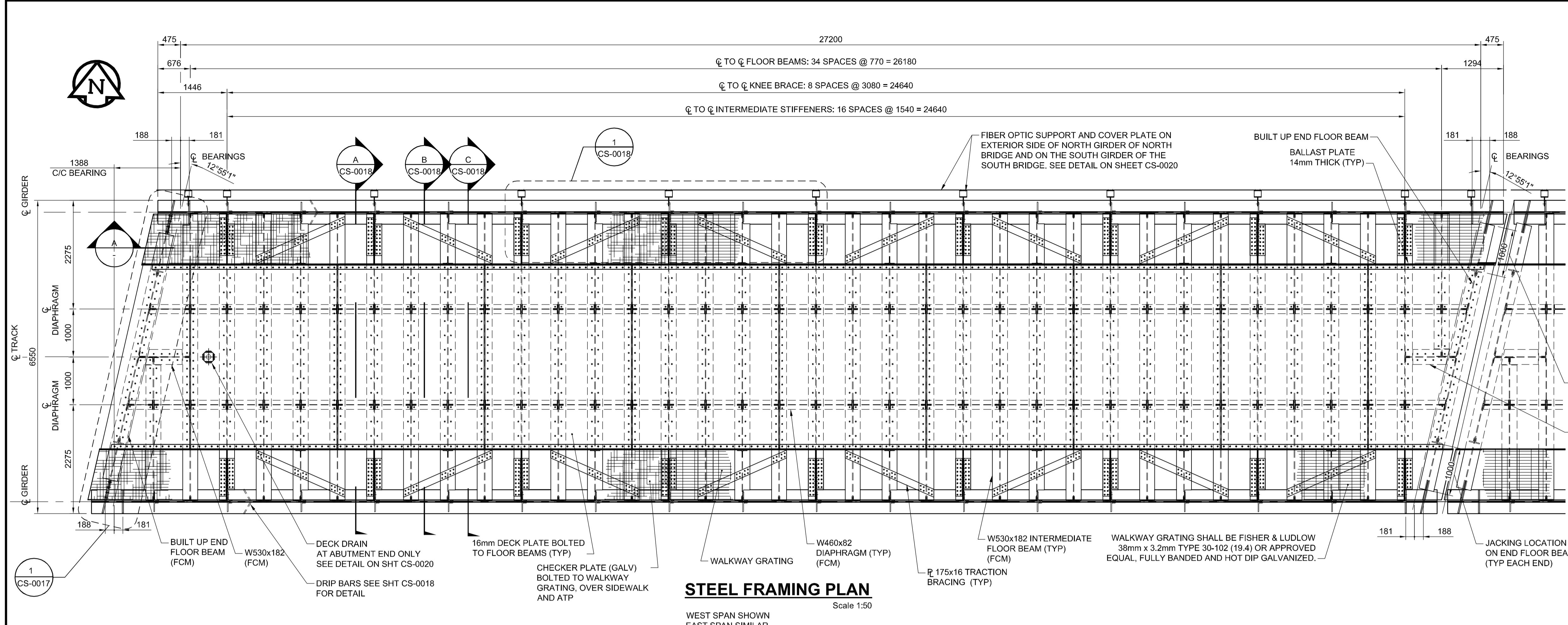


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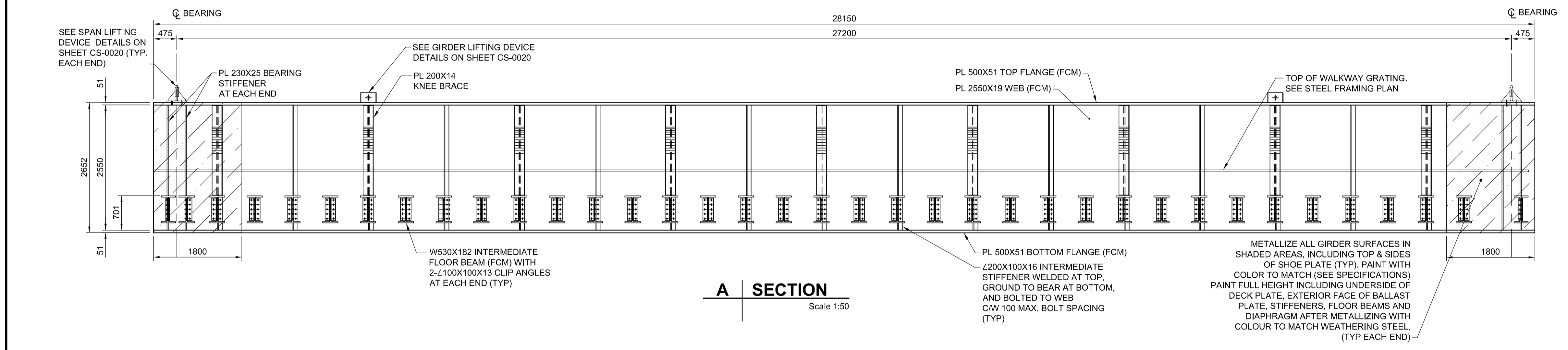


**STEEL FRAMING PLAN**  
Scale 1:50  
WEST SPAN SHOWN  
EAST SPAN SIMILAR

| 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>11</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>11</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  
 $S_{Rat} = 110 \text{ MPa}$   
MAXIMUM DESIGN STRESS RANGE AT BOTTOM FLANGE TO WEB WELD AT MIDSPAN  
 $104 \text{ MPa} < S_{Rat}$   
MAX. STRESS RANGE  
PERMISS. FATIGUE STRESS = 94%



**A SECTION**  
Scale 1:50

- 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, CATEGORY 5 IN GIRDER WEBS, FLANGES, STIFFENER PLATES, END FLOOR BEAMS  
GRADE 350AT, CATEGORY 3 IN INTERMEDIATE FLOOR BEAMS, DIAPHRAGMS, CONNECTION ANGLES FOR FLOOR BEAMS  
GRADE 350A IN DECK PLATE, KNEE BRACE PLATES, STIFFENER ANGLES AND ALL REMAINING MEMBERS.  
GRADE 300W 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 BEARINGS 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 U/N
  - 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



| LOCATION APPROVED UNDERGROUND STRUCTURES   |                     | B.M. ELEV. |     |
|--|---------------------|------------|-----|
| 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. |                     |            |     |
| 1  | ISSUED FOR ADDENDUM | 2013/12/10 | DJH |
| 0  | ISSUED FOR TENDER   | 2013/11/21 | KC  |
| NO.  | REVISIONS           | DATE       | BY  |

|             |  |          |  |                               |  |            |  |
|-------------|--|----------|--|-------------------------------|--|------------|--|
| 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 |  |

**AECOM**

ENGINEER'S SEAL  
PROVINCE OF MANITOBA  
ORIGINAL SIGNED BY  
**F. TABET**  
Member 30656  
ON NOV 21, 2013  
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.  
60273041-01-CS-201

**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**