# DESIGN DATA

SPECIFICATIONS

AASHTO LRFD Bridge Design Specifications, First Edition, 1994 plus 1996/97 Interims

VEHICULAR LIVE LOADING

1. Modified AASHTO HSS-25 Truck 2. AASHTO LRFD "HL-93" Loading

STRUCTURAL CONCRETE

CSA A23.1, Exposure Class C-1 Air content category 1

1. PRECAST PRESTRESSED CONCRETE CHANNEL GIRDERS - f'c = 45 MPa at 28 days f'ci = 35 MPa at time of de-stressing

2. PRECAST PANELS - f'c = 35 MPa

REINFORCING STEEL

PRECAST PRESTRESSED CONCRETE CHANNEL GIRDERS - CAN/CSA-G30.18-M92 Grade 400W black (i.e no epoxy coating)
 PRECAST PANELS - CAN/CSA-G30.18-M92 Grade 400W black (i.e no epoxy coating)

STRUCTURAL STEEL

All Structural Steel shall conform to CAN/CSA G40.21-M92 Grade 300W
 HSS Tubing for Bridge Rail shall confrom to CAN/CSA- G40.21-M92 Grade 350W

PRESTRESSING

20–13 Ø low relaxation strands, fpu = 1 860 MPa

PILE LOADING

MAXIMUM FACTORED LOAD FACTORED BEARING RESISTANCE END PILE BENTS 628 kN INTERMEDIATE PILE BENTS

# HYDRAULIC DESIGN DATA

DESIGN DISCHARGE

# SURVEY CONTROL

HORIZONTAL DATUM:	NAD83CSRS
VERTICAL DATUM:	CGVD28
Ellipsoid:	GRS 1980
GEOID (HT2.0):	
UT <b>M</b> :	ZONE
SCALE FACTOR:	

SITE CONTROL POINT DATA

CONTROL POINT *	Northing:	
	EASTING:	·
	ELEVATION	
	DATE:	
CONTROL POINT *		!
	EASTING	
	ELEVATION:	_
	DATE:	
CONTROL POINT +	NORTHING:	
	EASTING	!
	<b>ELEVATION</b> :	
	DATE:	!
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	PLANS OF PROPOSED	
P.P.C.C.	BRIDGE	OVER [

LENGTH

12 352 OUT TO OUT OF ABUTMENT PRECAST BACKWALL PANELS

ONE SIMPLY SUPPORTED SPAN OF PRECAST PRESTRESSED CONCRETE CHANNEL GIRDERS WITH ASPHALT OVERLAY

TWO PRECAST CONCRETE ABUTMENTS WITH STEEL H-PILES

SUPERSTRUCTURE

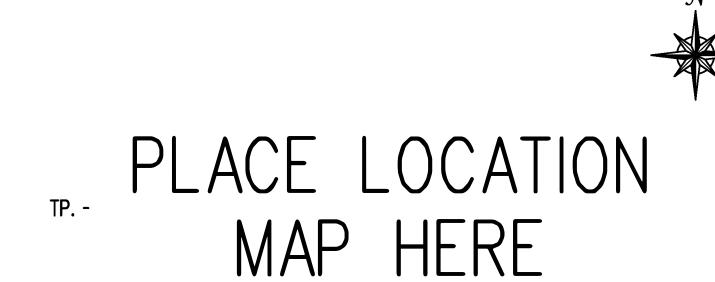
SUBSTRUCTURE

ROADWAY WIDTH

LOCATION

10 800 out to out of girders





RGE. -LOCATION MAP Not to Scale

# MANITOBA INFRASTRUCTURE

# WATER MANAGEMENT AND STRUCTURES

RELEASED FOR CONSTRUCTION BY :

EXECUTIVE DIRECTOR OF STRUCTURES

DATE \_\_\_\_\_

## SHEET LEGEND

1. COVER SHEET

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- GENERAL ELEVATION BORING LOGS
- 4. SITE AND EROSION CONTROL DETAILS
- 5. ASSEMBLY DETAILS
- ASSEMBLY DETAILS
   STEEL PILE CAP DETAILS
- 8. BEARING AND ERECTION DETAILS
- 9. RAILING LAYOUT AND DETAILS
- 10.RAILING DETAILS11.RAILPOST DETAILS
- P1. PRECAST PANEL DETAILS P2. PRECAST PANEL DETAILS

G1.	PRECAST	PRESTRESSED	CHANNEL	GIRDER	DETAILS
G2.	PRECAST	PRESTRESSED	CHANNEL	GIRDER	DETAILS
G3.	PRECAST	PRESTRESSED	CHANNEL	GIRDER	DETAILS
G4.	PRECAST	PRESTRESSED	CHANNEL	GIRDER	DETAILS
G5.	PRECAST	PRESTRESSED	CHANNEL	GIRDER	DETAILS

ENVIRONMENTAL APPROVALS
MANITOBA ENVIRONMENT ACT LICENCE
DATE :
FILE • :
FISHERIES AND OCEANS CANADA - AUTHORIZATION OR REVIEW
FILE • :
TRANSPORT CANADA - NAVIGATION ACT
DATE :
FILE • :
MANITOBA INFRASTRUCTURE ENVIRONMENTAL APPROVAL DATE :
FILE • :
ENVIRONMENTAL REVIEW COMPLETED
DATE :
COMPLETED BY :

ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS AND STATIONS ARE IN METRES (m) UNLESS SHOWN OTHERWISE.

