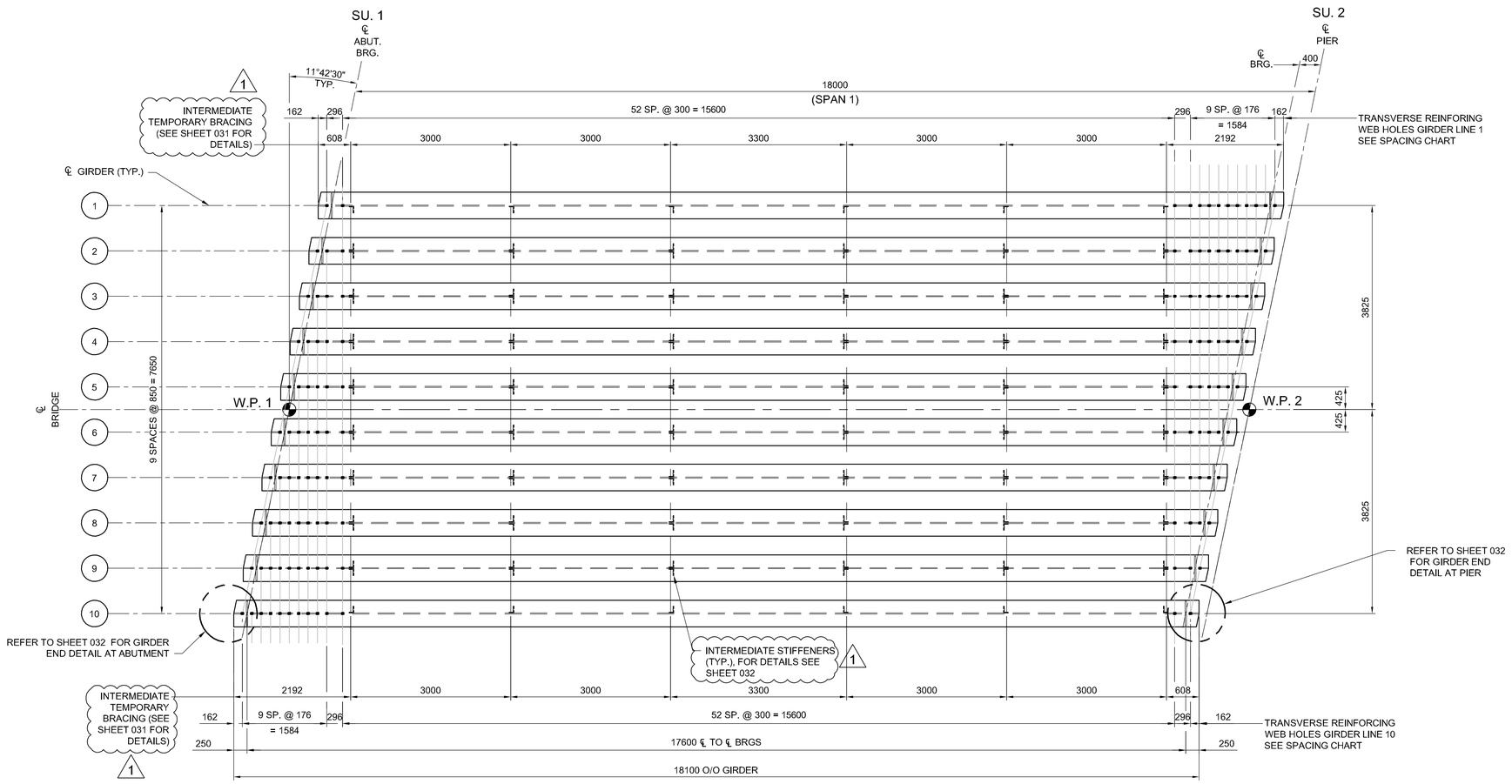
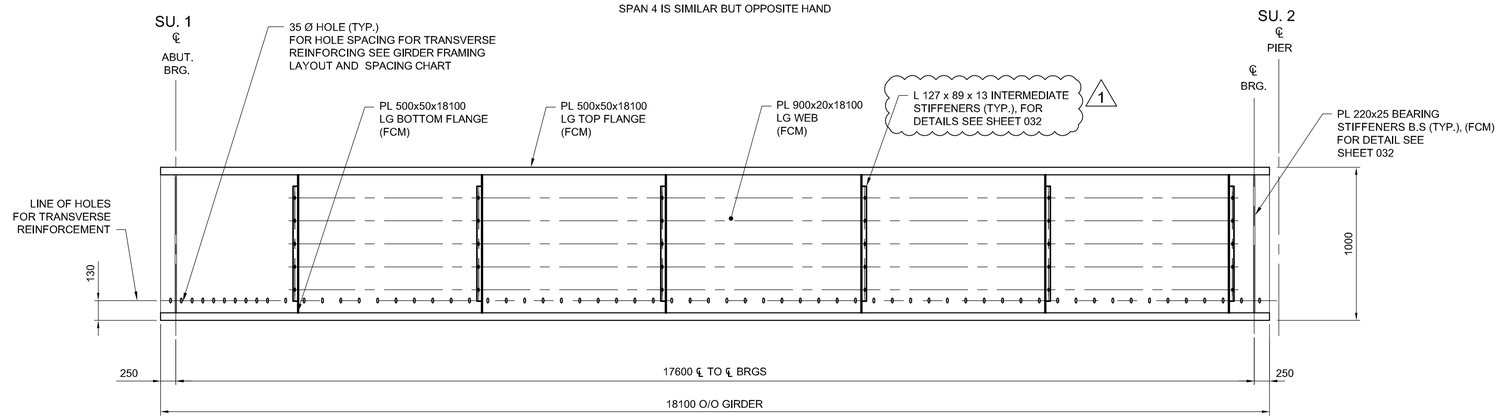


