measured along the line of action of the compressive axial force.

L_1 & L_3 = The distance from each of the ends of the Whitmore width to the first row of fasteners in the closest adjacent member, measured parallel to the line of action of the compressive axial force.



East Interior Span

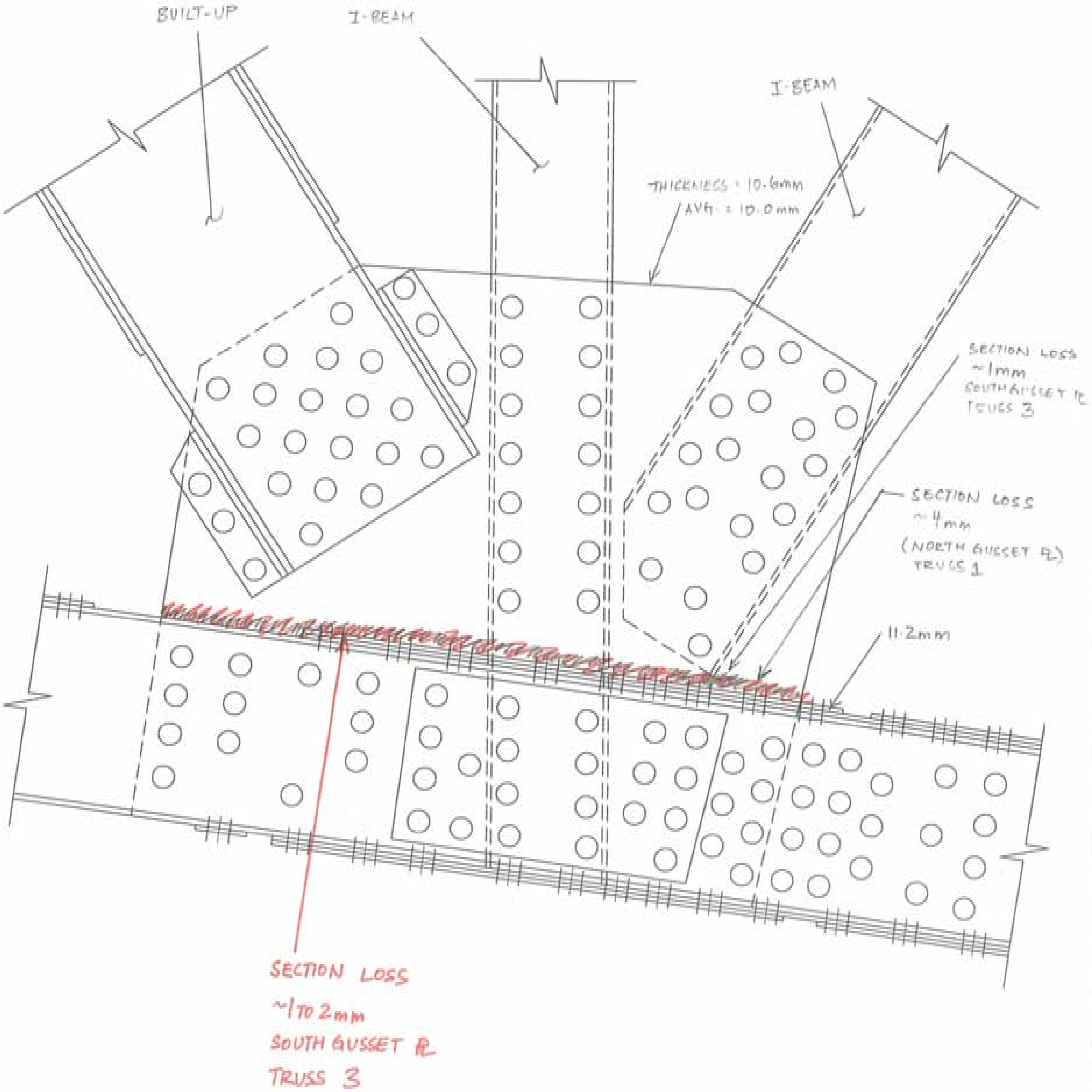


McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

DATE: DECEMBER 2008
DRAWING: L14E
SPAN
TRUSS NORTH

Glenn



P.2630

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L14E W

SPAN ______ TRUSS NORTH


423
790.7
623
152.3

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	530	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	5300	mm^2	2365.5	mm^2	= 1675 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	535	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4.0		= 2040 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	4400	mm^2	1614	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1675 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	495	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	4950	mm^2	2365.5	mm^2	= 1598 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	522	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	4.0		4		= 1996 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4270	mm^2	1614	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 1598 kN **Thus, gross section yielding governs**

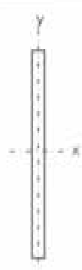
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

Δb =	0	mm						
b =	623	mm	I_x =	5.19E+04	mm^4	I_y =	2.02E+08	mm^4
t =	10	mm	r_x =	2.89	mm	r_y =	179.84	mm
A =	6230	mm^2	S_x =	1.04E+04	mm^3	S_y =	6.47E+05	mm^3
d =	0	mm						

Vertical Section:



h =	623	mm	I_x =	2.02E+08	mm^4	I_y =	5.19E+04	mm^4
t =	10	mm	r_x =	179.84	mm	r_y =	2.89	mm
A =	6230	mm^2	S_x =	6.47E+05	mm^3	S_y =	1.04E+04	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	152.5	mm
Unbraced length, L =	191.8	mm	L_2 =	423	mm
r_{min} =	2.89	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7173$$

ϕ_s =	0.9	
Effective width, L_w =	623	mm
Thickness, t =	10	mm
n =	1.34	

~~$C_r = \phi_s A F_y (1+\lambda^{2n})^{-1/n}$~~

~~= 998 kN~~

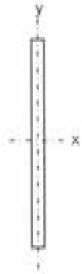
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	741.9	mm	I_x =	9.40E+04	mm^4	I_y =	3.91E+08	mm^4
t =	11.5	mm	r_x =	3.32	mm	r_y =	214.17	mm
A =	8531.85	mm^2	S_x =	1.64E+04	mm^3	S_y =	1.05E+06	mm^3

Vertical Section:



h =	741.9	mm	I_x =	3.91E+08	mm^4	I_y =	9.40E+04	mm^4
t =	11.5	mm	r_x =	214.17	mm	r_y =	3.32	mm
A =	8531.85	mm^2	S_x =	1.05E+06	mm^3	S_y =	1.64E+04	mm^3

Effective length factor, K =	1.00		L_1 =	148.4	mm
Unbraced length, L =	148.4	mm	L_2 =	148.4	mm
r_{min} =	3.32	mm	L_3 =	148.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.4825$$

ϕ_s =	0.9	
Effective width, L_w =	741.9	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1391 \text{ kN}$$

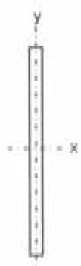
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	730.7	mm	I_x =	1.99E+08	mm^4	I_y =	3.25E+08	mm^4
t =	10	mm	r_x =	165.03	mm	r_y =	210.93	mm
A =	7307	mm^2	S_x =	3.98E+07	mm^3	S_y =	8.90E+05	mm^3
d =	165	mm						

Vertical Section:



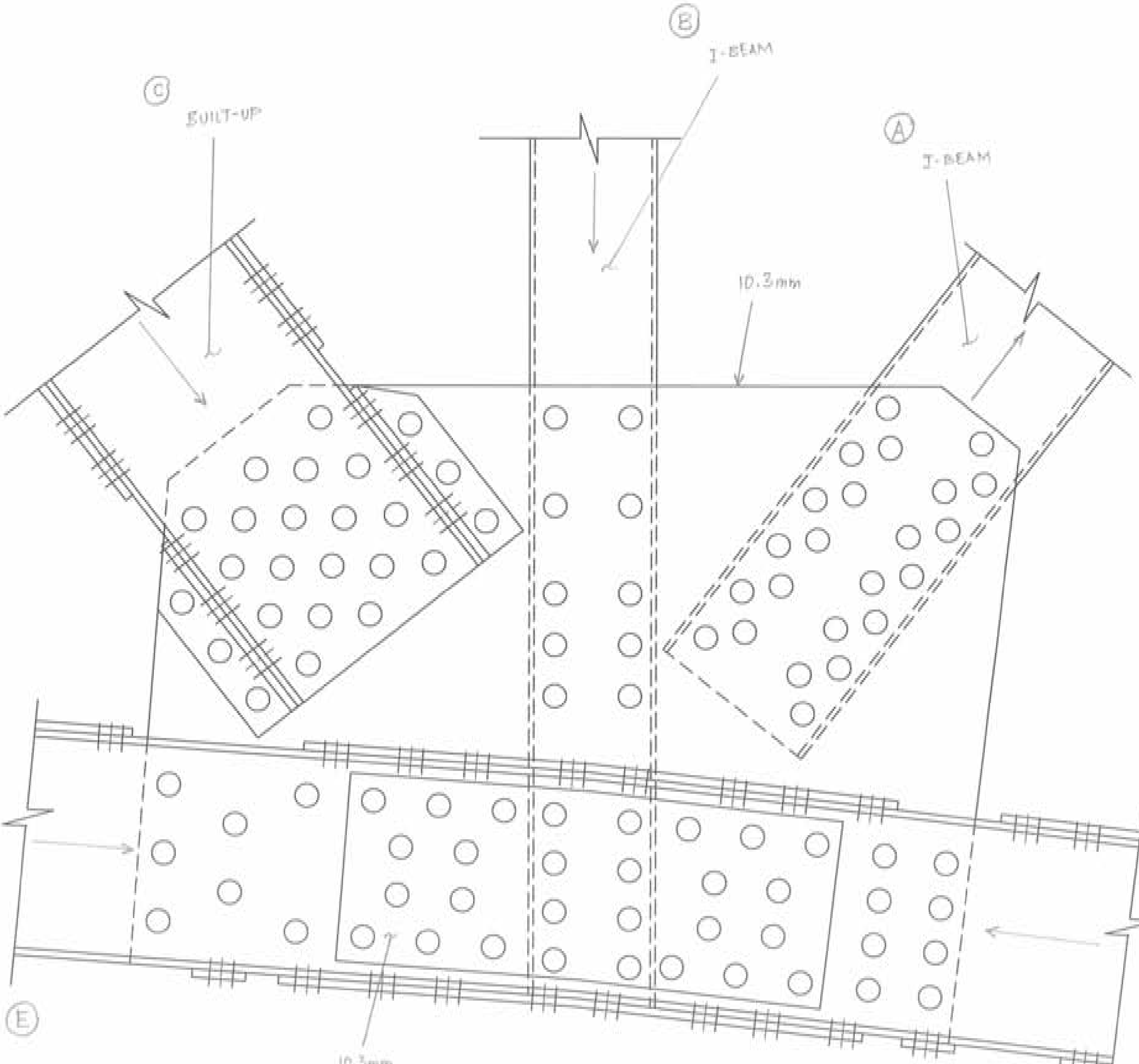
h =	730.7	mm	I_x =	3.25E+08	mm^4	I_y =	1.99E+08	mm^4
t =	10	mm	r_x =	210.93	mm	r_y =	165.03	mm
A =	7307	mm^2	S_x =	8.90E+05	mm^3	S_y =	3.98E+07	mm^3
d =	165	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	185.5	mm	L_2 =	423	mm
r_{min} =	165.03	mm	L_3 =	133.4	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0121$$

ϕ_s =	0.9	
Effective width, L_w =	730.7	mm
Thickness, t =	10	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1513 \text{ kN}$$



R 2629

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS —BRONTE CREEK

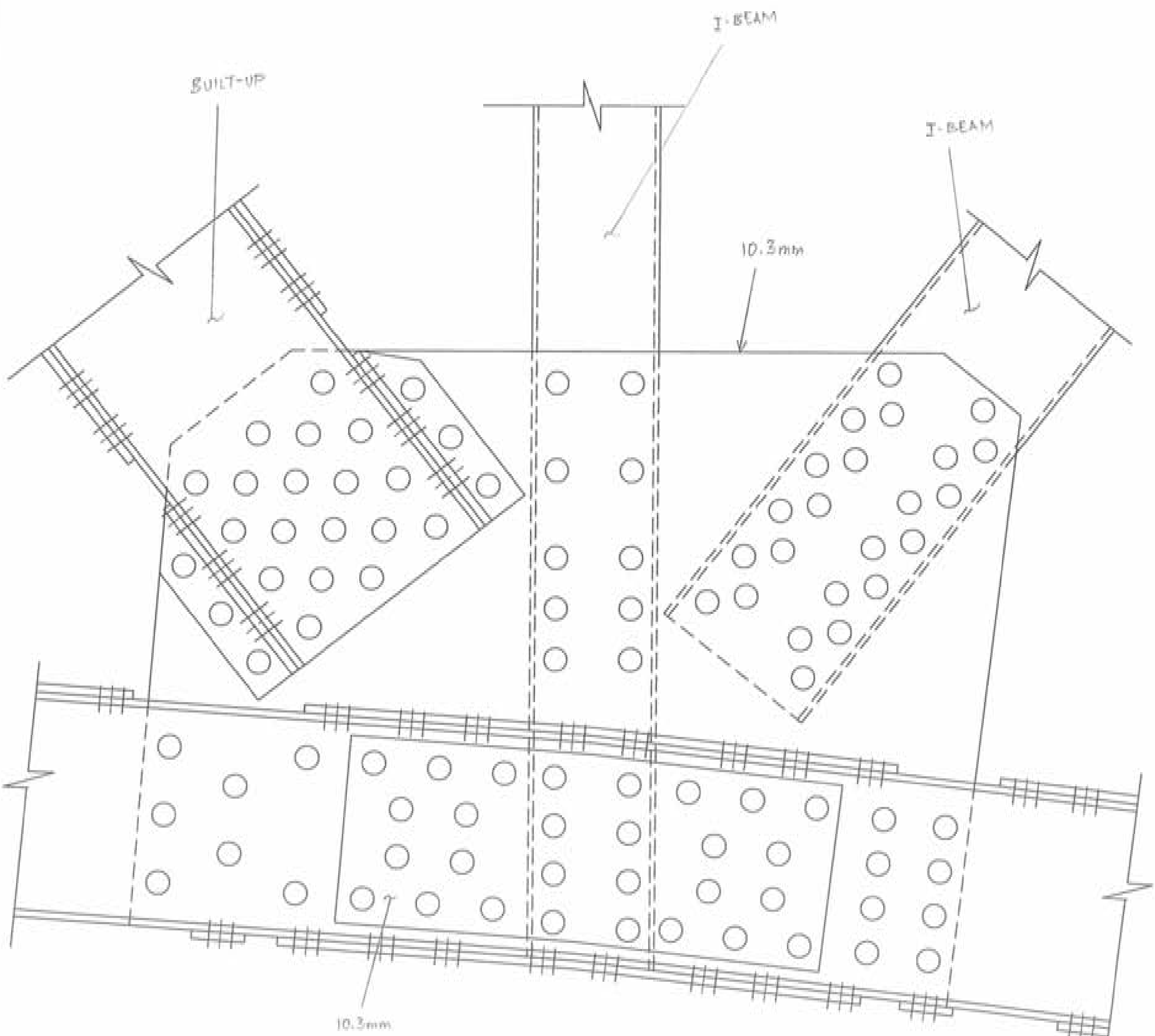
DATE: DECEMBER 2008

DRAWING:

L16E

SPAN

TRUSS NORTH



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MRC

McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS -BRONTE CREEK

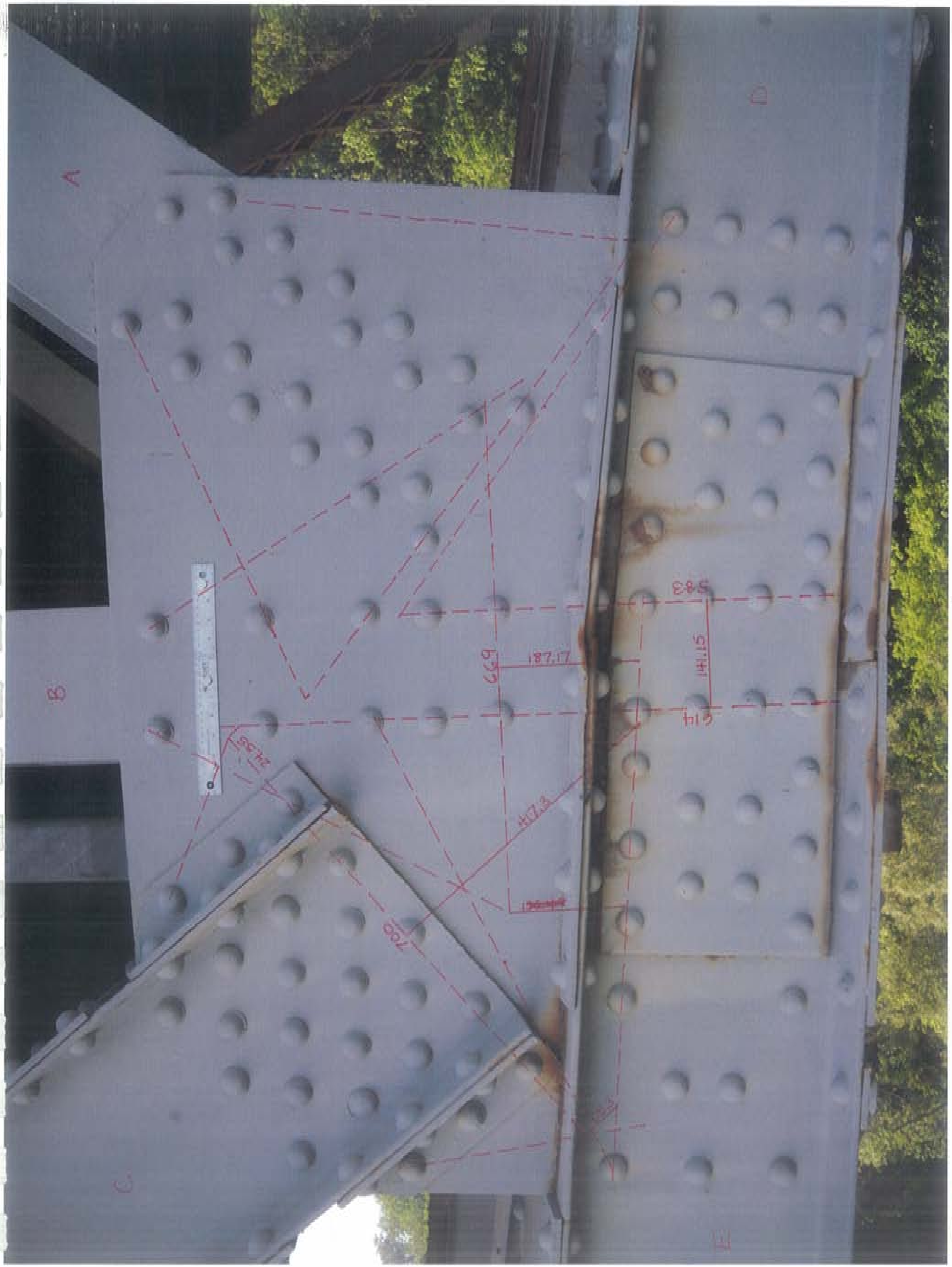
DATE: DECEMBER 2008

DRAWING:

L16EW

SPAN

TRUSS NORTH


A
B
C
D
E
583
187.17
141.15
614
417.3
700

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b = 669	mm	I_x = 6.09E+04	mm^4	I_y = 2.57E+08	mm^4		
t = 10.3	mm	r_x = 2.97	mm	r_y = 193.12	mm		
A = 6890.7	mm^2	S_x = 1.18E+04	mm^3	S_y = 7.68E+05	mm^3		

Vertical Section:

h = 669	mm	I_x = 2.57E+08	mm^4	I_y = 6.09E+04	mm^4
t = 10.3	mm	r_x = 193.12	mm	r_y = 2.97	mm
A = 6890.7	mm^2	S_x = 7.68E+05	mm^3	S_y = 1.18E+04	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	62.4	mm	L_2 =	187.2	mm
r_{min} =	2.97	mm	L_3 =	0	mm

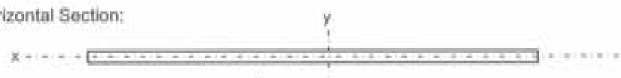
$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.2265$$

ϕ_s =	0.9	
Effective width, L_w =	669	mm
Thickness, t =	10.3	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1407 \text{ kN}$$

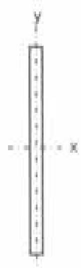
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b = 700	mm	I_x = 6.37E+04	mm^4	I_y = 2.94E+08	mm^4
t = 10.3	mm	r_x = 2.97	mm	r_y = 202.07	mm
A = 7210	mm^2	S_x = 1.24E+04	mm^3	S_y = 8.41E+05	mm^3
d = 0	mm				

Vertical Section:



h = 700	mm	I_x = 2.94E+08	mm^4	I_y = 6.37E+04	mm^4
t = 10.3	mm	r_x = 202.07	mm	r_y = 2.97	mm
A = 7210	mm^2	S_x = 8.41E+05	mm^3	S_y = 1.24E+04	mm^3
d = 0	mm				

Effective length factor, K =	1.00		L_1 =	58.3	mm
Unbraced length, L =	166.7	mm	L_2 =	417.3	mm
r_{min} =	2.97	mm	L_3 =	24.6	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6053$$

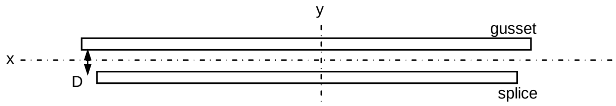
ϕ_s =	0.9	
Effective width, L_w =	700	mm
Thickness, t =	10.3	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1256 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D

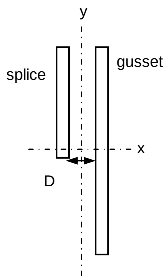
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	583	mm	D =	20.4	mm	I_x =	1.90E+06	mm^4	I_y =	2.32E+08	mm^4
t =	9.785	mm	t =	10.3	mm	y_b =	25.34	mm	r_x =	14.59	mm	r_y =	160.94	mm
A =	2935.5	mm^2	A =	6004.9	mm^2	x_L =	245.04	mm	S_{xb} =	1.50E+05	mm^3	S_{yL} =	1.89E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	583	mm	D =	20.4	mm	I_x =	2.32E+08	mm^4	I_y =	1.90E+06	mm^4
t =	9.785	mm	t =	10.3	mm	y_b =	337.96	mm	r_x =	160.94	mm	r_y =	14.59	mm
A =	2935.5	mm^2	A =	6004.9	mm^2	x_L =	25.34	mm	S_{xb} =	1.37E+06	mm^3	S_{yL} =	1.50E+05	mm^3

Effective length factor, K =	1.00		L_1 =	141.2	mm
Unbraced length, L =	141.2	mm	L_2 =	141.2	mm
r_{min} =	14.59	mm	L_3 =	141.2	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.1045$$

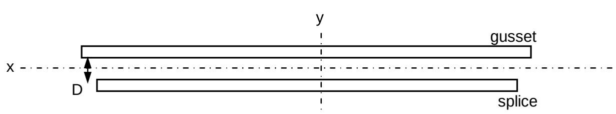
			(splice plate)	
f_s =	0.9			
Effective width, L_w =	583	mm	300	mm
Thickness, t =	10.3	mm	9.785	mm
n =	1.34			

$$C_r = f_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1847 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E

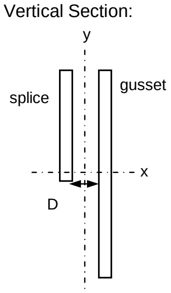
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	614	mm	D =	20.4	mm	I_x =	1.94E+06	mm^4	I_y =	2.70E+08	mm^4
t =	9.785	mm	t =	10.3	mm	y_b =	25.68	mm	r_x =	14.46	mm	r_y =	170.80	mm
A =	2935.5	mm^2	A =	6324.2	mm^2	x_L =	257.23	mm	S_{xb} =	1.51E+05	mm^3	S_{yL} =	2.10E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	614	mm	D =	20.4	mm	I_x =	2.70E+08	mm^4	I_y =	1.94E+06	mm^4
t =	9.785	mm	t =	10.3	mm	y_b =	356.77	mm	r_x =	170.80	mm	r_y =	14.46	mm
A =	2935.5	mm^2	A =	6324.2	mm^2	x_L =	25.68	mm	S_{xb} =	1.51E+06	mm^3	S_{yL} =	1.51E+05	mm^3

Effective length factor, K =	1.00		L_1 =	141.2	mm
Unbraced length, L =	141.2	mm	L_2 =	141.2	mm
r_{min} =	14.46	mm	L_3 =	141.2	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.1054$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	614	mm	300	mm
Thickness, t =	10.3	mm	9.785	mm
n =	1.34			

$$C_r = f_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1913 \text{ kN}$$

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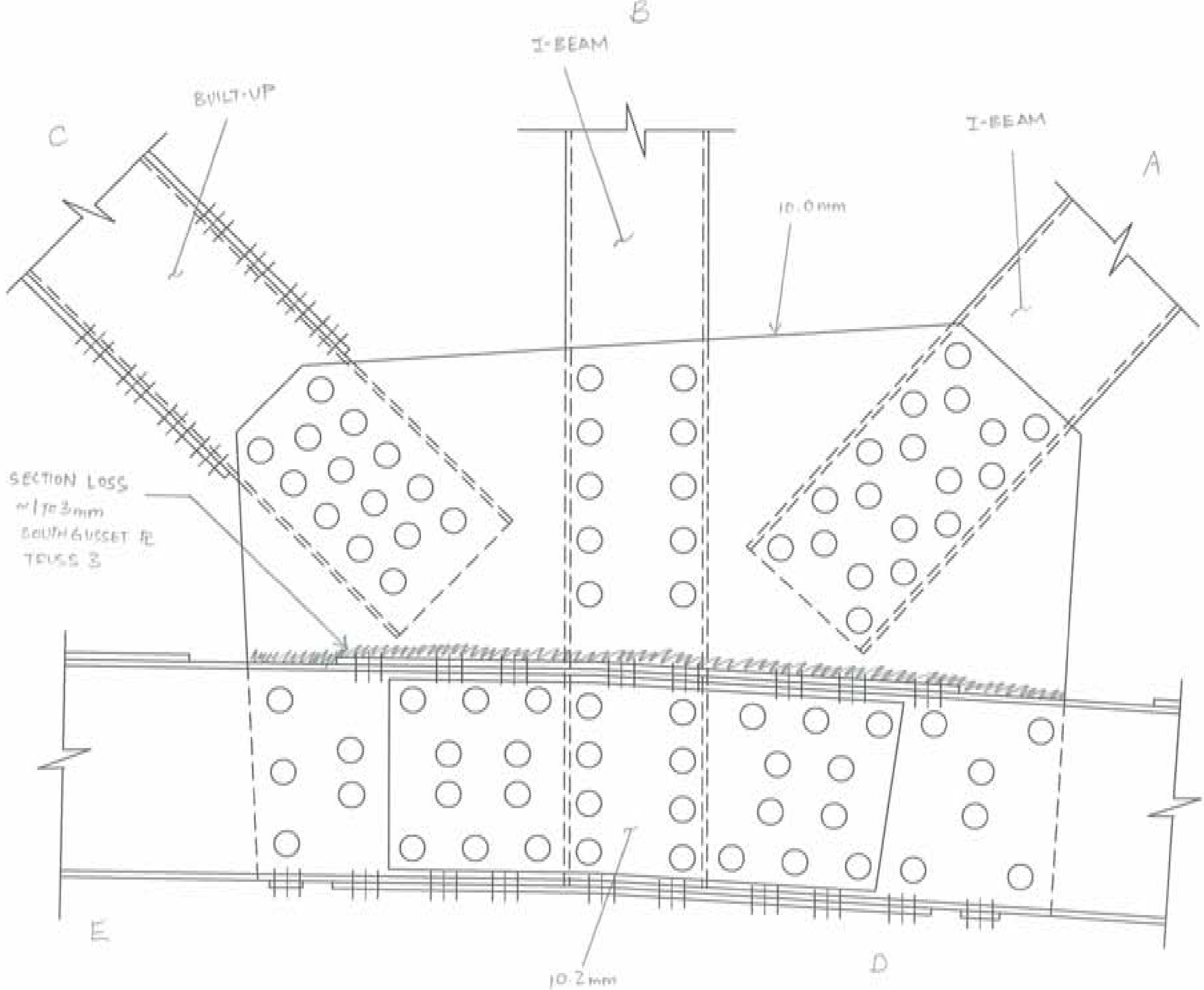
RESISTANCE SUMMARY (one gusset plate)

Member A								
	Factored applied tensile force =	286.95	kN	<	773	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	0	kN	<	1161	kN	Compressive resistance	**ok!**
Member B								
	Factored applied tensile force =	0	kN	<	1597	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	332.8	kN	<	1407	kN	Compressive resistance	**ok!**
Member C								
	Factored applied tensile force =	292.6	kN	<	760	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	947.4	kN	<	1256	kN	Compressive resistance	**ok!**
Member D								
	Factored applied tensile force =	1353.05	kN	<	2082	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	725.6	kN	<	1847	kN	Compressive resistance	**ok!**
Member E								
	Factored applied tensile force =	1348.05	kN	<	1906	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	175.65	kN	<	1913	kN	Compressive resistance	**ok!**



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McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

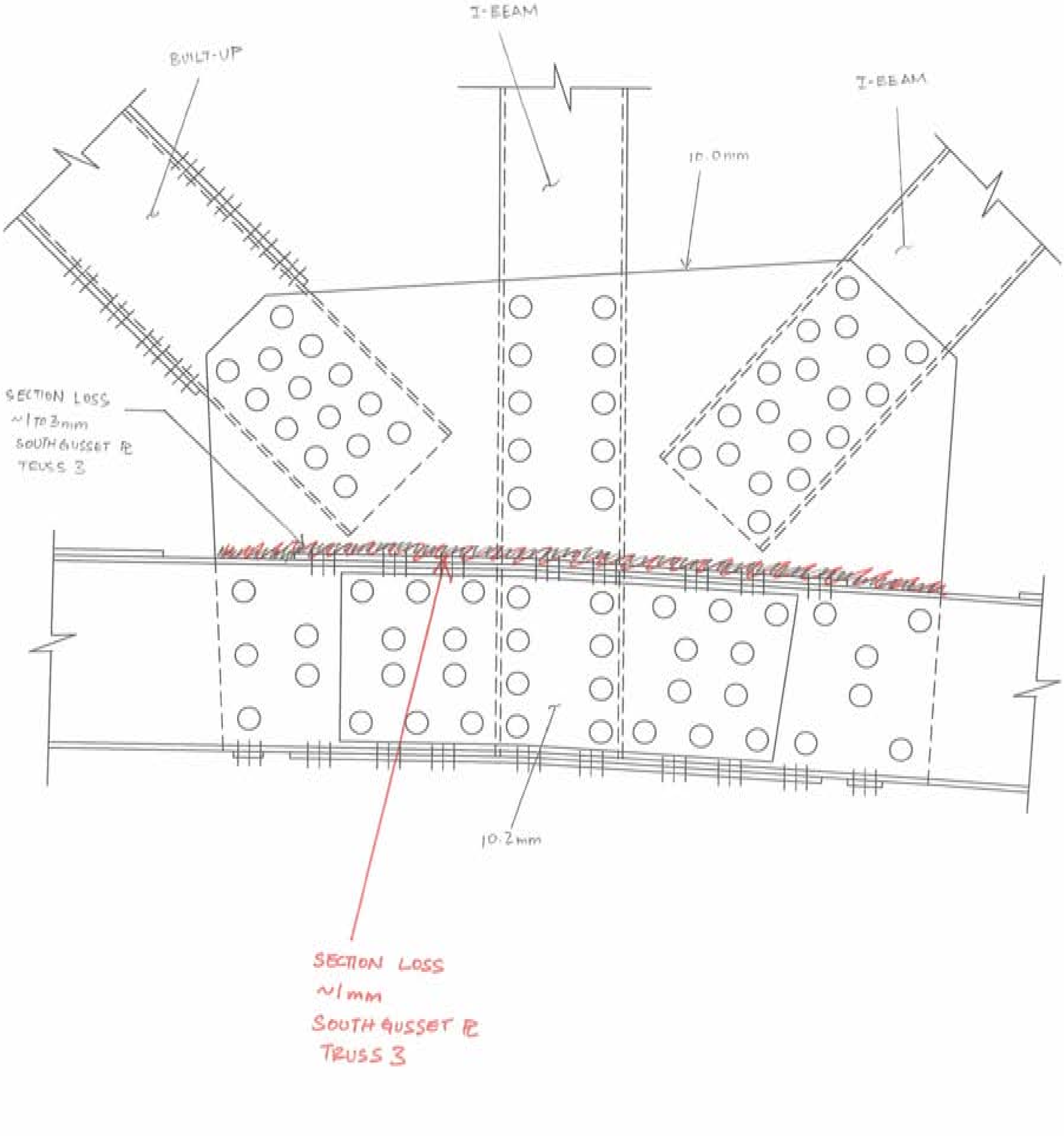
DATE: DECEMBER 2008

DRAWING:

L18E

SPAN

TRUSS NORTH



P. 2628

MRC

McCORMICK RANKIN CORPORATION

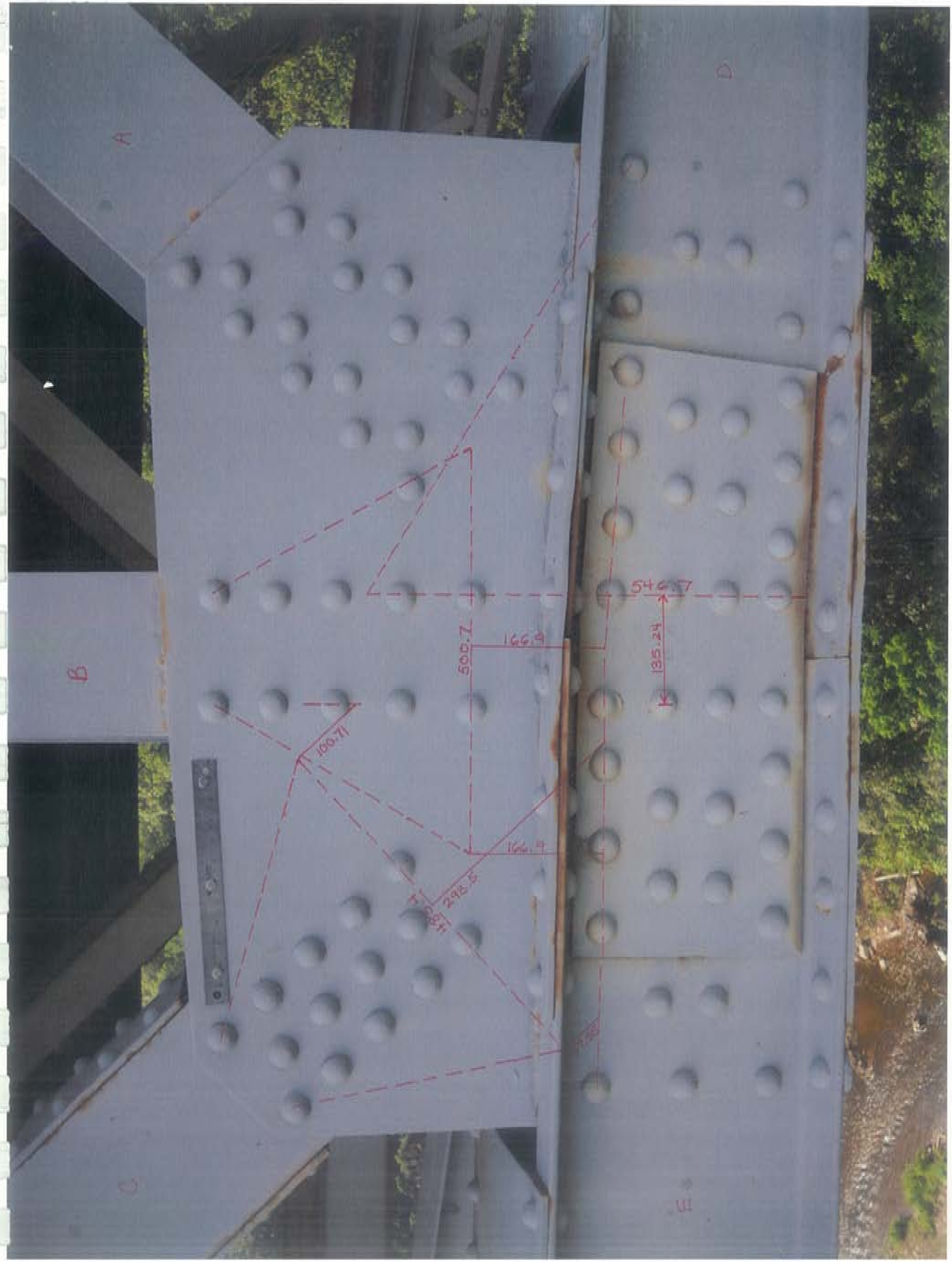
TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L18E W

SPAN

TRUSS NORTH



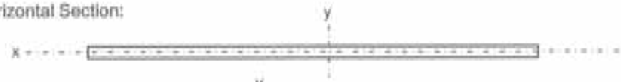
A
B
C
D
500.7
166.9
166.9
135.24
100.71
298.5

MRC

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

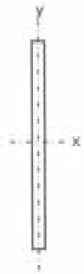
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	640.7	mm	I_x =	3.89E+04	mm^4	I_y =	1.97E+08	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	184.95	mm
A =	5766.3	mm^2	S_x =	8.65E+03	mm^3	S_y =	6.16E+05	mm^3

Vertical Section:



h =	640.7	mm	I_x =	1.97E+08	mm^4	I_y =	3.89E+04	mm^4
t =	9	mm	r_x =	184.95	mm	r_y =	2.60	mm
A =	5766.3	mm^2	S_x =	6.16E+05	mm^3	S_y =	8.65E+03	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	57.5	mm	L_2 =	172.4	mm
r_{min} =	2.60	mm	L_3 =	0	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.2388$$

ϕ_s =	0.9	
Effective width, L_w =	640.7	mm
Thickness, t =	9	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1175 \text{ kN}$$

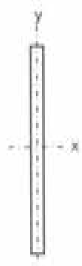
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	700	mm	I_x =	4.25E+04	mm^4	I_y =	2.57E+08	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	202.07	mm
A =	6300	mm^2	S_x =	9.45E+03	mm^3	S_y =	7.35E+05	mm^3
d =	0	mm						

Vertical Section:



h =	700	mm	I_x =	2.57E+08	mm^4	I_y =	4.25E+04	mm^4
t =	9	mm	r_x =	202.07	mm	r_y =	2.60	mm
A =	6300	mm^2	S_x =	7.35E+05	mm^3	S_y =	9.45E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	58.3	mm
Unbraced length, L =	166.7	mm	L_2 =	417.3	mm
r_{min} =	2.60	mm	L_3 =	24.6	mm

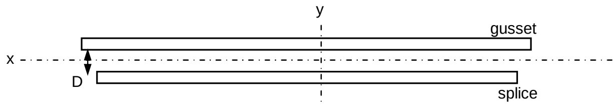
$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6927$$

ϕ_s =	0.9	
Effective width, L_w =	700	mm
Thickness, t =	9	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1029 \text{ kN}$$

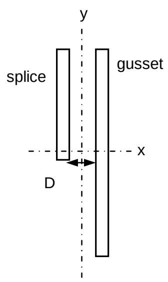
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



(splice plate)														
b =	300	mm	b =	534.4	mm	D =	20.4	mm	I_x =	1.66E+06	mm^4	I_y =	1.61E+08	mm^4
t =	9.69	mm	t =	9	mm	y_b =	23.38	mm	r_x =	14.66	mm	r_y =	144.51	mm
A =	2907	mm^2	A =	4809.6	mm^2	x_L =	223.05	mm	S_{xb} =	1.42E+05	mm^3	S_{yL} =	1.44E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	534.4	mm	D =	20.4	mm	I_x =	1.61E+08	mm^4	I_y =	1.66E+06	mm^4
t =	9.69	mm	t =	9	mm	y_b =	311.35	mm	r_x =	144.51	mm	r_y =	14.66	mm
A =	2907	mm^2	A =	4809.6	mm^2	x_L =	23.38	mm	S_{xb} =	1.04E+06	mm^3	S_{yL} =	1.42E+05	mm^3

Effective length factor, K =	1.00		L_1 =	132.2	mm
Unbraced length, L =	132.2	mm	L_2 =	132.2	mm
r_{min} =	14.66	mm	L_3 =	132.2	mm

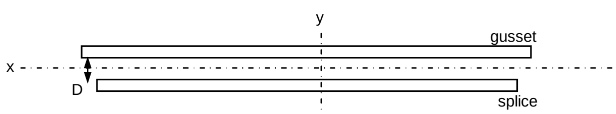
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0973$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	534.4	mm	300	mm
Thickness, t =	9	mm	9.69	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1595 \text{ kN}$$

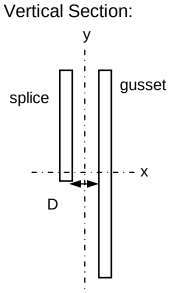
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



(splice plate)														
b =	300	mm	b =	459.7	mm	D =	20.4	mm	I_x =	1.56E+06	mm^4	I_y =	1.06E+08	mm^4
t =	9.69	mm	t =	9	mm	y_b =	22.32	mm	r_x =	14.89	mm	r_y =	122.41	mm
A =	2907	mm^2	A =	4137.3	mm^2	x_L =	196.90	mm	S_{xb} =	1.40E+05	mm^3	S_{yL} =	1.07E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	459.7	mm	D =	20.4	mm	I_x =	1.06E+08	mm^4	I_y =	1.56E+06	mm^4
t =	9.69	mm	t =	9	mm	y_b =	262.80	mm	r_x =	122.41	mm	r_y =	14.89	mm
A =	2907	mm^2	A =	4137.3	mm^2	x_L =	22.32	mm	S_{xb} =	8.03E+05	mm^3	S_{yL} =	1.40E+05	mm^3

Effective length factor, K =	1.00		L_1 =	132.2	mm
Unbraced length, L =	132.2	mm	L_2 =	132.2	mm
r_{min} =	14.89	mm	L_3 =	132.2	mm

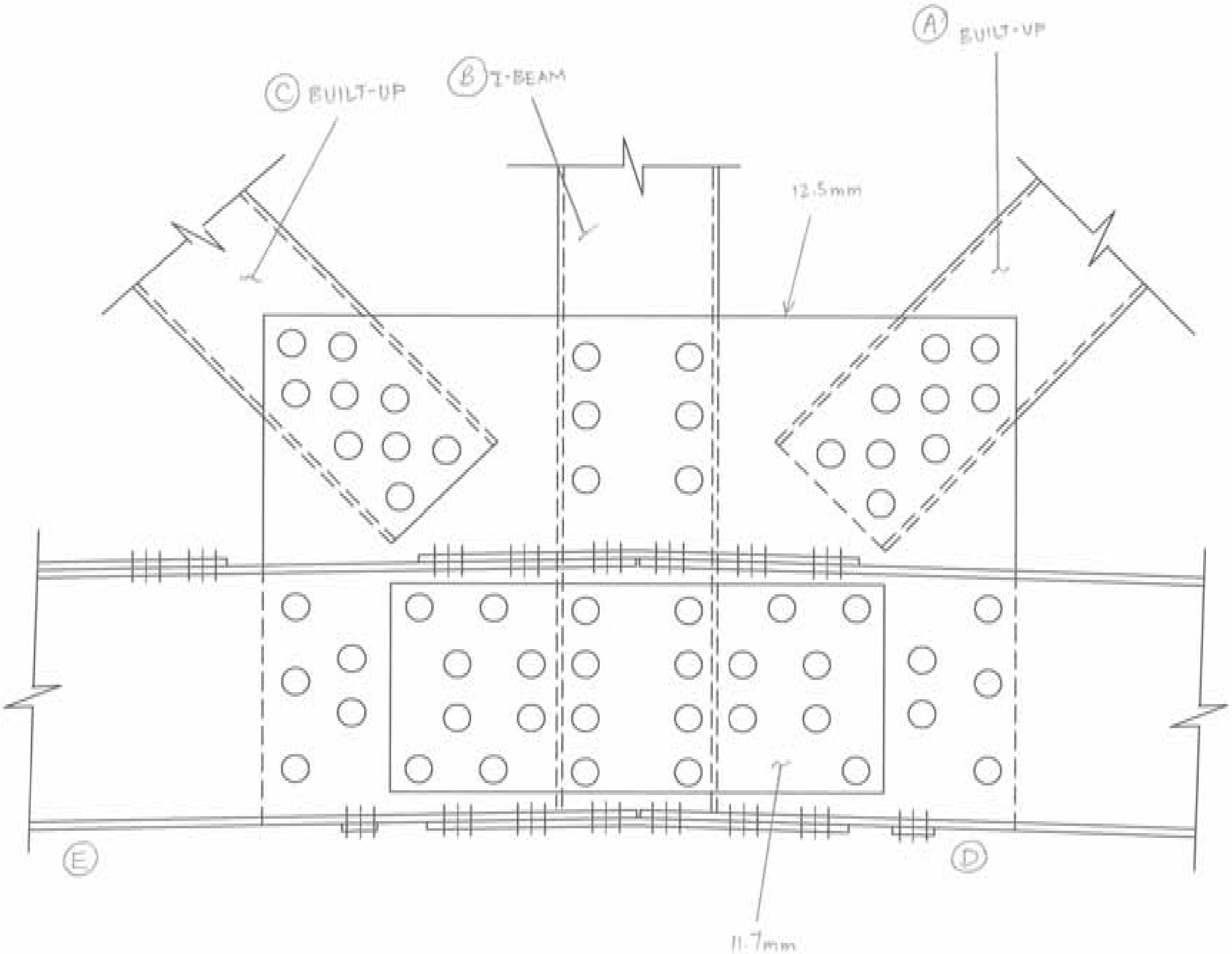
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0959$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	459.7	mm	300	mm
Thickness, t =	9	mm	9.69	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1456 \text{ kN}$$

RESISTANCE SUMMARY (one gusset plate)

Member A								
	Factored applied tensile force =	286.95	kN	<	675	kN	Tensile resistance	ok!
	Factored applied compressive force =	0	kN	<	939	kN	Compressive resistance	ok!
Member B								
	Factored applied tensile force =	0	kN	<	1396	kN	Tensile resistance	ok!
	Factored applied compressive force =	244.6	kN	<	1175	kN	Compressive resistance	ok!
Member C								
	Factored applied tensile force =	292.6	kN	<	664	kN	Tensile resistance	ok!
	Factored applied compressive force =	661.85	kN	<	1029	kN	Compressive resistance	ok!
Member D								
	Factored applied tensile force =	1353.05	kN	<	1894	kN	Tensile resistance	ok!
	Factored applied compressive force =	175.65	kN	<	1595	kN	Compressive resistance	ok!
Member E								
	Factored applied tensile force =	1348.05	kN	<	1740	kN	Tensile resistance	ok!
	Factored applied compressive force =	0	kN	<	1456	kN	Compressive resistance	ok!



McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

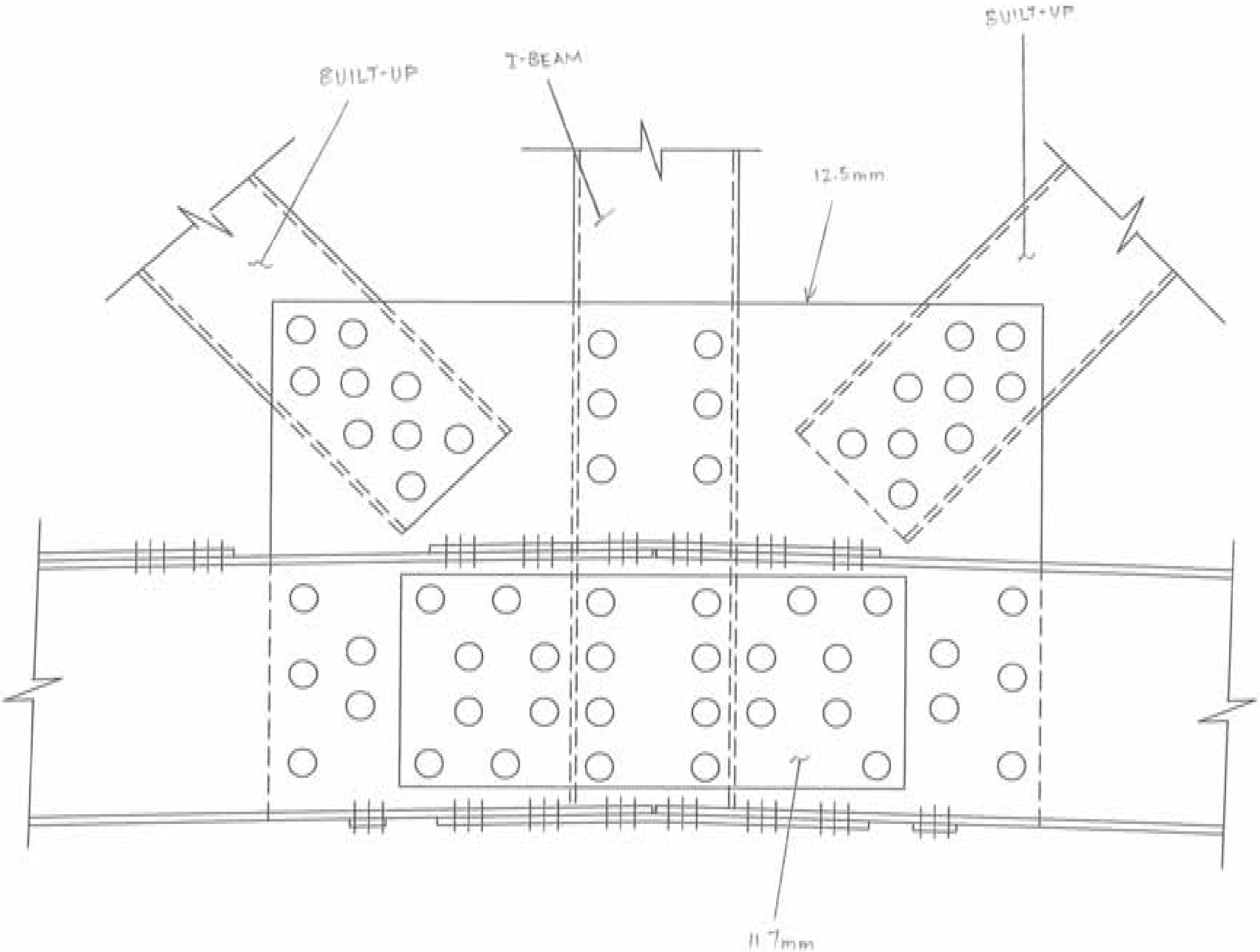
DATE: DECEMBER 2008

DRAWING:

L20E

SPAN

TRUSS NORTH



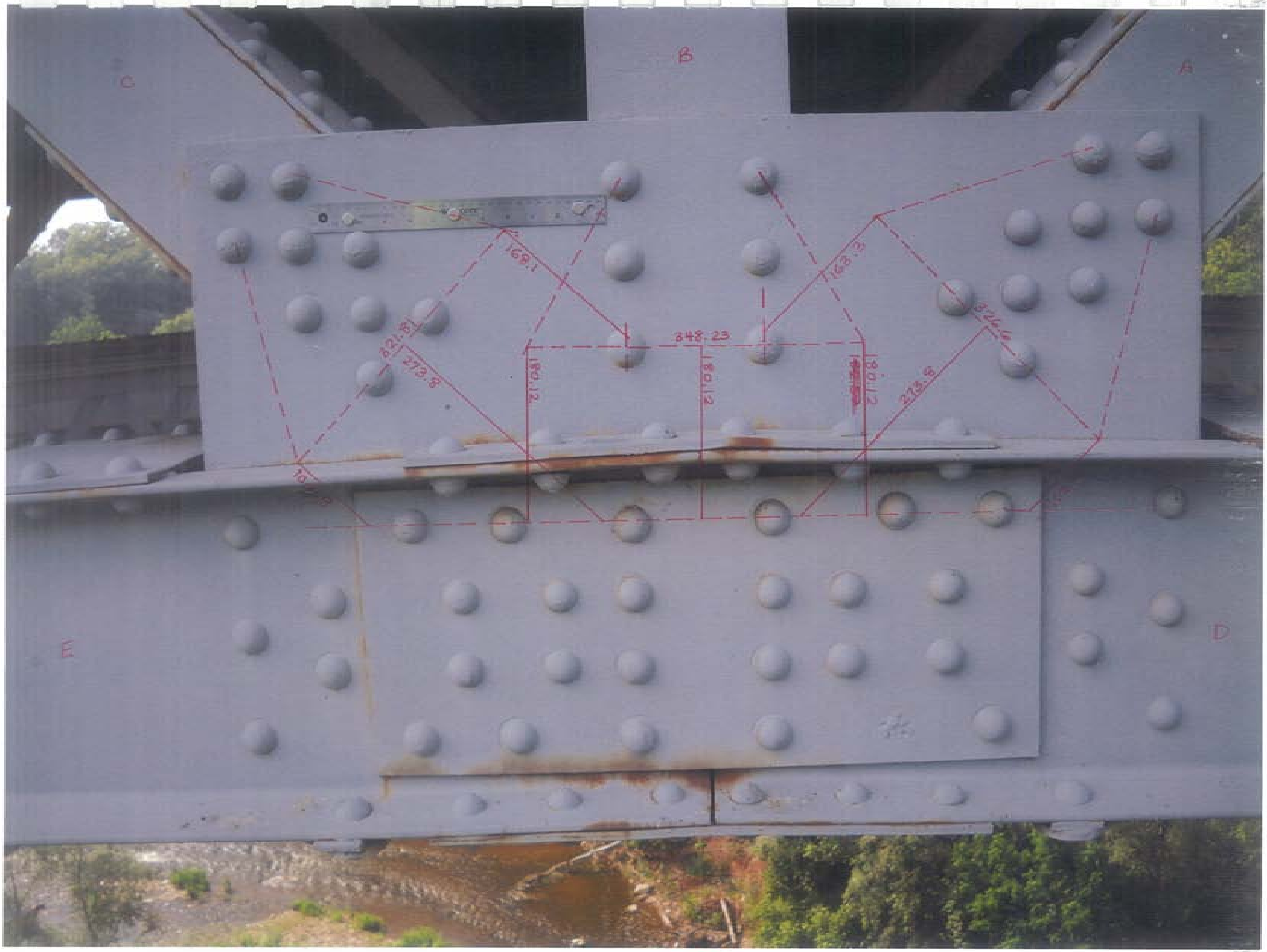
McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L20~~E~~W

SPAN______ TRUSS NORTH


C
B
A
168.1
163.3
326.6
348.23
221.8
273.8
180.12
180.12
180.12
273.8
E
D

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	7198.875	mm^2	2907	mm^2	= 2208 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	6.0		4.0		= 2569 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	5592	mm^2	1984	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 2208 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = \phi_s A_g F_y$
Gross area, A_g =	6322.5	mm^2	2907	mm^2	= 2017 kN
ϕ_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = 0.85\ \phi_s A_{ne} F_u$
holes =	5.0		4		= 2363 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	4983	mm^2	1984	mm^2	
ϕ_s =	0.95				

Factored tensile resistance = 2017 kN **Thus, gross section yielding governs**

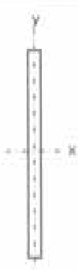
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

(Cl.10.9.3 & Whitmore Section)

Horizontal Section:

b =	326.6	mm	I_x =	3.88E+04	mm^4	I_y =	3.27E+07	mm^4
t =	11.25	mm	r_x =	3.25	mm	r_y =	94.28	mm
A =	3674.25	mm^2	S_x =	6.89E+03	mm^3	S_y =	2.00E+05	mm^3
d =	0	mm						

Vertical Section:



h =	326.6	mm	I_x =	3.27E+07	mm^4	I_y =	3.88E+04	mm^4
t =	11.25	mm	r_x =	94.28	mm	r_y =	3.25	mm
A =	3674.25	mm^2	S_x =	2.00E+05	mm^3	S_y =	6.89E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	103.3	mm
Unbraced length, L =	180.1	mm	L_2 =	273.8	mm
r_{min} =	3.25	mm	L_3 =	163.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.5987$$

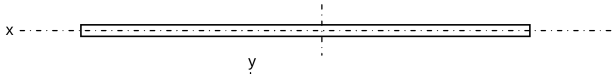
ϕ_s =	0.9	
Effective width, L_w =	326.6	mm
Thickness, t =	11.25	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 643 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

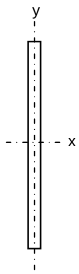
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	348.2	mm	I_x =	4.13E+04	mm^4	I_y =	3.96E+07	mm^4
t =	11.25	mm	r_x =	3.25	mm	r_y =	100.52	mm
A =	3917.25	mm^2	S_x =	7.34E+03	mm^3	S_y =	2.27E+05	mm^3

Vertical Section:



h =	348.2	mm	I_x =	3.96E+07	mm^4	I_y =	4.13E+04	mm^4
t =	11.25	mm	r_x =	100.52	mm	r_y =	3.25	mm
A =	3917.25	mm^2	S_x =	2.27E+05	mm^3	S_y =	7.34E+03	mm^3

Effective length factor, K =	1.00		L_1 =	180.1	mm
Unbraced length, L =	180.1	mm	L_2 =	180.1	mm
r_{min} =	3.25	mm	L_3 =	180.1	mm

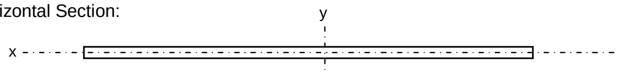
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.5986$$

f_s =	0.9	
Effective width, L_w =	348.2	mm
Thickness, t =	11.25	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 685 \text{ kN}$$

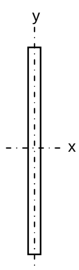
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	321.8	mm	I_x =	3.82E+04	mm^4	I_y =	3.12E+07	mm^4
t =	11.25	mm	r_x =	3.25	mm	r_y =	92.90	mm
A =	3620.25	mm^2	S_x =	6.79E+03	mm^3	S_y =	1.94E+05	mm^3
d =	0	mm						

Vertical Section:



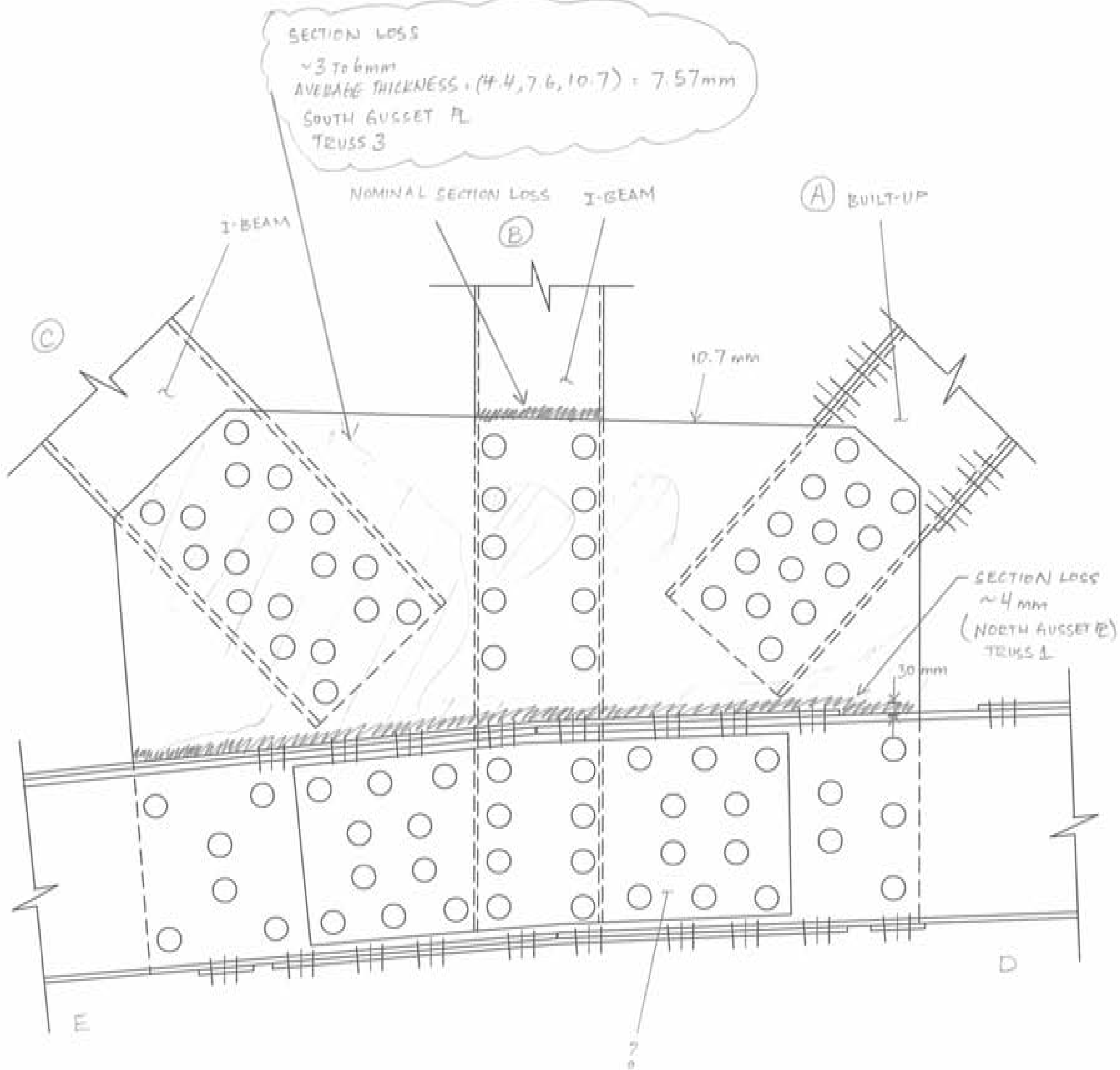
h =	321.8	mm	I_x =	3.12E+07	mm^4	I_y =	3.82E+04	mm^4
t =	11.25	mm	r_x =	92.90	mm	r_y =	3.25	mm
A =	3620.25	mm^2	S_x =	1.94E+05	mm^3	S_y =	6.79E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	168.1	mm
Unbraced length, L =	180.9	mm	L_2 =	273.8	mm
r_{min} =	3.25	mm	L_3 =	100.9	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6014$$

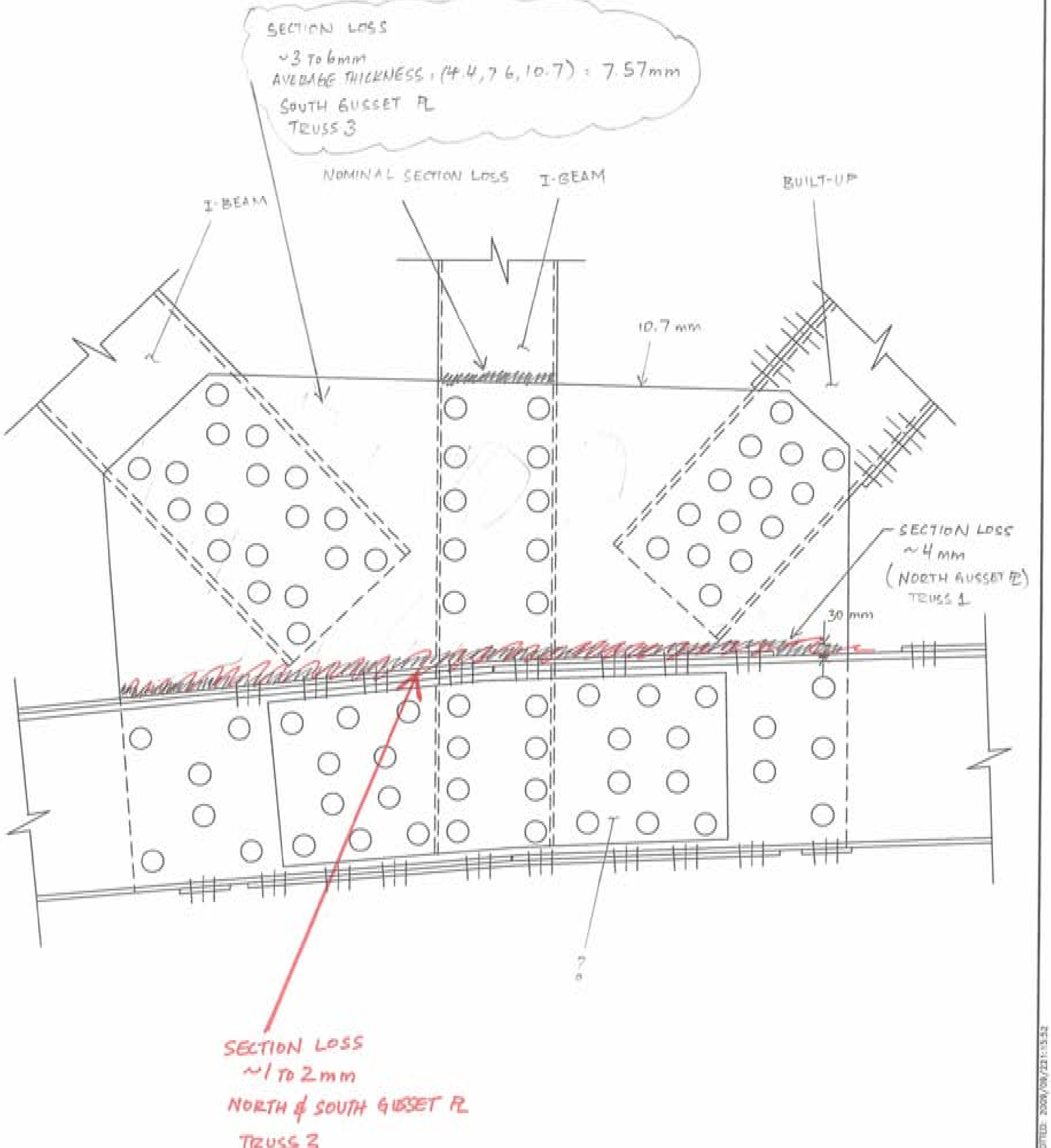
f_s =	0.9	
Effective width, L_w =	321.8	mm
Thickness, t =	11.25	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 632 \text{ kN}$$



P-21-21

McCORMICK RANKIN CORPORATION	TRUSS REPAIR ON TANSLEY BRIDGE DUNDAS – BRONTE CREEK	DATE: DECEMBER 2008
		DRAWING: L22E
		SPAN ______ TRUSS NORTH