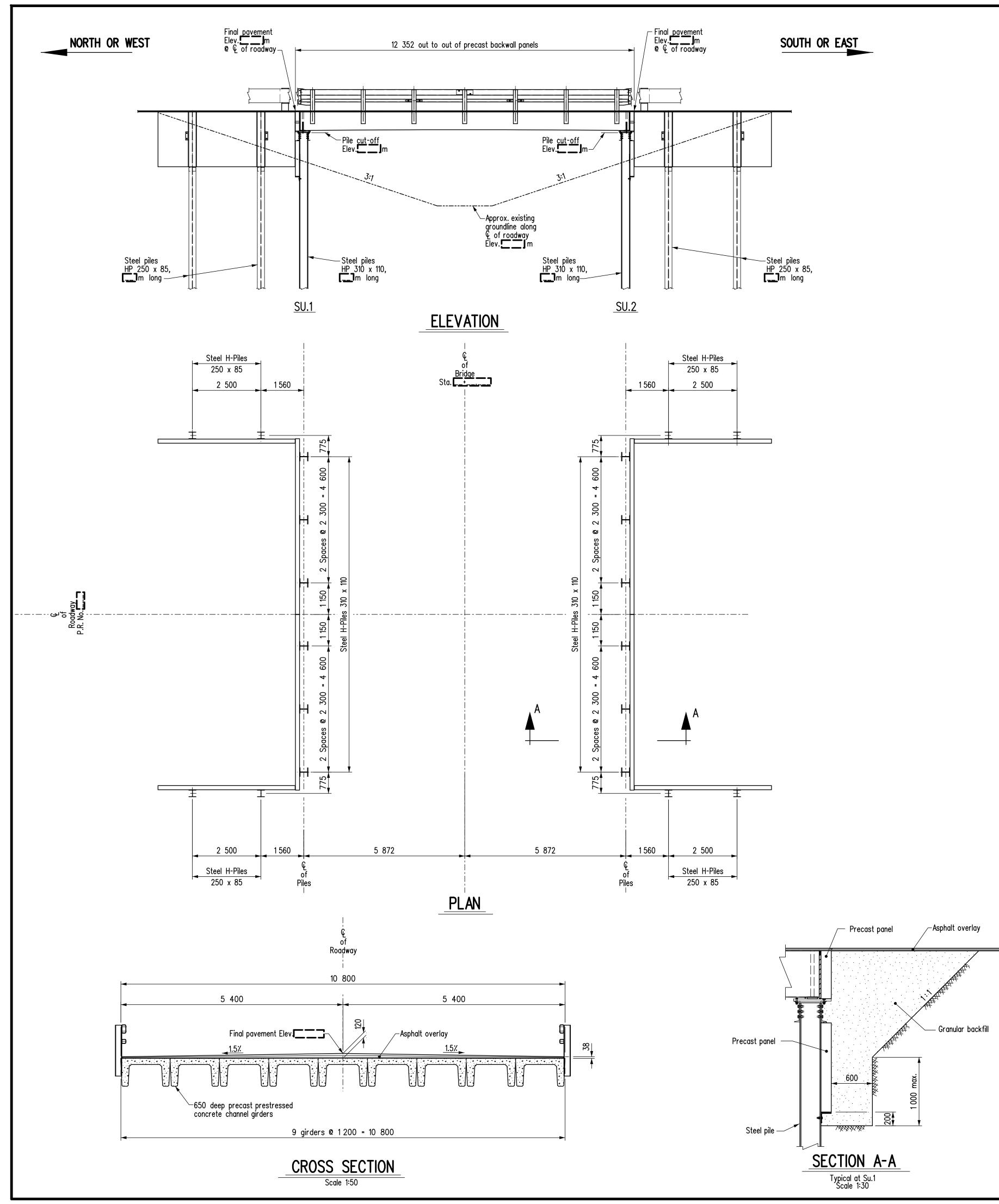
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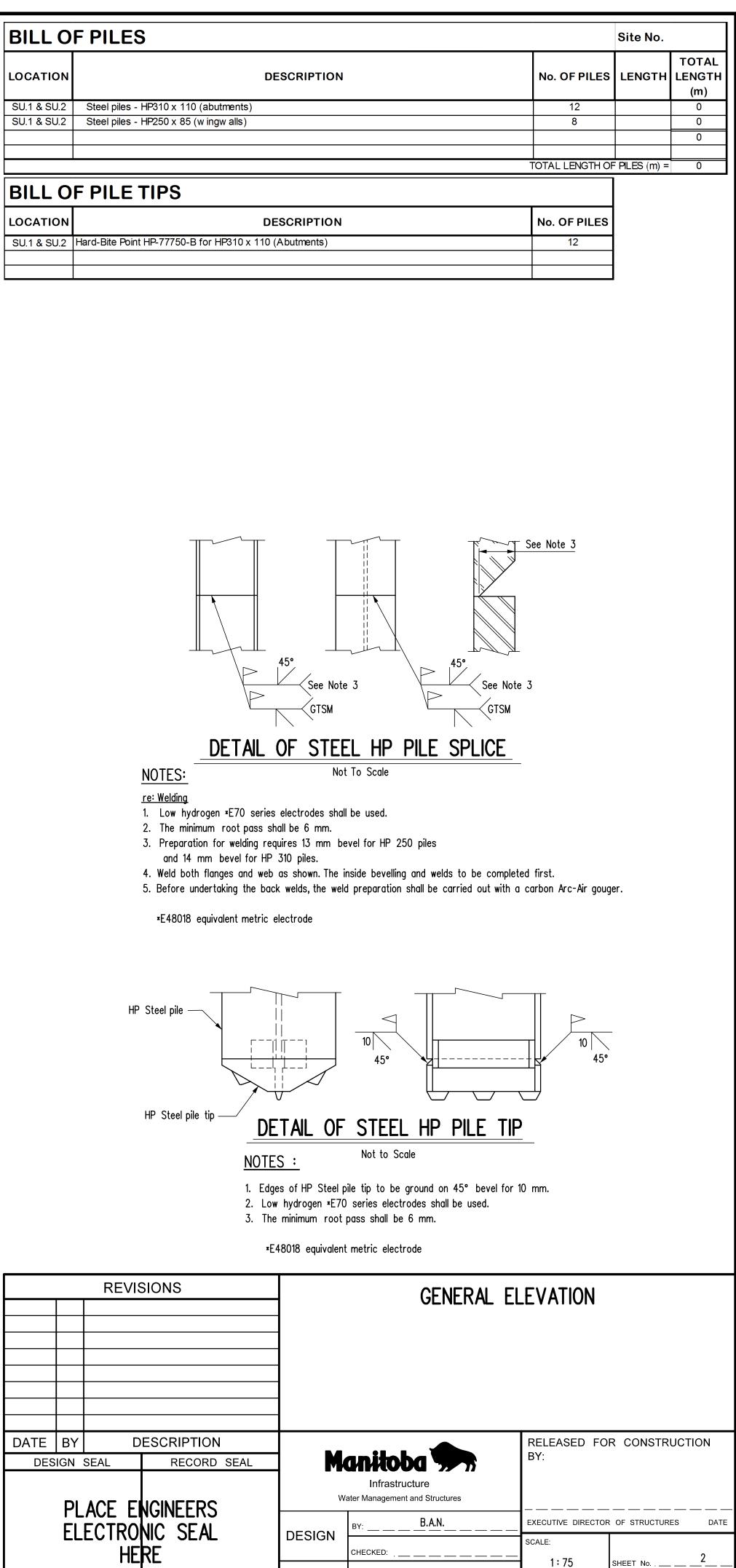
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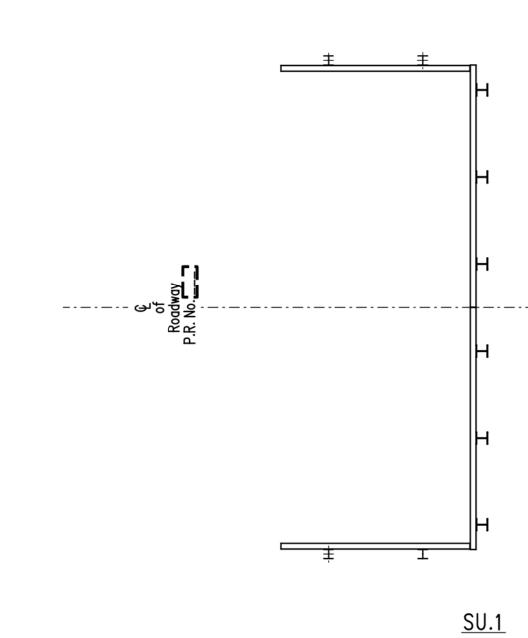
#### <u>NOTES</u>:

<u>re: Backfill Behind Abutment Ballast Walls</u>

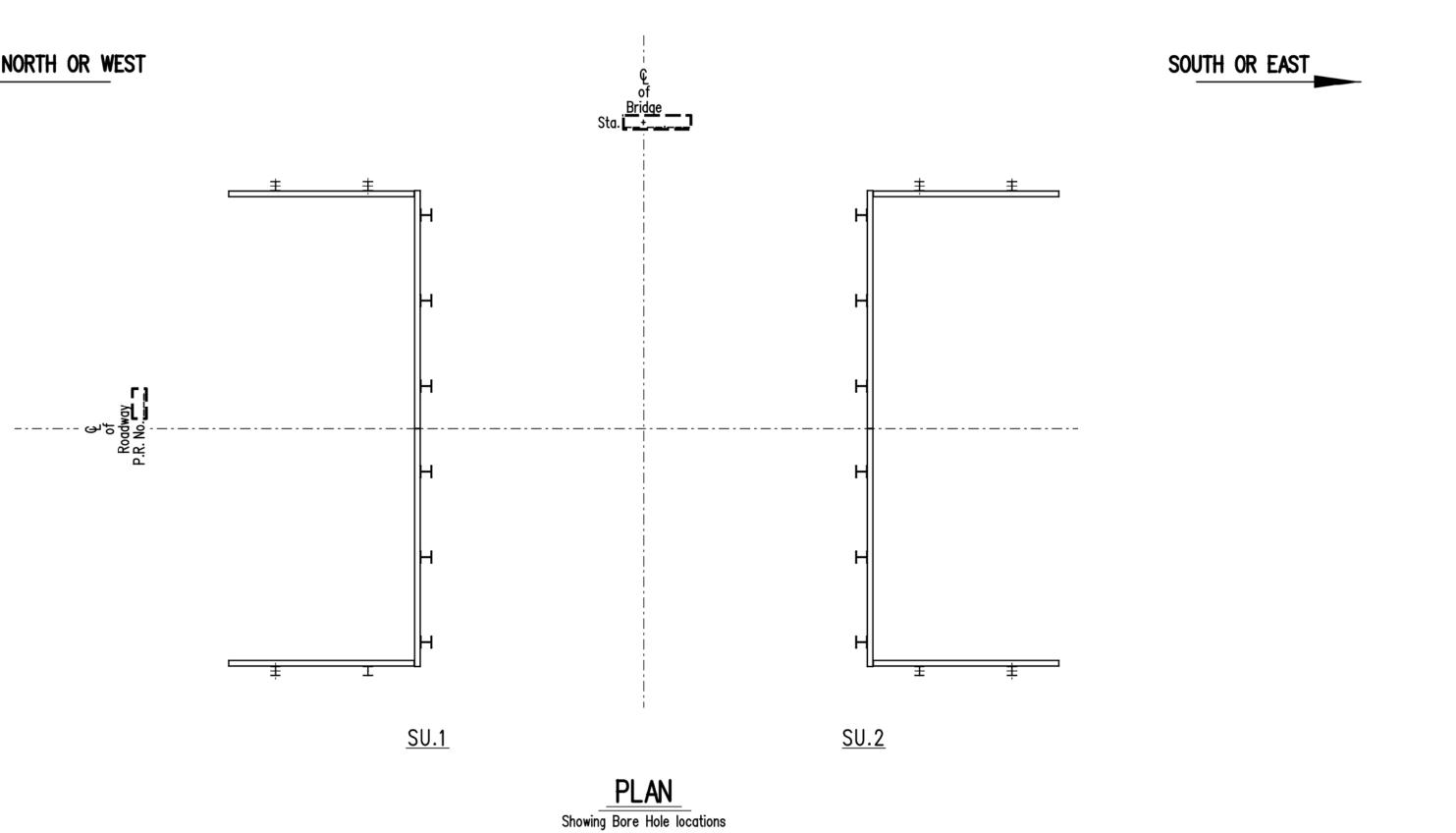
- Backfill behind ballast wall and wingwall panels shall be Type 1 Granular backfill supplied and placed in accordance with Bridge Specification 1001 (I). The granular backfill shall be placed and compacted in lifts not exceeding 150 mm.
- Compaction equipment used within 2 m of ballast walls and wingwalls shall be limited to light vibratory equipment with a mass not exceeding 120 kg unless otherwise approved. 2.
- 3. Steel pile tip to be PRUYN "Hard-Bite" or equivalent.