GIRDER FRAMING LAYOUT

SCALE 1:50
SHOWN SPAN 1
SPAN 4 IS SIMILAR BUT OPPOSITE HAND



GIRDER MK. "G1" ELEVATION

HORZ. SCALE : 1:50
VERT. SCALE: 1:20

NOTE: GIRDER LINE 10 SHOWN.

TRANSVERSE REINFORCEMENT HOLE SPACING - SPAN 1 & SPAN 4

GIRDER LINE	SU.1/SU.4																SU.2/SU.5
1	162	296	52 SPACES @ 300 = 15600													296	176 176 176 176 176 176 176 176 176 162
2	162	176	296	52 SPACES @ 300 = 15600												296	176 176 176 176 176 176 176 176 176 162
3	162	176	176	176	296	52 SPACES @ 300 = 15600										296	176 176 176 176 176 176 176 176 176 162
4	162	176	176	176	176	296	52 SPACES @ 300 = 15600									296	176 176 176 176 176 176 176 176 176 162
5	162	176	176	176	176	176	296	52 SPACES @ 300 = 15600								296	176 176 176 176 176 176 176 176 176 162
6	162	176	176	176	176	176	176	296	52 SPACES @ 300 = 15600							296	176 176 176 176 176 176 176 176 176 162
7	162	176	176	176	176	176	176	176	176	296	52 SPACES @ 300 = 15600					296	176 176 176 176 176 176 176 176 176 162
8	162	176	176	176	176	176	176	176	176	176	296	52 SPACES @ 300 = 15600				296	176 176 176 176 176 176 176 176 176 162
9	162	176	176	176	176	176	176	176	176	176	176	296	52 SPACES @ 300 = 15600			296	176 176 176 176 176 176 176 176 176 162
10	162	176	176	176	176	176	176	176	176	176	176	176	296	52 SPACES @ 300 = 15600		296	176 176 176 176 176 176 176 176 176 162

SECTION PROPERTIES AND STRESSES

17600 mm SPAN LENGTH (C/C BEARINGS)

STEEL SECTION				
TOP FLANGE PLATE SIZE	500mm	50mm	AREA =	25000mm^2
WEB PLATE SIZE	900mm	20mm	AREA =	18000mm^2
BOTTOM FLANGE PLATE SIZE	500mm	50mm	AREA =	25000mm^2