P. 2-21

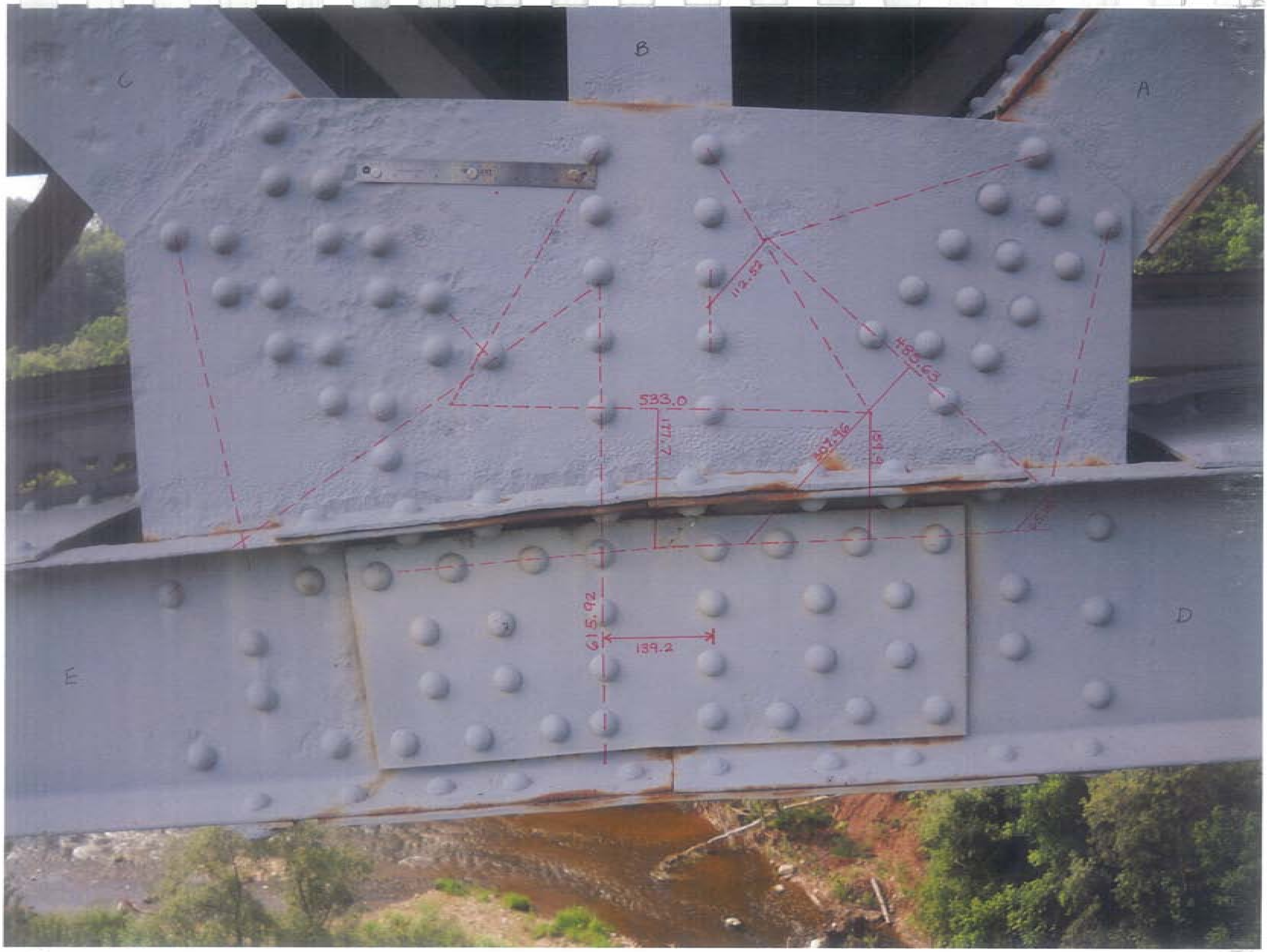
McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L22EW

SPAN ____ TRUSS NORTH


C
B
A
112.52
485.63
533.0
177.7
307.96
159.4
615.92
139.2
E
D

GUSSET PLATE INVESTIGATION - Whitmore Method

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge
Gusset Node: L22E

Material Properties For Gusset Plate

Gusset Plate:			Splice Plate:					
F_y =	230	MPa	F_y =	230	MPa			
F_u =	420	MPa	F_u =	420	MPa			
E =	200,000	MPa	E =	200,000	MPa			
t =	7.57	mm	t =	9.5	mm	orig. t =	10	mm
$t_{original}$ =	10.7	mm	h =		mm	section loss =	5	%

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 344 mm
Gross area, A_g = 2600.295 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 568 kN

B) Net Section Fracture

Effective width, w_e = 344 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 2240 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 760 kN

Factored tensile resistance = 568 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 710 mm
Gross area, A_g = 5372.429 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1174 kN

B) Net Section Fracture

Effective width, w_e = 602 mm
holes = 3.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 4016 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1362 kN

Factored tensile resistance = 1174 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 338 mm
Gross area, A_g = 2555.632 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 558 kN

B) Net Section Fracture

Effective width, w_e = 338 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 2195 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 744 kN

Factored tensile resistance = 558 kN **Thus, gross section yielding governs**

GUSSET PLATE INVESTIGATION - Whitmore Method

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	4844.043	mm^2	2850	mm^2	= 1681 kN
f_s =	0.95				

B) Net Section Fracture

			(splice plate)		
Effective width, w_e =	640	mm	300	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	6.0		4.0		= 1936 kN
gap =	1.5875	mm	1.5875	mm	
dia. =	22.225	mm	22.225	mm	
Net area, A_{ne} =	3762	mm^2	1945	mm^2	
f_s =	0.95				

Factored tensile resistance = 1681 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E

(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = f_s A_g F_y$
Gross area, A_g =	4254.34	mm^2	2850	mm^2	= 1552 kN
f_s =	0.95				

B) Net Section Fracture

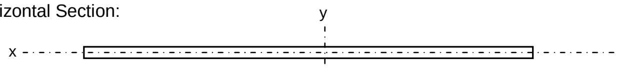
			(splice plate)		
Effective width, w_e =	562	mm	300	mm	$T_r = 0.85\ f_s A_{ne} F_u$
holes =	5.0		4		= 1797 kN
gap =	1.5875	mm	2	mm	
dia. =	22.225	mm	22	mm	
Net area, A_{ne} =	3353	mm^2	1945	mm^2	
f_s =	0.95				

Factored tensile resistance = 1552 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A

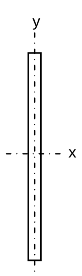
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	485.6	mm	I_x =	1.76E+04	mm^4	I_y =	7.22E+07	mm^4
t =	7.57	mm	r_x =	2.19	mm	r_y =	140.18	mm
A =	3675.992	mm^2	S_x =	4.64E+03	mm^3	S_y =	2.98E+05	mm^3
d =	0	mm						

Vertical Section:



h =	485.6	mm	I_x =	7.22E+07	mm^4	I_y =	1.76E+04	mm^4
t =	7.57	mm	r_x =	140.18	mm	r_y =	2.19	mm
A =	3675.992	mm^2	S_x =	2.98E+05	mm^3	S_y =	4.64E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	112.5	mm
Unbraced length, L =	161.9	mm	L_2 =	308	mm
r_{min} =	2.19	mm	L_3 =	65.2	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7997$$

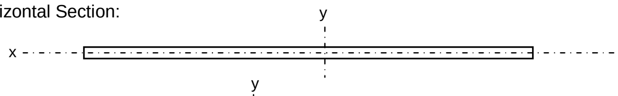
f_s =	0.9	
Effective width, L_w =	485.6	mm
Thickness, t =	7.57	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 549 \text{ kN}$$

MRC

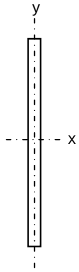
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	533	mm	I_x =	1.93E+04	mm^4	I_y =	9.55E+07	mm^4
t =	7.57	mm	r_x =	2.19	mm	r_y =	153.86	mm
A =	4034.81	mm^2	S_x =	5.09E+03	mm^3	S_y =	3.58E+05	mm^3

Vertical Section:



h =	533	mm	I_x =	9.55E+07	mm^4	I_y =	1.93E+04	mm^4
t =	7.57	mm	r_x =	153.86	mm	r_y =	2.19	mm
A =	4034.81	mm^2	S_x =	3.58E+05	mm^3	S_y =	5.09E+03	mm^3

Effective length factor, K =	1.00		L_1 =	533	mm
Unbraced length, L =	290.2	mm	L_2 =	159.9	mm
r_{min} =	2.19	mm	L_3 =	177.7	mm

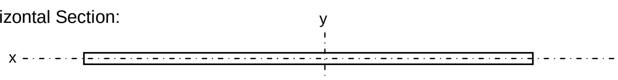
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 1.4335$$

f_s =	0.9	
Effective width, L_w =	533	mm
Thickness, t =	7.57	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 319 \text{ kN}$$

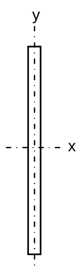
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:



b =	321.8	mm	I_x =	1.16E+04	mm^4	I_y =	2.10E+07	mm^4
t =	7.57	mm	r_x =	2.19	mm	r_y =	92.90	mm
A =	2436.026	mm^2	S_x =	3.07E+03	mm^3	S_y =	1.31E+05	mm^3
d =	0	mm						

Vertical Section:



h =	321.8	mm	I_x =	2.10E+07	mm^4	I_y =	1.16E+04	mm^4
t =	7.57	mm	r_x =	92.90	mm	r_y =	2.19	mm
A =	2436.026	mm^2	S_x =	1.31E+05	mm^3	S_y =	3.07E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	168.1	mm
Unbraced length, L =	180.9	mm	L_2 =	273.8	mm
r_{min} =	2.19	mm	L_3 =	100.9	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.8937$$

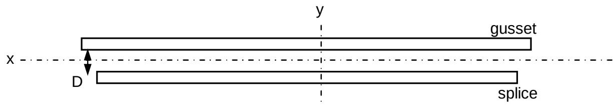
f_s =	0.9	
Effective width, L_w =	321.8	mm
Thickness, t =	7.57	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 334 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D

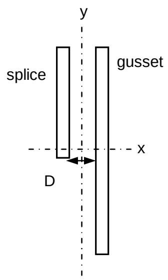
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	534.4	mm	D =	20.4	mm	I_x =	1.44E+06	mm^4	I_y =	1.41E+08	mm^4
t =	9.5	mm	t =	7.57	mm	y_b =	21.73	mm	r_x =	14.45	mm	r_y =	142.80	mm
A =	2850	mm^2	A =	4045.408	mm^2	x_L =	218.76	mm	S_{xb} =	1.33E+05	mm^3	S_{yL} =	1.29E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	534.4	mm	D =	20.4	mm	I_x =	1.41E+08	mm^4	I_y =	1.44E+06	mm^4
t =	9.5	mm	t =	7.57	mm	y_b =	315.64	mm	r_x =	142.80	mm	r_y =	14.45	mm
A =	2850	mm^2	A =	4045.408	mm^2	x_L =	21.73	mm	S_{xb} =	8.91E+05	mm^3	S_{yL} =	1.33E+05	mm^3

Effective length factor, K =	1.00		L_1 =	132.2	mm
Unbraced length, L =	132.2	mm	L_2 =	132.2	mm
r_{min} =	14.45	mm	L_3 =	132.2	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0987$$

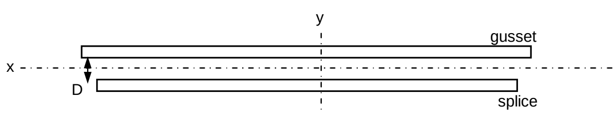
			(splice plate)	
f_s =	0.9			
Effective width, L_w =	534.4	mm	300	mm
Thickness, t =	7.57	mm	9.5	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1425 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E

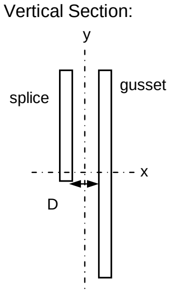
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	615.9	mm	D =	20.4	mm	I_x =	1.52E+06	mm^4	I_y =	2.13E+08	mm^4
t =	9.5	mm	t =	7.57	mm	y_b =	22.71	mm	r_x =	14.25	mm	r_y =	168.34	mm
A =	2850	mm^2	A =	4662.363	mm^2	x_L =	248.03	mm	S_{xb} =	1.34E+05	mm^3	S_{yL} =	1.72E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	615.9	mm	D =	20.4	mm	I_x =	2.13E+08	mm^4	I_y =	1.52E+06	mm^4
t =	9.5	mm	t =	7.57	mm	y_b =	367.87	mm	r_x =	168.34	mm	r_y =	14.25	mm
A =	2850	mm^2	A =	4662.363	mm^2	x_L =	22.71	mm	S_{xb} =	1.16E+06	mm^3	S_{yL} =	1.34E+05	mm^3

Effective length factor, K =	1.00		L_1 =	139.2	mm
Unbraced length, L =	139.2	mm	L_2 =	139.2	mm
r_{min} =	14.25	mm	L_3 =	139.2	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.1055$$

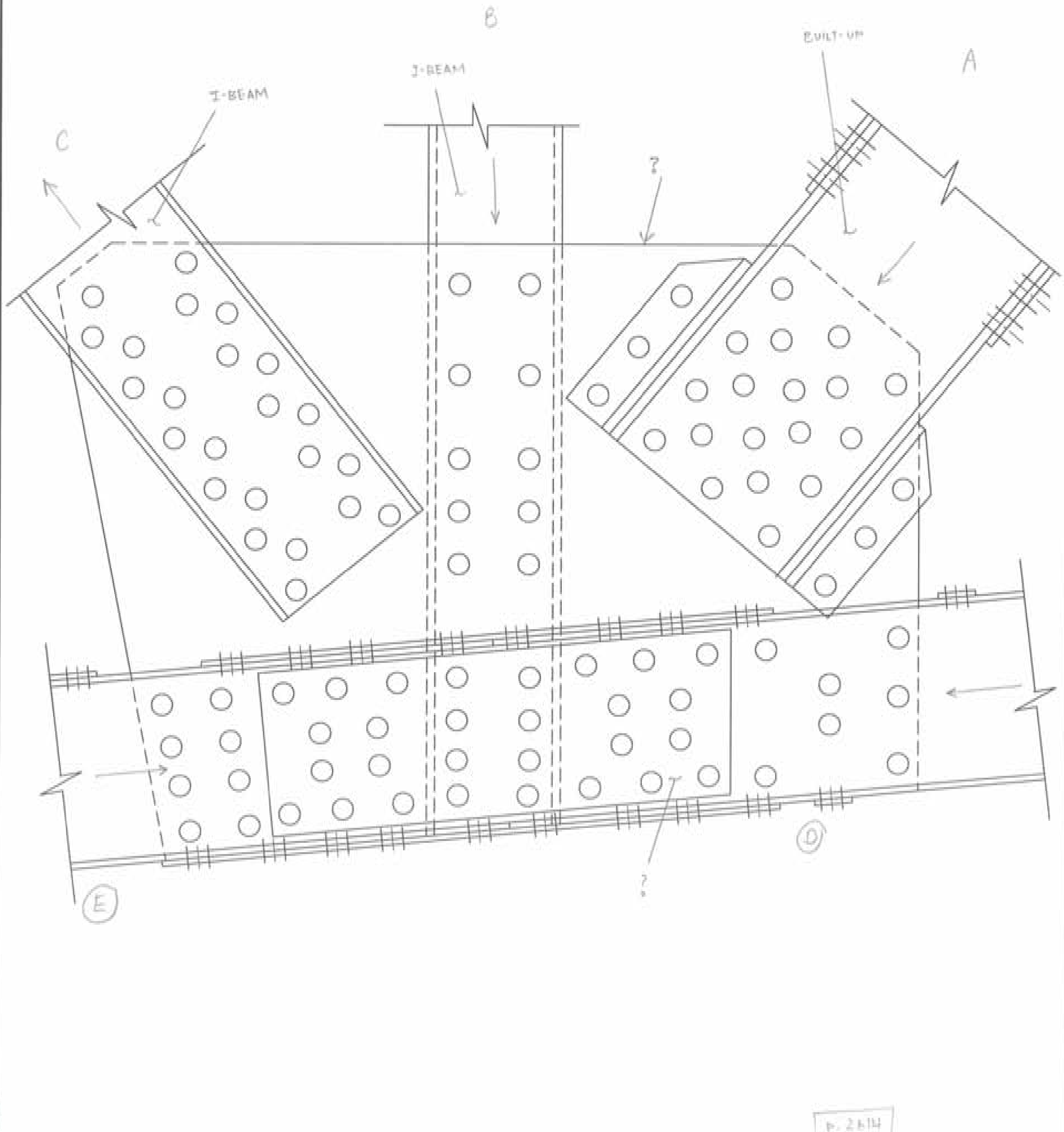
			(splice plate)	
f_s =	0.9			
Effective width, L_w =	615.9	mm	300	mm
Thickness, t =	7.57	mm	9.5	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1552 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

RESISTANCE SUMMARY (one gusset plate)

Member A								
	Factored applied tensile force =	286.95	kN	<	568	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	674.65	kN	>	549	kN	Compressive resistance	**no good!**
Member B								
	Factored applied tensile force =	0	kN	<	1174	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	252.05	kN	<	319	kN	Compressive resistance	**ok!**
Member C								
	Factored applied tensile force =	292.6	kN	<	558	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	0	kN	<	334	kN	Compressive resistance	**ok!**
Member D								
	Factored applied tensile force =	1353.05	kN	<	1681	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	0	kN	<	1425	kN	Compressive resistance	**ok!**
Member E								
	Factored applied tensile force =	1348.05	kN	<	1552	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	276.7	kN	<	1552	kN	Compressive resistance	**ok!**



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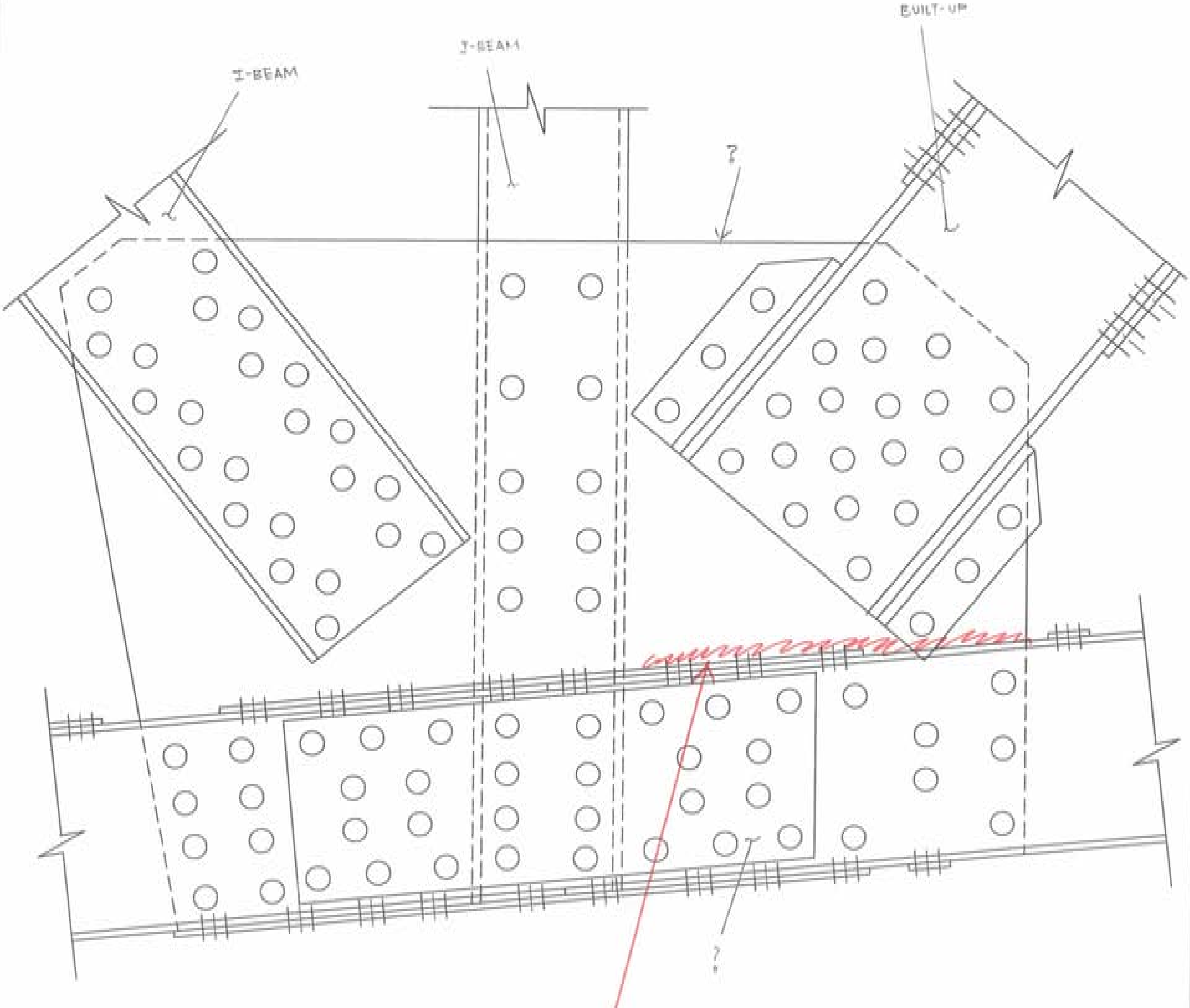
McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008
DRAWING:
L24E
SPAN
TRUSS NORTH



P. 2614

MRC

McCORMICK RANKIN
CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS —BRONTE CREEK

DATE: DECEMBER 2008

DRAWING:

L24EW

SPAN

TRUSS NORTH

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge
Gusset Node: L24E

Material Properties For Gusset Plate

Gusset Plate:	F_y =	230	MPa	Splice Plate:	F_y =	230	MPa			
	F_u =	420	MPa		F_u =	420	MPa			
	E =	200,000	MPa		E =	200,000	MPa			
	t =	9.0	mm		t =	9.5	mm	orig. t =	10	mm
	$t_{original}$ =	10.0	mm		h =		mm	section loss =	5	%

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 344 mm
Gross area, A_g = 3091.5 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 675 kN

B) Net Section Fracture

Effective width, w_e = 344 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 2663 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 903 kN

Factored tensile resistance = 675 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 710 mm
Gross area, A_g = 6387.3 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1396 kN

B) Net Section Fracture

Effective width, w_e = 602 mm
holes = 3.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 4775 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1619 kN

Factored tensile resistance = 1396 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

Effective width, w_e = 338 mm
Gross area, A_g = 3038.4 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 664 kN

B) Net Section Fracture

Effective width, w_e = 338 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 2610 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 885 kN

Factored tensile resistance = 664 kN **Thus, gross section yielding governs**

GUSSET PLATE INVESTIGATION - Whitmore Method

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	640	mm	300	mm
Gross area, A_g =	5759.1	mm^2	2850	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$
= 1881 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	640	mm	300	mm
holes =	6.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4473	mm^2	1945	mm^2
f_s =	0.95			

$T_r = 0.85\ f_s A_{ne} F_u$
= 2177 kN

Factored tensile resistance = 1881 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =	562	mm	300	mm
Gross area, A_g =	5058	mm^2	2850	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$
= 1728 kN

B) Net Section Fracture

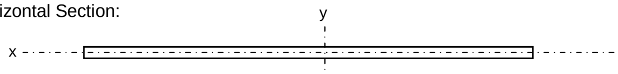
			(splice plate)	
Effective width, w_e =	562	mm	300	mm
holes =	5.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	3986	mm^2	1945	mm^2
f_s =	0.95			

$T_r = 0.85\ f_s A_{ne} F_u$
= 2012 kN

Factored tensile resistance = 1728 kN **Thus, gross section yielding governs**

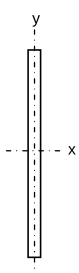
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	655.1	mm	I_x =	3.98E+04	mm^4	I_y =	2.11E+08	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	189.11	mm
A =	5895.9	mm^2	S_x =	8.84E+03	mm^3	S_y =	6.44E+05	mm^3
d =	0	mm						

Vertical Section:



h =	655.1	mm	I_x =	2.11E+08	mm^4	I_y =	3.98E+04	mm^4
t =	9	mm	r_x =	189.11	mm	r_y =	2.60	mm
A =	5895.9	mm^2	S_x =	6.44E+05	mm^3	S_y =	8.84E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	8.6	mm
Unbraced length, L =	137.0	mm	L_2 =	356.3	mm
r_{min} =	2.60	mm	L_3 =	46	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.5691$$

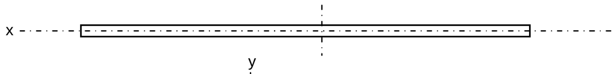
f_s =	0.9	
Effective width, L_w =	655.1	mm
Thickness, t =	9	mm
n =	1.34	

$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$
= 1052 kN

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

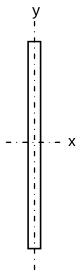
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	640.7	mm	I_x =	3.89E+04	mm^4	I_y =	1.97E+08	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	184.95	mm
A =	5766.3	mm^2	S_x =	8.65E+03	mm^3	S_y =	6.16E+05	mm^3

Vertical Section:



h =	640.7	mm	I_x =	1.97E+08	mm^4	I_y =	3.89E+04	mm^4
t =	9	mm	r_x =	184.95	mm	r_y =	2.60	mm
A =	5766.3	mm^2	S_x =	6.16E+05	mm^3	S_y =	8.65E+03	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	57.5	mm	L_2 =	172.4	mm
r_{min} =	2.60	mm	L_3 =	0	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.2388$$

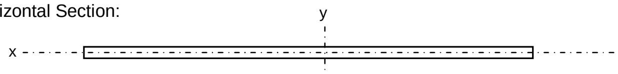
f_s =	0.9	
Effective width, L_w =	640.7	mm
Thickness, t =	9	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1175 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

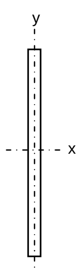
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	321.8	mm	I_x =	1.95E+04	mm^4	I_y =	2.50E+07	mm^4
t =	9	mm	r_x =	2.60	mm	r_y =	92.90	mm
A =	2896.2	mm^2	S_x =	4.34E+03	mm^3	S_y =	1.55E+05	mm^3
d =	0	mm						

Vertical Section:



h =	321.8	mm	I_x =	2.50E+07	mm^4	I_y =	1.95E+04	mm^4
t =	9	mm	r_x =	92.90	mm	r_y =	2.60	mm
A =	2896.2	mm^2	S_x =	1.55E+05	mm^3	S_y =	4.34E+03	mm^3
d =	0	mm						

Effective length factor, K =	1.00		L_1 =	168.1	mm
Unbraced length, L =	180.9	mm	L_2 =	273.8	mm
r_{min} =	2.60	mm	L_3 =	100.9	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7517$$

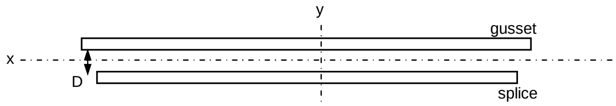
f_s =	0.9	
Effective width, L_w =	321.8	mm
Thickness, t =	9	mm
n =	1.34	

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 451 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

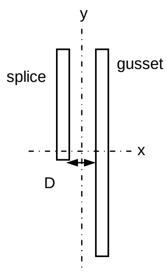
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	534.4	mm	D =	20.4	mm	I_x =	1.63E+06	mm^4	I_y =	1.60E+08	mm^4
t =	9.5	mm	t =	9	mm	y_b =	23.37	mm	r_x =	14.58	mm	r_y =	144.72	mm
A =	2850	mm^2	A =	4809.6	mm^2	x_L =	223.59	mm	S_{xb} =	1.39E+05	mm^3	S_{yL} =	1.43E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	534.4	mm	D =	20.4	mm	I_x =	1.60E+08	mm^4	I_y =	1.63E+06	mm^4
t =	9.5	mm	t =	9	mm	y_b =	310.81	mm	r_x =	144.72	mm	r_y =	14.58	mm
A =	2850	mm^2	A =	4809.6	mm^2	x_L =	23.37	mm	S_{xb} =	1.03E+06	mm^3	S_{yL} =	1.39E+05	mm^3

Effective length factor, K =	1.00		L_1 =	132.2	mm
Unbraced length, L =	132.2	mm	L_2 =	132.2	mm
r_{min} =	14.58	mm	L_3 =	132.2	mm

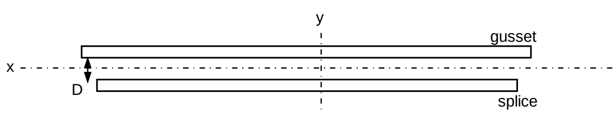
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0979$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	534.4	mm	300	mm
Thickness, t =	9	mm	9.5	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1583 \text{ kN}$$

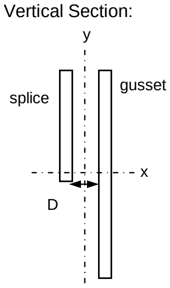
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	459.7	mm	D =	20.4	mm	I_x =	1.53E+06	mm^4	I_y =	1.05E+08	mm^4
t =	9.5	mm	t =	9	mm	y_b =	22.31	mm	r_x =	14.81	mm	r_y =	122.58	mm
A =	2850	mm^2	A =	4137.3	mm^2	x_L =	197.28	mm	S_{xb} =	1.37E+05	mm^3	S_{yL} =	1.06E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	459.7	mm	D =	20.4	mm	I_x =	1.05E+08	mm^4	I_y =	1.53E+06	mm^4
t =	9.5	mm	t =	9	mm	y_b =	262.42	mm	r_x =	122.58	mm	r_y =	14.81	mm
A =	2850	mm^2	A =	4137.3	mm^2	x_L =	22.31	mm	S_{xb} =	8.00E+05	mm^3	S_{yL} =	1.37E+05	mm^3

Effective length factor, K =	1.00		L_1 =	132.2	mm
Unbraced length, L =	132.2	mm	L_2 =	132.2	mm
r_{min} =	14.81	mm	L_3 =	132.2	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0963$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	459.7	mm	300	mm
Thickness, t =	9	mm	9.5	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1444 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

RESISTANCE SUMMARY (one gusset plate)

Member A

Factored applied tensile force =	286.95	kN	<	675	kN	Tensile resistance	**ok!**
Factored applied compressive force =	964.55	kN	<	1052	kN	Compressive resistance	**ok!**

Member B

Factored applied tensile force =	0	kN	<	1396	kN	Tensile resistance	**ok!**
Factored applied compressive force =	252.15	kN	<	1175	kN	Compressive resistance	**ok!**

Member C

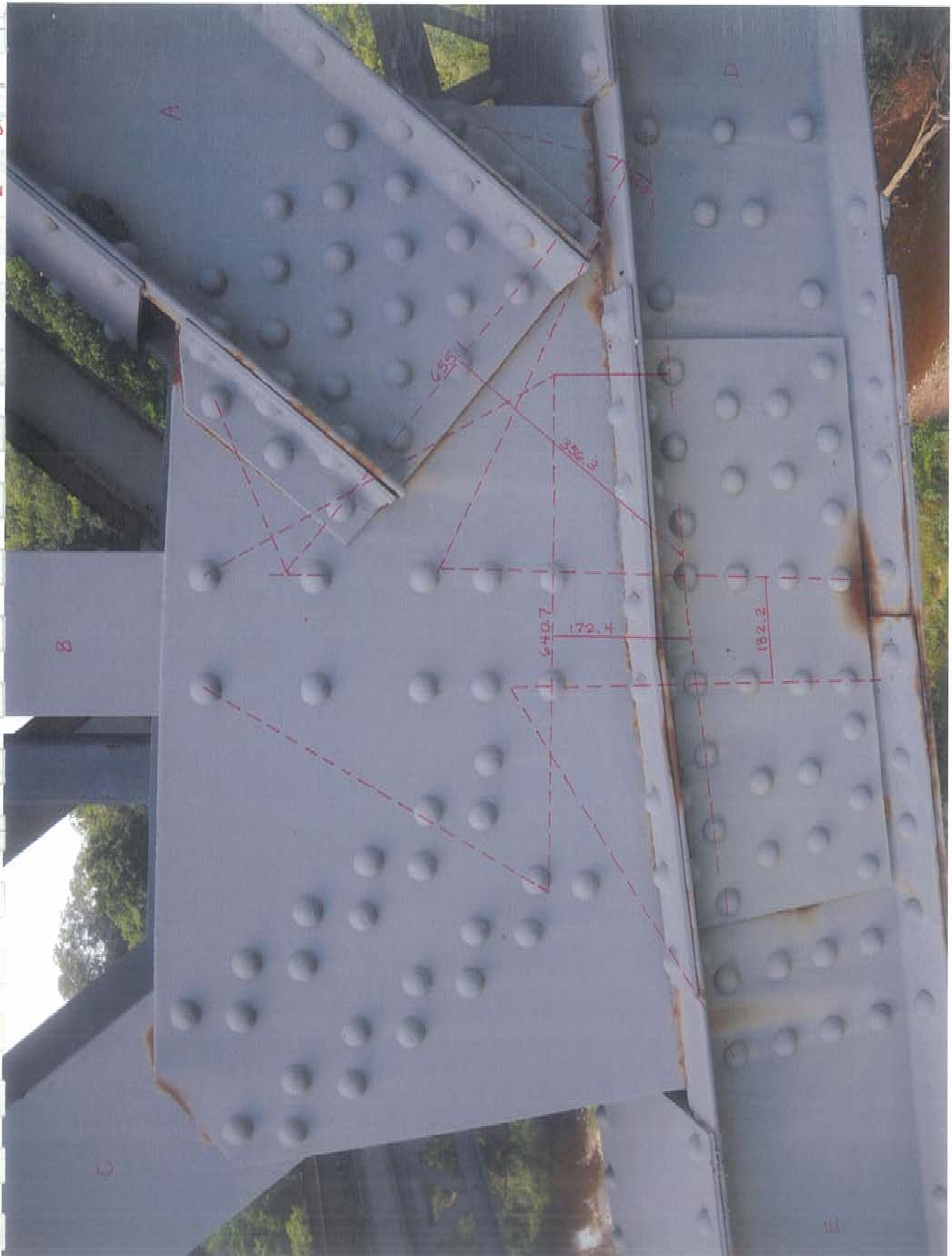
Factored applied tensile force =	292.6	kN	<	664	kN	Tensile resistance	**ok!**
Factored applied compressive force =	0	kN	<	451	kN	Compressive resistance	**ok!**