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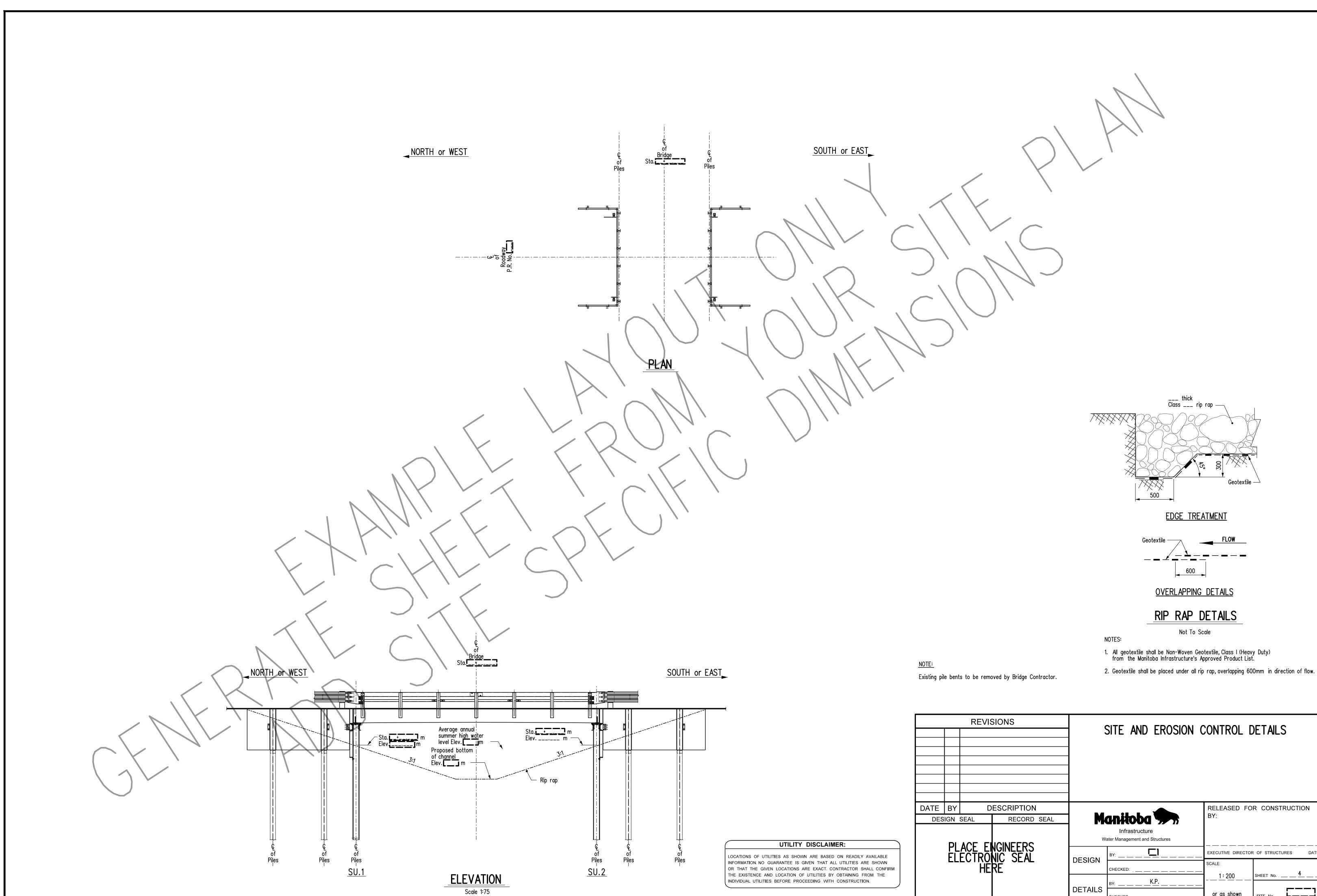




