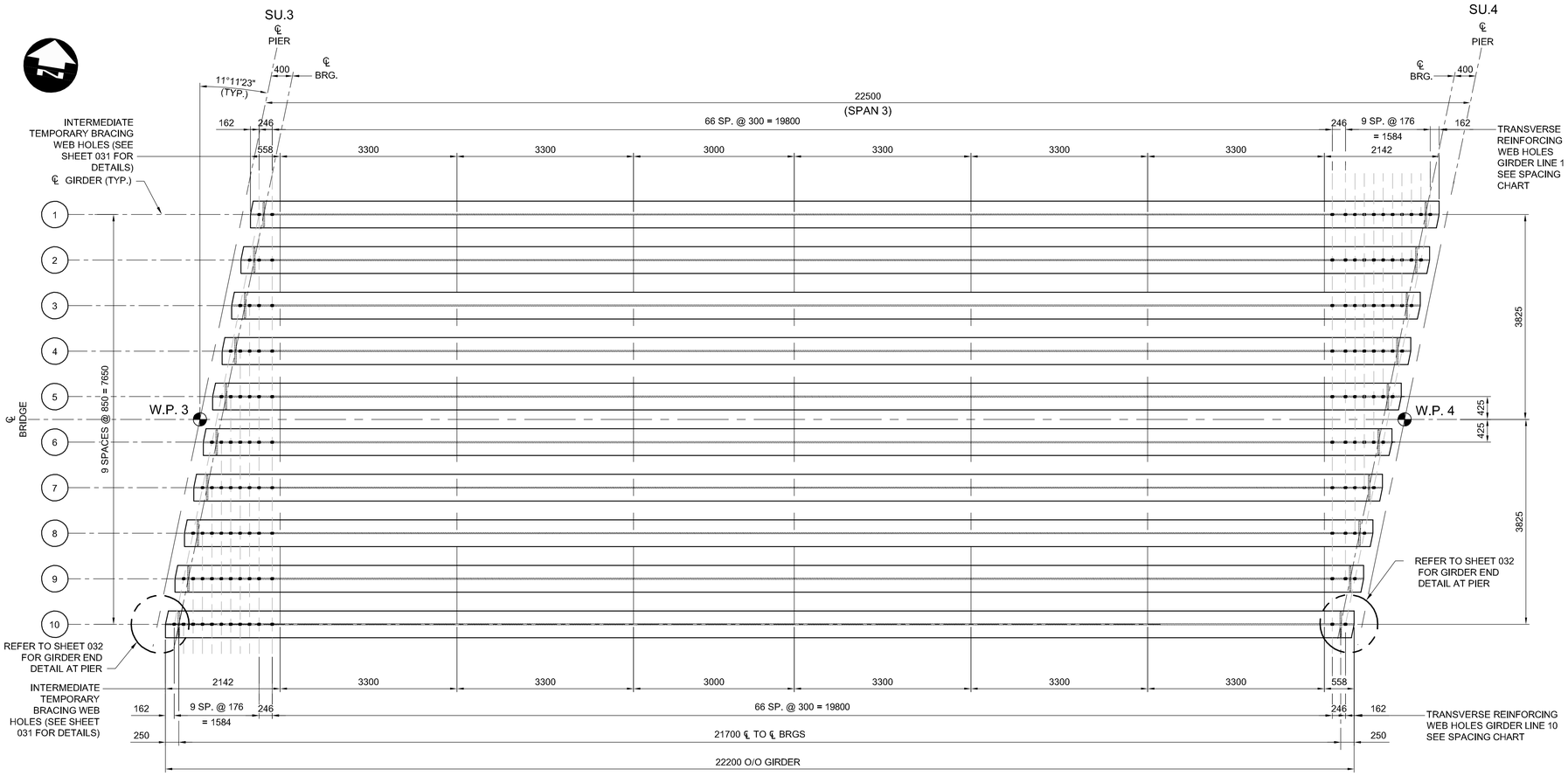
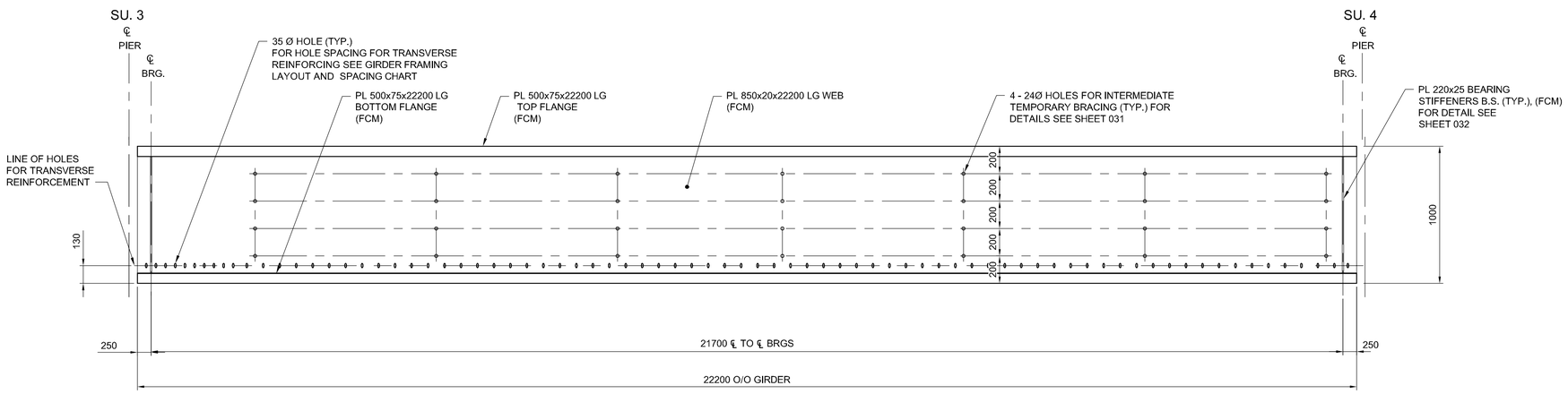


