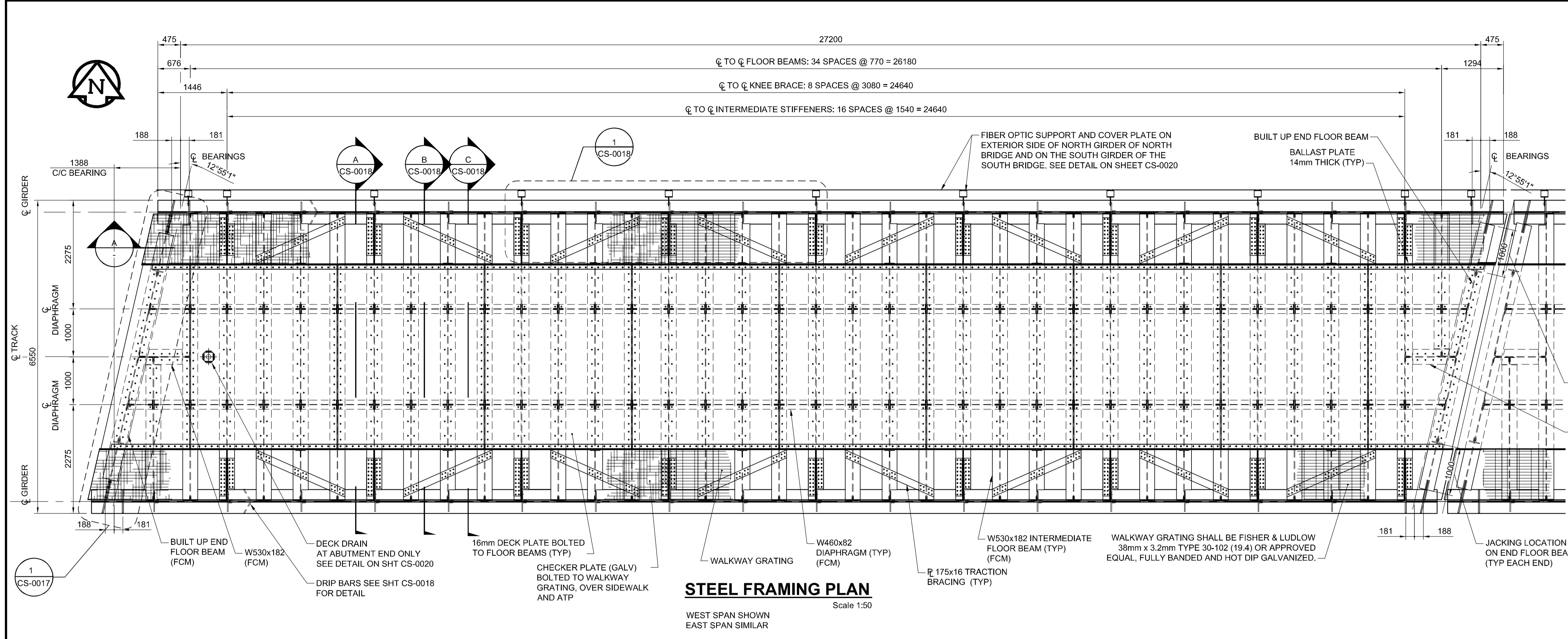


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**STEEL FRAMING PLAN**  
Scale 1:50

WEST SPAN SHOWN  
EAST SPAN SIMILAR

**TABLE OF STRESSES**

27.2m SPAN (C/C BRGS)

STEEL:	SEE NOTES			
TOP FLANGE PLATE	51 x 500	AREA = 25500mm <sup>2</sup>		
WEB PLATE	19 x 2550	AREA = 48450mm <sup>2</sup>		
BOTTOM FLANGE PLATE	51 x 500	AREA = 25500mm <sup>2</sup>		
Sx-x TOP	= 8,486 x 10 <sup>7</sup> mm <sup>3</sup>		Ix = 1.125 x 10 <sup>11</sup> mm <sup>4</sup>	
Sx-x BOT	= 8,486 x 10 <sup>7</sup> mm <sup>3</sup>			

	END REACTION kN	SHEAR STRESS MPa	BENDING MOMENT kN.m	BENDING STRESSES TOP FLANGE MPa
DEAD LOAD	52,552	715	15	4860
LIVE LOAD E90	1364	28	8025	95
IMPACT 28%	382	8	2251	27
CENTRIFUGAL FORCE COMPOSITE	-	-	-	-
TOTAL GROUP "1"	2461	51	15136	179
ALLOWABLE STRESSES (BENDING AND SHEAR)	-	123	-	190
RATIO OF WORKING STRESS TO ALLOWABLE	-	41%	-	94%

DEFLECTION:  $\frac{\Delta_{LL+I}}{SPAN} = \frac{1}{771}$

FATIGUE: ALLOWABLE STRESS RANGE FOR FATIGUE CATEGORY "B" FOR N > 2,000,000 CYCLES  
 $S_{Rfat} = 110 \text{ MPa}$   
 MAXIMUM DESIGN STRESS RANGE AT BOTTOM FLANGE TO WEB WELD AT MIDSPAN  
 $104 \text{ MPa} < S_{Rfat}$   
 MAX. STRESS RANGE  
 PERMISS. FATIGUE STRESS = 94%