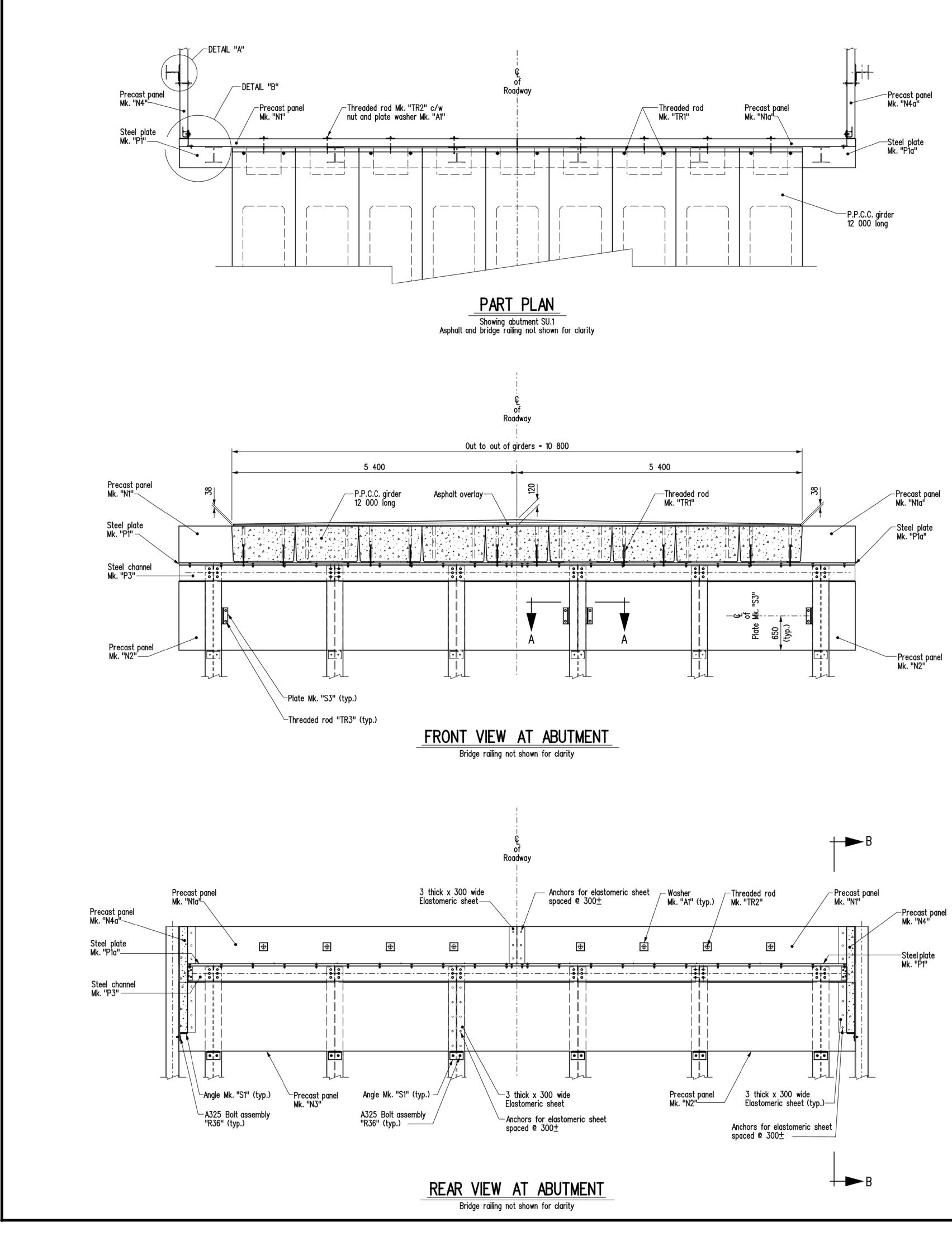
<u>NOTES - re: Boring Logs</u>

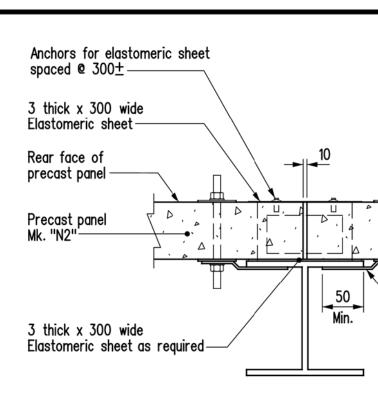
- The Department provides log boring information shown on the Plans. This
  information may not be representative of the soil conditions throughout
  the site. Contractors may peruse all available soil information in the Water
  Management and Structures Branch located at 6th floor, 215 Garry Street, Winnipeg.
- The following abbreviations apply to bore hole information:
   Qu Laboratory unconfined compressive strength in kPa
   SPT (N) Number of blows per 300 mm Standard Penetration Test
   USC Unified Soil Classification
   M.C. Moisture Content
- All stations, elevations, offsets and depths as shown are in meters. All dimensions are in millimeters.
- 4. All bore hole locations shown in plan view are approximate.
- 5. Elevations on boring logs are at a vertical scale of 1:100.

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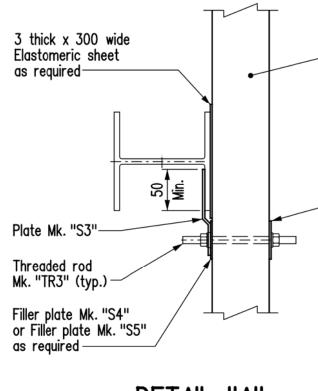


SITE AND EROSION CONTROL DETAILS RELEASED FOR CONSTRUCTION BY: XECUTIVE DIRECTOR OF STRUCTURES DATE SHEET No. . \_\_\_\_ 4\_\_\_ or as shown CHECKED:

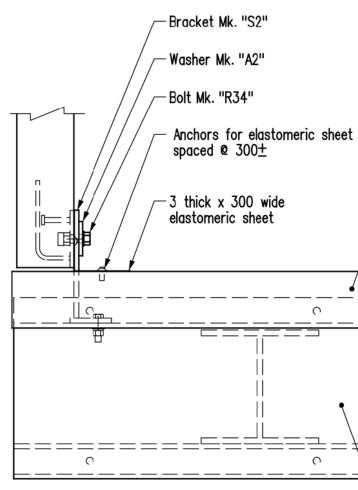




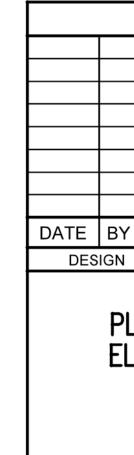






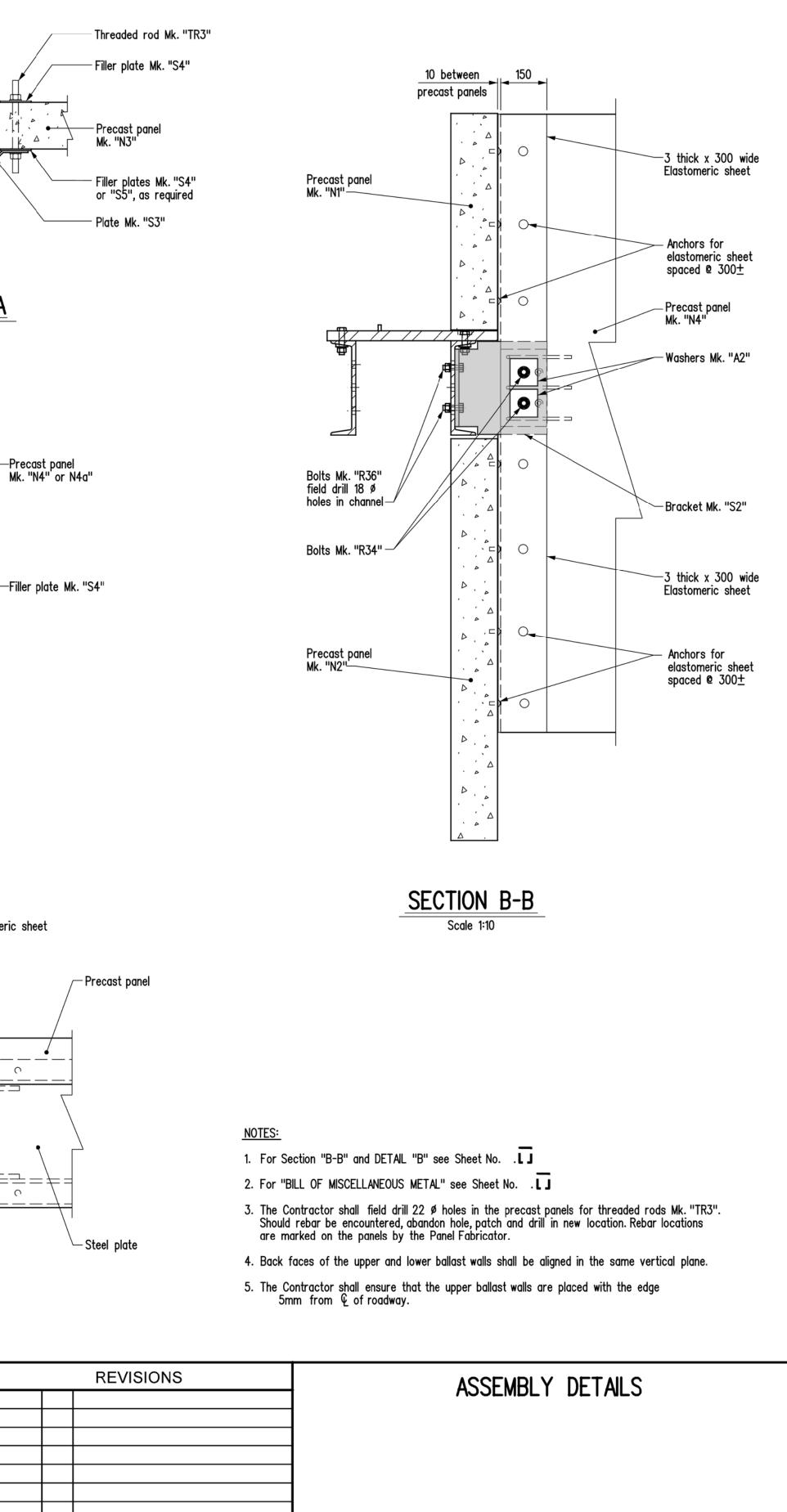






DESIGN SEAL

DESCRIPTION



Manitoba 🗫 BY⁺ RECORD SEAL Infrastructure Water Management and Structures PLACE ENGINEERS \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_\_\_\_\_B.A.N.\_\_ XECUTIVE DIRECTOR OF STRUCTURES ELECTRONIC SEAL DESIGN CALE: HERE CHECKED: \_ \_\_\_ \_\_\_ \_\_\_ \_\_\_ 1:40 SHEET No. . \_\_\_\_ 6\_\_\_\_ K.P. DETAILS **--**or as shown