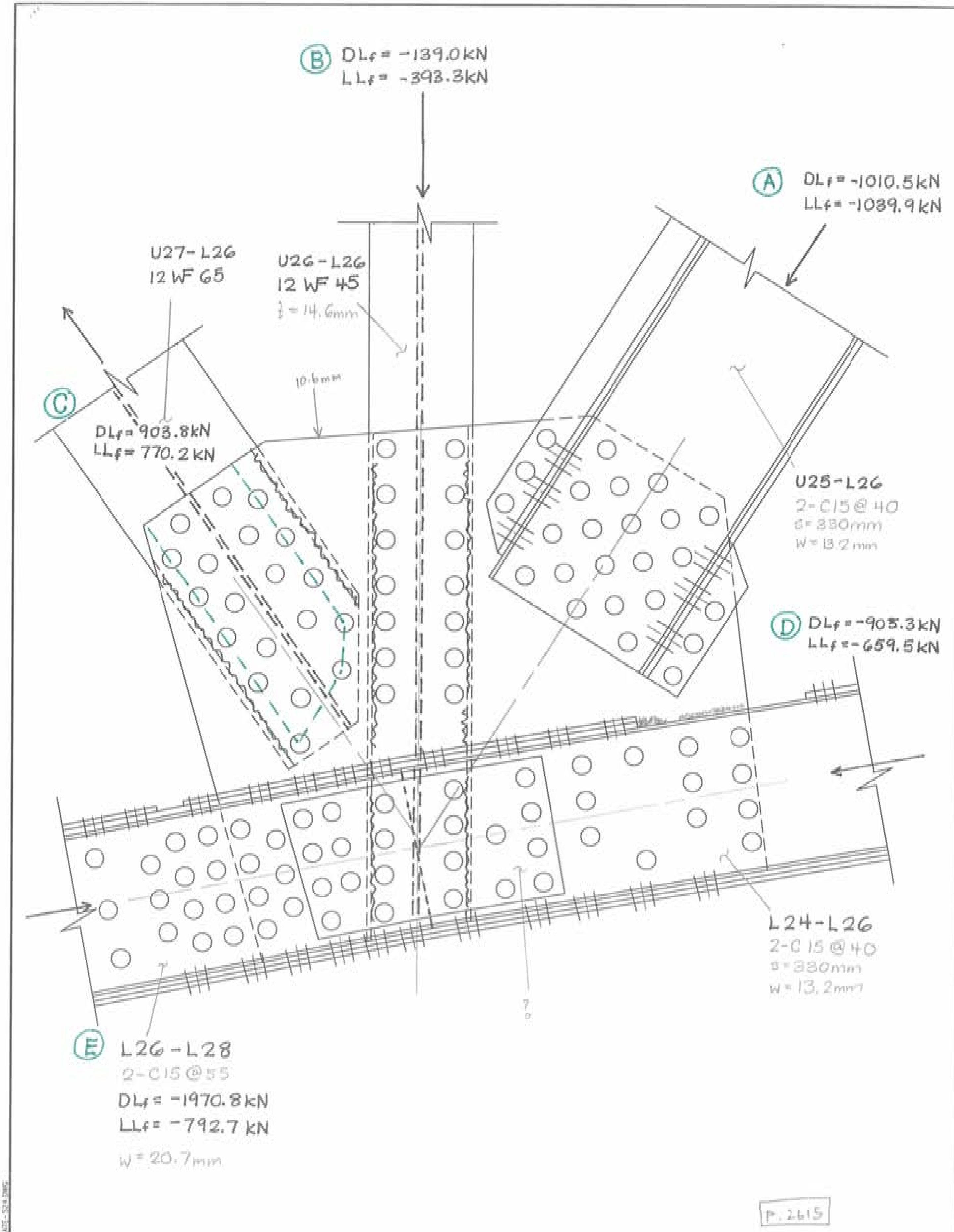
Member D

Factored applied tensile force =	1353.05	kN	<	1881	kN	Tensile resistance	**ok!**
Factored applied compressive force =	276.7	kN	<	1583	kN	Compressive resistance	**ok!**

Member E

Factored applied tensile force =	1348.05	kN	<	1728	kN	Tensile resistance	**ok!**
Factored applied compressive force =	844.7	kN	<	1444	kN	Compressive resistance	**ok!**


A
B
C
D
640.7
172.4
182.2
336.3



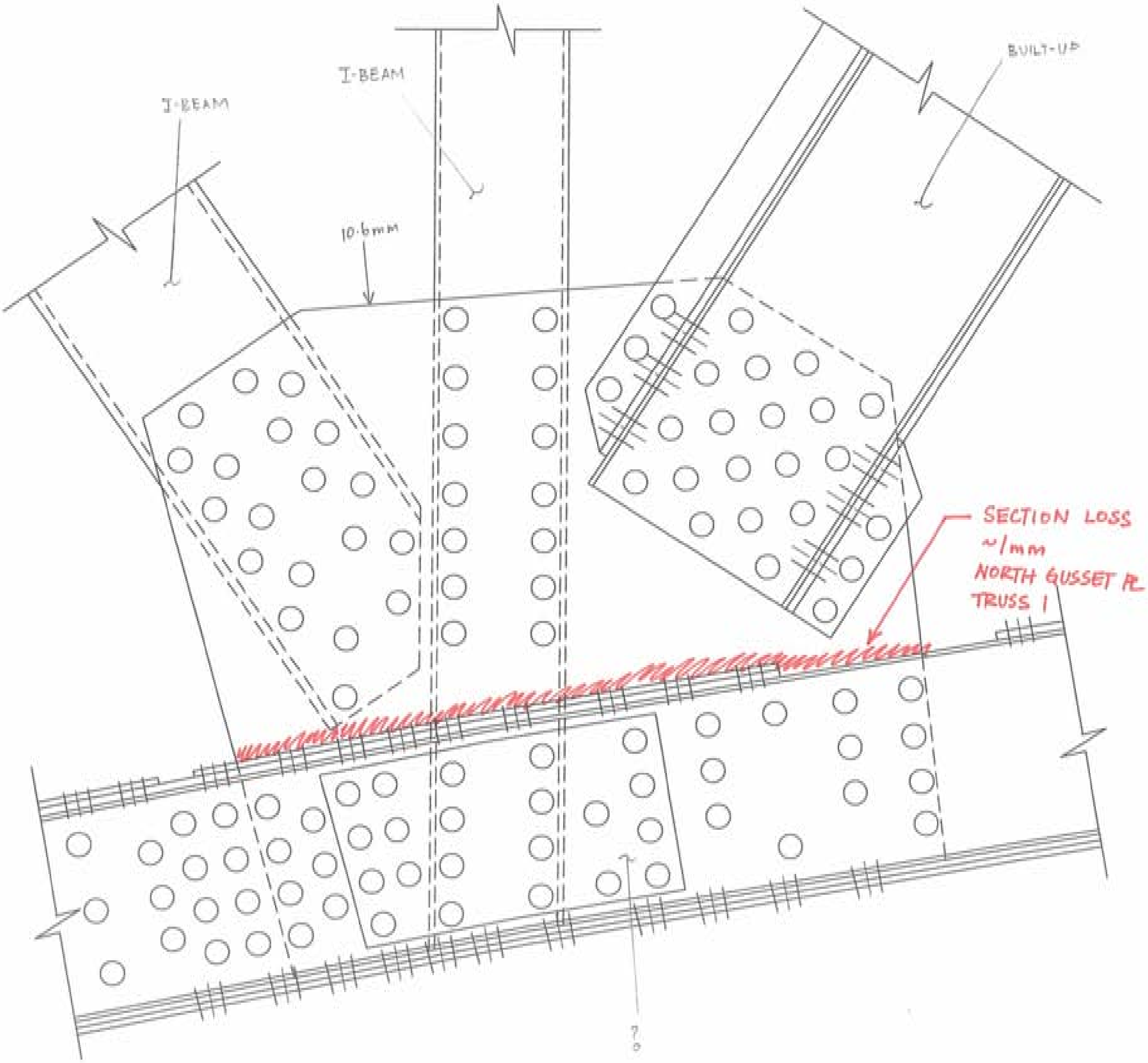
MRC McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS - BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L26E

SPAN ____ TRUSS NORTH



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McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L26E W

SPAN

TRUSS NORTH

721.4
598.3
149.6
428.2
709.7
205.3
255.1

MRC

AXIAL TENSILE RESISTANCE OF GUSSET - Member C

(Cl.10.8.2)

A) Gross Section Yielding

$T_r = \phi_s A_g F_y$ $\phi_s =$ 0.95 $A_g =$ 12338.298 mm^2

= **2696** kN

B) Net Section Fracture Segments

Direct tension: (normal to force)

$A_n = w_n t$ = 0 mm^2

$A_{ne} =$ 0 mm^2

$T_r =$ **0** kN

	Segment 1		Segment 2		Segment 3	
w =		mm		mm		mm
holes =						
gap =		mm		mm		mm
dia. =		mm		mm		mm
w_n =	0	mm	0	mm	0	mm
t =	10.6	mm	10.6	mm	10.6	mm

Shear: (parallel to force)

$A_n = 0.6 L_n t$ = 4791.0675 mm^2

$A_{ne} =$ 4791 mm^2

$T_r =$ **1625** kN

	Segment 1		Segment 2		Segment 3	
L =	385	mm	535	mm		mm
holes =	3.5		3.5			
gap =	1.5875	mm	1.5875	mm		mm
dia. =	22.225	mm	22.225	mm		mm
L_n =	301.65625	mm	451.65625	mm	0	mm
t =	10.6	mm	10.6	mm	10.6	mm

Inclined to Force:

$A_n = w_n t + (s^2 t / 4g)$ = 2081 mm^2

$A_{ne} =$ 2081 mm^2

$T_r =$ **706** kN

	Segment 1		Segment 2		Segment 3	
w =	150	mm	60	mm		mm
holes =	1.0		1.0			
gap =	1.5875	mm	1.5875	mm		mm
dia. =	22.225	mm	22.225	mm		mm
w_n =	126.1875	mm	36.1875	mm	0	mm
t =	10.6	mm	10.6	mm	10.6	mm
s =	75	mm	80	mm		mm
g =	150	mm	65	mm	1	mm
A_{n1} / A_{n2} / A_{n3} =	1437	mm^2	645	mm^2	0	mm^2

Combined net effective area for a combination of fracture segments:

$A_{ne} = \Sigma A_n$ = 6873 mm^2

$T_r = 0.85 \phi_s A_{ne} F_u$ = **2331** kN

C) Net Section Fracture Segments - with Shear Lag

$T_r = 0.85 \phi_s A'_{ne} F_u$ = **2098** kN

$A'_{ne} =$ 6185 mm^2

* see CHBDC *Cl.10.8.1.3.2*

* usually need not account for shear lag effects in gusset plates

GUSSET PLATE INVESTIGATION - Fasteners

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge

Gusset Node: L26E

Material Properties For Fasteners

Rivets:				Bolts:				Gusset Plate:			
	F_u =	360	MPa		F_u =	0	MPa		F_y =	230	MPa
	dia. =	22.225	mm		dia. =		mm		F_u =	420	MPa
	A_r =	388	mm^2		A_b =	0	mm^2		t =	10.6	mm
									w =		mm
									A_g =	0	mm^2

FASTENER RESISTANCE - Member A

(Rivets Cl.14.14.1.4; Bolts Cl.10.18.2.2)

A) Rivets in Shear

Minimum adjacent member thickness = 13.2 mm

f_{mc} = 0.67
number of rivets, n = 36
edge distance, e = 35 mm

Bearing Resistance, B_r = f_{mc} t n e F_u = 3758 kN

[3 f_{mc} t n d F_u = 7160 kN
ok!

f_r = 0.67
no. of shear planes, m = 1

Shear Resistance, V_r = 0.75 f_r n m A_r F_u = 2526 kN

Factored shear resistance = 2526 kN

B) Bolts in Shear

Minimum adjacent member thickness = mm

f_{br} = 0.67
number of bolts, n =

Bearing Resistance, B_r = 3 f_{br} n t d F_u = 0 kN

f_b = 0.8
no. of shear planes, m =

Shear Resistance, V_r = 0.60 f_b n m A_b F_u = 0 kN

Factored shear resistance = 0 kN

* If bolt threads are intercepted by a shear plane, the factored shear resistance shall be taken as 0.7 V_r *(Cl.10.18.2.3.3)* .

FASTENER RESISTANCE - Member B

(Rivets Cl.14.14.1.4; Bolts Cl.10.18.2.2)

A) Rivets in Shear

Minimum adjacent member thickness = 14.6 mm

f_{mc} = 0.67
number of rivets, n = 44
edge distance, e = 40 mm

Bearing Resistance, B_r = f_{mc} t n e F_u = 5250 kN

[3 f_{mc} t n d F_u = 8751 kN
ok!

f_r = 0.67
no. of shear planes, m = 1

Shear Resistance, V_r = 0.75 f_r n m A_r F_u = 3088 kN

Factored shear resistance = 3088 kN

B) Bolts in Shear

Minimum adjacent member thickness = mm

f_{br} = 0.67
number of bolts, n =

Bearing Resistance, B_r = 3 f_{br} n t d F_u = 0 kN

f_b = 0.8
no. of shear planes, m =

Shear Resistance, V_r = 0.60 f_b n m A_b F_u = 0 kN

Factored shear resistance = 0 kN

* If bolt threads are intercepted by a shear plane, the factored shear resistance shall be taken as 0.7 V_r *(Cl.10.18.2.3.3)* .

FASTENER RESISTANCE - Member C

(Rivets Cl.14.14.1.4; Bolts Cl.10.18.2.2)

A) Rivets in Shear

Minimum adjacent member thickness = 15.4 mm

f_{mc} = 0.67
number of rivets, n = 38
edge distance, e = 35 mm

Bearing Resistance, $B_r = f_{mc}\, t\, n\, e\, F_u$ = 3967 kN

[$3\ f_{mc}\, t\, n\, d\, F_u$ = 7557 kN
ok!

f_r = 0.67
no. of shear planes, m = 1

Shear Resistance, $V_r = 0.75\ f_r\, n\, m\, A_r\, F_u$ = 2667 kN

Factored shear resistance = 2667 kN

B) Bolts in Shear

Minimum adjacent member thickness = mm

f_{br} = 0.67
number of bolts, n =

Bearing Resistance, $B_r = 3\ f_{br}\, n\, t\, d\, F_u$ = 0 kN

f_b = 0.8
no. of shear planes, m =

Shear Resistance, $V_r = 0.60\ f_b\, n\, m\, A_b\, F_u$ = 0 kN

Factored shear resistance = 0 kN

* If bolt threads are intercepted by a shear plane, the factored shear resistance shall be taken as 0.7 V_r *(Cl.10.18.2.3.3)* .

FASTENER RESISTANCE - Member D

(Rivets Cl.14.14.1.4; Bolts Cl.10.18.2.2)

A) Rivets in Shear

Minimum adjacent member thickness = 13.2 mm

f_{mc} = 0.67
number of rivets, n = 44
edge distance, e = 35 mm

Bearing Resistance, $B_r = f_{mc}\, t\, n\, e\, F_u$ = 4594 kN

[$3\ f_{mc}\, t\, n\, d\, F_u$ = 8751 kN
ok!

f_r = 0.67
m = 1 no. of rivets = 44
m = 2 no. of rivets = 0

Shear Resistance, $V_r = 0.75\ f_r\, n\, m\, A_r\, F_u$ = 3088 kN

Factored shear resistance = 3088 kN

B) Bolts in Shear

Minimum adjacent member thickness = mm

f_{br} = 0.67
number of bolts, n =

Bearing Resistance, $B_r = 3\ f_{br}\, n\, t\, d\, F_u$ = 0 kN

f_b = 0.8
no. of shear planes, m =

Shear Resistance, $V_r = 0.60\ f_b\, n\, m\, A_b\, F_u$ = 0 kN

Factored shear resistance = 0 kN

* If bolt threads are intercepted by a shear plane, the factored shear resistance shall be taken as 0.7 V_r *(Cl.10.18.2.3.3)* .

FASTENER RESISTANCE - Member E

(Rivets Cl.14.14.1.4; Bolts Cl.10.18.2.2)

A) Rivets in Shear

Minimum adjacent member thickness = 20.7 mm

f_{mc} = 0.67
number of rivets, n = 36
edge distance, e = 35 mm

Bearing Resistance, $B_r = f_{mc}\, t\, n\, e\, F_u$ = 3758 kN

[$3\ f_{mc}\, t\, n\, d\, F_u$ = 7160 kN
ok!

f_r = 0.67
m = 1 no. of rivets = 36
m = 2 no. of rivets = 0

Shear Resistance, $V_r = 0.75\ f_r\, n\, m\, A_r\, F_u$ = 2526 kN

Factored shear resistance = 2526 kN

B) Bolts in Shear

Minimum adjacent member thickness = mm

f_{br} = 0.67
number of bolts, n =

Bearing Resistance, $B_r = 3\ f_{br}\, n\, t\, d\, F_u$ = 0 kN

f_b = 0.8
no. of shear planes, m =

Shear Resistance, $V_r = 0.60\ f_b\, n\, m\, A_b\, F_u$ = 0 kN

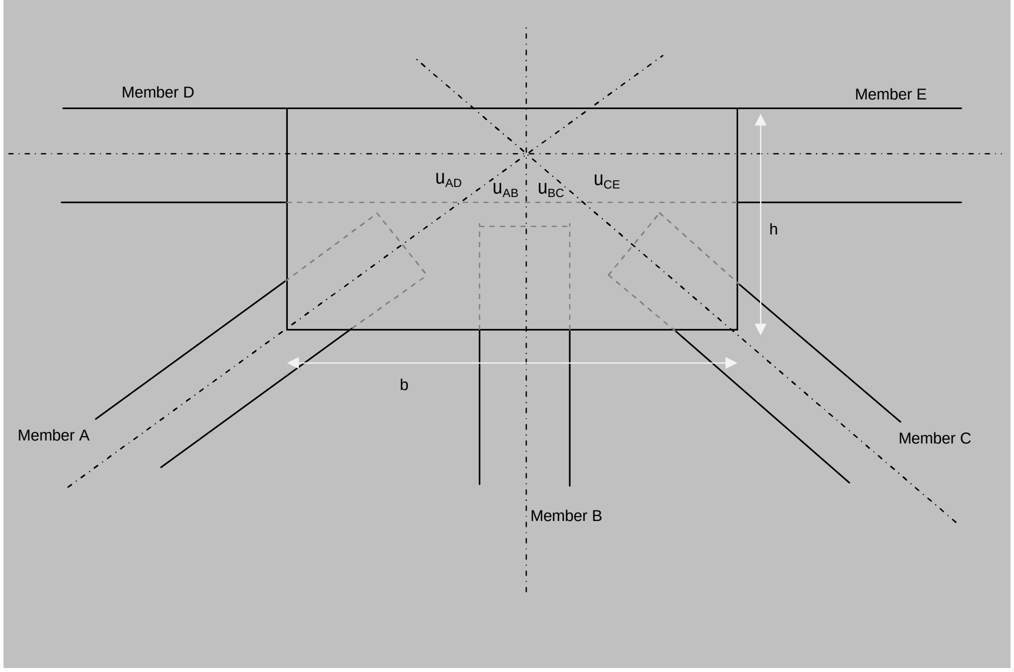
Factored shear resistance = 0 kN

* If bolt threads are intercepted by a shear plane, the factored shear resistance shall be taken as 0.7 V_r *(Cl.10.18.2.3.3)* .

RESISTANCE SUMMARY

Member A								
	Factored applied force =	2198.4	kN	<	2526	kN	Factored shear resistance	ok!
Member B								
	Factored applied force =	556.8	kN	<	3088	kN	Factored shear resistance	ok!
Member C								
	Factored applied force =	1793.1	kN	<	2667	kN	Factored shear resistance	ok!
Member D								
	Factored applied force =	1689.4	kN	<	3088	kN	Factored shear resistance	ok!
Member E								
	Factored applied force =	3037	kN	>	2526	kN	Factored shear resistance	no good!
					4573	kN	Factored shear resistance	ok!

Gusset Plate Geometry



	b =	1130	mm
	h =	900	mm
	t =	10.1	mm
	u_{AD} =	65	deg
	u_{AB} =	25	deg
	u_{BC} =	30	deg
	u_{CE} =	60	deg
A	F1 =	2198.4	kN
B	F2 =	556.8	kN
C	F3 =	1793.1	kN
D	F4 =	1689.4	kN
E	F5 =	3037	kN

GUSSET PLATE INVESTIGATION - Whitmore Method

MRC

Project: 7108 Dundas - Bronte Creek
Bridge: Tansley Bridge

Gusset Node: L26E

Material Properties For Gusset Plate

Gusset Plate:	F_y =	230	MPa	Splice Plate:	F_y =	230	MPa	
	F_u =	420	MPa		F_u =	420	MPa	
	E =	200,000	MPa		E =	200,000	MPa	
	t =	10.6	mm		t =	7.885	mm	orig. t = 8.3 mm
					h =		mm	section loss = 5 %

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member A *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

Effective width, w_e = 598 mm
Gross area, A_g = 6341.98 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1386 kN

B) Net Section Fracture

Effective width, w_e = 598 mm
holes = 3.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 5585 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1894 kN

Factored tensile resistance = 1386 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member B *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

Effective width, w_e = 710 mm
Gross area, A_g = 7522.82 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1644 kN

B) Net Section Fracture

Effective width, w_e = 602 mm
holes = 3.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 5624 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 1907 kN

Factored tensile resistance = 1644 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member C *(Cl.10.8.2 & Whitmore Section)*

A) Gross Section Yielding

Effective width, w_e = 616 mm
Gross area, A_g = 6528.54 mm^2
f_s = 0.95

$T_r = f_s A_g F_y$
= 1426 kN

B) Net Section Fracture

Effective width, w_e = 616 mm
holes = 2.0
gap = 1.5875 mm
dia. = 22.225 mm
Net area, A_{ne} = 6024 mm^2
f_s = 0.95

$T_r = 0.85\ f_s A_{ne} F_u$
= 2043 kN

Factored tensile resistance = 1426 kN **Thus, gross section yielding governs**

GUSSET PLATE INVESTIGATION - Whitmore Method

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member D
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =		mm	300	mm
Gross area, A_g =	0	mm^2	2365.5	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

= 517 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	535	mm	300	mm
holes =	4.0		4.0	
gap =	1.5875	mm	1.5875	mm
dia. =	22.225	mm	22.225	mm
Net area, A_{ne} =	4664	mm^2	1614	mm^2
f_s =	0.95			

$T_r = 0.85\ f_s A_{ne} F_u$

= 2129 kN

Factored tensile resistance = 517 kN **Thus, gross section yielding governs**

WHITMORE SECTION ANALYSIS - TENSILE RESISTANCE - Member E
(Cl.10.8.2 & Whitmore Section)

A) Gross Section Yielding

			(splice plate)	
Effective width, w_e =		mm	300	mm
Gross area, A_g =	0	mm^2	2365.5	mm^2
f_s =	0.95			

$T_r = f_s A_g F_y$

= 517 kN

B) Net Section Fracture

			(splice plate)	
Effective width, w_e =	27	mm	300	mm
holes =	4.0		4	
gap =	1.5875	mm	2	mm
dia. =	22.225	mm	22	mm
Net area, A_{ne} =	-721	mm^2	1614	mm^2
f_s =	0.95			

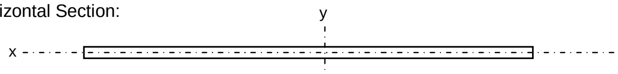
$T_r = 0.85\ f_s A_{ne} F_u$

= 303 kN

Factored tensile resistance = 303 kN **Thus, net section fracture governs**

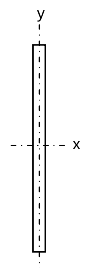
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	721.4	mm	I_x = 7.16E+04	mm^4	I_y =	3.32E+08	mm^4
t =	10.6	mm	r_x = 3.06	mm	r_y =	208.25	mm
A =	7646.84	mm^2	S_x = 1.35E+04	mm^3	S_y =	9.19E+05	mm^3
d =	0	mm					

Vertical Section:



h =	721.4	mm	I_x = 3.32E+08	mm^4	I_y =	7.16E+04	mm^4
t =	10.6	mm	r_x = 208.25	mm	r_y =	3.06	mm
A =	7646.84	mm^2	S_x = 9.19E+05	mm^3	S_y =	1.35E+04	mm^3
d =	0	mm					

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	189.7	mm	L_2 =	428.2	mm
r_{min} =	3.06	mm	L_3 =	140.8	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.6691$$

f_s =	0.9	
Effective width, L_w =	721.4	mm
Thickness, t =	10.6	mm
n =	1.34	

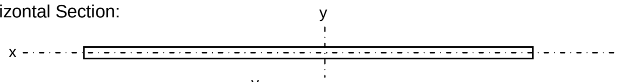
$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$

= 1272 kN

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member B

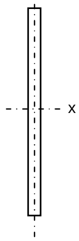
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	709.7	mm	I_x =	7.04E+04	mm^4	I_y =	3.16E+08	mm^4
t =	10.6	mm	r_x =	3.06	mm	r_y =	204.87	mm
A =	7522.82	mm^2	S_x =	1.33E+04	mm^3	S_y =	8.90E+05	mm^3

Vertical Section:



h =	709.7	mm	I_x =	3.16E+08	mm^4	I_y =	7.04E+04	mm^4
t =	10.6	mm	r_x =	204.87	mm	r_y =	3.06	mm
A =	7522.82	mm^2	S_x =	8.90E+05	mm^3	S_y =	1.33E+04	mm^3

Effective length factor, K =	1.00		L_1 =	255.1	mm
Unbraced length, L =	203.3	mm	L_2 =	205.3	mm
r_{min} =	3.06	mm	L_3 =	149.6	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7173$$

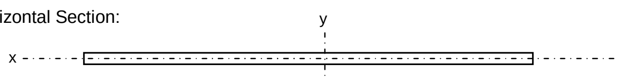
f_s =	0.9	
Effective width, L_w =	709.7	mm
Thickness, t =	10.6	mm
n =	1.34	

$$C_r = f_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1205 \text{ kN}$$

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member C

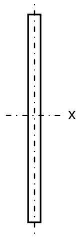
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	615.9	mm	I_x =	1.78E+08	mm^4	I_y =	2.06E+08	mm^4
t =	10.6	mm	r_x =	165.03	mm	r_y =	177.80	mm
A =	6528.54	mm^2	S_x =	3.35E+07	mm^3	S_y =	6.70E+05	mm^3
d =	165	mm						

Vertical Section:



h =	615.9	mm	I_x =	2.06E+08	mm^4	I_y =	1.78E+08	mm^4
t =	10.6	mm	r_x =	177.80	mm	r_y =	165.03	mm
A =	6528.54	mm^2	S_x =	6.70E+05	mm^3	S_y =	3.35E+07	mm^3
d =	165	mm						

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	136.0	mm	L_2 =	270	mm
r_{min} =	165.03	mm	L_3 =	138	mm

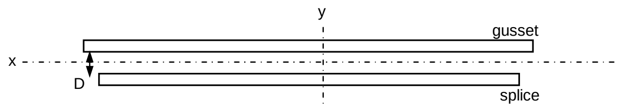
$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0089$$

f_s =	0.9	
Effective width, L_w =	615.9	mm
Thickness, t =	10.6	mm
n =	1.34	

$$C_r = f_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1351 \text{ kN}$$

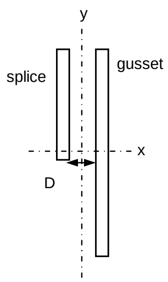
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member D
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	560	mm	D =	13.2	mm	I_x =	9.34E+05	mm^4	I_y =	2.02E+08	mm^4
t =	8	mm	t =	10.6	mm	y_b =	20.02	mm	r_x =	10.58	mm	r_y =	155.67	mm
A =	2400	mm^2	A =	5936	mm^2	x_L =	242.57	mm	S_{xb} =	9.33E+04	mm^3	S_{yL} =	1.67E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	560	mm	D =	13.2	mm	I_x =	2.02E+08	mm^4	I_y =	9.34E+05	mm^4
t =	8	mm	t =	10.6	mm	y_b =	317.43	mm	r_x =	155.67	mm	r_y =	10.58	mm
A =	2400	mm^2	A =	5936	mm^2	x_L =	20.02	mm	S_{xb} =	1.27E+06	mm^3	S_{yL} =	9.33E+04	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	10.58	mm	L_3 =	0	mm

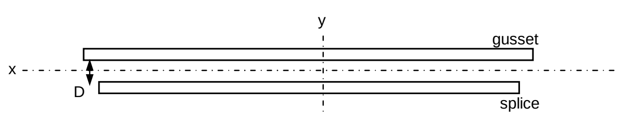
$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	560	mm	300	mm
Thickness, t =	10.6	mm	7.885	mm
n =	1.34			

$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1718 \text{ kN}$$

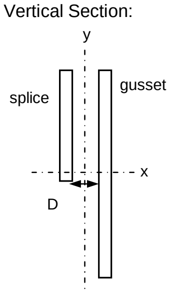
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member E
(Cl.10.9.3 & Whitmore Section)

Horizontal Section:



(splice plate)														
b =	300	mm	b =	676	mm	D =	30.3	mm	I_x =	4.73E+06	mm^4	I_y =	4.15E+08	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	34.80	mm	r_x =	20.21	mm	r_y =	189.27	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	276.17	mm	S_{xb} =	2.72E+05	mm^3	S_{yL} =	3.01E+06	mm^3

Vertical Section:



(splice plate)														
h =	300	mm	h =	676	mm	D =	30.3	mm	I_x =	4.15E+08	mm^4	I_y =	4.73E+06	mm^4
t =	12.7	mm	t =	11.5	mm	y_b =	399.83	mm	r_x =	189.27	mm	r_y =	20.21	mm
A =	3810	mm^2	A =	7774	mm^2	x_L =	34.80	mm	S_{xb} =	2.08E+06	mm^3	S_{yL} =	2.72E+05	mm^3

Effective length factor, K =	1.00		L_1 =	0	mm
Unbraced length, L =	0.0	mm	L_2 =	0	mm
r_{min} =	20.21	mm	L_3 =	0	mm

$$l = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0000$$

			(splice plate)	
f_s =	0.9			
Effective width, L_w =	676	mm	300	mm
Thickness, t =	10.6	mm	7.885	mm
n =	1.34			

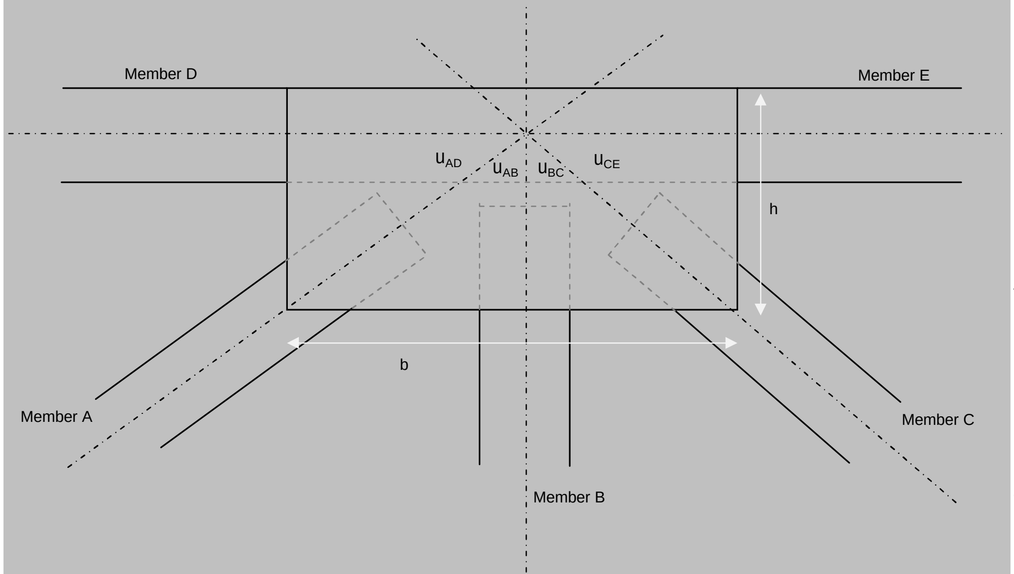
$$C_r = f_s A F_y (1 + l^{2n})^{-1/n}$$
$$= 1973 \text{ kN}$$

GUSSET PLATE INVESTIGATION - Whitmore Method

RESISTANCE SUMMARY (one gusset plate)

Member A								
	Factored applied tensile force =	0	kN	<	1386	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	1099.2	kN	<	1272	kN	Compressive resistance	**ok!**
Member B								
	Factored applied tensile force =	0	kN	<	1644	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	278.4	kN	<	1205	kN	Compressive resistance	**ok!**
Member C								
	Factored applied tensile force =	896.55	kN	<	1426	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	0	kN	<	1351	kN	Compressive resistance	**ok!**
Member D								
	Factored applied tensile force =	0	kN	<	517	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	844.7	kN	<	1718	kN	Compressive resistance	**ok!**
Member E								
	Factored applied tensile force =	0	kN	<	303	kN	Tensile resistance	**ok!**
	Factored applied compressive force =	1518.5	kN	<	1973	kN	Compressive resistance	**ok!**

Gusset Plate Geometry



	b =	1130	mm
	h =	900	mm
	t =	10.1	mm
	u_{AD} =	65	deg
	u_{AB} =	25	deg
	u_{BC} =	30	deg
	u_{CE} =	60	deg

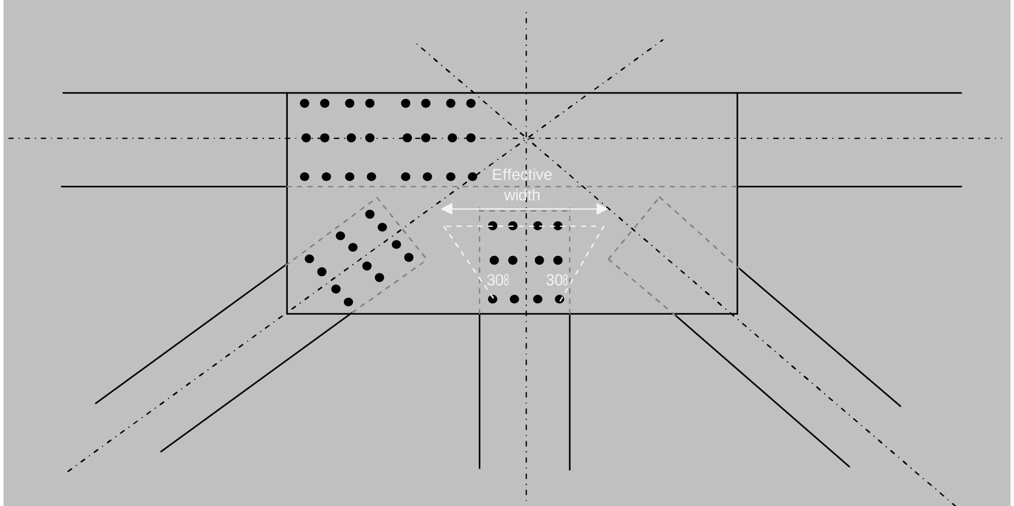
Tensile forces:

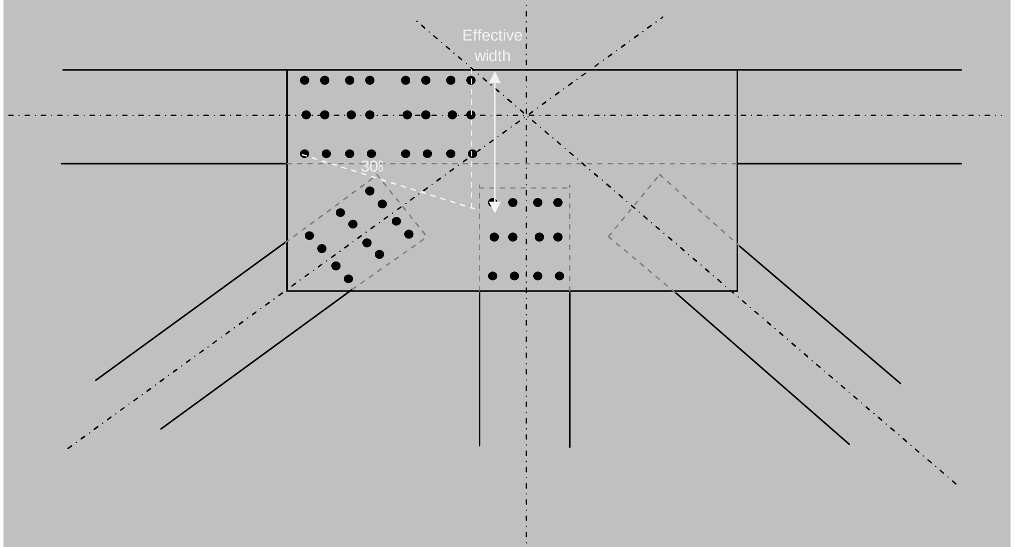
A	F1 =	0	kN
B	F2 =	0	kN
C	F3 =	1793.1	kN
D	F4 =	0	kN
E	F5 =	0	kN

Compressive forces:

A	F1 =	2198.4	kN
B	F2 =	556.8	kN
C	F3 =	0	kN
D	F4 =	1689.4	kN
E	F5 =	3037	kN

Whitmore Effective Width Method



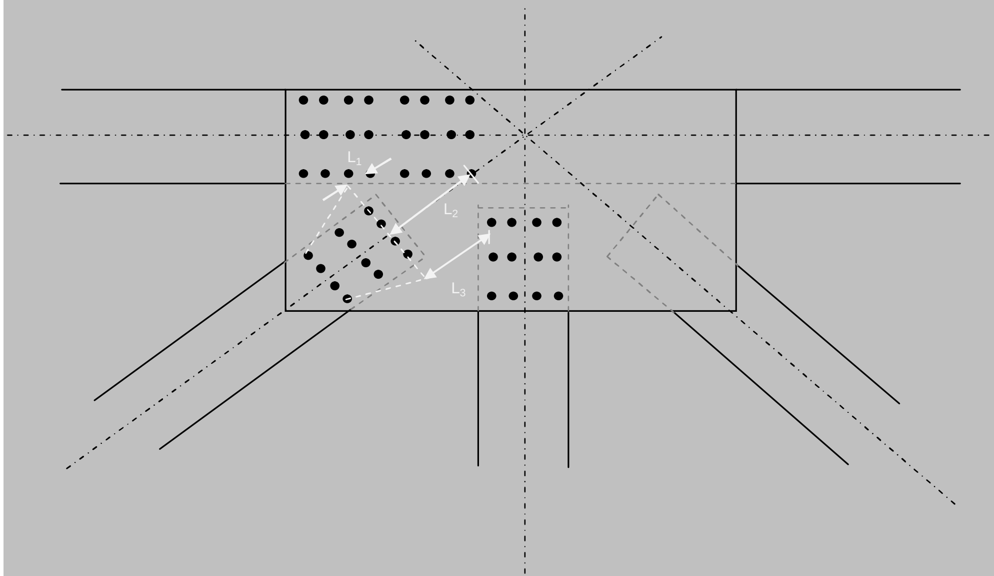


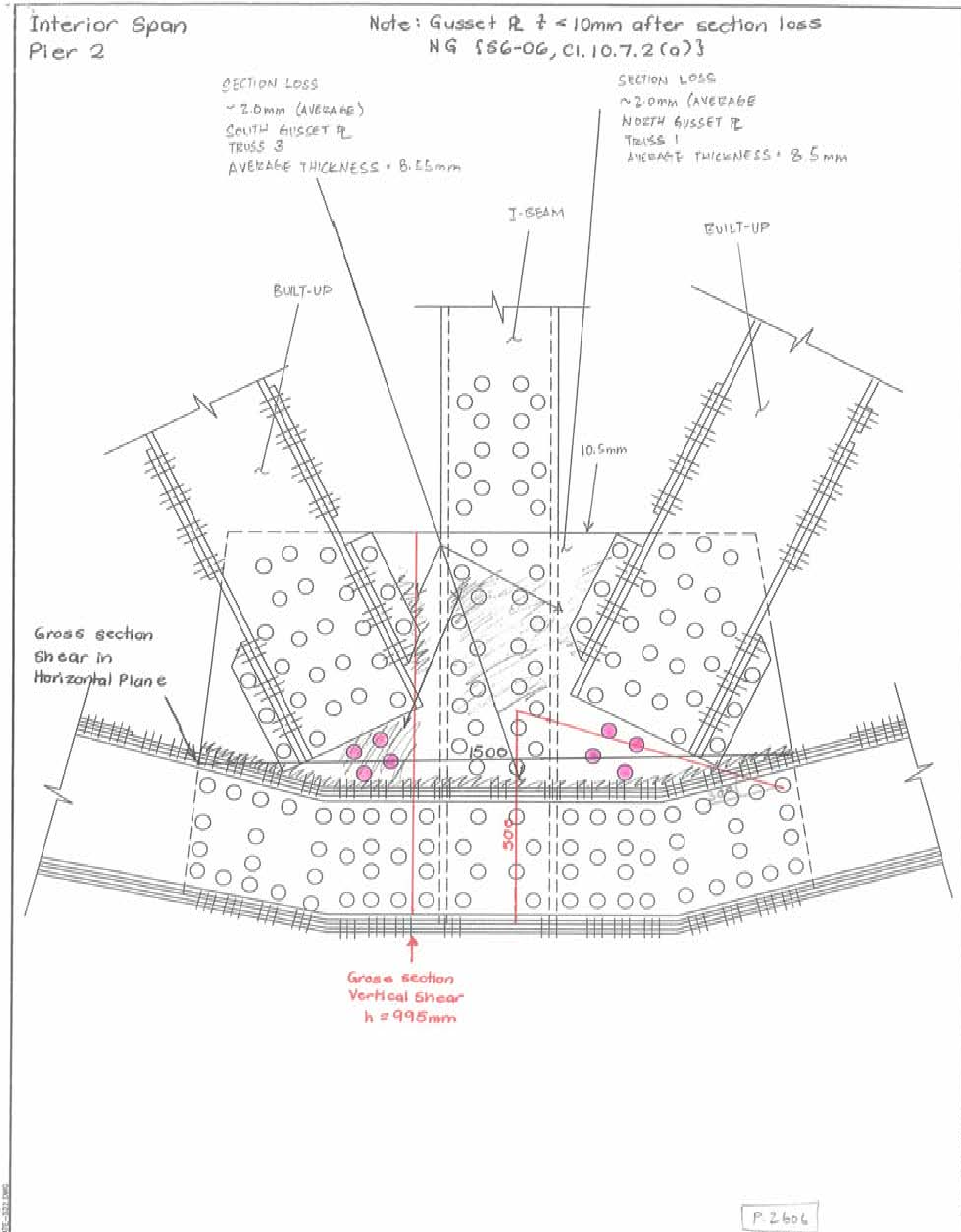
* The *effective width* is measured across the last row of fasteners in the connection under consideration. The effective width is bound on either side by the closer of the nearest adjacent plate edges or lines constructed starting from the external fasteners within the first row and extending from these fasteners at an angle of 30 degrees with respect to the line of action of the axial force. Bolt/rivet holes are not subtracted from the width.

Gusset Plate Geometry

L_2 = The distance from the last row of fasteners in the compression member under consideration, to the first row of fasteners in the closest adjacent member, measured along the line of action of the compressive axial force.

L_1 & L_3 = The distance from each of the ends of the Whitmore width to the first row of fasteners in the closest adjacent member, measured parallel to the line of action of the compressive axial force.



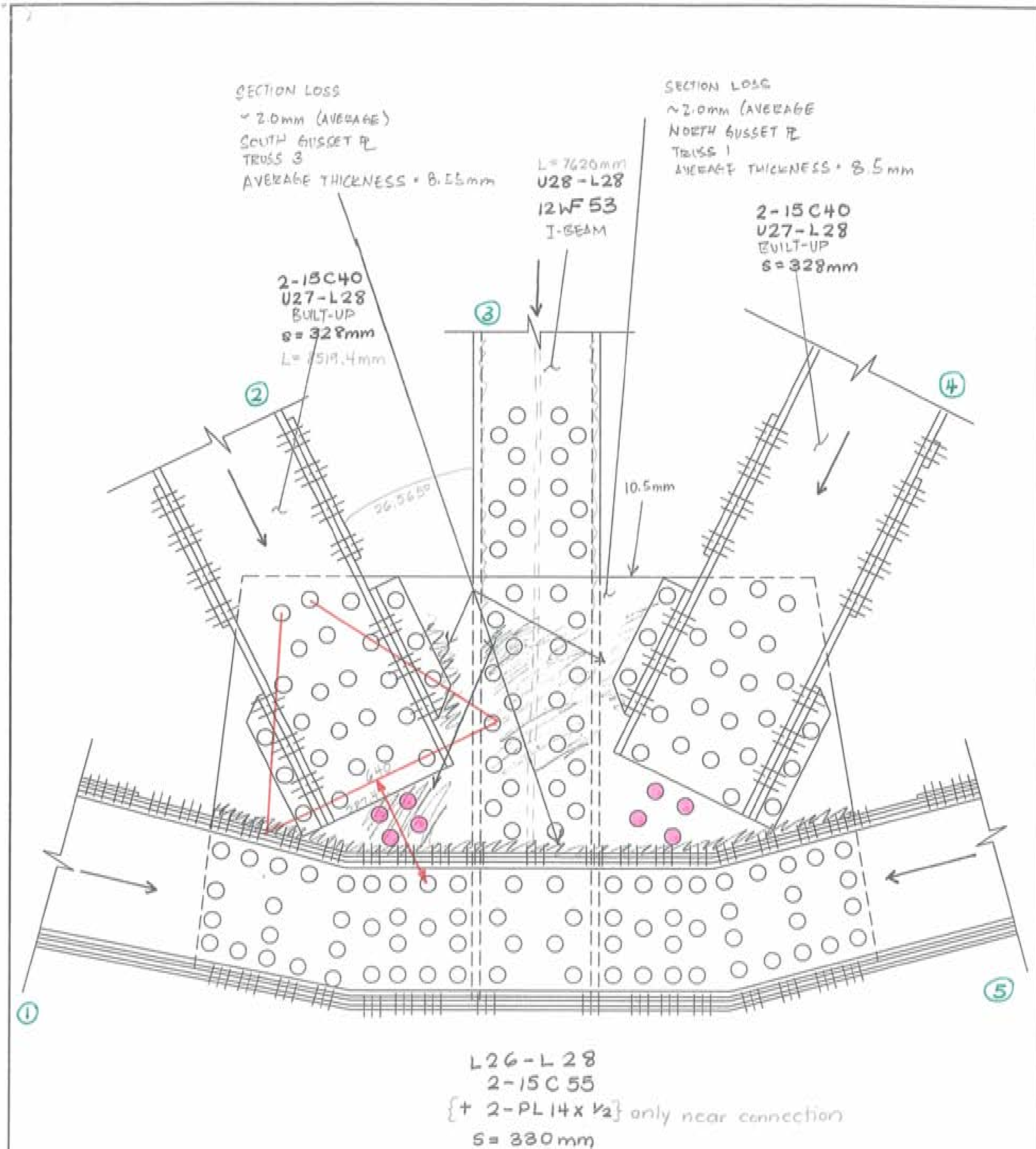


MRC

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008	
DRAWING: L28	
SPAN	TRUSS NORTH



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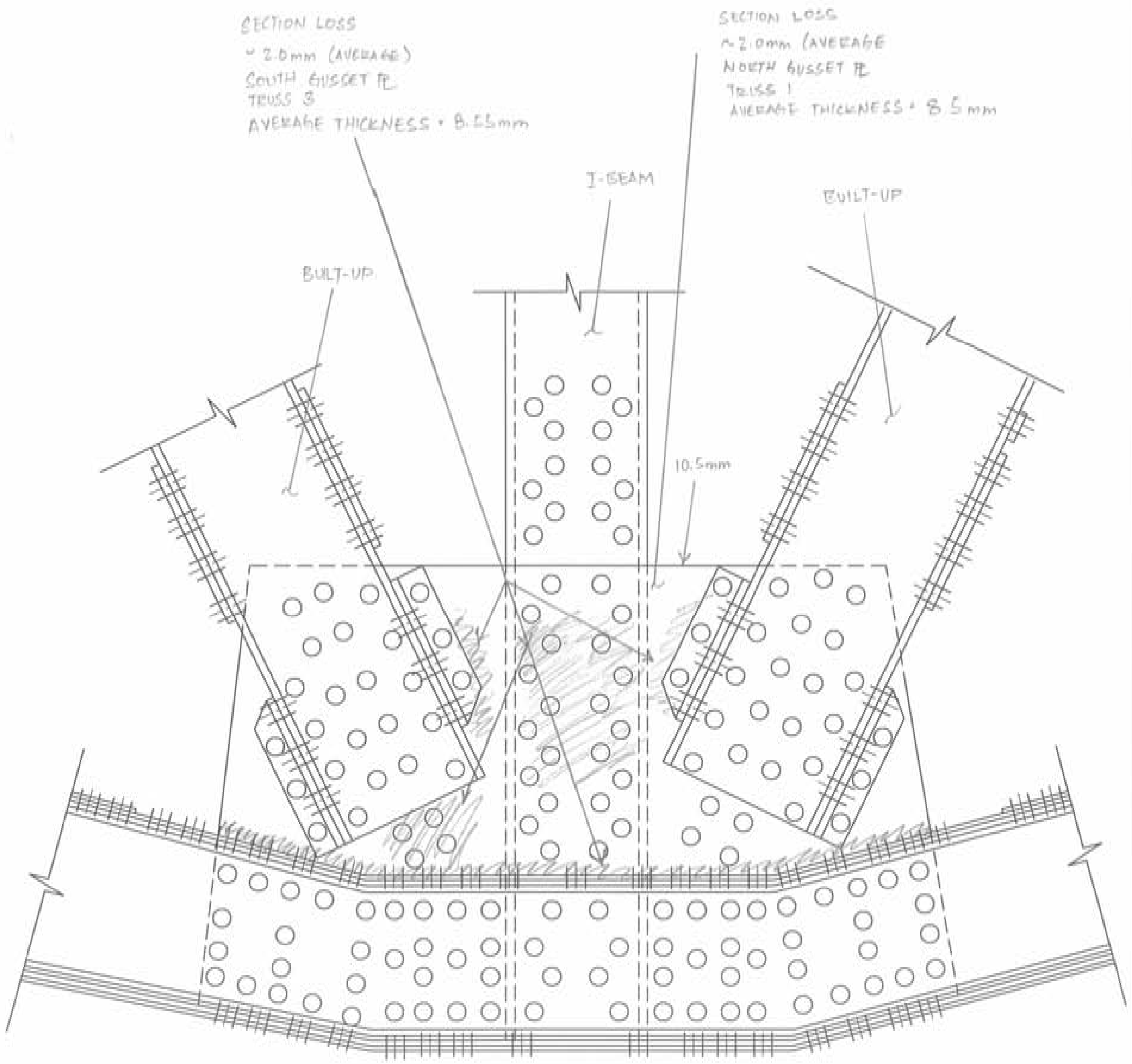
McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS –BRONTE CREEK

DATE: DECEMBER 2008

DRAWING: L28

SPAN ______ TRUSS NORTH

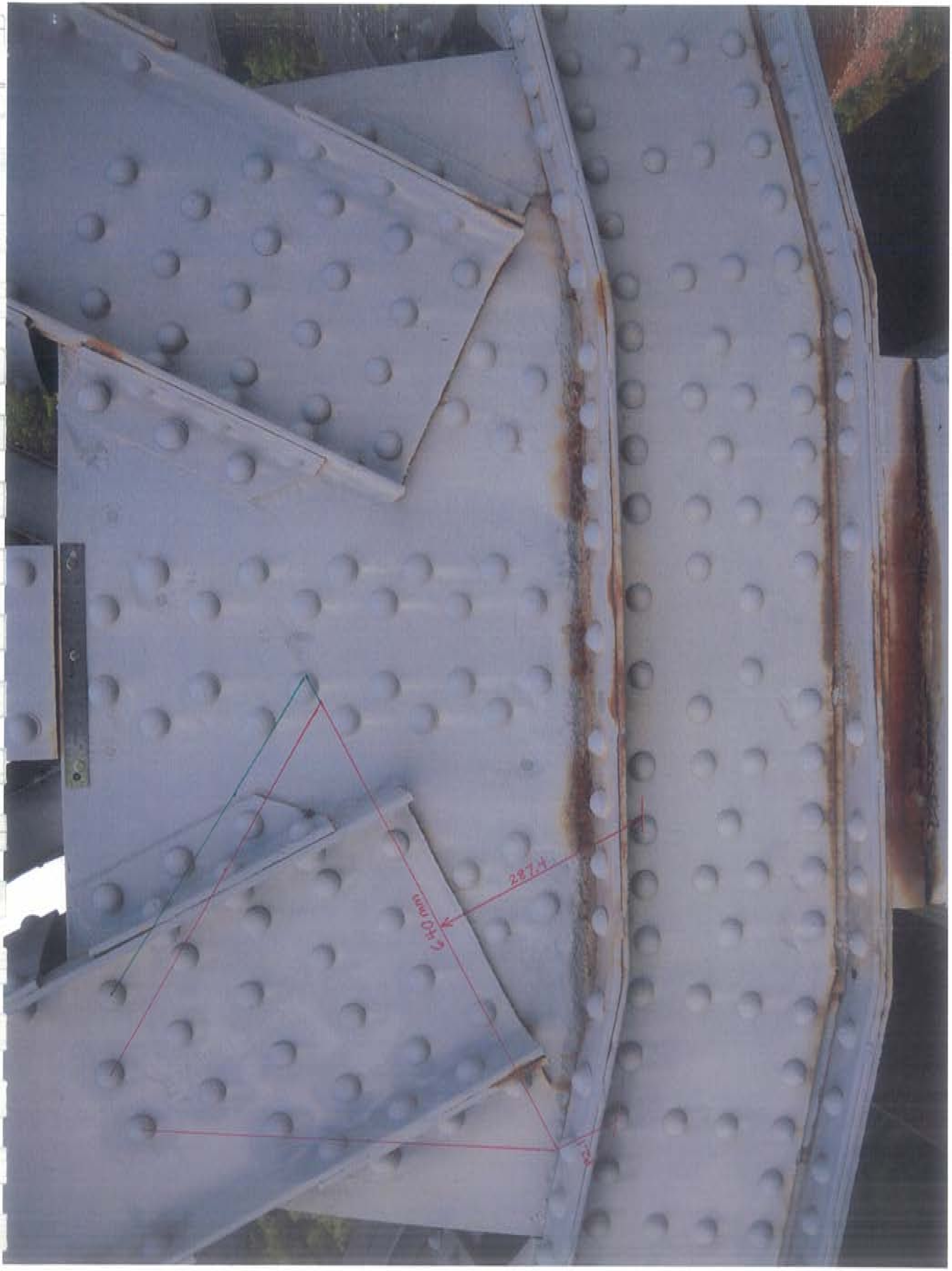


P.2606

McCORMICK RANKIN CORPORATION

TRUSS REPAIR ON
TANSLEY BRIDGE
DUNDAS – BRONTE CREEK

DATE: DECEMBER 2008
DRAWING:
L28
SPAN______ TRUSS NORTH



1. Resistance of Fasteners

1.1 Fasteners at End of Members 1 and 5

1.1.1 Shear Resistance of Fasteners

The shear resistance of one rivet is:

$$V_r = 0.75\,\phi_r\, n\, m\, A_r\, F_u$$
$$= 0.75(0.67)(1)(1)(\pi)\left(\tfrac{22.225\,mm}{2}\right)^2(360\,MPa)$$
$$= 70.18\ kN$$

1.1.2. Plate Bearing Resistance at Fasteners

$$B_r = \phi_{mc}\, t\, n\, e\, F_u \le 3\,\phi_{mc}\, t\, n\, d\, F_u \qquad e = 30\,mm - \tfrac{22.225\,mm}{2}$$
$$= 0.67(8.5)(1)(18.888)(420) \qquad = 18.888\,mm$$
$$= 45.18\,kN < 159.5\,kN$$, including section loss

∴ plate bearing resistance governs.

The resistance of all rivets in the group is:

$P_r = 34\,(45.18\,kN) = 1536.02\,kN$ (includes section loss)

1.2 Fasteners at End of Member 2

1.2.1 Shear Resistance of Fasteners

The shear resistance of one rivet is: $V_r = 70.18\,kN$

1.2.2 Plate Bearing Resistance at Fasteners

$$B_r = \phi_{mc}\, t\, n\, e\, F_u \qquad e = 30\,mm$$
$$= 0.67(8.5)(1)(30\,mm)(420\,MPa)$$
$$= 71.757\,kN$$

∴ rivet shear governs

The resistance of all rivets in the group is:

$P_r = 19\,(70.18\,kN) = 1333.4\,kN$

1.3 Fasteners at End of Member 3

1.3.1 Shear Resistance of Fasteners

$V_r = 70.18\,kN$

1.3.2 Plate Bearing Resistance at Fasteners

$B_r = \phi_{mc}\, t\, n\, e\, F_u$ $e = 30mm$
$= 0.67(8.5mm)(1)(30mm)(420MPa)$
$= 71.76\,kN$

The resistance of all rivets in the group is:

$P_r = 22(70.18kN) = 1543.96\,kN$

1.4 Fasteners at End of Member 4

1.4.1 Shear Resistance of Fasteners

$V_r = 70.18\,kN$

1.4.2 Plate Bearing Resistance at Fasteners

$B_r = 0.67(8.5mm)(1)(27mm)(420MPa)$
$= 64.58\,kN$

∴ plate bearing resistance governs

The resistance of all rivets in the group is:

$P_r = 19(64.58kN) = 1227.04\,kN$

2. Resistance of Gusset Plate

2.1 Gusset Plate Tension at Members 1 and 5

2.1.1 Gross Section Yielding Resistance

$P_r = \phi_s F_y A_s$
$= 0.95(230MPa)(8.5mm)(500mm)$ + built-up section capacity
$= 928.6kN + 6516kN$
$P_r = 7444.6kN$

2.1.2 Net Section Fracture Resistance

$P_r = 0.85\ \phi_s A_{ne} F_u$
$= 0.85(0.95)(420MPa)(500mm - 4 \times 23.8125mm)(8.5mm)$
$P_r = 1166.8$ kN + Member Capacity

2.1.3 Block Shear Rupture Resistance

Not applicable

∴ tension is not an issue since member is always in compression

2.2. Gusset Plate Tension Members 2,3 and 4

∴ tension is not an issue since member is always under compression.

2.3 Gusset Plate Subject to Vertical Shear {S6-06, Cl. 10.18.5.2}

2.3.1 Gross Section Shear Yielding Resistance

$$V_r = 0.50\, \phi_s A_g F_y$$
$$= 0.50(0.95)(8.5mm)(995mm)(230\ MPa)$$
$$= 924\ kN, \text{ including section loss}$$

2.3.2 Net Section Shear Fracture Resistance

$$V_r = 0.50\, \phi_s A_n F_u$$
$$= 0.50(0.95)(8.5mm)(995 - 8(23.8125)mm)(420MPa)$$
$$= 1364.23kN, \text{ including section loss}$$

2.4 Gusset Plate Subject to Horizontal Shear

2.4.1 Gross Section Shear Yielding Resistance

$$V_r = 0.50\, \phi_s A_g F_y$$
$$= 0.50(0.95)(8.5mm)(1500mm)(230MPa)$$
$$= 1393\ kN, \text{ including section loss}$$

2.4.2 Net Section Shear

$$V_r = 0.50\, \phi_s A_n F_u$$
$$= 0.50(0.95)(1500 - 4(23.8125))(8.5mm)(420MPa)$$
$$= 2382.1kN, \text{ including section loss}$$

2.5 Gusset Plate in Compression at Members 2 and 4

For 1 plate:

$K = 1.0$

$\phi_s = 0.90$

$L_c = \frac{0 + 287.4 + \phi}{3}$ (82.1)

$L_c = 95.8\ mm$

$b = ~~640~~\ mm$ 674.8

$t = 8.5mm$

$A = 5440mm^2$

$s = 328mm$

$930t/\sqrt{F_y}$ {S6-06, Cl. 10.18.5.2}

$= 930(8.5mm)/\sqrt{230MPa}$

$= 521.24\ mm$

$I_s = 185\,685\,333.3mm^4$ $\quad r_s = 184.8\ mm$

$I_w = 146\,346\,993.3mm^4$ $\quad r_w = 164.0\ mm$

$\lambda = \frac{KL_c}{r_w}\sqrt{\frac{F_y}{\pi^2 E}} = ~~0.0063~~$ 0.0081

$\therefore\ C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n} = ~~1126~~.1kN$ per plate (1187.1)

3.0 Resistance Summary

	Member	Shear Resistance of Fasteners	Comp. Buckling Resistance	Controlling Resistance
1)	L26-L28	1536.02 kN	∞	1536.02 kN
2)	U27-L28	1333.40 kN	1126.1 kN	1126.1 kN
3)	U28-L28	1543.96 kN	∞	1543.96 kN
4)	U27-L28	1227.04 kN	1126.1 kN	1126.1 kN
5)	L26-L28	1536.02 kN	∞	1536.02 kN

* Note that section loss has been accounted for.

Section Orientation	Shear Resistance (Per Gusset Plate) Gross Section Yield in Shear (kN)	Net Section Fracture in Shear (kN)	Controlling Shear Resistance (kN)
Vertical	924	1364.23	924
Horizontal	1393	2382.1	1393

4.0 Live Load Capacity Factors

	Member	DL_f (kN)	LL_f (kN)	U	R_r (kN)	LL Cap. Factor, F
1)	L26-L28	-1970.8	-792.7	1.81	-3072.04	4.53
2)	U27-L28	-1065.8	-1102.1	1.01	-2252.2	1.10
3)	U28-L28	-186.5	-323.7	1.81	-3087.9	16.69
4)	U27-L28	-1065.8	-1102.1	1.01	-2252.2	1.10
5)	L26-L28	-1970.8	-792.7	1.81	-3072.04	4.53

$$F = \frac{UR_r - \Sigma\alpha_D D}{\alpha_L L(1+DLA)}$$

Section Orientation	DL_f (kN)	LL_f (kN)	V_r (kN)
Vertical	0	0	924
Horizontal	0	0	1393

∴ the controlling Live Load Rating Factor for the Gusset Connection is 1.10, governed by compressive buckling of forces from diagonals.

TABLE XX - LOAD CAPACITY EVALUATION - TANSLEY BRIDGE OVER BRONTE CREEK
STEEL TRUSS BRIDGE - STRINGERS & FLOORBEAMS

Notes:

1. Load rating method is referenced to CSA - S6 - 06, Section 14.
2. Evaluation procedure: ULS method.
3. Highway Class A (as per CSA-S6-06 Clause 1.4.2.2)
4. Evaluation Level 1 (Vehicle trains)
5. Assume concrete deck is poured all at once.
6. Inspection Level considered: "INSP2".
7. A concrete deck overlay with a nominal thickness of 76.2mm is considered.
8. Target reliability index from Table 14.6.
9. Dead load factors from Table 14.7.
10. Live load factors are from Table 14.12.
11. Resistance adjustment factor from Table 14.15.
12. Live load capacity factor as per Clause 14.15.2.1.
13. Material strengths:
    F_y = 230 MPa for original structural steel
    F_y = 300 MPa for new structural steel
    f'_c = 27.6 MPa for concrete deck

	NAME	DATE
EVALUATOR	KWS	10/28/09
CHECKER		

Elt. #	Element - Force Effect	Effect Units	Target reliability index				Dead load									Live Load					Resistance		LL Capacity Factor
			Syst Behav	Elem Behav	Insp Level	Beta	Unfact. loads			Load factors		Fact. loads		Lat. Distr.	Type span	Unfact Lane	Unfact Truck	DLA	Load factor	Fact L incl DLA	Fact Resist	Adjust Fact	
							D1	D2	D3	D1	D2	D1	D2										
1	Floorbeams - Maximum Positive Moment (End floorbeam govern)	M_{max} (+) [kN.m]	S2	E3	INSP2	3.00	3	13	0	1.07	1.14	2.7	14.8	static	All	12	103	0.30	1.49	199	408	1.06	2.08
2	Floorbeams - Maximum Negative Moment (End floorbeam govern)	M_{max} (-) [kN.m]	S2	E3	INSP2	3.00	-8	-45	0	1.07	1.14	-8.7	-51.6	static	All	-17	-99	0.30	1.49	-192	-408	1.06	1.93
3	Stringers - Maximum Positive Moment (Old stringers govern)	M_{max} (+) [kN.m]	S3	E3	INSP2	2.75	6	24	0	1.06	1.12	6.3	26.5	static	All	9	134	0.30	1.42	247	307	1.00	1.11
4	Floorbeams - Web Shear (End floorbeam govern)	V_{max} [kN]	S2	E3	INSP2	3.00	5	32	0	1.07	1.14	5.1	36.3	static	All	16	93	0.30	1.49	180	645	1.03	3.46
5	Stringers - Web Shear (Old stringers govern)	V_{max} [kN]	S3	E3	INSP2	2.75	6	25	0	1.06	1.12	6.6	27.8	static	All	9	103	0.30	1.42	189	466	1.03	2.35
																			Governing LL Capacity Factor				1.11

DL1: Steel, 15% contingency and barriers
DL2: CIP Deck, Haunch and Overlay

STRINGER AND FLOORBEAM DEMANDS

[illegible]

STRINGER AND FLOORBEAM DEMANDS

STRINGER AND FLOORBEAM DEMANDS

2.24

SHEARS

Member	MN	V_{D1} kN	α_{D1}	V_{D2} kN	α_{D2}	$V_{D2\text{-asphalt}}$ kN	$\alpha_{D2\text{-asphalt}}$	V_{LDL} kN	$V_{T\,DLA(?)}$ kN	α_L	V_{LL} kN	V_f kN	V_r kN	Adjust Factor	LL Capacity Factor
stringers	1392	6.25	1.06	19.57	1.12	5.28	1.12	34.46	133.4	1.42	189.5	223.9	466	1.03	2.35
	MAXIMUM	6.3	1.06	19.6	1.12	5.3	1.12	34.5	133.4	1.42	189.5	223.9	466.0	1.03	2.35
	MINIMUM														
floorbeams	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
floorbeams	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]
MINIMUM	3.46

	Shear Check	Left Stringer	Typical Stringer	Right Stringer	End Floorbeam	Typical Floorbeam
		1	2	3	4	5
	Description of Column --->	0	0	0	11.259	11.259

Inputs and Outputs

NOTE: All parameters are controlled by the yellow cells in the Inputs section below

Inputs:

Phi Factors and Modular Ratio

		16 WF 50	16 WF 50	16 WF 50	21 WF 62	21 WF 62
ϕ_s (flexure)		0.95	0.95	0.95	0.95	0.95
ϕ_s (tension)		0.95	0.95	0.95	0.95	0.95
ϕ_s (compression)		0.90	0.90	0.90	0.90	0.90
ϕ_s (shear)		0.95	0.95	0.95	0.95	0.95
ϕ_c		0.75	0.75	0.75	0.75	0.75
ϕ_r (rebar)		0.90	0.90	0.90	0.90	0.90
n (modular ratio)		8.05	8.05	8.05	8.05	8.05

Steel Girder Information

Top flange width	(mm)	180	180	180	209	209
Top flange thickness	(mm)	16	16	16	15.6	15.6
Web depth	(mm)	381	381	381	501.8	501.8
Web thickness	(mm)	9.7	9.7	9.7	10.2	10.2
Bottom flange width	(mm)	180	180	180	209	209
Bottom flange thickness	(mm)	16	16	16	15.6	15.6
F_y	(MPa)	230	230	230	230	230
E_s	(MPa)	200000	200000	200000	200000	200000
G_s	(MPa)	77000	77000	77000	77000	77000
K_y		1	1	1	1	1
K_x		1	1	1	1	1
L_y	(mm)	3810	3810	3810	5486.4	5486.4
L_x	(mm)	3810	3810	3810	5486.4	5486.4
n		1.34	1.34	1.34	1.34	1.34
Section at discontinued girder end / near web hole?		yes	yes	yes	yes	yes
A		9456	9456	9456	11639	11639

Concrete Slab Information

Slab thickness	(mm)	190.5	190.5	190.5	0	0
Haunch height - t.o. girder to u/s of slab	(mm)	75.0	75.0	75.0	0.0	0.0
Slab effective width	(mm)	1524	1828.8	1676.4	0	0
f'_c	(MPa)	27.6	27.6	27.6	27.6	27.6
Rebar quantity - top layer	(mm^2/m)	564.3	564.3	564.3	564.3	564.3
t.o. slab to center of top bars	(mm)	73.05	73.05	73.05	73.05	73.05
Rebar quantity - bottom layer	(mm^2/m)	652.9	652.9	652.9	652.9	652.9
t.o. slab to center of bottom bars	(mm)	46.2	46.2	46.2	46.2	46.2
Rebar steel strength	(MPa)	400	400	400	400	400
E_c	(MPa)	24853	24853	24853	24853	24853