**STEEL GIRDER NOTES:**

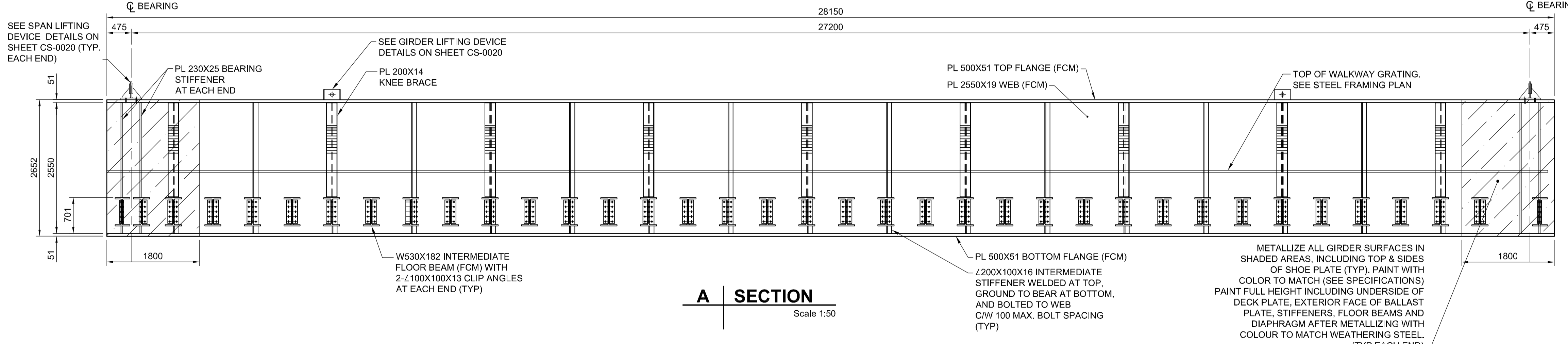
- FOR GENERAL NOTES SEE SHEET CS-0001.
- MATERIAL SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:  
 STRUCTURAL STEEL: CSA CAN-G40.21-13  
 GRADE 350AT, CAT 3 OR ASTM A709 GRADE 50W ZONE 3 IN GIRDER WEBS, ALL FLOOR BEAMS, FLANGES, AND STIFFENER PLATES  
 GRADE 350A OR ASTM A583/A709/A5721/A36 GRADE 50W FOR STIFFENER ANGLES AND ALL REMAINING MEMBERS.  
 GRADE 300W OR ASTM A572/A36 GRADE 50 FOR BEARING PLATES.  
 BRONZE PLATES: A.S.T.M. B22-13, COPPER ALLOY UNS No. C91100.  
 WELDING: C.S.A. W59-13 (R2008) AND AWS D1.5  
 ANCHOR BOLTS: A.S.T.M. F1554, GRADE 105  
 H.S. BOLTS: A.S.T.M. A325, M22, TYPE 3 (OR EQUIVALENT)  
 METALLIZING: A.S.T.M. B833  
 GALVANIZING: ASTM A123/A123M-12
- ALL HOLES SHALL BE DRILLED OR SUB-PUNCHED AND REAMED.
- ALL H.S. BOLTS SHALL BE TIGHTENED BY THE TURN-OF-NUT METHOD.
- BOTTOM FLANGES OF GIRDERS OVER BEARINGS SHALL BE TRUE AND SQUARE; MAXIMUM MEASURED DEVIATION AT OUTSIDE OF EDGE OF BEARING PLATES SHALL NOT EXCEED 1mm.
- DEVIATION RESULTING IN NEGATIVE CAMBER SHALL NOT BE PERMITTED.
- DEVIATION FROM STRAIGHTNESS OF MAIN GIRDERS SHALL NOT EXCEED 6mm.
- ALL NON-SLIDING SURFACES OF GIRDERS SHALL BE ZINC-METALLIZED IN ACCORDANCE WITH C.S.A. G189. ZINC COATING SHALL NOT BE LESS THAN 0.25mm.
- REFER TO CN STANDARD DRAWINGS FOR ADDITIONAL INFORMATION NOT SHOWN ON THIS DRAWING
- ALL BOLT HOLES TO BE 24 DIA UN
- SPAN SHALL BE SHOP ASSEMBLED

**ESTIMATED QUANTITIES (PER SPAN):**

- TOTAL SPAN STRUCTURAL STEEL WEIGHT (WITHOUT BRGS) 123,808 kg
- LIFTING WEIGHT OF ONE I-GIRDER (WITH BEARINGS) 29,206 kg
- WALKWAY GRATING 57m<sup>2</sup>
- CHECKER PLATE 24m<sup>2</sup>

NOTE: ALL WEIGHTS SHOWN ARE APPROXIMATE. CONTRACTOR IS RESPONSIBLE FOR CALCULATE EXACT LIFTING WEIGHTS OF NEW SPANS

BID OPPORTUNITY NO. 712-2013



**A SECTION**  
Scale 1:50

LOCATION APPROVED UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE DATE

NOTE: LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE, BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. ELEV.	NO.	ISSUED FOR TENDER	DATE	BY
	0	ISSUED FOR TENDER	2013/11/21	KC
		REVISIONS		

<b>AECOM</b>		ENGINEER'S SEAL	
DESIGNED BY	FT	CHECKED BY	CD
DRAWN BY	KC	APPROVED BY	EBL
HOR. SCALE:	AS NOTED	RELEASED FOR CONSTRUCTION BY:	
VERTICAL:	AS NOTED		
DATE	2013-06-04	DATE	

CONSULTANT DRAWING NO. 60273041-01-CS-201

**AECOM**  
Certificate of Authorization  
AECOM Canada Ltd.  
No. 4671 Date: 2013/11/21

**THE CITY OF WINNIPEG PUBLIC WORKS DEPARTMENT**

PLESSIS ROAD TWINNING AND GRADE SEPARATION AT CN REDDITT SUBDIVISION CONTRACT 3

CITY DRAWING NUMBER U238-2014-2016  
SHEET 16 OF 37

STEEL FRAMING PLAN & ELEVATION

**CS-0016**