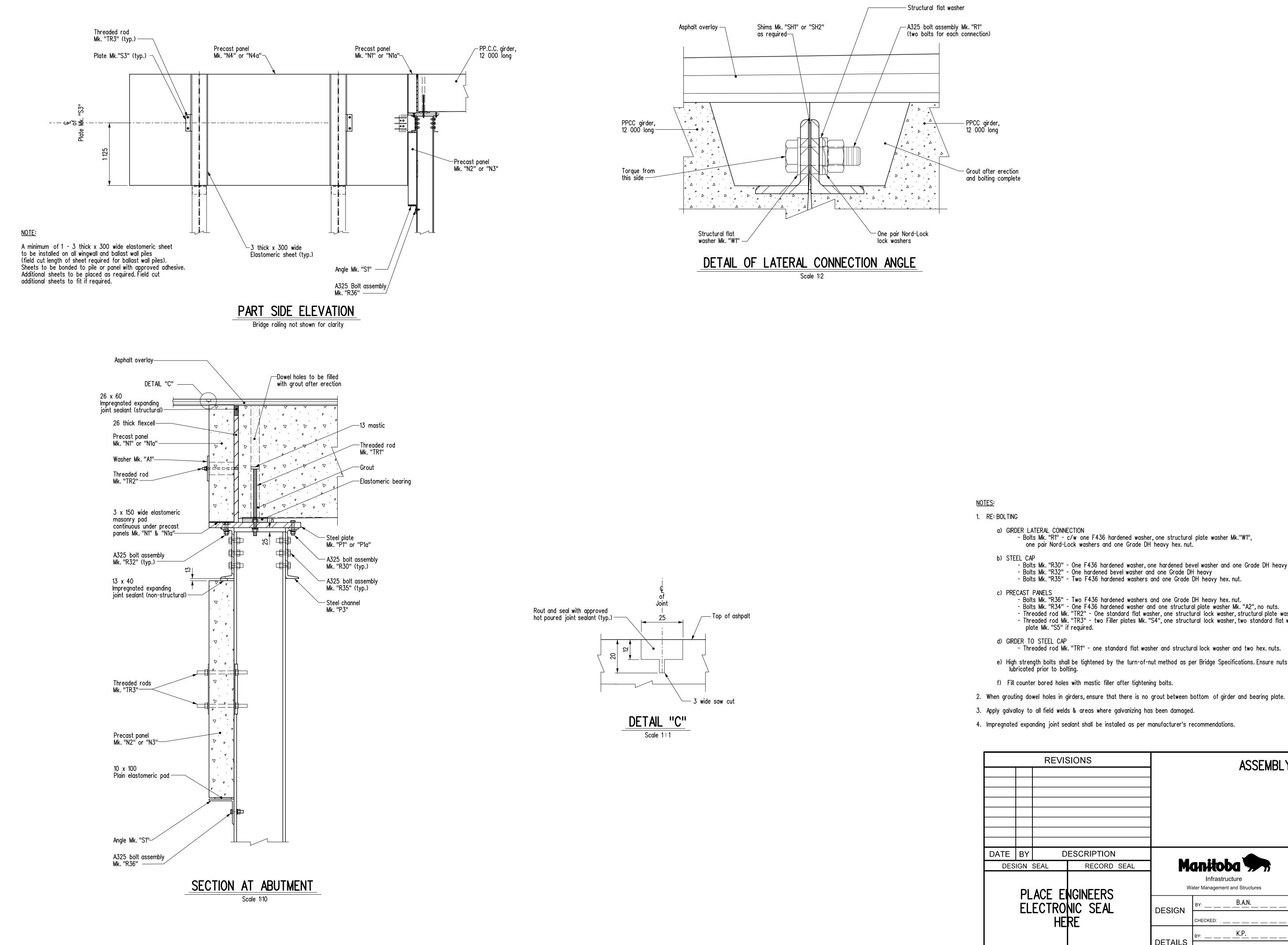
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1. RE: BOLTING

a) GIRDER LATERAL CONNECTION

- Bolts Mk. "R1" - c/w one F436 hardened washer, one structural plate washer Mk."W1", one pair Nord-Lock washers and one Grade DH heavy hex. nut.

b) STEEL CAP

 Bolts Mk. "R30" - One F436 hardened washer, one hardened bevel washer and one Grade DH heavy hex. nut.
 Bolts Mk. "R32" - One hardened bevel washer and one Grade DH heavy
 Bolts Mk. "R35" - Two F436 hardened washers and one Grade DH heavy hex. nut.

d) GIRDER TO STEEL CAP - Threaded rod Mk. "TR1" - one standard flat washer and structural lock washer and two hex. nuts.

c) PRECAST PANELS - Bolts Mk. "R36" - Two F436 hardened washers and one Grade DH heavy hex.nut.

- Bolts Mk. "R34" - One F436 hardened washer and one structural plate washer Mk. "A2", no nuts. Threaded rod Mk. "TR2" - One standard flat washer, one structural lock washer, structural plate washer Mk. "A1" and one stainless steel hex. nut.
 Threaded rod Mk. "TR3" - two Filler plates Mk. "S4", one structural lock washer, two standard flat washers and two hex. nuts, Filler plate Mk. "S5" if required.

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Infrastructure

Water Management and Structures

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ASSEMBLY DETAILS

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PLACE ENGINEERS

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f) Fill counter bored holes with mastic filler after tightening bolts.

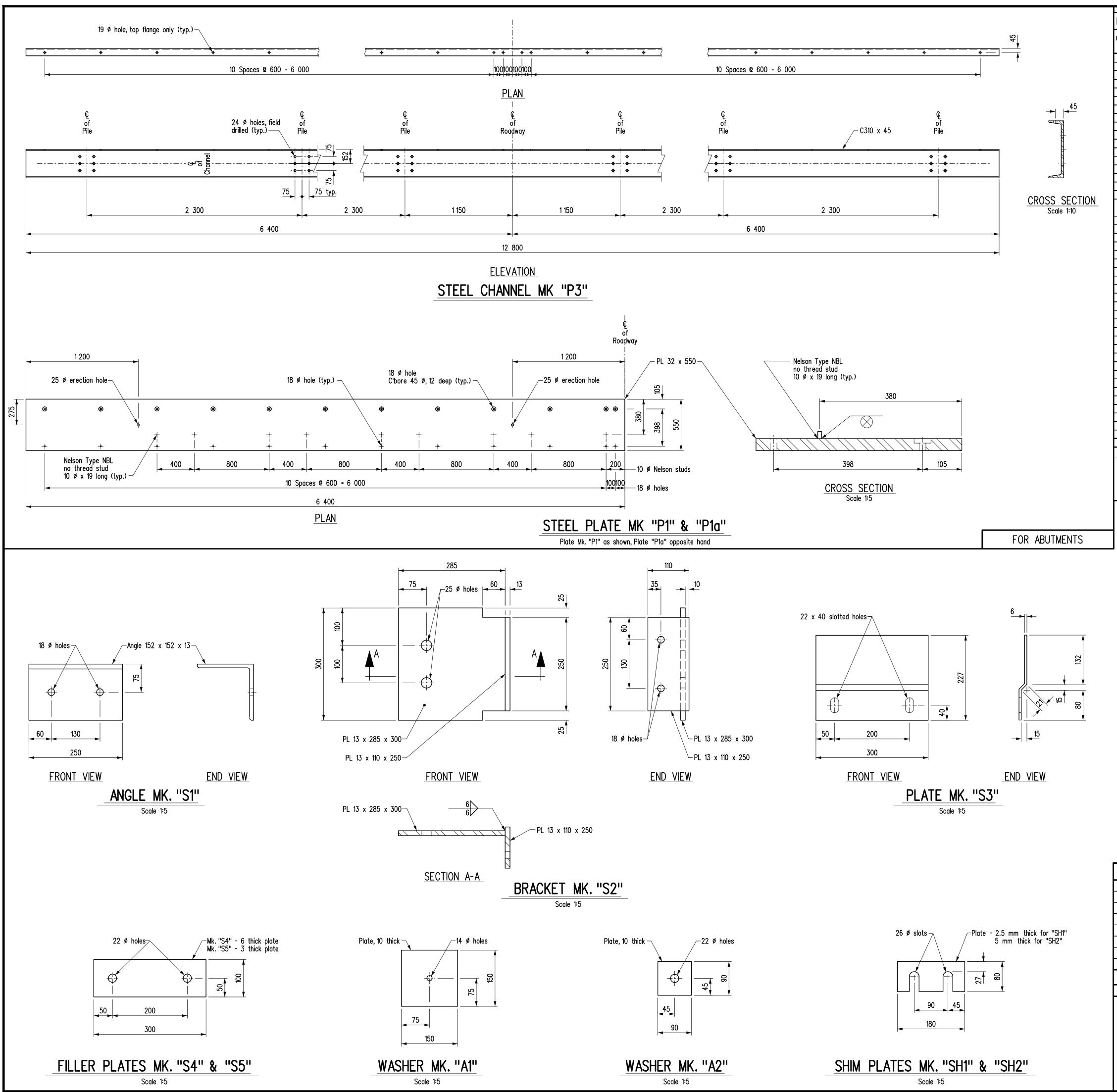
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lubricated prior to bolting.