Stiffener Information

Stiffener steel yield strength	(MPa)	350	350	350	350	350
Longitudinal Stiffener						
Stiffener width - b	(mm)	101.6	101.6	101.6	101.6	101.6
Stiffener thickness - t	(mm)	9.525	9.525	9.525	9.525	9.525
Transverse Stiffener - Single Plates Only						
Stiffener width - b	(mm)	177.8	177.8	177.8	177.8	177.8
Stiffener thickness - t	(mm)	12.7	12.7	12.7	12.7	12.7
a - (transverse stiffener spacing)	(mm)	3810	3810	3810	5486.4	5486.4

Summary of Outputs:

Bare Section Symmetry		Bi-symmetric	Bi-symmetric	Bi-symmetric	Bi-symmetric	Bi-symmetric

Girder Resistance

T_r (girder + rebar)	(MN)	2.734	2.987	2.901	2.543	2.543
C_r (bare girder - cross section capacity)	(MN)	-1.957	-1.957	-1.957	-2.301	-2.301
C_r (bare girder - flexural buckling)	(MN)	-1.152	-1.152	-1.069	-0.853	-0.829
M_r (bare girder) positive bending	(MN-m)	0.307	0.307	0.307	0.406	0.406
M_r (bare girder) negative bending	(MN-m)	-0.307	-0.307	-0.307	-0.406	-0.406
M_r (composite girder) positive bending	(MN-m)	0.900	0.903	0.900	0.509	0.509
M_r (composite girder) negative bending	(MN-m)	-0.550	-0.582	-0.567	-0.509	-0.509
V_r allowable	(kN)	465.9	465.9	465.9	-21393.3	-21393.3

TABLE 6.1 - LOAD CAPACITY EVALUATION - TANSLEY BRIDGE OVER BRONTE CREEK STEEL GIRDERS & CONCRETE DECK, COMPOSITE SECTION

Notes:

1. Load rating method is referenced to CSA - S6 - 06, Section 14.
2. Evaluation procedure: ULS method.
3. Highway Class A (as per CSA-S6-06 Clause 1.4.2.2)
4. Evaluation Level 1 (Vehicle trains)
5. Assume concrete deck is poured all at once.
5. Inspection Level considered: "INSP2".
6. A concrete deck overlay with a nominal thickness of 76.2mm is considered.
7. Target reliability index from Table 14.6.
8. Dead load factors from Table 14.7.
9. Live load factors are from Table 14.12.
10. Resistance adjustment factor from Table 14.15.
11. Live load capacity factor as per Clause 14.15.2.1.
12. Material strength: F_y = 350 MPa (F_y) for structural steel
    f'_c = 27.6 MPa for concrete deck
    f_y = 414 MPa for reinforcement

Elt. #	Element - Force Effect	Effect Units	Target reliability index				Dead load									Live Load							Resistance		LL Capacity Factor
			Syst Behav	Elem Behav	Insp Level	Beta	Unfact. loads			Load factors			Fact. loads			Lat. Distr.	Type span	Unfact Lane	Unfact Truck	DLA	Load factor	Fact L incl DLA	Fact Resist	Adjust Fact	
							D1	D2	D3	D1	D2	D3	D1	D2	D3										
1	Exterior Span, North Exterior Girder - Positive Moment Near or at Midspan	Mmax (+) [kN.m]	S2	E3	INSP2	3.00	1837	3231	0	1.07	1.14	1.35	1966	3683	0	static	All	1411	3411	0.25	1.49	6353	24443	0.96	2.80
2	Interior Span, North Exterior Girder - Positive Moment at Midspan	Mmax (+) [kN.m]	S2	E3	INSP2	3.00	1375	2282	0	1.07	1.14	1.35	1471	2602	0	static	All	1458	3265	0.25	1.49	6081	24443	0.96	3.19
3	North Exterior Girder - Negative Moment at Pier 1 or 3 Support	Mmax (-) [kN.m]	S2	E3	INSP2	3.00	-4500	-7839	0	1.07	1.14	1.35	-4816	-8937	0	static	All	-2315	-2961	0.25	1.49	-6979	-41763	0.96	3.77
4	North Exterior Girder - Web Shear at Pier Supports (outside face)	Vmax [kN]	S2	E3	INSP2	3.00	435	653	0	1.07	1.14	1.35	466	745	0	static	All	215	451	0.25	1.49	858	4127	1.03	3.54
5	North Exterior Girder - Web Shear at Abutment Supports	Vmax [kN]	S2	E3	INSP2	3.00	213	317	0	1.07	1.14	1.35	228	361	0	static	All	113	348	0.25	1.49	648	2203	1.00	2.49
																						Governing LL Capacity Factor			2.49

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Inputs and Outputs
Composite Girder Capacities in Bending and Axial Load
Serviceability Limit States Stress Check
Shear Check

solver

	Left Girder	Middle Girder	Right Girder	Left Girder	Middle Girder	Right Girder	Left Girder	Middle Girder	Right Girder	Left Girder	Middle Girder	Right Girder	Left Girder	Middle Girder	Right Girder	Left Girder	Middle Girder	Right Girder
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Description of Column --->	0	0	0	11.259	11.259	11.259	-1	-1	-1	-18.401	-18.401	-18.401	-1	-1	-1	11.259	11.259	11.259

Inputs and Outputs

NOTE: All parameters are controlled by the yellow cells in the Inputs section below

Inputs:

Phi Factors and Modular Ratio

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ϕ_s (flexure)		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
ϕ_s (tension)		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
ϕ_s (compression)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ϕ_s (shear)		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
ϕ_c		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
ϕ_r (rebar)		0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
n (modular ratio)		8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05

Steel Girder Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Top flange width	(mm)	355.6	355.6	355.6	355.6	355.6	355.6	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	355.6	355.6	355.6
Top flange thickness	(mm)	19.05	19.05	19.05	19.05	19.05	19.05	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	19.05	19.05	19.05
Web depth	(mm)	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4
Web thickness	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Bottom flange width	(mm)	406.4	406.4	406.4	406.4	406.4	406.4	558.8	558.8	558.8	711.2	711.2	711.2	558.8	558.8	558.8	406.4	406.4	406.4
Bottom flange thickness	(mm)	25.4	25.4	25.4	38.1	38.1	38.1	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	38.1	38.1	38.1
F_y	(MPa)	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
E_s	(MPa)	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000
G_s	(MPa)	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000
K_y		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
K_x		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
L_y	(mm)	6604	6604	6604	6604	6604	6604	6096	6096	6096	5334	5334	5334	6350	6350	6350	6350	6350	6350
L_x	(mm)	50292	50292	50292	50292	50292	50292	50292	50292	50292	60960	60960	60960	60960	60960	60960	60960	60960	60960
n		1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
		yes	yes	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
A		40323	40323	40323	45484	45484	45484	61935	61935	61935	97419	97419	97419	61935	61935	61935	45484	45484	45484

Concrete Slab Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Slab thickness	(mm)	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9
Haunch height - t.o. girder to u/s of slab	(mm)	38.2	38.2	38.2	38.2	38.2	38.2	19.2	19.2	19.2	0.0	0.0	0.0	19.2	19.2	19.2	38.2	38.2	38.2
Slab effective width	(mm)	3200.4	3505.2	3176	3200.4	3505.2	3175	3200.4	3505.2	3176	3200.4	3505.2	3176	3200.4	3505.2	3176	3200.4	3505.2	3175
f'_c	(MPa)	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Rebar quantity - top layer	(mm²/m)	574.5	574.5	574.5	574.5	574.5	574.5	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	574.5	574.5	574.5
t.o. slab to center of top bars	(mm)	57.15	57.15	57.15	57.15	57.15	57.15	65.15	65.15	65.15	65.15	65.15	65.15	65.15	65.15	65.15	57.15	57.15	57.15
Rebar quantity - bottom layer	(mm²/m)	986.9	986.9	986.9	986.9	986.9	986.9	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	986.9	986.9	986.9
t.o. slab to center of bottom bars	(mm)	46.2	46.2	46.2	46.2	46.2	46.2	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	46.2	46.2	46.2
Rebar steel strength	(MPa)	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
E_c	(MPa)	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853	24853

Stiffener Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Stiffener steel yield strength	(MPa)	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Longitudinal Stiffener																			
Stiffener width - b	(mm)	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6
Stiffener thickness - t	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Transverse Stiffener - Single Plates Only																			
Stiffener width - b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
Stiffener thickness - t	(mm)	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
a - (transverse stiffener spacing)	(mm)	990.6	990.6	990.6	1320.8	1320.8	1320.8	889	889	889	889	889	889	889	889	889	1320.8	1320.8	1320.8

Demands - Ultimate Limit States

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Factored Applied Positive Moment (M_f+)																			
Bare Girder max positive moment	(kN-m)	0	0	0	0	0	0	6000	6000	6000	0	0	0	6000	6000	6000	0	0	0
3n Composite girder max positive moment	(kN-m)	0	0	0	0	0	0				0	0	0				0	0	0
1n Composite girder max positive moment	(kN-m)	0	0	0	11259	11259	11259	0	0	0	0	0	0	0	0	0	11259	11259	11259
TOTAL DEMAND		0	0	0	11259	11259	11259	0	0	0	0	0	0	0	0	0	11259	11259	11259
Factored Applied Negative Moment (M_f-)																			
Bare Girder max negative moment	(kN-m)	0	0	0	0	0	0	-3000	-3000	-3000	0	0	0	-3000	-3000	-3000	-3000	-3000	-3000
3n Composite girder max negative moment	(kN-m)	0	0	0							0	0	0						
1n Composite girder max negative moment	(kN-m)	0	0	0	0	0	0	-1000	-1000	-1000	-18401	-18401	-18401	-1000	-1000	-1000	-1000	-1000	-1000
TOTAL DEMAND		0	0	0	0	0	0	-1000	-1000	-1000	-18401	-18401	-18401	-1000	-1000	-1000	-1000	-1000	-1000
Factored Applied Shear (V_f)	(kN)	1160	1160	1160	0	0	0	1390	1390	1390	1912	1912	1912	1390	1390	1390	1390	1390	1390

Summary of Outputs:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri	Mono-symmetri

Girder Resistance

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T_r (girder + rebar)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C_r (bare girder - cross section capacity)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C_r (bare girder - flexural buckling)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
M_r (bare girder) positive bending	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
M_r (bare girder) negative bending	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
M_r (composite girder) positive bending	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
M_r (composite girder) negative bending	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
V_r allowable	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Composite Girder Capacities in Bending and Axial Load

NOTE: All parameters are controlled by the yellow cells in the "Inputs and Outputs" section

---> *Click here to go to the Inputs section*

Steel Girder Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Top flange width	(mm)	355.6	355.6	355.6	355.6	355.6	355.6	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	355.6	355.6	355.6
Top flange thickness	(mm)	19.05	19.05	19.05	19.05	19.05	19.05	38.1	38.1	38.1	63.5	63.5	63.6	38.1	38.1	38.1	19.05	19.05	19.05
Web depth	(mm)	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4
Web thickness	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Bottom flange width	(mm)	406.4	406.4	406.4	406.4	406.4	406.4	558.8	558.8	558.8	711.2	711.2	711.2	558.8	558.8	558.8	406.4	406.4	406.4
Bottom flange thickness	(mm)	25.4	25.4	25.4	38.1	38.1	38.1	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	38.1	38.1	38.1
Steel yield strength	(MPa)	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
E_s	(MPa)	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000

Concrete Slab Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Slab thickness	(mm)	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9
Haunch height - t.o.girder to u/s slab	(mm)	38.227	38.227	38.227	38.2	38.227	38.227	19.177	19.177	19.177	0	0	0	19.177	19.177	19.177	38.227	38.227	38.227
Slab effective width	(mm)	3200.4	3505.2	3176	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175
Concrete strength	(MPa)	27.579028	27.579028	27.579028	27.6	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028	27.579028
ϕ_c		0.75	0.75	0.75	0.8	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Rebar quantity - top layer	(mm²/m)	574.4590409	574.4590409	574.4590409	574.5	574.4590409	574.4590409	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	574.4590409	574.4590409	574.4590409
Top of slab to center of top bars	(mm)	57.15	57.15	57.15	57.2	57.15	57.15	65.15	65.15	65.15	65.15	65.15	65.15	65.15	65.15	65.15	57.15	57.15	57.15
Rebar quantity - bottom layer	(mm²/m)	986.8833876	986.8833876	986.8833876	986.9	986.8833876	986.8833876	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	4243.2	986.8833876	986.8833876	986.8833876
Top of slab to center of bottom bars	(mm)	46.2	46.2	46.2	46.2	46.2	46.2	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	46.2	46.2	46.2
Rebar steel strength	(MPa)	400	400	400	400.0	400	400	400	400	400	400	400	400	400	400	400	400	400	400
ϕ_s (rebar)		0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Bare Steel Girder Section Properties

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Gross Sectional Area	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Linear Weight	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web

Composite Section Properties

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Total height	(mm)	2737	2737	2737	2750	2750	2750	2750	2750	2750	2781	2781	2781	2750	2750	2750	2750	2750	2750
Elastic Y bar bare girder + rebar (from u/s	(mm)	1306.7	1321.0	1305.5	1165.1	1199.3	1183.9	1640.5	1670.1	1637.9	1434.6	1460.8	1432.4	1640.5	1670.1	1637.9	1185.1	1199.3	1183.9
Elastic Y bar bare girder + rebar (from t.o.	(mm)	1176.2	1161.6	1177.4	1310.4	1296.3	1311.6	874.1	844.5	876.7	1130.8	1104.6	1133.0	874.1	844.5	876.7	1310.4	1296.3	1311.6
		1342	1369	1340	1084	1111	1082	2479	2482	2479	1980	2127	1967	2479	2482	2479	1084	1111	1082
		PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Web	PNA in Top FL	PNA in Top FL	PNA in Top FL	PNA in Web	PNA in Web	PNA in Web	PNA in Top FL	PNA in Top FL	PNA in Top FL	PNA in Web	PNA in Web	PNA in Web
I_s - Bare girder + rebar	(mm⁴)	47619452706	48516431876	47543653371	55608060680	56689183576	55517046275	1.13595E+11	1.16368E+11	1.13357E+11	1.81059E+11	1.85262E+11	1.80701E+11	1.13595E+11	1.16368E+11	1.13357E+11	55608060680	56689183576	55517046275

Limiting Width-to-Thickness Ratios

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Flanges																			
b/t Top Flange		9.33	9.33	9.33	9.33	9.33	9.33	6.00	6.00	6.00	3.60	3.60	3.60	6.00	6.00	6.00	9.33	9.33	9.33
b/t Bottom Flange		8.00	8.00	8.00	5.33	5.33	5.33	7.33	7.33	7.33	5.60	5.60	5.60	7.33	7.33	7.33	5.33	5.33	5.33
Class 1 - b/t Maximum		7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75
Class 2 - b/t Maximum		9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09	9.09
Class 3 - b/t Maximum		10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69
Web																			
Class 1 - h/w Maximum		58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8	58.8
Class 2 - h/w Maximum		90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9
Class 3 - h/w Maximum		101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6

Bare Girder Section Class Check

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Class of Top Flange		Class 3 Top Flange	Class 3 Top Flange	Class 3 Top Flange	Class 3 Top Flange	Class 3 Top Flange	Class 3 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 1 Top Flange	Class 3 Top Flange	Class 3 Top Flange	Class 3 Top Flange
Class of Bottom Flange		Class 2 Bottom	Class 2 Bottom	Class 2 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom	Class 1 Bottom
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		233.1	233.1	233.1	205.9	205.9	205.9	239.8	239.8	239.8	212.5	212.5	212.5	239.8	239.8	239.8	205.9	205.9	205.9

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Composite Girder Capacities in Bending and Axial Load
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		Left Girder 1	Middle Girder 2	Right Girder 3	Left Girder 4	Middle Girder 5	Right Girder 6	Left Girder 7	Middle Girder 8	Right Girder 9	Left Girder 10	Middle Girder 11	Right Girder 12	Left Girder 13	Middle Girder 14	Right Girder 15	Left Girder 16	Middle Girder 17	Right Girder 18
Class of Web		Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
Class of Section	(-) bending	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section
Positive Bending																			
$2d_c/w$		278.9	278.9	278.9	306.1	306.1	306.1	272.3	272.3	272.3	299.5	299.5	299.5	272.3	272.3	272.3	306.1	306.1	306.1
Class of Web		Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
Class of Section	(+) bending	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section
Plastic d_c																			
Negative Bending																			
$2d_c/w$		216.9	216.9	216.9	160.0	160.0	160.0	213.3	213.3	213.3	78.2	78.2	78.2	213.3	213.3	213.3	160.0	160.0	160.0
Class of Web		Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not
Class of Section	(-) bending	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Positive Bending																			
$2d_c/w$		295.1	295.1	295.1	352.0	352.0	352.0	298.7	298.7	298.7	433.8	433.8	433.8	298.7	298.7	298.7	352.0	352.0	352.0
Class of Web		Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not
Class of Section	(+) bending	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Class of Section (governing)	(-) Bending	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section
Class of Section (governing)	(+) Bending	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section

Composite Girder Section Class Check

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Elastic d_c																			
Negative Bending																			
Governing d_c		1281.3	1295.6	1280.1	1147.0	1161.2	1145.8	1602.4	1632.0	1599.8	1371.1	1397.3	1368.9	1602.4	1632.0	1599.8	1147.0	1161.2	1145.8
$2d_c/w$		269.0	272.0	268.8	240.8	243.8	240.6	336.5	342.7	335.9	287.9	293.4	287.4	336.5	342.7	335.9	240.8	243.8	240.6
Class of Top Flange		Class 3 Top Flan	Class 3 Top Flan	Class 3 Top Flan	Class 3 Top Flan	Class 3 Top Flan	Class 3 Top Flan	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 3 Top Flan	Class 3 Top Flan	Class 3 Top Flan
Class of Bottom Flange		Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot
Class of Web		Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
Class of Section	(-) Bending	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio
Plastic d_c																			
Negative Bending																			
Governing d_c		1316.9	1344.0	1314.7	Not Applicable	Not Applicable	Not Applicable	2438.4	2438.4	2438.4	1916.2	2063.2	1903.9	2438.4	2438.4	2438.4	Not Applicable	Not Applicable	Not Applicable
$2d_c/w$		276.5	282.2	276.0	Not Applicable	Not Applicable	Not Applicable	512.0	512.0	512.0	402.3	433.2	399.8	512.0	512.0	512.0	Not Applicable	Not Applicable	Not Applicable
Class of Top Flange		Class 3 Top Flan	Class 3 Top Flan	Class 3 Top Flan	Not Applicable	Not Applicable	Not Applicable	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Class 1 / 2 Top	Not Applicable	Not Applicable	Not Applicable
Class of Bottom Flange		Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Not Applicable	Not Applicable	Not Applicable	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Class 1 / 2 Bot	Not Applicable	Not Applicable	Not Applicable
Class of Web		Class 4	Class 4	Class 4	Not	Not	Not	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4	Not	Not	Not
Class of Section	(-) Bending	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Not Applicable	Not Applicable	Not Applicable	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Class 4 Sectio	Not Applicable	Not Applicable	Not Applicable
Class of Section (governing)	(-) Bending	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section	Class 4 Section

Bare Girder Moment Resistance - All Section Classes

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
G_s	(MPa)	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000	77000
d_1	(mm)	2460.625	2460.625	2460.625	2466.975	2466.975	2466.975	2476.5	2476.5	2476.5	2501.9	2501.9	2501.9	2476.5	2476.5	2476.5	2466.975	2466.975	2466.975
J	(mm^4)	3741747	3741747	3741747	9014012	9014012	9014012	19432805	19432805	19432805	100424503	100424503	100424503	19432805	19432805	19432805	9014012	9014012	9014012
C_w	(mm^6)	2.87669E+14	2.87669E+14	2.87669E+14	3.25432E+14	3.25432E+14	3.25432E+14	1.2024E+15	1.2024E+15	1.2024E+15	2.5011E+15	2.5011E+15	2.5011E+15	1.2024E+15	1.2024E+15	1.2024E+15	3.25432E+14	3.25432E+14	3.25432E+14
I_y	(mm^4)	213632947.1	213632947.1	213632947.1	284669777	284669777	284669777	857612334.4	857612334.4	857612334.4	2409461833	2409461833	2409461833	857612334.4	857612334.4	857612334.4	284669777	284669777	284669777
I_{xc} (negative bending - bottom flange)	(mm^4)	142073659.9	142073659.9	142073659.9	213110489.9	213110489.9	213110489.9	554004027.5	554004027.5	554004027.5	1903565053	1903565053	1903565053	554004027.5	554004027.5	554004027.5	213110489.9	213110489.9	213110489.9
I_{xc} (positive bending - top flange)	(mm^4)	71383689.49	71383689.49	71383689.49	71383689.49	71383689.49	71383689.49	303432709.3	303432709.3	303432709.3	505721182.1	505721182.1	505721182.1	303432709.3	303432709.3	303432709.3	71383689.49	71383689.49	71383689.49
β_x (negative bending - bottom flange)	(mm)	730.94	730.94	730.94	1103.98	1103.98	1103.98	650.66	650.66	650.66	1305.66	1305.66	1305.66	650.66	650.66	650.66	1103.98	1103.98	1103.98
β_x (positive bending - top flange)	(mm)	-734.58	-734.58	-734.58	-1106.72	-1106.72	-1106.72	-651.57	-651.57	-651.57	-1305.99	-1305.99	-1305.99	-651.57	-651.57	-651.57	-1106.72	-1106.72	-1106.72
B_1 (negative bending - bottom flange)		2.12	2.12	2.12	2.38	2.38	2.38	1.80	1.80	1.80	3.04	3.04	3.04	1.72	1.72	1.72	2.47	2.47	2.47
B_1 (positive bending - top flange)		-2.13	-2.13	-2.13	-2.38	-2.38	-2.38	-1.80	-1.80	-1.80	-3.04	-3.04	-3.04	-1.73	-1.73	-1.73	-2.48	-2.48	-2.48
B_2		45.2	45.2	45.2	21.2	21.2	21.2	42.7	42.7	42.7	22.4	22.4	22.4	39.3	39.3	39.3	23.0	23.0	23.0
ω_2		1.0	2.0	3.0	4.0	5.0	6.0	7.0	7.0	7.0	7.0	7.0	7.0	6.0	7.0	7.0	4.0	5.0	6.0
M_u (negative bending - bottom flange)	(kN-m)	15415	30830	46245	91604	114505	137406	499555	499555	499555	2202044	2202044	2202044	394003	460720	460720	98988	123733	148479
M_u (positive bending - top flange)	(kN-m)	8335	16670	25005	34670	43337	52005	291965	291965	291965	674132	674132	674132	230919	269406	269406	37406	46758	56110
Z (bare girder)	(mm^3)	34867917	34867917	34867917	39663864	39663864	39663864	61697296	61697296	61697296	100142714	100142714	100142714	61697296	61697296	61697296	39663864	39663864	39663864
S bottom fibre (bare girder)	(mm^3)	32512286	32512286	32512286	42100180	42100180	42100180	59745011	59745011	59745011	114781356	114781356	114781356	59745011	59745011	59745011	42100180	42100180	42100180
S' bottom fibre (bare girder + rebar)	(mm^3)	36443017	36726385	36418850	46921305	47269460	46891616	69244473	69676275	69206626	126207093	126820900	126153752	69244473	69676275	69206626	46921305	47269460	46891616
S top fibre (bare girder)	(mm^3)	27407320	27407320	27407320	29043174	29043174	29043174	52816509	52816509	52816509	82867946	82867946	82867946	52816509	52816509	52816509	29043174	29043174	29043174
S' top fibre (bare girder + rebar)	(mm^3)	40486965	41758772	40381190	42435444	43732447	42327533	129955181	137799107	129305663	160119140	167721072	159487824	129955181	137799107	129305663	42435444	43732447	42327533
S' rebar (bare girder + rebar)	(mm^3)	34679127	35705270	34593620	36890235	37963629	36800790	108803707	114715785	108311127	141283857	147579857	140759248	108803707	114715785	108311127	36890235	37963629	36800790
M_s (bare girder) (Class 1 or 2)	(kN-m)	12204	12204	12204	13882	13882	13882	21594	21594	21594	35050	35050	35050	21594	21594	21594	13882	13882	13882
M_r (bare girder, - bending) (Class 3 or 4)	(kN-m)	11379	11379	11379	14735	14735	14735	20911	20911	20911	40173	40173	40173	20911	20911	20911	14735	14735	14735
M_r (bare girder, + bending) (Class 3 or 4)	(kN-m)	14170	14616	14133	14852	15306	14815	45484	48230	45257	56042	58702	55821	45484	48230	45257	14852	15308	14815
$1.15*\omega*M_u*(1-0.28*M_y/M_u)$ (bare girder -)	(kN-m)	9862	11147	11575	15373	15518	15615	22577	22577	22577	43665	43665	43665	22506	22555	22555	15427	15561	15651
$1.15*\omega*M_u*(1-0.28*M_y/M_u)$ (bare girder +)	(kN-m)	8112	12048	12997	14280	15068	14894	47524	50254	47297	59800	62569	59570	46951	50050	47118	14422	15189	14986
A_n (- bending)	(mm^2)	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
A_n (+ bending)	(mm^2)	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
A_s - negative bending	(mm^2)	21150	21150	21150	18682	18682	18682	21751	21751	21751	19280	19280	19280	21751	21751	21751	18682	18682	18682
A_s - positive bending	(mm^2)	25301	25301	25301	27770	27770	27770	24700	24700	24700	27171	27171	27171	24700	24700	24700	27770	27770	27770
Moment Reduction - Class 4 Sections Only																			
M_r Reduction Factor - negative bending		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
M_r Reduction Factor - positive bending		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
M_r (bare girder - negative bending)	(kN-m)	9862	10810	10810	13998	13998	13998	19865	19865	19865	38165	38165	38165	19865	19865	19865	13998	13998	13998
M_r (bare girder - positive bending)	(kN-m)	7918	12048	12997	14110	14541	14074	43210	45818	42994	53240	55767	53030	43210	45818	42994	14110	14541	14074

Composite Girder - Positive Bending (Sagging) Resistance

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ϕ_s flexure		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Concrete compression load	(N)	12060461	13209076	11964743	12060461	13209076	11964743	11670800	12782305	11578175	11670800	12782305	11578175	11670800	12782305	11578175	12060461	13209076	11964743
Top rebar load	(N)	661859.5373	724893.7789	656606.6838	661859.5373	724893.7789	656606.6838	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	661859.5373	724893.7789	656606.6838
Bottom rebar load	(N)	1137031.774	1245320.514	1128007.712	1137031.774	1245320.514	1128007.712	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	1137031.774	1245320.514	1128007.712
Top flange load	(N)	2252415	2252415	2252415	2252415	2252415	2252415	5791924	5791924	5791924	9653207	9653207	9653207	5791924	5791924	5791924	2252415	2252415	2252415
Web tension load	(N)	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565
Bottom flange tension load	(N)	3432251.2	3432251.2	3432251.2	5148376.8	5148376.8	5148376.8	7079018.1	7079018.1	7079018.1	15016099	15016099	15016099	7079018.1	7079018.1	7079018.1	5148376.8	5148376.8	5148376.8
Total steel tension load	(N)	13407231	13407231	13407231	15123357	15123357	15123357	20593507	20593507	20593507	32391871	32391871	32391871	20593507	20593507	20593507	15123357	15123357	15123357
Determine the location of the neutral axis		Neutral Axis in Concrete	Neutral Axis in Concrete	Neutral Axis in Concrete	Neutral Axis in Top	Neutral Axis in Concrete	Neutral Axis in Top	Neutral Axis in Concrete	Neutral Axis in Concrete	Neutral Axis in Concrete	Neutral Axis in Top	Neutral Axis in Top	Neutral Axis in Top	Neutral Axis in Concrete	Neutral Axis in Concrete	Neutral Axis in Concrete	Neutral Axis in Top	Neutral Axis in Concrete	Neutral Axis in Top
If N.A. in Concrete:																			
a	(mm)	206.3	185.8	208.2	Not Applicable	213.4	Not Applicable	192.2	160.4	195.1	Not Applicable	Not Applicable	Not Applicable	192.2	160.4	195.1	Not Applicable	213.4	Not Applicable
Centroid of tension steel (from u/s of bot fl)	(mm)	1135.7	1135.7	1135.7	Not Applicable	1018.8	Not Applicable	1179.9	1179.9	1179.9	Not Applicable	Not Applicable	Not Applicable	1179.9	1179.9	1179.9	Not Applicable	1018.8	Not Applicable
C_c	(N)	11608340	11437017	11622617	Not Applicable	13153143	Not Applicable	10815952	9884757	10893552	Not Applicable	Not Applicable	Not Applicable	10815952	9884757	10893552	Not Applicable	13153143	Not Applicable
e_c	(mm)	1498	1509	1497	Not Applicable	1624	Not Applicable	1474	1490	1472	Not Applicable	Not Applicable	Not Applicable	1474	1490	1472	Not Applicable	1624	Not Applicable
C, top of slab	(N)	661859.5373	724893.7789	656606.6838	Not Applicable	724893.7789	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	724893.7789	Not Applicable
e, top of slab	(mm)	1544.2	1544.2	1544.2	Not Applicable	1673.8	Not Applicable	1504.6	1504.6	1504.6	Not Applicable	Not Applicable	Not Applicable	1504.6	1504.6	1504.6	Not Applicable	1673.8	Not Applicable
C, bottom of slab	(N)	1137031.774	1245320.514	1128007.712	Not Applicable	1245320.514	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	1245320.514	Not Applicable
e, bottom of slab	(mm)	1555.1	1555.1	1555.1	Not Applicable	1684.7	Not Applicable	1517.2	1517.2	1517.2	Not Applicable	Not Applicable	Not Applicable	1517.2	1517.2	1517.2	Not Applicable	1684.7	Not Applicable
M_r	(kN-m)	20181	20309	20170	Not Applicable	24675	Not Applicable	30712	30904	30693	Not Applicable	Not Applicable	Not Applicable	30712	30904	30693	Not Applicable	24675	Not Applicable

Composite Girder - Negative Bending (Hogging) Resistance Class 1 and 2 Sections

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ϕ_s flexure		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Concrete tension load	(N)	0	1	2	3	4	5	6	6	6	6	6	6	5	6	6	3	4	5
Top rebar load	(N)	661859.5373	724893.7789	656606.6838	661859.5373	724893.7789	656606.6838	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	661859.5373	724893.7789	656606.6838
Bottom rebar load	(N)	1137031.774	1245320.514	1128007.712	1137031.774	1245320.514	1128007.712	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	4888777.421	5354375.27	4849977.6	1137031.774	1245320.514	1128007.712
Top flange load	(N)	2252415	2252415	2252415	2252415	2252415	2252415	5791924	5791924	5791924	9653207	9653207	9653207	5791924	5791924	5791924	2252415	2252415	2252415
Total web load (using entire web depth)	(N)	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565	7722565
Bottom flange compressive load	(N)	3432251.2	3432251.2	3432251.2	5148376.8	5148376.8	5148376.8	7079018.1	7079018.1	7079018.1	15016099	15016099	15016099	7079018.1	7079018.1	7079018.1	5148376.8	5148376.8	5148376.8
Total girder steel load	(N)	13407231	13407231	13407231	15123357	15123357	15123357	20593507	20593507	20593507	32391871	32391871	32391871	20593507	20593507	20593507	15123357	15123357	15123357
Determine the location of the neutral axis		Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Top	Neutral Axis in Top	Neutral Axis in Top	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Top	Neutral Axis in Top	Neutral Axis in Top	Neutral Axis in Web	Neutral Axis in Web	Neutral Axis in Web
(NOTE - It is not realistic for the neutral axis to be in the concrete in negative bending for this application)																			
If N.A. in Top Flange:																			
Net tension in top flange	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	5407973.179	4942375.33	5446773	Not Applicable	Not Applicable	Not Applicable	5407973.679	4942375.33	5446773	Not Applicable	Not Applicable	Not Applicable
Depth of top flange in tension	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	35.57	32.51	35.83	Not Applicable	Not Applicable	Not Applicable	35.57	32.51	35.83	Not Applicable	Not Applicable	Not Applicable
Centroid of compression steel (from U.S. of	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	710.9	763.6	706.4	Not Applicable	Not Applicable	Not Applicable	710.9	763.6	706.4	Not Applicable	Not Applicable	Not Applicable
T, top of slab	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable
e, top of slab	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	1973.6	1921.0	1978.1	Not Applicable	Not Applicable	Not Applicable	1973.6	1921.0	1978.1	Not Applicable	Not Applicable	Not Applicable
T, bottom of slab	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable
e, bottom of slab	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	1986.2	1933.5	1990.7	Not Applicable	Not Applicable	Not Applicable	1986.2	1933.5	1990.7	Not Applicable	Not Applicable	Not Applicable
T top flange	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	5407973.179	4942375.33	5446773	Not Applicable	Not Applicable	Not Applicable	5407973.679	4942375.33	5446773	Not Applicable	Not Applicable	Not Applicable
e top flange	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	1785.887866	1734.775329	1790.289085	Not Applicable	Not Applicable	Not Applicable	1785.887923	1734.775329	1790.289085	Not Applicable	Not Applicable	Not Applicable
M_r	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	29018.4	29212.2	28999.9	Not Applicable	Not Applicable	Not Applicable	29016.4	29212.2	28999.9	Not Applicable	Not Applicable	Not Applicable
If N.A. in Web:																			
(Assume entire web depth usable)																			
Net tension in web	(N)	3551755.119	3466093.628	3558693.577	4409817.919	4324156.428	4416956.377	Not Applicable	Not Applicable	Not Applicable	1653951.429	1188353.58	1692751.25	Not Applicable	Not Applicable	Not Applicable	4409817.919	4324156.428	4416956.377
Depth of web in tension	(mm)	1121.5	1094.4	1123.7	1392.4	1365.4	1394.7	Not Applicable	Not Applicable	Not Applicable	522.2	375.2	534.5	Not Applicable	Not Applicable	Not Applicable	1392.4	1365.4	1394.7
Depth of web in compression	(mm)	1316.9	1344.0	1314.7	1046.0	1073.0	1043.7	Not Applicable	Not Applicable	Not Applicable	1916.2	2063.2	1903.9	Not Applicable	Not Applicable	Not Applicable	1046.0	1073.0	1043.7
Centroid of compression steel (from u/s of	(mm)	380.9	391.7	380.0	231.3	240.0	230.6	Not Applicable	Not Applicable	Not Applicable	316.6	354.2	313.6	Not Applicable	Not Applicable	Not Applicable	231.3	240.0	230.6
T, top of slab	(N)	661859.5373	724893.7789	656606.6838	661859.5373	724893.7789	656606.6838	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable	661859.5373	724893.7789	656606.6838
e, top of slab	(mm)	2298.9	2288.1	2299.8	2461.3	2452.6	2462.0	Not Applicable	Not Applicable	Not Applicable	2399.5	2362.0	2402.6	Not Applicable	Not Applicable	Not Applicable	2461.3	2452.6	2462.0
T, bottom of slab	(N)	1137031.774	1245320.514	1128007.712	1137031.774	1245320.514	1128007.712	Not Applicable	Not Applicable	Not Applicable	4888777.421	5354375.27	4849977.6	Not Applicable	Not Applicable	Not Applicable	1137031.774	1245320.514	1128007.712
e, bottom of slab	(mm)	2309.9	2299.0	2310.8	2472.2	2463.5	2472.9	Not Applicable	Not Applicable	Not Applicable	2412.1	2374.5	2415.1	Not Applicable	Not Applicable	Not Applicable	2472.2	2463.5	2472.9
T top flange	(N)	2252414.85	2252414.85	2252414.85	2252414.85	2252414.85	2252414.85	Not Applicable	Not Applicable	Not Applicable	9653206.5	9653206.5	9653206.5	Not Applicable	Not Applicable	Not Applicable	2252414.85	2252414.85	2252414.85
e top flange	(mm)	2092.4	2081.6	2093.3	2254.7	2246.1	2255.5	Not Applicable	Not Applicable	Not Applicable	2217.0	2179.5	2220.1	Not Applicable	Not Applicable	Not Applicable	2254.7	2246.1	2255.5
T web	(N)	3551755	3466094	3558694	4409818	4324156	4416956	Not Applicable	Not Applicable	Not Applicable	1653951	1188354	1692751	Not Applicable	Not Applicable	Not Applicable	4409818	4324156	4416956
e web	(mm)	1522.2	1524.8	1522.0	1549.0	1553.9	1548.6	Not Applicable	Not Applicable	Not Applicable	1924.1	1960.1	1921.1	Not Applicable	Not Applicable	Not Applicable	1549.0	1553.9	1548.6
M_r	(kN-m)	14267.5	14495.5	14248.3	16349.5	16623.9	16326.4	Not Applicable	Not Applicable	Not Applicable	48106.3	48729.5	48048.2	Not Applicable	Not Applicable	Not Applicable	16349.5	16623.9	16328.4
If N.A. in Bottom Flange:																			
Net tension in bottom flange	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Depth of web in tension	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Depth of web in compression	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Centroid of compression steel (from u/s of	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
T, top of slab	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
e, top of slab	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
T, bottom of slab	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