SECTION MODULES X 10^6 [mm^3]			
n = 7.14	CONC. DECK	STEEL TOP FLANGE	STEEL BOTTOM FLANGE
STEEL ONLY	-	24.820	24.820
COMPOSITE - n	44.78	56.830	45.690
COMPOSITE - 3n	30.89	38.760	34.490

TABLE OF STRESSES

	LOAD	END REACTION	SHEAR STRESS	BENDING MOMENT	BENDING STRESS		
					STEEL		CONC. DECK
					TOP FLANGE	BOTTOM FLANGE	
	[kN/m]	[kN]	[MPa]	[kNm]	[MPa]	[MPa]	[MPa]
DEAD LOAD NON-COMPOSITE	27.36	240.74	13.37	1059.25	42.68	42.68	-
SUPERIMPOSED DEAD LOAD NON-COMPOSITE	16.50	145.18	8.07	638.82	25.74	25.74	2.90
LIVE LOAD E90 NON-COMPOSITE	-	514.13	28.56	1713.37	69.03	69.03	5.36
IMPACT I = 38.32%	-	196.99	10.94	656.48	26.45	26.45	2.05
CENTRIFUGAL FORCE	-	-	-	-	-	-	-
TOTAL GROUP A		1097.03	60.95	4067.92	163.90	163.90	10.31
ALLOWABLE STRESSES (BENDING & SHEAR)			122.50		192.50	192.50	14.00
RATIO OF WORKING STRESS TO ALLOWABLE			0.50		0.85	0.85	0.74

$$\frac{D\,(LL+I)}{SPAN} = \frac{1}{1369}$$

ALLOWABLE STRESS RANGE FOR FATIGUE CATEGORY "B" FOR N> 2 000 000 CYCLES:

S Rfat = 110.30MPa

MAXIMUM DESIGN STRESS RANGE AT BOTTOM FLANGE TO WEB WELD AT MIDSPAN (35% MEAN IMPACT LOAD) :

70.45 < S Rfat

ESTIMATED QUANTITIES (PER SPAN):

- TOTAL SPAN STRUCTURAL STEEL WEIGHT (WITHOUT BRGS) — 100 133 kg
- LIFTING WEIGHT OF I-GIRDER (WITH BRGS) — 10 035 kg
- STRUCTURAL STEEL IN BEARINGS — 2 304 kg
- CONCRETE
  - DECK — 177 m³
  - TRAINMAN'S WALKWAY — 27 m³
- WATERPROOFING — 177 m²

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

APEGM Certificate of Authorization
Dillon Consulting Limited (MB)
No. 1789 Date: 2017/01/09

NO.	REVISIONS	DATE	BY
1	ADDENDUM #4	17/02/24	RE
0	ISSUED FOR TENDER	17/01/09	RE

DILLON CONSULTING

DESIGNED BY	RE	CHECKED BY	SSR
DRAWN BY	NBG	APPROVED BY	DBW
HOR. SCALE	AS SHOWN	RELEASED FOR CONSTRUCTION	
VERTICAL	AS SHOWN		
DATE		DATE	

ENGINEER'S SEAL
PROVINCE OF MANITOBA — R.B. ERIC — Member 22665 — REGISTERED PROFESSIONAL ENGINEER

CONSULTANT PROJECT NUMBER
16-3353

Winnipeg

THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

WAVERLEY STREET UNDERPASS AT CN MILE 3.89 RIVERS SUB
CONTRACT 2: UNDERPASS STRUCTURE, RAILWORKS, ROADWORKS, LAND DRAINAGE SEWER, PUMPING STATION AND LANDSCAPING WORKS

STEEL GIRDER DETAILS
SPAN 1 AND 4 (17.60 m)

CITY DRAWING NUMBER: U-239-2016-C2-CS-028
SHEET 028 OF 085
CONSULTANT DRAWING NUMBER: C2-CS-028

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