DESIGN SEAL

e) High strength bolts shall be tightened by the turn-of-nut method as per Bridge Specifications. Ensure nuts are



BIL	LO	F MISCELLANEOU	S METAL	10 800 ROADWAY WIDTH - 1 SPAN				Site No.	
MARK No.	No.	DESCRIPTION	CORROSION PROTECTION	SIZE	LENGTH	REMARKS	COMPONENT MASS	MASS PER UNIT	TOTAL MASS
P1	2	Steel plate	Hot dip galvanized						1768.66
		Each unit to be fabricated from :							
		1 - Steel plate		PL 32x550	6 400	See detail for Abutment	884.224	884.224	
		9 - Nelson Type NBL, no thread studs		10 dia.	19	Part No. 101-063-167	0.012	0.108	
								884.332	
P1a	2	Steel plate	Hot dip galvanized						1768.66
		Each unit to be fabricated from :	1.0						
		1 - Steel plate		PL 32x550	6 400	See detail for Abutment	884.224	884.224	
		9 - Nelson Type NBL, no thread studs		10 dia.	19	Part No. 101-063-167	0.012	0.108	
								884.332	
P3	4	Steel channel	Hot dip galvanized	C310x45	12 800	See detail for Abutment		572.160	2288.64
10	•				12 000			072.100	2200.01
R30	48	A325 bolt assembly	Hot dip galvanized	16 dia.	89	Steel plate to channels		0.245	11.76
R32	48	A325 bolt assembly	Hot dip galvanized	16 dia.	76	Steel plate to channels Cbore holes		0.225	10.80
R35	144	A325 bolt assembly	Hot dip galvanized	22 dia.	64	Channels to piles		0.461	66.38
R36	48	A325 bolt assembly	Hot dip galvanized	16 dia.	64	Angles Mk. "S1" to piles & bracket Mk. "S2" to cap		0.205	9.84
S1	20	Angle	Hot dip galvanized	L 152x152x13	250	As detailed		7.250	
S2	4	Bracket	Hot dip galvanized			As detailed		11.226	
S3	16	Plate	Hot dip galvanized	PL 6x300		As detailed		3.223	51.57
S4	32	Filler plate	Hot dip galvanized	PL 6x100		As detailed		1.413	
S5	16	Filler plate	Hot dip galvanized	PL 3x100		As detailed		0.707	11.31
A1	16	Structural plate washer	Hot dip galvanized	PL 10x150		As detailed - One to threaded rod Mk. "TR2"		1.766	
A2	8	Structural plate washer	Hot dip galvanized	PL 10x90	90	As detailed - One to bolt Mk. "R34"		0.636	
TR1	18	Threaded rods c/w two hex. nuts	Hot dip galvanized	19 dia.	400	Girder to steel cap plate		0.940	
TR3	32	Threaded rods c/w two hex. nuts	Hot dip galvanized	19 dia.	300	Steel plates Mk. "S3" to precast panels		0.660	21.12
	96	Hardened bevel w asher	Hot dip galvanized	for 16 dia. bolts		One to bolts Mk. "R30" & "R32"		0.110	10.56
	18	Standard flat w asher	Hot dip galvanized	for 13 dia. rod		One to threaded rod Mk. "TR2"		0.010	0.18
	82	Standard flat washer	Hot dip galvanized	for 19 dia. rod		One to "TR1", tw o to "TR3"		0.020	1.64
	18	Structural lock washer	Hot dip galvanized	for 12 dia. rod		One to threaded rod Mk. "TR2"		0.010	0.18
	50	Structural lock w asher	Hot dip galvanized	for 19 dia. rod		One to "TR1" & "TR3"		0.020	1.00
	144	F436 Hardened w asher	Hot dip galvanized			One to bolt Mk. "R35"		0.032	4.61
	48	F436 Hardened w asher	Hot dip galvanized	for 16 dia. bolts		One to bolt Mk. "R36"		0.014	0.67
R1	64	A325 bolt assembly	Hot dip galvanized	22 dia.	76	R.C. girder connection		0.499	31.94
W1	64	Structural flat washer	Hot dip galvanized	for 22 dia. bolts		One to bolt Mk. "R1"		0.455	
** 1	64	Pair Nord-Lock lock w ashers		for 22 dia. bolts		One pair to bolt Mk. "R1"		0.030	
						P. 10 10 10 10 10 10 10 10 10 10 10 10 10			
SH1	32	Shim plate	Hot dip galvanized	PL 2.5x80	180	As detailed - use as required		0.231	7.39
SH2	32	Shim plate	Hot dip galvanized	PL 5x80	180	As detailed - use as required		0.463	14.82
							TOTAL MA	ASS (ka) =	6371.60

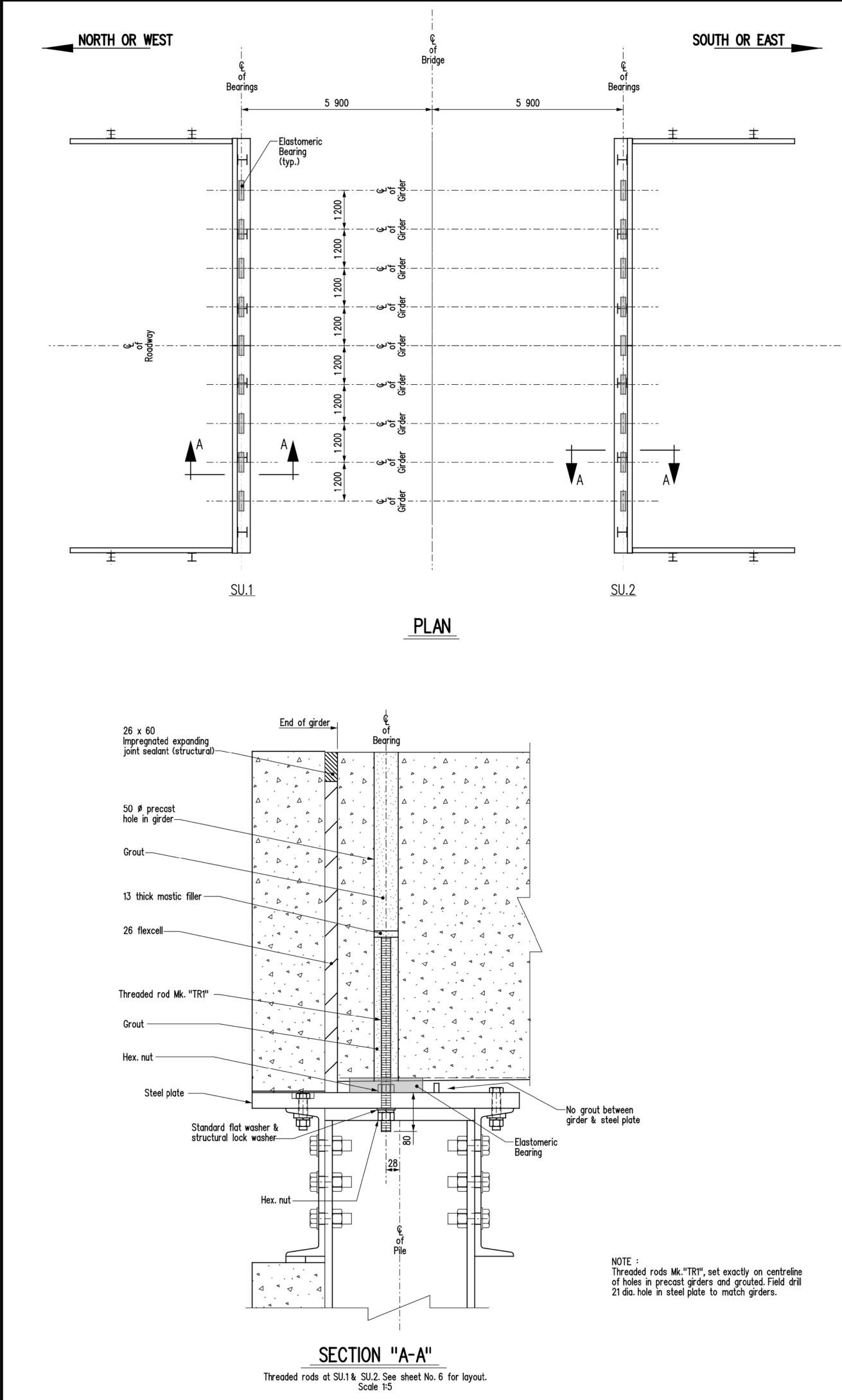
NOTES:

All material noted in the above Bill shall be hot dip galvanized after fabrication in accordance with CSA G164 for a minimum net retention of 610 g/m<sup>2</sup> unless otherwise stated in the specified material ASTM standards. The fabricator and galvanizer shall safeguard against embrittlement using recommended practices from applicable standards.
 Seal all welds prior to galvanizing.