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Page Links

- General Information
- Inputs and Outputs
- Composite Girder Capacities in Bending and Axial L solver solve:
- Serviceability Limit States Stress Check
- Shear Check

		Left Girder 1	Middle Girder 2	Right Girder 3	Left Girder 4	Middle Girder 5	Right Girder 6	Left Girder 7	Middle Girder 8	Right Girder 9	Left Girder 10	Middle Girder 11	Right Girder 12	Left Girder 13	Middle Girder 14	Right Girder 15	Left Girder 16	Middle Girder 17	Right Girder 18
[redacted]	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	(N)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Composite Girder - Negative Bending (Hogging) Resistance Class 3 Sections

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
[redacted]		319.3	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0
		304.1	462.7	499.2	511.4	527.0	510.1	861.2	913.2	856.9	876.3	708.4	673.8	861.2	913.2	856.9	511.4	527.0	510.1
For the Bottom (Compression) Fibre:																			
M_d/S	(MPa)	0.0	0.0	0.0	0.0	0.0	0.0	50.2	50.2	50.2	0.0	0.0	0.0	50.2	50.2	50.2	71.3	71.3	71.3
$(M_{sd}+M_l)/S'$	(MPa)	0.0	0.0	0.0	0.0	0.0	0.0	14.4	14.4	14.4	145.8	145.1	145.9	14.4	14.4	14.4	21.3	21.2	21.3
$M_d/S + (M_{sd}+M_l)/S'$	(MPa)	0.0	0.0	0.0	0.0	0.0	0.0	64.7	64.6	64.7	145.8	145.1	145.9	64.7	64.6	64.7	92.6	92.4	92.6
[redacted]		303.3	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5
		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
For the Top (Tension) Fibre:																			
M_d/S	(MPa)	0.0	0.0	0.0	0.0	0.0	0.0	56.8	56.8	56.8	0.0	0.0	0.0	56.8	56.8	56.8	103.3	103.3	103.3
$(M_{sd}+M_l)/S'$	(MPa)	0.0	0.0	0.0	0.0	0.0	0.0	7.7	7.3	7.7	114.9	109.7	115.4	7.7	7.3	7.7	23.6	22.9	23.6
$M_d/S + (M_{sd}+M_l)/S'$	(MPa)	0.0	0.0	0.0	0.0	0.0	0.0	64.5	64.1	64.5	114.9	109.7	115.4	64.5	64.1	64.5	126.9	126.2	126.9
$\phi_s{}^*F_y$	(MPa)	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5	332.5
Check to ensure $\phi_s{}^*F_y$ not exceeded		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
For the Top Layer of Rebar:																			
$(M_{sd}+M_l)/S'$	(MPa)	0.00	0.00	0.00	0.00	0.00	0.00	9.19	8.72	9.23	130.24	124.69	130.73	9.10	8.72	9.23	27.11	26.34	27.17
$\phi_r{}^*f_y$ rebar	(MPa)	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
Check to ensure $\phi_r{}^*f_y$ not exceeded		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Calculation of M_r																			
[redacted]		N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web	N.A. in Web
If Neutral Axis is in the Web:																			
M_r - Assume Bottom Flange Yields First																			
[redacted]		3100811	3399254	3398861	5065621	5066597	5065538	6996814	6998272	6996686	14683774	14689733	14683256	6996814	6998272	6996686	5065621	5066597	5065538
		1815032	2012213	1987598	1757972	1780344	1756089	2478505	2525405	2474474	2076110	2116510	2071582	2478505	2525405	2474474	1757972	1780344	1756089
		1460209	1565447	1627497	2228216	2153074	2234571	674643	616528	679616	1267319	1174905	1264551	674643	616528	679616	2228216	2153974	2234571
		1834653	1964734	2014966	2472415	2416697	2477167	3018673	2862644	3032575	7395091	7089385	7421658	3018673	2862544	3032575	2472415	2416697	2477167
		1014835	1192620	1105549	1345438	1442634	1337150	2908173	3040883	2896545	4072987	4292220	4053938	2908173	3040883	2896545	1345438	1442634	1337150
		586056	688667	638447	777524	833636	772738	2873630	3003722	2862223	4033487	4249734	4014691	2873630	3003722	2862223	777524	833636	772738
Total Compression	(N)	4915842	5411467	5386459	6823593	6846942	6821627	9475319	9523677	9471160	16758883	16806243	16754838	9475319	9523677	9471160	6823593	6846942	6821627
Total Tension	(N)	4915842	5411467	5386459	6823593	6846942	6821627	9475319	9523677	9471160	16758883	16806243	16754838	9475319	9523677	9471160	6823593	6846942	6821627
Determine moment arms for all force components																			
[redacted]		1294.0	1308.4	1292.8	1166.2	1180.3	1165.0	1621.5	1651.1	1619.0	1403.1	1429.3	1400.9	1621.5	1651.1	1619.0	1166.2	1180.3	1165.0
		854.2	863.7	853.4	764.7	774.1	763.9	1068.3	1088.0	1066.6	914.1	931.5	912.6	1068.3	1088.0	1066.6	764.7	774.1	763.9
		771.4	761.9	772.2	860.9	851.5	861.7	557.3	537.6	559.0	711.5	694.1	713.0	557.3	537.6	559.0	860.9	851.5	861.7
		1166.7	1152.3	1167.9	1300.9	1286.8	1302.1	855.2	825.6	857.7	1099.3	1073.1	1101.6	855.2	825.6	857.7	1300.9	1286.8	1302.1
		1384.1	1369.8	1385.3	1518.3	1504.2	1519.5	1056.6	1027.0	1059.1	1294.1	1267.9	1296.3	1056.6	1027.0	1059.1	1518.3	1504.2	1519.5
		1373.1	1358.8	1374.4	1507.4	1493.2	1508.6	1044.0	1014.4	1046.6	1281.5	1255.3	1283.8	1044.0	1014.4	1046.6	1507.4	1493.2	1508.6
		4012.5	4447.5	4394.1	5907.5	5980.3	5901.3	11345.4	11555.2	11327.4	20603.0	20996.1	20569.5	11345.4	11555.2	11327.4	5907.5	5980.3	5901.3
		1550.4	1738.0	1696.2	1344.3	1378.2	1341.5	2647.7	2747.7	2639.2	1896.8	1971.6	1890.5	2647.7	2747.7	2639.2	1344.3	1378.2	1341.5
		1141.9	1192.6	1256.8	1918.3	1834.1	1925.5	376.0	331.4	380.0	894.6	815.4	901.6	376.0	331.4	380.0	1918.3	1834.1	1925.5
		2140.4	2264.0	2353.2	3216.4	3109.7	3225.5	2581.7	2363.2	2601.2	8129.7	7608.0	8175.4	2581.7	2363.2	2601.2	3216.4	3109.7	3225.5
		1404.6	1633.6	1531.5	2042.8	2170.0	2031.8	3072.7	3122.8	3067.6	5270.8	5442.0	5255.2	3072.7	3122.8	3067.6	2042.8	2170.0	2031.8
		804.7	935.8	877.5	1172.0	1244.8	1165.7	3000.2	3047.0	2995.6	5169.0	5334.8	5153.9	3000.2	3047.0	2995.6	1172.0	1244.8	1165.7
		11054.6	**12211.5**	**12109.3**	**15601.3**	**15717.1**	**15591.5**	**23023.8**	**23167.4**	**23011.2**	**41963.9**	**42167.9**	**41946.1**	**23023.8**	**23167.4**	**23011.2**	**15601.3**	**15717.1**	**15591.5**
M_r - Assume Top Flange Yields First																			
Compression in bottom flange	(N)	3776055	3865033	3768655	4581328	4687481	4572496	13131333	13840517	13072609	18629327	19427221	18563043	13131333	13840517	13072609	4581328	4687481	4572496
Compression in web	(N)	2210280	2287934	2203847	1589903	1647127	1585164	4651557	4994606	4623307	2632695	2769092	2618960	4651557	4994606	4623307	1589903	1647127	1585164
Tension in web	(N)	1802654	1779960	1804568	2015190	1992799	2017075	1266143	1219311	1270169	1595163	1553815	1589686	1266143	1219311	1270169	2015190	1992799	2017075
Tension in top flange	(N)	2234174	2233949	2234193	2236043	2235864	2236058	5665697	5661268	5666064	9382164	9375736	9382696	5665697	5661268	5666064	2236043	2235864	2236058
Tension in bottom layer of slab rebar	(N)	1170785	1284666	1161314	1152767	1264440	1143475	5170679	5697445	5127068	4895436	5377113	4855376	5170679	5697445	5127068	1152767	1264440	1143475
Tension in top layer of slab rebar	(N)	678116	741610	670651	666179	730665	660814	5109263	5627818	5066316	4847960	5324403	4808370	5109263	5627818	5066316	666179	730665	660814
Solve for equilibrium by iterating y bar:																			
Total Compression	(N)	5986334	6152967	5972501	6171231	6334608	6157660	17782890	18835023	17695916	21262022	22226314	21182004	17782890	18835023	17695916	6171231	6334608	6157660
Total Tension	(N)	5883729	6040384	5870725	6070179	6223769	6057422	17211782	18205842	17129617	20720722	21631747	20645129	17211782	18205842	17129617	6070179	6223769	6057422
Net Force (C-T)	(N)	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR
Determine moment arms for all force components																			
e bottom flange	(mm)	1294.0	1308.4	1292.8	1166.2	1180.3	1165.0	1621.5	1651.1	1619.0	1403.1	1429.3	1400.9	1621.5	1651.1	1619.0	1166.2	1180.3	1165.0
e web compression	(mm)	854.2	863.7	853.4	764.7	774.1	763.9	1068.3	1088.0	1066.6	914.1	931.5	912.6	1068.3	1088.0	1066.6	764.7	774.1	763.9
e web tension	(mm)	771.4	761.9	772.2	860.9	851.5	861.7	557.3	537.6	559.0	711.5	694.1	713.0	557.3	537.6	559.0	860.9	851.5	861.7
e top flange	(mm)	1166.7	1152.3	1167.9	1300.9	1286.8	1302.1	855.2	825.6	857.7	1099.3	1073.1	1101.6	855.2	825.6	857.7	1300.9	1286.8	1302.1
e slab - bottom rebar	(mm)	1384.1	1369.8	1385.3	1518.3	1504.2	1519.5	1056.6	1027.0	1059.1	1294.1	1267.9	1296.3	1056.6	1027.0	1059.1	1518.3	1504.2	1519.5
e slab - top rebar	(mm)	1373.1	1358.8	1374.4	1507.4	1493.2	1508.6	1044.0	1014.4	1046.6	1281.5	1255.3	1283.8	1044.0	1014.4	1046.6	1507.4	1493.2	1508.6
Calculate moment resistance																			
Bottom flange	(kN-m)	4886.3	5056.9	4872.2	5342.7	5532.8	5326.9	21292.7	22852.7	21164.1	26139.0	27767.4	26004.8	21292.7	22852.7	21164.1	5342.7	5532.8	5326.9
Web compression	(kN-m)	1888.0	1976.2	1880.7	1215.8	1275.1	1210.9	4969.1	5434.1	4931.0	2406.5	2607.5	2390.0	4969.1	5434.1	4931.0	1215.8	1275.1	1210.9
Web tension	(kN-m)	1390.6	1356.1	1393.5	1734.9	1696.8	1738.1	705.7	655.5	710.1	1135.0	1078.4	1133.4	705.7	655.5	710.1	1734.9	1696.8	1738.1
Top flange	(kN-m)	2606.5	2574.2	2609.3	2908.9	2877.0	2911.6	4845.3	4673.8	4860.0	10314.1	10061.5	10335.7	4845.3	4673.8	4860.0	2908.9	2877.0	2911.6
Slab bottom rebar	(kN-m)	1620.5	1759.7	1608.8	1750.3	1902.0	1737.5	5463.3	5851.0	5430.2	6335.1	6818.3	6294.1	5463.3	5851.0	5430.2	1750.3	1902.0	1737.5
Slab top rebar	(kN-m)	928.4	1008.0	921.7	1004.2	1091.1	996.9	5334.3	5708.9	5302.3	6212.8	6684.0	6172.8	5334.3	5708.9	5302.3	1004.2	1091.1	996.9
M_r, Moment Resistance (F_y @ top flan	(kN-m)	**13320.3**	**13731.0**	**13286.2**	**13956.8**	**14374.8**	**13922.0**	**42610.2**	**45176.0**	**42397.9**	**52542.5**	**55017.1**	**52337.0**	**42610.2**	**45176.0**	**42397.9**	**13956.8**	**14374.8**	**13922.0**
Mr - Assuming Slab Top Rebar Yields First																			
Compression in bottom flange	(N)	3696436	3776650	3689735	4551620	4650454	4543384	12564663	13168037	12514391	18766177	19536290	18723674	12564663	13168037	12514391	4551620	4650454	4543384
Compression in web	(N)	2163675	2235733	2157696	1579593	1634117	1575072	4460824	4751834	4425886	2654861	2814807	2641623	4460824	4751834	4425886	1579593	1634117	1575072
Tension in web	(N)	1764645	1739339	1766778	2002122	1977058	2004233	1211504	1160067	1215931	1608593	1562539	1612519	1211504	1160067	1215931	2002122	1977058	2004233
Tension in top flange	(N)	2187066	2182980	2187406	2221543	2218203	2221821	5421199	5386199	5424115	9461167	9428373	9463889	5421199	5386199	5424115	2221543	2218203	2221821
Tension in bottom layer of slab rebar	(N)	1148099	1255356	1136995	1145291	1254452	1136195	4947544	5420619	4908136	4936653	5407905	4897391	4947544	5420619	4908136	1145291	1254452	1136195
Tension in top layer of slab rebar	(N)	661860	724894	656607	661860	724894	656607	4888777	5354375	4849978	4888777	5354375	4849978	4888777	5354375	4849978	661860	724894	656607
Solve for equilibrium by iterating y bar:																			
Total Compression	(N)	5860111	6012383	5847431	6131213	6284571	6118456	17015487	17919871	16940277	21441038	22351097	21365297	17015487	17919871	16940277	6131213	6284571	6118456
Total Tension	(N)	5759669	5902569	5747786	6030816	6174608	6018856	16469024	17321260	16398160	20895180	21753192	20823777	16469024	17321260	16398160	6030816	6174608	6018856
Net force (C - T)	(N)	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR
Determine moment arms for all force components																			
e bottom flange	(mm)	1294.0	1308.4	1292.8	1166.2	1180.3	1165.0	1621.5	1651.1	1619.0	1403.1	1429.3	1400.9	1621.5	1651.1	1619.0	1166.2	1180.3	1165.0
e web compression	(mm)	854.2	863.7	853.4	764.7	774.1	763.9	1068.3	1088.0	1066.6	914.1	931.5	912.6	1068.3	1088.0	1066.6	764.7	774.1	763.9
e web tension	(mm)	771.4	761.9	772.2	860.9	851.5	861.7	557.3	537.6	559.0	711.5	694.1	713.0	557.3	537.6	559.0	860.9	851.5	861.7
e top flange	(mm)	1166.7	1152.3	1167.9	1300.9	1286.8	1302.1	855.2	825.6	857.7	1099.3	1073.1	1101.6	855.2	825.6	857.7	1300.9	1286.8	1302.1
e slab - bottom rebar	(mm)	1384.1	1369.8	1385.3	1518.3	1504.2	1519.5	1056.6	1027.0	1059.1	1294.1	1267.9	1296.3	1056.6	1027.0	1059.1	1518.3	1504.2	1519.5
e slab - top rebar	(mm)	1373.1	1358.8	1374.4	1507.4	1493.2	1508.6	1044.0	1014.4	1046.6	1281.5	1255.3	1283.8	1044.0	1014.4	1046.6	1507.4	1493.2	1508.6
Calculate moment resistance																			
Bottom flange	(kN-m)	4783.3	4941.6	4770.1	5308.0	5489.1	5293.0	20373.8	21742.4	20260.4	26359.1	27923.2	26229.6	20373.8	21742.4	20260.4	5308.0	5489.1	5293.0
Web compression	(kN-m)	1848.2	1931.1	1841.3	1207.9	1265.0	1203.2	4754.6	5170.1	4720.5	2426.8	2622.1	2410.7	4754.6	5170.1	4720.5	1207.9	1265.0	1203.2
Web tension	(kN-m)	1361.3	1325.1	1364.3	1723.6	1683.4	1727.1	675.2	623.6	679.8	1144.5	1084.5	1149.7	675.2	623.6	679.8	1723.6	1683.4	1727.1
Top flange	(kN-m)	2551.6	2516.5	2554.6	2890.0	2854.3	2893.0	4636.2	4446.7	4652.5	10401.0	10118.0	10425.1	4636.2	4446.7	4652.5	2890.0	2854.3	2893.0
Slab bottom rebar	(kN-m)	1586.3	1719.5	1575.1	1738.9	1886.9	1726.5	5227.5	5566.7	5198.4	6388.4	6856.6	6348.5	5227.5	5566.7	5198.4	1738.9	1886.9	1726.5
Slab top rebar	(kN-m)	908.8	985.0	902.4	997.7	1082.4	990.5	5104.1	5431.5	5075.9	6265.1	6721.5	6226.2	5104.1	5431.5	5075.9	997.7	1082.4	990.5
M_r, Moment Resistance (F_y @ slab top	(kN-m)	**13039.4**	**13417.8**	**13007.9**	**13866.3**	**14261.2**	**13833.4**	**40771.4**	**42981.0**	**40587.4**	**52984.9**	**55328.0**	**52789.9**	**40771.4**	**42981.0**	**40587.4**	**13866.3**	**14261.2**	**13833.4**
[redacted]		0.23215	0.25170	0.25470	0.28056	0.27725	0.28084	0.20268	0.19909	0.20300	0.23177	0.22761	0.23213	0.20268	0.19909	0.20300	0.28056	0.27725	0.28084
		309.89	332.39	340.31	412.19	403.41	412.94	207.72	198.14	208.56	297.02	285.73	298.00	207.72	198.14	208.56	412.19	403.41	412.94
		312.44	335.14	343.10	415.26	406.44	416.01	210.27	200.64	211.11	299.93	288.59	300.91	210.27	200.64	211.11	415.26	406.44	416.01
		273.04	292.43	299.87	367.65	359.39	368.35	177.17	168.12	177.96	262.08	251.42	263.01	177.17	168.12	177.96	367.65	359.39	368.35
		268.62	287.64	295.02	362.30	354.11	363.00	169.44	160.54	170.23	247.36	236.96	248.27	169.44	160.54	170.23	362.30	354.11	363.00
		-297.44	-326.11	-326.03	-321.81	-321.94	-321.80	-324.78	-324.91	-324.77	-317.78	-318.05	-317.76	-324.78	-324.91	-324.77	-321.81	-321.94	-321.80
		-303.34	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50	-332.50
		569741	669293	620689	757806	812295	753157	2820847	2946937	2809777	4033487	4249734	4014691	2820847	2946937	2809777	757806	812295	753157
		986806	1159336	1075042	1311565	1405972	1303511	2855390	2984099	2844099	4072987	4292220	4053938	2855390	2984099	2844099	1311565	1405972	1303511
		57099136	60408075	62774866	85659143	82831722	85901164	35401759	32455900	35663766	67746382	63484808	68120089	35401759	32455900	35663766	85659143	82831722	85901164
		-55264483	-58443341	-60759899	-83166728	-80415025	-83423997	-32382886	-29593356	-32631190	-60351291	-56395423	-60698431	-32382886	-29593356	-32631190	-83166728	-80415025	-83423997
		-334733	-446766	-360100	470244	373629	478483	-1803862	-1908877	-1794657	-817791	-941606	-907031	-1803862	-1908877	-1794657	470244	373629	478483
		-3100811	-3399254	-3398861	-5065621	-5066597	-5065538	-6996814	-6998272	-6996686	-14683774	-14689733	-14683256	-6996814	-6998272	-6996686	-5065621	-5066597	-5065538
		3391200	3793363	3710696	4541786	4634964	4533836	8695109	8793580	8686452	15501565	15631338	15490287	8695109	8793580	8686452	4541786	4634964	4533836
		-3435543	-3846020	-3758962	-4595377	-4692968	-4587055	-8800676	-8907149	-8791343	-15501565	-15631338	-15490287	-8800676	-8907149	-8791343	-4595377	-4692968	-4587055
		ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR	ral Axis Found	ral Axis Found	ral Axis Found	ERROR	ERROR	ERROR	ERROR	ERROR	ERROR
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
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		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
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		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable
[redacted]		0.24908	0.25178	0.24885	0.22632	0.22852	0.22614	0.32443	0.33410	0.32363	0.25946	0.26487	0.25900	0.32443	0.33410	0.32363	0.22632	0.22852	0.22614
		332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50	332.50
		344.75	344.88	344.74	343.63	343.74	343.62	342.79	343.10	342.77	335.76	335.82	335.75	342.79	343.10	342.77	343.63	343.74	343.62
		292.96	292.53	292.99	296.57	296.22	296.60	283.59	282.14	283.71	293.39	292.57	293.46	283.59	282.14	283.71	296.57	296.22	296.60
		288.21	287.73	288.25	292.26	291.87	292.29	271.23	269.41	271.38	276.91	275.75	277.01	271.23	269.41	271.38	292.26	291.87	292.29
		-319.14	-326.22	-318.55	-259.60	-265.35	-259.12	-519.87	-545.25	-517.76	-355.75	-370.11	-354.55	-519.87	-545.25	-517.76	-259.60	-265.35	-259.12
		-325.47	-332.61	-324.87	-268.22	-274.06	-267.73	-532.23	-557.98	-530.09	-372.22	-386.93	-371.00	-532.23	-557.98	-530.09	-268.22	-274.06	-267.73
		611301	669520	606449	611301	669520	606449	4515329	4945360	4479493	4515329	4945360	4479493	4515329	4945360	4479493	611301	669520	606449
		1088863	1193024	1080186	1085327	1189066	1076685	4655112	5103015	4617823	4559548	4994801	4523285	4655112	5103015	4617823	1085327	1189066	1076685
		1968483	1965400	1968740	1994428	1991921	1994637	4832310	4803738	4834689	8278512	8249827	8280903	4832310	4803738	4834689	1994428	1991921	1994637
		-359150	-446917	-351839	379332	307957	385279	-2887442	-3203354	-2861136	-915485	-1095735	-900466	-2887442	-3203354	-2861136	379332	307957	385279
		83090372	85683516	82858650	60505893	62609828	60331459	232750815	248627700	231436187	173450908	183900714	172586031	232750815	248627700	231436187	60505893	62609828	60331459
		-86417374	-89283923	-86179637	-64592188	-66785882	-64410277	-243950615	-260371751	-242590668	-189888813	-200994968	-188969246	-243950615	-260371751	-242590668	-64592188	-66785882	-64410277
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
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		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

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Page Links

General Information
Inputs and Outputs
Composite Girder Capacities in Bending and Axial Load — Click below to solve:
Serviceability Limit States Stress Check — solver
Shear Check

		Left Girder 1	Middle Girder 2	Right Girder 3	Left Girder 4	Middle Girder 5	Right Girder 6	Left Girder 7	Middle Girder 8	Right Girder 9	Left Girder 10	Middle Girder 11	Right Girder 12	Left Girder 13	Middle Girder 14	Right Girder 15	Left Girder 16	Middle Girder 17	Right Girder 18
e top flange in tension	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
e web tension	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
e bot flange in tension	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
e bottom flange in compression	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Calculate moment resistance																			
Slab top rebar	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Slab bottom rebar	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Top flange	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Web	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Bottom flange	(kN-m)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
M_r Moment Resistance (F_y @ slab top	(kN-m)	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable	ot Applicable
Governing Moment Resistance	(kN-m)	11054.6	12211.5	12109.3	13866.3	14281.2	13833.4	23023.8	23167.4	23011.2	41963.9	42167.9	41946.1	23023.8	23167.4	23011.2	13866.3	14281.2	13833.4
Location of first yield		Bottom Flange	ottom Flange	ottom Flange	ab Top Rebar	ab Top Rebar	ab Top Rebar	ottom Flange	ottom Flange	ottom Flange	ottom Flange	ottom Flange	ottom Flange	ottom Flange	ottom Flange	ottom Flange	ab Top Rebar	ab Top Rebar	ab Top Rebar

Calculate Moment Resistance Reduction Factor

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Moment Resistance Reduction Factor (MRRF)		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SUMMARY - Girder Resistance

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T_r (girder + rebar)	(kN)	15206	15377	15192	16922	17094	16908	30371	31302	30293	42169	43101	42092	30371	31302	30293	16922	17094	16908
C_r (bare girder - cross section capacity)	(kN)	-6409	-6409	-6409	-8035	-8035	-8035	-13217	-13217	-13217	-24394	-24394	-24394	-13217	-13217	-13217	-8035	-8035	-8035
C_r (bare girder - flexural or flexural-torsional)	(kN)	-2813	-1373	-733	-711	-572	-494	-1332	-1332	-1332	-4700	-4700	-4700	-1480	-1285	-1285	-743	-593	-509
M_r (composite girder) positive bending	(kN-m)	20181	20309	20170	24460	24675	24443	30712	30904	30693	50856	51189	50828	30712	30904	30693	24460	24675	24443
M_r (composite girder) negative bending	(kN-m)	-11055	-12212	-12109	-13866	-14261	-13833	-23024	-23167	-23011	-41964	-42168	-41946	-23024	-23167	-23011	-13866	-14261	-13833

Serviceability Limit States Stress Check

NOTE: All parameters are controlled by the yellow cells in the "Inputs and Outputs" section
---> *Click here to go to the Inputs section*

Phi Factors and Modular Ratio

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ϕ_s (flexure)		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
ϕ_s (tension)		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
ϕ_s (compression)		0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
ϕ_c		0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
ϕ_r (rebar)		0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
n (modular ratio)		8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05	8.05

Steel Girder Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Top flange width	(mm)	355.6	355.6	355.6	355.6	355.6	355.6	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	355.6	355.6	355.6
Top flange thickness	(mm)	19.05	19.05	19.05	19.05	19.05	19.05	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	19.05	19.05	19.05
Web depth	(mm)	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4
Web thickness	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Bottom flange width	(mm)	406.4	406.4	406.4	406.4	406.4	406.4	558.8	558.8	558.8	711.2	711.2	711.2	558.8	558.8	558.8	406.4	406.4	406.4
Bottom flange thickness	(mm)	25.4	25.4	25.4	38.1	38.1	38.1	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	38.1	38.1	38.1
Steel yield strength	(MPa)	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
E_s	(MPa)	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000

Concrete Slab Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Slab thickness	(mm)	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9	215.9
Haunch height - t.o. girder to u/s slab	(mm)	38.227	38.227	38.227	38.227	38.227	38.227	19.177	19.177	19.177	0	0	0	19.177	19.177	19.177	38.227	38.227	38.227
Slab effective width	(mm)	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175	3200.4	3505.2	3175
Concrete strength	(MPa)	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Rebar quantity - top layer	(mm^2/m)	574	574	574	574	574	574	4243	4243	4243	4243	4243	4243	4243	4243	4243	574	574	574
t.o. slab to center of top bars	(mm)	57	57	57	57	57	57	65	65	65	65	65	65	65	65	65	57	57	57
Rebar quantity - bot layer	(mm^2/m)	987	987	987	987	987	987	4243	4243	4243	4243	4243	4243	4243	4243	4243	987	987	987
Top of slab to center of bot bars	(mm)	46.2	46.2	48.2	46.2	46.2	46.2	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	46.2	46.2	46.2
Rebar steel strength	(MPa)	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400

Bare Steel Girder Section Properties

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Area	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Centroid from u/s of bot flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Centroid from t.o. top flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Moment of Inertia - Strong	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
S - top of top flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
S - u/s of bot flange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Composite Section Properties - 3n

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Effective width of slab	(mm)	132.6	145.2	131.5	132.6	145.2	131.5	132.6	145.2	131.5	132.6	145.2	131.5	132.6	145.2	131.5	132.6	145.2	131.5
Effective area of top rebar	(mm^2)	1782.3	1930.2	1748.4	1762.3	1930.2	1748.4	13017.4	14257.2	12914.1	13017.4	14257.2	12914.1	13017.4	14257.2	12914.1	1762.3	1930.2	1748.4
Effective area of bot rebar	(mm^2)	3027.6	3315.9	3003.6	3027.6	3315.9	3003.6	13017.4	14257.2	12914.1	13017.4	14257.2	12914.1	13017.4	14257.2	12914.1	3027.6	3315.9	3003.6
Total composite section height	(mm)	2737.0	2737.0	2737.0	2749.7	2749.7	2749.7	2749.7	2749.7	2749.7	2781.3	2781.3	2781.3	2749.7	2749.7	2749.7	2749.7	2749.7	2749.7
Area	(mm^2)	73734	75915	73460	78805	82077	78530	116592	121797	116159	152075	157281	151642	116592	121797	116159	78895	82077	78530
Centroid from u/s of bot flange	(mm)	1816.1	1850.1	1813.1	1709.6	1746.0	1706.4	1876.1	1909.9	1873.2	1658.2	1692.6	1655.3	1876.1	1909.9	1873.2	1709.6	1746.0	1706.4
Centroid from t.o. top flange	(mm)	666.74	632.77	669.71	785.97	749.51	789.14	638.46	604.74	641.40	907.17	872.80	910.14	638.46	604.74	641.40	785.97	749.51	789.14
Moment of Inertia - Strong	(mm^4)	7.825E+10	8.032E+10	7.807E+10	9.427E+10	9.699E+10	9.403E+10	1.347E+11	1.378E+11	1.344E+11	2.156E+11	2.211E+11	2.151E+11	1.347E+11	1.378E+11	1.344E+11	9.427E+10	9.699E+10	9.403E+10
S - top of slab	(mm^3)	-84972548	-90560289	-84504598	-90635697	-96635324	-90133676	-154181440	-164081504	-153352634	-191990484	-203050078	-191066315	-154181440	-164081504	-153352634	-90635697	-96635324	-90133676
S - top layer of rebar	(mm^3)	-90594937	-96797744	-90076900	-95905396	-102470277	-95357333	-166607382	-177880909	-165666899	-203813847	-215974415	-202799816	-166607382	-177880909	-165666899	-95905396	-102470277	-95357333
S - top of top flange	(mm^3)	-117359471	-126930137	-116570618	-119940891	-129400250	-119159430	-210950439	-227864196	-209557102	-237682818	-253277485	-236390283	-210950439	-227864196	-209557102	-119940891	-129400250	-119159430
S - u/s of bot flange	(mm^3)	43086075	43413201	43056980	55142076	55546729	55106085	71786913	72150760	71754528	130029592	130604297	129978824	71786913	72150760	71754528	55142076	55546729	55106085