GIRDER FRAMING LAYOUT

SCALE 1:50



GIRDER MK. "G3" ELEVATION

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

NOTE: GIRDER LINE 10 SHOWN.

SECTION PROPERTIES AND STRESSES

21700mm SPAN LENGTH (C/C BEARINGS)

STEEL SECTION				
TOP FLANGE PLATE SIZE	500mm	75mm	AREA =	37500mm^2
WEB PLATE SIZE	850mm	20mm	AREA =	17000mm^2
BOTTOM FLANGE PLATE SIZE	500mm	75mm	AREA =	37500mm^2

SECTION MODULES X 10^6 [mm^3]			
n = 7.15	CONC. DECK	STEEL TOP FLANGE	STEEL BOTTOM FLANGE
STEEL ONLY	-	34.010	34.010
COMPOSITE - n	50.56	64.240	51.170
COMPOSITE - 3n	37.72	47.330	42.200

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	28.72	311.64	18.33	1690.62	49.71	49.71	-
SUPERIMPOSED DEAD LOAD NON-COMPOSITE	15.09	163.69	9.63	888.03	26.11	26.11	3.29
LIVE LOAD E90 NON-COMPOSITE	-	525.38	30.90	2423.25	71.25	71.25	6.70
IMPACT I = 35.39%	-	185.93	10.94	857.59	25.22	25.22	2.37
CENTRIFUGAL FORCE	-	-	-	-	-	-	-
TOTAL GROUP A		1186.64	69.80	5859.49	172.29	172.29	12.37
ALLOWABLE STRESSES (BENDING & SHEAR)			122.50		192.50	192.50	14.00
RATIO OF WORKING STRESS TO ALLOWABLE			0.57		0.89	0.89	0.88

$$\frac{D\ (LL+I)}{SPAN} = \frac{1}{906}$$

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

S Rfat = 110.30 MPa

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

68.06 MPa < S Rfat

ESTIMATED QUANTITIES (PER SPAN):

- TOTAL SPAN STRUCTURAL STEEL WEIGHT (WITHOUT BRGS)	161 780 kg
- LIFTING WEIGHT OF I-GIRDER (WITH BRGS)	16 178 kg
- STRUCTURAL STEEL IN BEARINGS	2 304 kg
- CONCRETE	
- DECK	203 m^3
- TRAINMAN'S WALKWAY	30 m^3
- WATERPROOFING	196 m^2

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

TRANSVERSE REINFORCEMENT HOLE SPACING - SPAN 3

GIRDER LINE	SU.3																	SU.4
1	162	246	66 SPACES @ 300 = 19800									246	176	176	176	176	176	176	176	176	176	162
2	162	176	246	66 SPACES @ 300 = 19800								246	176	176	176	176	176	176	176	176	176	162
3	162	176	176	246	66 SPACES @ 300 = 19800							246	176	176	176	176	176	176	176	176	176	162
4	162	176	176	176	246	66 SPACES @ 300 = 19800						246	176	176	176	176	176	176	176	176	176	162
5	162	176	176	176	176	246	66 SPACES @ 300 = 19800					246	176	176	176	176	176	176	176	176	176	162
6	162	176	176	176	176	176	246	66 SPACES @ 300 = 19800				246	176	176	176	176	176	176	176	176	176	162
7	162	176	176	176	176	176	176	246	66 SPACES @ 300 = 19800			246	176	176	176	176	176	176	176	176	176	162
8	162	176	176	176	176	176	176	176	246	66 SPACES @ 300 = 19800		246	176	176	176	176	176	176	176	176	176	162
9	162	176	176	176	176	176	176	176	176	176	246	66 SPACES @ 300 = 19800									246	162
10	162	176	176	176	176	176	176	176	176	176	176	246	66 SPACES @ 300 = 19800								246	162

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

NO.	REVISIONS	DATE	BY
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

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 3 (21.70 m)

CITY DRAWING NUMBER U-239-2016-C2-CS-030
SHEET 030 OF 085
CONSULTANT DRAWING NUMBER C2-CS-030

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