3. Apply Galvaloy to all field welds and areas where galvanizing has been damaged.

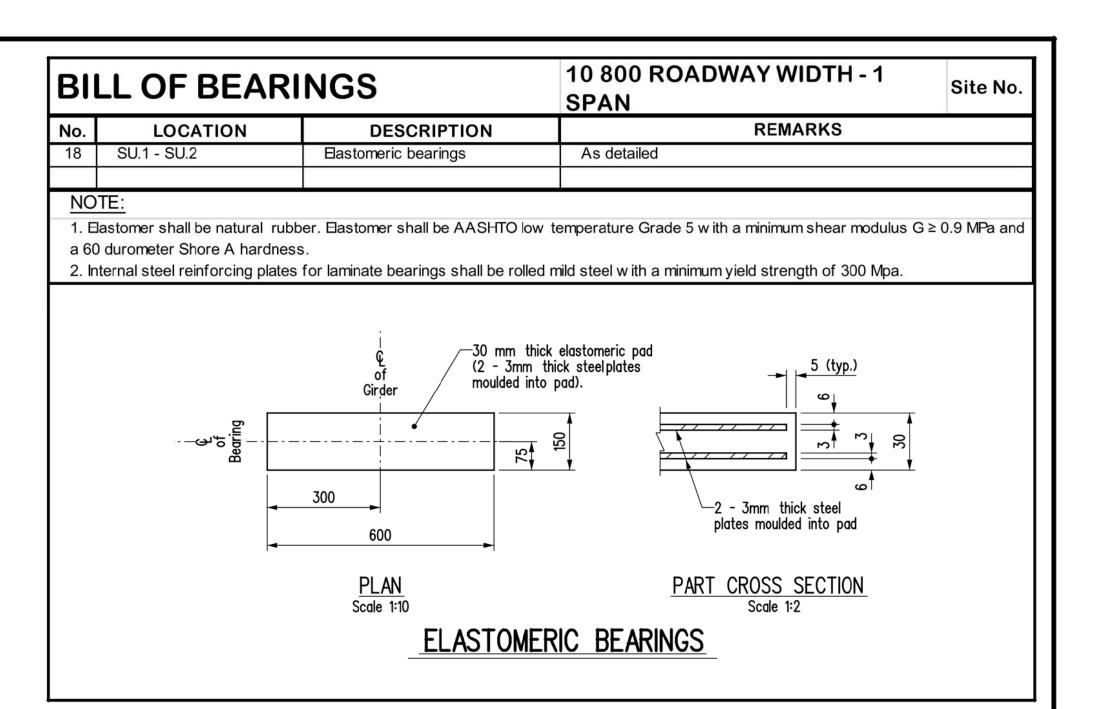
All bolts and threaded rod in the above Bill shall be Imperial thread.

REVISIONS			SIONS		STEEL PILE CAP DETAILS				
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DATE BY DESCRIPTION			ESCRIPTION		RELEASED FOR CONSTRUCTION				
DESIGN SEAL RECORD SEAL					Infrastructure ater Management and Structures	BY:			
				ELECTRONIC SEAL		DECION	BY:	EXECUTIVE DIRECTOR	R OF STRUCTURES DATE
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SOUTH OR EAST

Threaded rods Mk."TR1", set exactly on centreline of holes in precast girders and grouted. Field drill 21 dia. hole in steel plate to match girders.

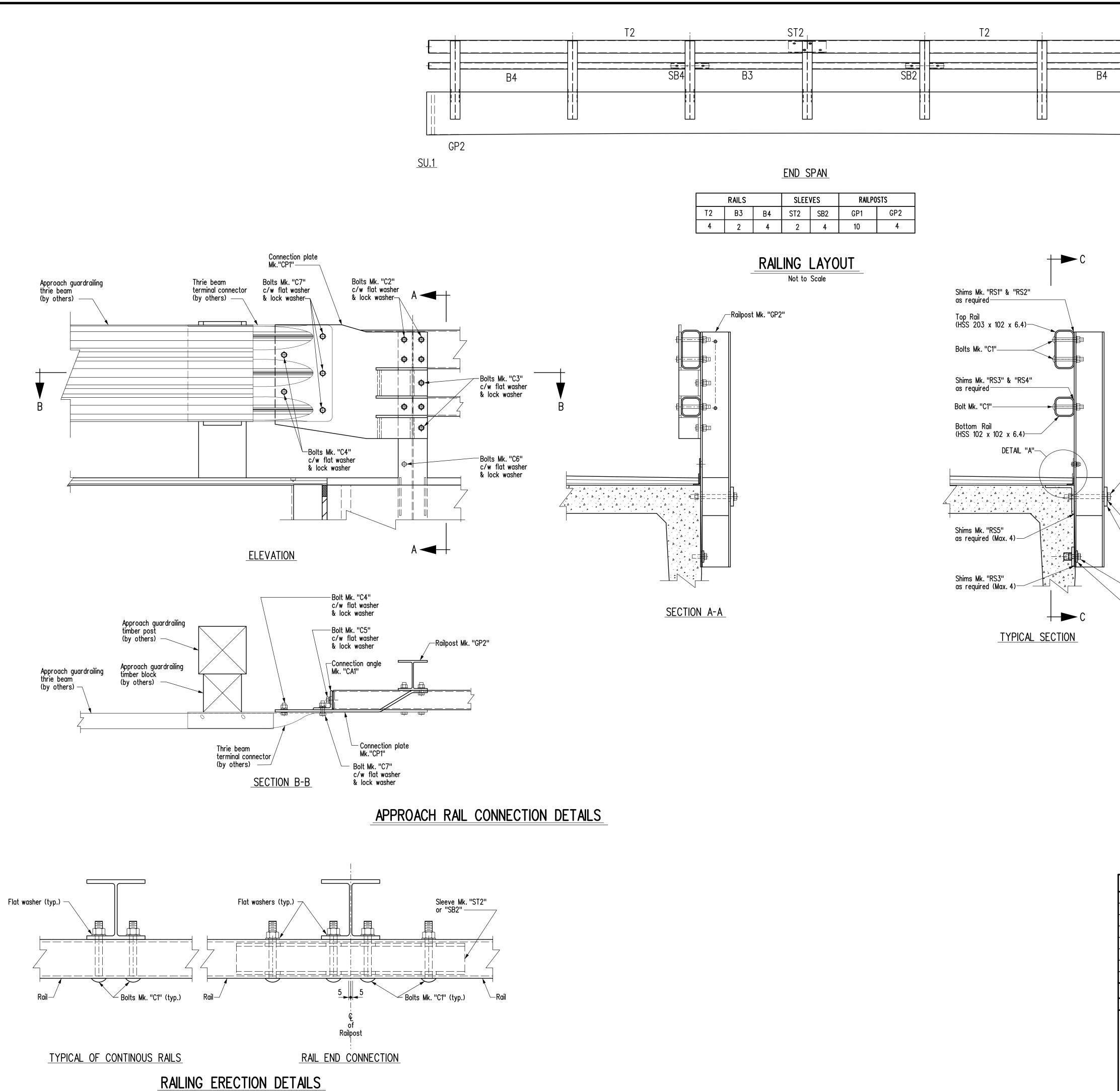


#### NOTES:

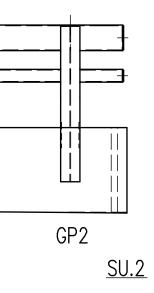
Re: Girder Erection Operations Behind Abutment Ballast Walls

- Surcharge loading on the backfill resulting from girder erection operations shall be minimized near the precast concrete ballast walls and wingwalls.
- Where possible, girder erection equipment shall be positioned such that there are no surcharge loads behind the back face of the precast panels within a distance equal to the depth of backfill to the bottom of the panels at the time of girder erection.
- 3. Should the Contractor propose to encroach on this zone, the following requirements must be satisfied: Submit a girder erection procedure for approval outlining type, configuration, weights and locations of equipment including expected tipping forces on crane outriggers, etc.
   Perform all precautionary measures outlined by the Department as a result of that submission.
   All surcharge loads encroaching in this zone must be distributed over an area not less than 2.0 m<sup>2</sup>.