Composite Section Properties - 1n

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Effective width of slab	(mm)	398	436	395	398	436	395	398	436	395	398	436	395	398	436	395	398	436	395
Effective area of top rebar	(mm^2)	1610	1763	1597	1610	1763	1597	11892	13025	11798	11892	13025	11798	11892	13025	11798	1610	1763	1597
Effective area of bot rebar	(mm^2)	2766	3029	2744	2766	3029	2744	11892	13025	11798	11892	13025	11798	11892	13025	11798	2766	3029	2744
Area	(mm^2)	130563	139157	129846	135724	144318	135008	171584	182027	170714	207068	217511	206198	171584	182027	170714	135724	144318	135008
Centroid from u/s of bot flange	(mm)	2169.8	2198.3	2167.2	2099.7	2132.1	2096.8	2120.9	2151.4	2118.2	1927.3	1963.6	1924.1	2120.9	2151.4	2118.2	2099.7	2132.1	2096.8
Centroid from t.o. top flange	(mm)	313.1	284.6	315.6	395.8	363.4	398.7	393.7	363.2	396.4	638.1	601.8	641.3	393.7	363.2	396.4	395.8	363.4	398.7
Moment of Inertia - Strong	(mm^4)	9.966E+10	1.014E+11	9.950E+10	1.232E+11	1.256E+11	1.230E+11	1.567E+11	1.595E+11	1.564E+11	2.573E+11	2.630E+11	2.568E+11	1.567E+11	1.595E+11	1.564E+11	1.232E+11	1.256E+11	1.230E+11
S - top of slab	(mm^3)	-175692356	-188257289	-174631769	-189496828	-203391597	-188326361	-249179996	-266587010	-247714916	-301272108	-321663577	-299562429	-249179996	-266587010	-247714916	-189496828	-203391597	-188326361
S - top layer of rebar	(mm^3)	-195377459	-210600244	-194100762	-207764875	-224134375	-206393489	-277981310	-299162525	-276209920	-326153417	-349511453	-324202787	-277981310	-299162525	-276209920	-207764875	-224134375	-206393489
S - top of top flange	(mm^3)	-318295029	-356382383	-315229124	-311150427	-345623094	-308352200	-397953042	-439114040	-394602457	-403205337	-437066355	-400412472	-397953042	-439114040	-394602457	-311150427	-345623094	-308352200
S - u/s of bot flange	(mm^3)	45929863	46131845	45911656	58659777	58907903	58637392	73878308	74140571	73854734	133498097	133945568	133458039	73878308	74140571	73854734	58659777	58907903	58637392

Composite Section Properties - concrete slab excluded

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Area	(mm^2)	45319	45795	45280	50481	50957	50441	89095	91682	88880	124579	127166	124363	89095	91682	88880	50481	50957	50441
Centroid from u/s of bot flange	(mm)	1306.7	1321.0	1305.5	1185.1	1199.3	1183.9	1640.5	1670.1	1637.9	1434.6	1460.8	1432.4	1640.5	1670.1	1637.9	1185.1	1199.3	1183.9
Centroid from t.o. top flange	(mm)	1176.2	1161.8	1177.4	1310.4	1296.3	1311.6	874.1	844.5	876.7	1130.8	1104.6	1133.0	874.1	844.5	876.7	1310.4	1296.3	1311.6
Moment of Inertia - Strong	(mm^4)	4.76E+10	4.85E+10	4.75E+10	5.56E+10	5.67E+10	5.55E+10	1.14E+11	1.16E+11	1.13E+11	1.81E+11	1.85E+11	1.81E+11	1.14E+11	1.16E+11	1.13E+11	5.56E+10	5.67E+10	5.55E+10
S - top layer of rebar	(mm^3)	-34679127	-35705270	-34593620	-36890235	-37963629	-36800790	-108803707	-114715785	-108311127	-141283857	-147579857	-140759248	-108803707	-114715785	-108311127	-36890235	-37963629	-36800790
S - top of top flange	(mm^3)	-40486965	-41758772	-40381190	-42435444	-43732447	-42327533	-129955181	-137799107	-129305663	-160119140	-167721072	-159487624	-129955181	-137799107	-129305663	-42435444	-43732447	-42327533
S - u/s of bot flange	(mm^3)	36443017	36726385	36418850	46921305	47269460	46891616	69244473	69676275	69206626	126207093	126820900	126153752	69244473	69676275	69206626	46921305	47269460	46891616

SUMMARY - Section Properties

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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Shear Check

NOTE: All parameters are controlled by the yellow cells in the "Inputs and Outputs" section
---> *Click here to go to the Inputs section*

Steel Girder Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ϕ_s (shear)		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Web depth	(mm)	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4	2438.4
Web thickness	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Web area (A_w)	(mm^2)	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226	23226
Top flange width	(mm)	355.6	355.6	355.6	355.6	355.6	355.6	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	355.6	355.6	355.6
Top flange thickness	(mm)	19.05	19.05	19.05	19.05	19.05	19.05	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	19.05	19.05	19.05
Bottom flange width	(mm)	408.4	406.4	406.4	406.4	406.4	406.4	558.8	558.8	558.8	711.2	711.2	711.2	558.8	558.8	558.8	406.4	406.4	406.4
Bottom flange thickness	(mm)	25.4	25.4	25.4	38.1	38.1	38.1	38.1	38.1	38.1	63.5	63.5	63.5	38.1	38.1	38.1	38.1	38.1	38.1
Steel yield strength (F_y)	(MPa)	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
E_s	(MPa)	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000	200000

Stiffener Information

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Stiffener steel yield strength	(MPa)	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Longitudinal Stiffener																			
Stiffener width - b	(mm)	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.8	101.6	101.6	101.6	101.6	101.6	101.6	101.6
Stiffener thickness - t	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Transverse Stiffener																			
Stiffener width - b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
Stiffener thickness - t	(mm)	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
D = 2.4, for single plates only		2.4	3.4	4.4	5.4	6.4	7.4	8.4	8.4	8.4	8.4	8.4	8.4	7.4	8.4	8.4	5.4	6.4	7.4
a - (transverse stiffener spacing)	(mm)	990.6	990.6	990.6	1320.8	1320.8	1320.8	889	889	889	889	889	889	889	889	889	1320.8	1320.8	1320.8

W.O. 7108.300

Page Links

General Information
Inputs and Outputs
Composite Girder Capacities in Bending and Axial Lo[redacted]e:
Serviceability Limit States Stress Check
Shear Check

solver

		Left Girder 1	Middle Girder 2	Right Girder 3	Left Girder 4	Middle Girder 5	Right Girder 6	Left Girder 7	Middle Girder 8	Right Girder 9	Left Girder 10	Middle Girder 11	Right Girder 12	Left Girder 13	Middle Girder 14	Right Girder 15	Left Girder 16	Middle Girder 17	Right Girder 18
Steel Girder Properties																			
a/h		0.41	0.41	0.41	0.54	0.54	0.54	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.54	0.54	0.54
[redacted]		36.36	36.36	36.36	22.20	22.20	22.20	44.17	44.17	44.17	44.17	44.17	44.17	44.17	44.17	44.17	22.20	22.20	22.20
Governing (maximum) D_c - (+) bending (bar	(mm)	1328.14	1328.14	1328.14	1457.73	1457.73	1457.73	1296.59	1296.59	1296.59	1426.31	1426.31	1426.31	1296.59	1296.59	1296.59	1457.73	1457.73	1457.73
Governing (maximum) D_c - (-) bending (bar	(mm)	1281.28	1295.62	1280.07	1147.03	1161.18	1145.84	1602.39	1632.02	1599.84	1371.12	1397.32	1368.89	1602.39	1632.02	1599.84	1147.03	1161.18	1145.84
h/w		256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0
[redacted]		Negative Bending	Negative Bending	Negative Bending	Positive Bending	Positive Bending	Positive Bending	Negative Bending	Negative Bending	Negative Bending	Negative Bending	Negative Bending	Negative Bending	Negative Bending	Negative Bending	Negative Bending	Positive Bending	Positive Bending	Positive Bending
Calculation of F_{cr} and F_t - h/w Limits																			
502*SQRT(k/F_y)		161.8	161.8	161.8	126.4	126.4	126.4	178.3	178.3	178.3	178.3	178.3	178.3	178.3	178.3	178.3	126.4	126.4	126.4
621*SQRT(k/F_y)		200.1	200.1	200.1	156.4	156.4	156.4	220.6	220.6	220.6	220.6	220.6	220.6	220.6	220.6	220.6	156.4	156.4	156.4
When h/w <= 502*SQRT(kvFy): F_{cr}	(MPa)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
[redacted]		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
When 502*SQRT(kvFy) < h/w <= 621*SQRT(kvFy): F_{cr}	(MPa)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
[redacted]		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
When h/w > 621*SQRT(kvFy): F_{cr}	(MPa)	99.9	99.9	99.9	61.0	61.0	61.0	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	61.0	61.0	61.0
[redacted]		0.0	0.0	0.0	107.4	107.4	107.4	65.7	65.7	65.7	65.7	65.7	65.7	65.7	65.7	65.7	107.4	107.4	107.4
F_s	(MPa)	99.9	99.9	99.9	168.4	168.4	168.4	187.0	187.0	187.0	187.0	187.0	187.0	187.0	187.0	187.0	168.4	168.4	168.4
Check Combined Shear and Moment																			
V_r	(kN)	2203	2203	2203	3716	3716	3716	4127	4127	4127	4127	4127	4127	4127	4127	4127	3716	3716	3716
Factored Applied Shear (V_f)	(kN)	1160	1160	1160	0	0	0	1390	1390	1390	1912	1912	1912	1390	1390	1390	1390	1390	1390
[redacted]	(kN)	4842	4842	4842	5434	5458	5432	9070	9070	9070	9070	9070	9070	9070	9070	9070	5434	5468	5432
Allowable V/V_r		2.20	2.20	2.20	1.46	1.47	1.46	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	1.46	1.47	1.46
Applied V_f/V_r		0.53	0.53	0.53	0.00	0.00	0.00	0.34	0.34	0.34	0.46	0.46	0.46	0.34	0.34	0.34	0.37	0.37	0.37
Applied V_f / Allowable V_f		0.24	0.24	0.24	0.00	0.00	0.00	0.15	0.15	0.15	0.21	0.21	0.21	0.15	0.15	0.15	0.26	0.25	0.26
Check <= 1		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
[redacted]		0.00	0.00	0.00	0.46	0.46	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0.46
Check <= 1		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Interaction between shear and moment: [redacted] GOAL SEEK THESE C		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Check <= 1		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
[redacted]	(kN)	4842	4842	4842	8167	8167	8167	8783	8786	8783	6178	6192	6177	8783	8785	8783	7739	7751	7738
Allowable V/V_r		2.20	2.20	2.20	2.20	2.20	2.20	2.13	2.13	2.13	1.50	1.50	1.50	2.13	2.13	2.13	2.08	2.09	2.08
Applied V_f/V_r		0.53	0.53	0.53	0.00	0.00	0.00	0.34	0.34	0.34	0.46	0.46	0.46	0.34	0.34	0.34	0.37	0.37	0.37
Applied V_f / Allowable V_f		0.24	0.24	0.24	0.00	0.00	0.00	0.16	0.16	0.16	0.31	0.31	0.31	0.16	0.16	0.16	0.18	0.18	0.18
Check <= 1		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
[redacted]		0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.44	0.44	0.44	0.04	0.04	0.04	0.07	0.07	0.07
		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
[redacted] EK THESE C		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Check If Longitudinal Stiffeners Required																			
Unstiffened web limit: Slenderness <= 3150/SQRT(F_y)		168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4	168.4
Stiffened web limit: Slenderness <= 6000/SQRT(F_y)		320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7
Governing web slenderness		256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0	256.0
Check		Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required	Longitudinal Stiffener Required
Compression flange		Bottom	Bottom	Bottom	Top Flange	Top Flange	Top Flange	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Top Flange	Top Flange	Top Flange
Stiffener location (from inside of compressi	(mm)	512.5	518.2	512.0	583.1	583.1	583.1	641.0	652.8	639.9	548.4	558.9	547.6	641.0	652.8	639.9	583.1	583.1	583.1
Subpanel depth - h_p	(mm)	1925.9	1920.2	1926.4	1855.3	1855.3	1855.3	1797.4	1785.6	1798.5	1890.0	1879.5	1890.8	1797.4	1785.6	1798.5	1855.3	1855.3	1855.3
Stiffener width - b	(mm)	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6
Stiffener thickness - t	(mm)	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525	9.525
Longitudinal Stiffener Proportioning Checks:																			
b/t <= 200/SQRT(Fy): b/t		10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667	10.66666667
200/SQRT(F_y)		10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Projecting stiffener width: b <= 30*t: Projecting width	(mm)	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6	101.6
30*t	(mm)	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75	285.75
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Inertia: I >= h*w^3*(2.4*(a/h)^2 - 0.13): [redacted]		24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
[redacted]		2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615	2794615
$h*w^3*(2.4*(a/h)^2 - 0.13)$	(mm^4)	560705	560705	560705	1209868	1209868	1209868	398277	398277	398277	398277	398277	398277	398277	398277	398277	1209868	1209868	1209868
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
R-value: r >= a*SQRT(Fy)/1900: [redacted]		31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7
a*SQRT(F_y)/1900	(mm)	9.8	9.8	9.8	13.0	13.0	13.0	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	13.0	13.0	13.0
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Check If Transverse Stiffeners Required																			
Unstiffened Web Shear Resistance: F_s	(MPa)	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
$V_{r,\ Unstiffened}$	(kN)	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6
[redacted]		Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required	Transverse Stiffeners Required
Stiffener width - b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
Stiffener thickness - t	(mm)	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
D=2.4 for single plate stiffener only		2.4	3.4	4.4	5.4	6.4	7.4	8.4	8.4	8.4	8.4	8.4	8.4	7.4	8.4	8.4	5.4	6.4	7.4
Transverse Stiffener Proportioning Checks - With Longitudinal Stiffener																			
Spacing: a <= 67500*h/(h/w)² when h/w > 150: a	(mm)	990.6	990.6	990.6	1320.8	1320.8	1320.8	889	889	889	889	889	889	889	889	889	1320.8	1320.8	1320.8
$67500*h/(h/w)^2$ when h/w > 150	(mm)	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511	2511
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Spacing: a <= 3*h when h/w <= 150: a	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
3*h	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Check:		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Inertia: $I >= a*w^3*j$: $j = 2.5*(h_p/a)^2 - 2$		7.45	7.39	7.45	2.93	2.93	2.93	8.22	8.09	8.23	9.30	9.17	9.31	8.22	8.09	8.23	2.93	2.93	2.93
			WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird	WARNING - Weird
I	(mm^4)	23794563																	
$a*w^3*j$	(mm^4)	6376987	6328869	6381049	3347509	3347509	3347509	6314859	6211650	6323763	7143817	7047836	7152020	6314859	6211650	6323763	3347509	3347509	3347509
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
A_s = (a*w²/2*(1-(a/h)/SQRT(1+(a/h)²))*(Vf/Vr)*C*D - 18*w²)*Y: [redacted]		0.53	0.53	0.53	0.00	0.00	0.00	0.34	0.34	0.34	0.46	0.46	0.46	0.34	0.34	0.34	0.37	0.37	0.37
C		0.51	0.51	0.51	0.70	0.70	0.70	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.70	0.70	0.70
Y		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
			Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener	Weird Stiffener
A_s	(mm^2)	2258									2181	2168	2182	734	1043	1055	2103	2794	3486
[redacted]		12	693	1384	0	0	0	1054	1043	1055									
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Width: b >= 50 + h/30: b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
50 + h/30	(mm)	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Width: b >= MAX(top flange width, bottom flange width)/4: b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
(b top flange width)/4	(mm)	88.9	88.9	88.9	88.9	88.9	88.9	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	88.9	88.9	88.9
(b bot flange width)/4	(mm)	101.6	101.6	101.6	101.6	101.6	101.6	139.7	139.7	139.7	177.8	177.8	177.8	139.7	139.7	139.7	101.6	101.6	101.6
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Width: b <= 30*t: b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
30*t	(mm)	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
b/t <= 200/SQRT(F_y): b/t		14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
200/SQRT(F_y)		10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69
Check:		wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide	wide
Section modulus: $S_t >= h*S_b/(3*a)$: S_t		32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774	32774
S_b		133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828	133828
$h*S_b/(3*a)$		26892	26892	26892	20169	20169	20169	29965	29965	29965	29965	29965	29965	29965	29965	29965	20169	20169	20169
Check:		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Page Links

General Information
Inputs and Outputs
Composite Girder Capacities in Bending and Axial Load
Serviceability Limit States Stress Check
Shear Check

Click below to solve:
solver

Transverse Stiffener Proportioning Checks - Without Longitudinal Stiffener

		Left Girder 1	Middle Girder 2	Right Girder 3	Left Girder 4	Middle Girder 5	Right Girder 6	Left Girder 7	Middle Girder 8	Right Girder 9	Left Girder 10	Middle Girder 11	Right Girder 12	Left Girder 13	Middle Girder 14	Right Girder 15	Left Girder 16	Middle Girder 17	Right Girder 18
Spacing: a <= 3*h when h/w <= 150																			
a	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
3*h	(mm)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Check:		***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***
Inertia: I >= $a^*w^{3*}j$																			
$j = 2.5^*(h/a)^2 - 2$		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
I	(mm^4)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
$a^*w^{3*}j$	(mm^4)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Check:		***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***
$A_s = (a^*w^2/2^*(1-(a/h)/SQRT(1+(a/h)^2))^*(V_f/V_r)^*C^*D - 18^*w^2)^*Y$																			
V_f/V_r		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
C		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Y		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
A_s	(mm^2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
$(a^*w/2^*(1-(a/h)/SQRT(1+(a/h)^2))^*(V_f/V_r)^*C^*$	(mm^2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Check:		***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***	***Not Applicable***
Width: b >= 50 + h/30																			
b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
50 + h/30	(mm)	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28	131.28
Check:		***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***
Width: b >= MAX(top flange width, bottom flange width)/4																			
b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
(b top flange width)/4	(mm)	88.9	88.9	88.9	88.9	88.9	88.9	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	88.9	88.9	88.9
(b bot flange width)/4	(mm)	101.6	101.6	101.6	101.6	101.6	101.6	139.7	139.7	139.7	177.8	177.8	177.8	139.7	139.7	139.7	101.6	101.6	101.6
Check:		***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***
Width: b <= 30*t																			
b	(mm)	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8	177.8
30*t	(mm)	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381
Check:		***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***	***OK***
$b/t <= 200/SQRT(F_y)$																			
b/t		14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
$200/SQRT(F_y)$		10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69	10.69
Check:		***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***	***wide***

Addendum to the Structural Evaluation Report Volume 1 and Volume 2

The report documents:

"Dundas Street (Reg. Rd. 5) Class EA Study, Brant Street (Reg. Rd. 18) to Proudfoot Trail Tansley Bridge, Dundas Street at Bronte Creek, Bridge No. 005109, MTO Site No 010-0111 Volume 1"

and

"Dundas Street (Reg. Rd. 5) Class EA Study, Brant Street (Reg. Rd. 18) to Proudfoot Trail Tansley Bridge, Dundas Street at Bronte Creek, Bridge No. 005109, MTO Site No 010-0111 Volume 2"

shall be revised by removing and inserting revised pages as per the following table:

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
Section	Dated	Section	Dated	
Vol.1, p.14	October 2009	Vol.1, p.14	November 2009	U27 Gusset Plate removed from table
Vol.1 Appendix D	October 2009	Vol.1 Appendix D	November 2009	Revised diagram "Deficient Gusset Plates on Center Truss"
Vol.2, Center Truss Diagram	October 2009	Vol.2, Center Truss Diagram	November 2009	Revised diagram "Deficient Gusset Plates on Center Truss"
Vol.2, U27	October 2009	Vol.2, U27	November 2009	Corrected calculations for U27 Gusset Plate compressive buckling capacity and live load capacity factor

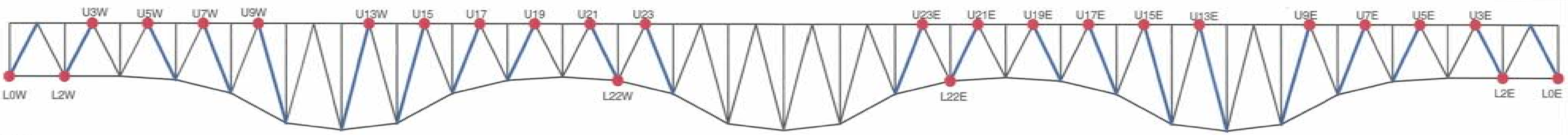
Table 6.3 – Arched Truss Gusset Plates, ULS 1 Evaluation Level 1 Results

Region	Live Load Capacity Factor, F[1]		Location[2]
Span 1 or 4	C_r / C_f	0.81	Center Truss - Gusset Plate L0
	C_r / C_f	0.61	Center Truss - Gusset Plate L2
	C_r / C_f	0.51	Center Truss - Gusset Plate U3
	C_r / C_f	0.69	Center Truss - Gusset Plate U5
	C_r / C_f	0.51	Center Truss - Gusset Plate U7
	C_r / C_f	0.65	Center Truss - Gusset Plate U9
Span 2 or 3	C_r / C_f	0.77	Center Truss - Gusset Plate L22
	C_r / C_f	0.95	Center Truss - Gusset Plate U13
	C_r / C_f	0.88	Center Truss - Gusset Plate U15
	C_r / C_f	0.53	Center Truss - Gusset Plate U17
	C_r / C_f	0.67	Center Truss - Gusset Plate U19
	C_r / C_f	0.74	Center Truss - Gusset Plate U21
	C_r / C_f	0.51	Center Truss - Gusset Plate U23

[1] Footnote: A "Live Load Capacity Factor" greater than or equal to 1.0 is desirable
C_r is defined as the factored compressive resistance
C_f is defined as the factored applied compressive axial load
T_r is defined as the factored tensile resistance
T_f is defined as the factored applied tensile axial load

[2] Footnote: See truss diagrams in Appendix D

APPENDIX 'D'
TRUSS DIAGRAM

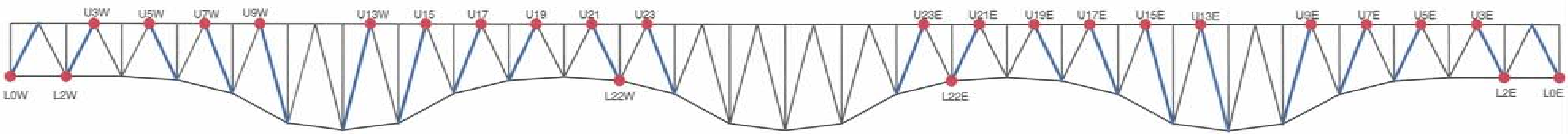


Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Center Truss

STRUCTURAL EVALUATION REPORT
VOLUME 2

REVISED CENTER TRUSS DIAGRAM



Notes:
1) Blue members are in compression causing gusset plate failure.
2) Red dots indicate locations of deficient gusset plates

Deficient Gusset Plates on Center Truss

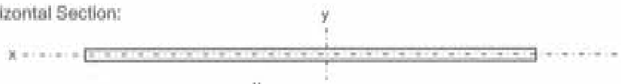
STRUCTURAL EVALUATION REPORT
VOLUME 2

REVISED CALCULATIONS
FOR

GUSSET PLATE
U27

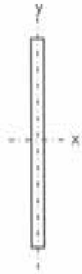
WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A (Cl.10.9.3 & Whitmore Section)

Horizontal Section:



b =	701.5	mm	I_x =	1.81E+08	mm^4	I_y =	2.76E+08	mm^4
t =	9.595	mm	r_x =	164.02	mm	r_y =	202.51	mm
A =	6730.8925	mm^2	S_x =	3.77E+07	mm^3	S_y =	7.87E+05	mm^3
d =	164	mm						

Vertical Section:



h =	701.5	mm	I_x =	2.76E+08	mm^4	I_y =	1.81E+08	mm^4
t =	9.595	mm	r_x =	202.51	mm	r_y =	164.02	mm
A =	6730.8925	mm^2	S_x =	7.87E+05	mm^3	S_y =	3.77E+07	mm^3
d =	164	mm						

Effective length factor, K =	1.00		L_1 =	183	mm
Unbraced length, L =	194.8	mm	L_2 =	259	mm
r_{min} =	164.02	mm	L_3 =	142.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.0128$$

ϕ_s =	0.9	
Effective width, L_w =	701.5	mm
Thickness, t =	9.595	mm
n =	1.34	

$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$

C_r = 1393 kN

Back-to-back stiffening channels are considered in compressive resistance calculation.

C_{DL} = −1217 kN
C_{LL} = −1052 kN

∴ F = 1.62 for Evaluation 1. Thus Gusset Plate U27 is okay.

GUSSET PLATE INVESTIGATION - Whitmore Method

WHITMORE SECTION ANALYSIS - COMPRESSIVE RESISTANCE - Member A *(Cl.10.9.3 & Whitmore Section)*

Horizontal Section:

b =	701.5	mm	I_x =	5.16E+04	mm^4	I_y =	2.76E+08	mm^4
t =	9.595	mm	r_x =	2.77	mm	r_y =	202.51	mm
A =	6730.8925	mm^2	S_x =	1.08E+04	mm^3	S_y =	7.87E+05	mm^3
d =	0	mm						

Vertical Section:

h =	701.5	mm	I_x =	2.76E+08	mm^4	I_y =	5.16E+04	mm^4
t =	9.595	mm	r_x =	202.51	mm	r_y =	2.77	mm
A =	6730.8925	mm^2	S_x =	7.87E+05	mm^3	S_y =	1.08E+04	mm^3
d =	0	mm						

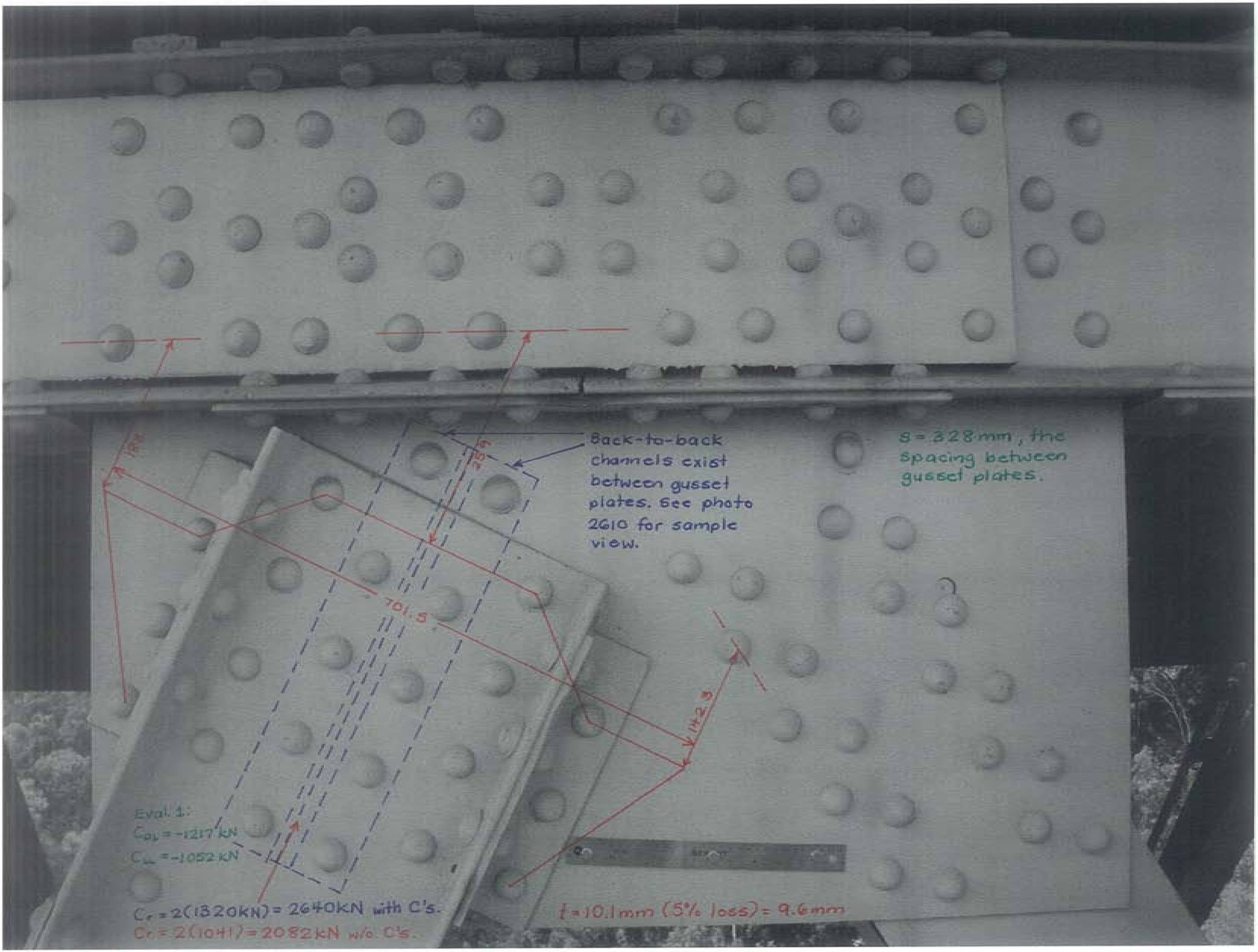
Effective length factor, K =	1.00		L_1 =	183	mm
Unbraced length, L =	194.9	mm	L_2 =	259.25	mm
r_{min} =	2.77	mm	L_3 =	142.3	mm

$$\lambda = \frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E_s}} = 0.7594$$

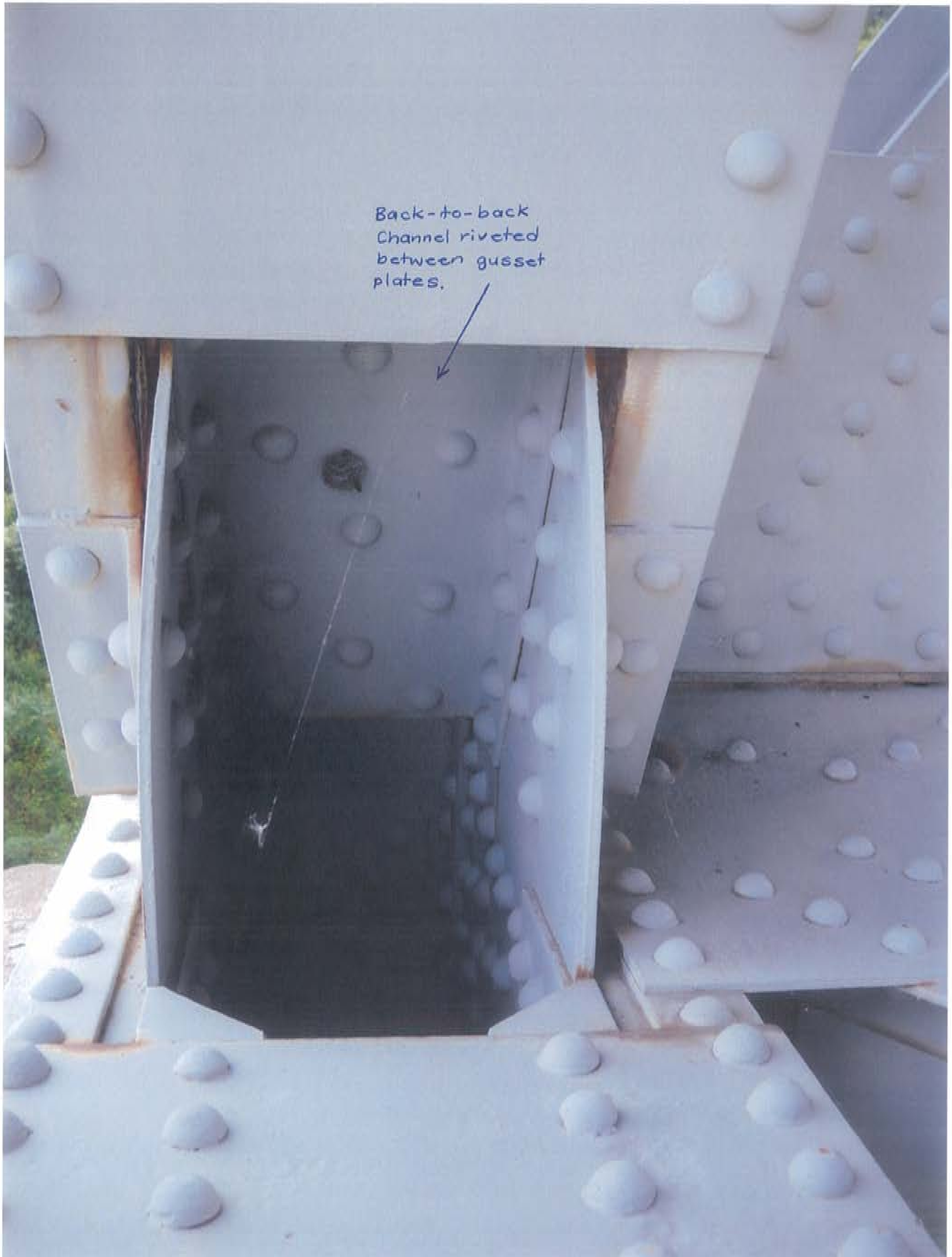
ϕ_s =	0.9	
Effective width, L_w =	701.5	mm
Thickness, t =	9.595	mm
n =	1.34	

$$C_r = \phi_s A F_y (1 + \lambda^{2n})^{-1/n}$$
$$= 1041 \text{ kN}$$

Back-to-back channels are not considered.



184
289
701.5
1142.3
Back-to-back channels exist between gusset plates. See photo 2610 for sample view.
S = 328 mm, the spacing between gusset plates.
Eval. 1:
C_{DL} = -1217 kN
C_{LL} = -1052 kN
C_r = 2(1320kN) = 2640kN with C's.
C_r = 2(1041) = 2082kN w/o C's.
t = 10.1mm (5% loss) = 9.6mm


Back-to-back
Channel riveted
between gusset
plates.