REVISIONS			SIONS	BEARING AND ERECTION DETAILS				
DATE	ΒY	D	ESCRIPTION		RELEASED FOR CONSTRUCTION			
DESIGN SEAL RECORD SEAL PLACE ENGINEERS					Infrastructure ater Management and Structures	BY:		
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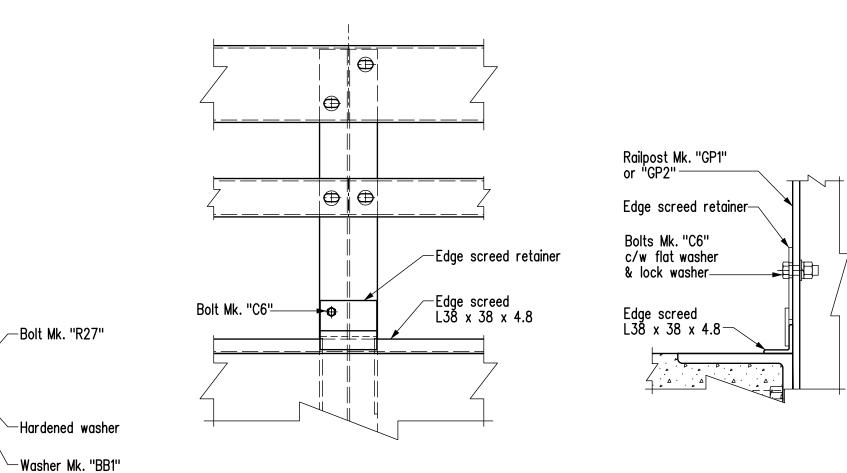
Scale 1:5



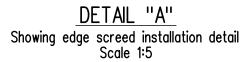
#### NOTES:

1. All railposts shall be Mk. "GP1" unless noted otherwise.

2. This sheet to be read in conjunction with Sheets & .







—Bolt Mk. "R28"

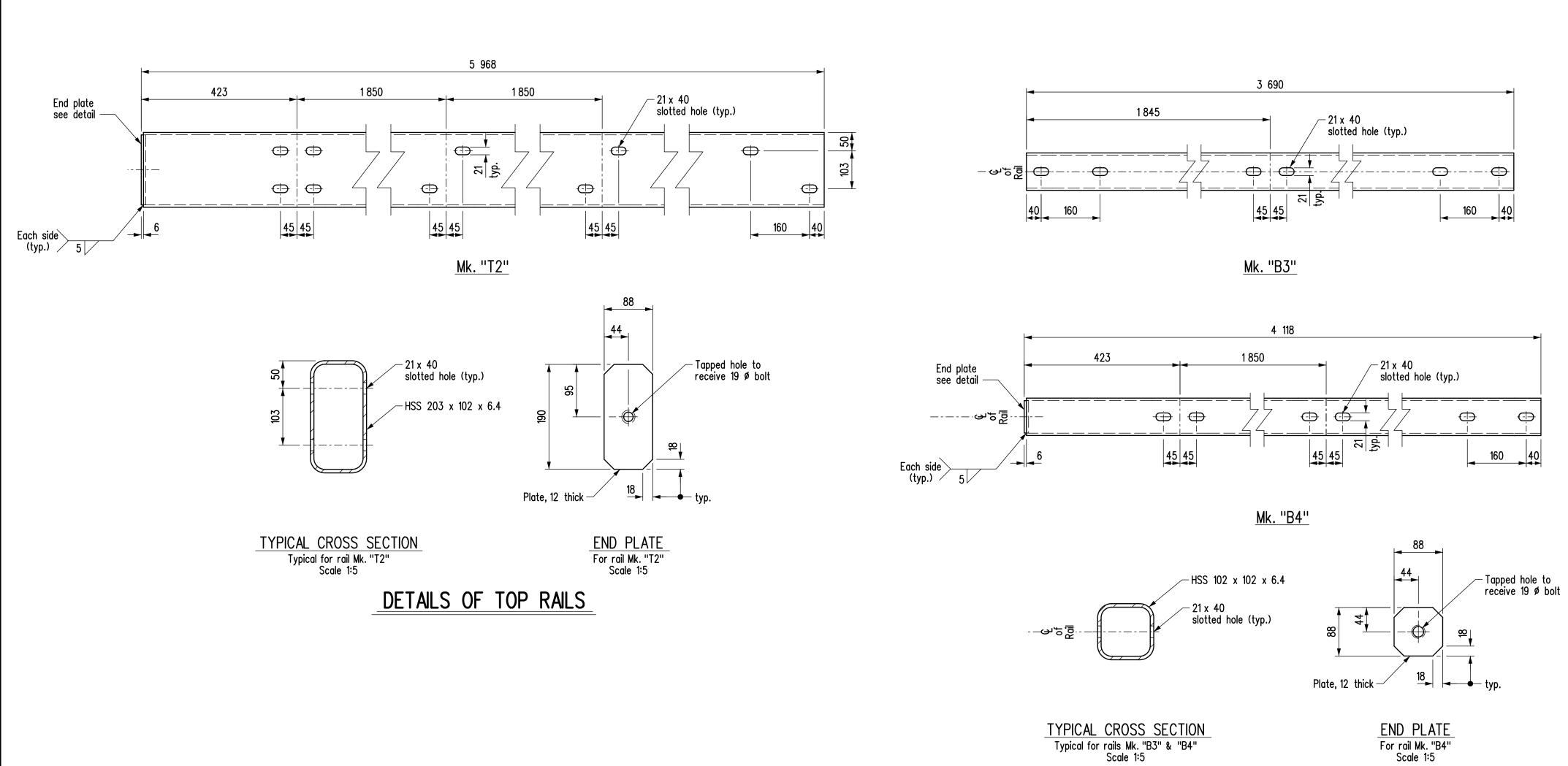
-Washer Mk. "A"

# RAILPOST ERECTION DETAILS

## NOTES:

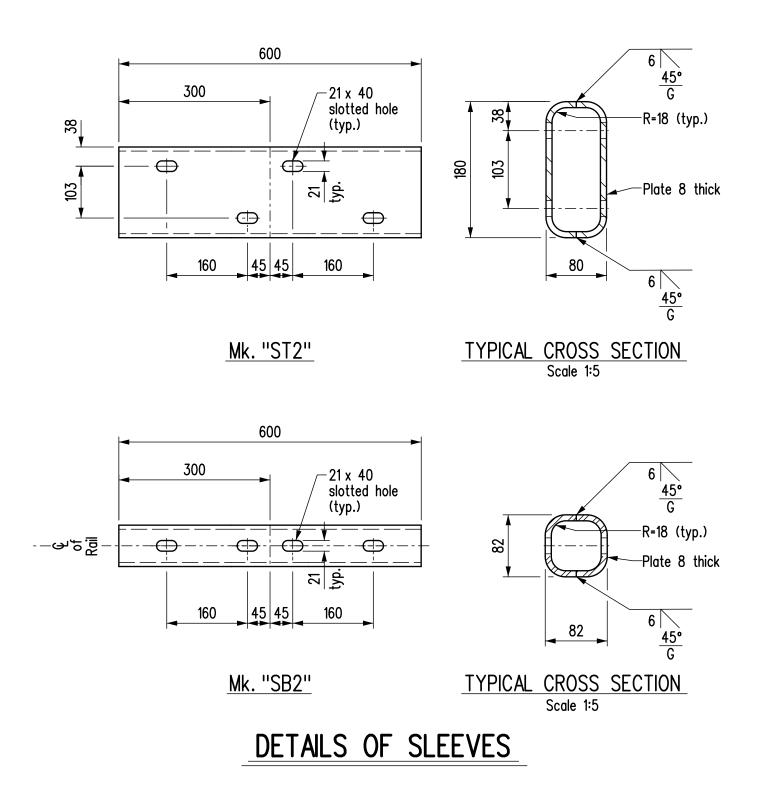
- High strength bolts Mk. "R27" & "R28" shall be tightened by turn-of-nut method as per Specification 1061. These bolts to be supplied by the Girder Fabricator. For quantities see Bill of Miscellaneous Metal on Girder sheet.
- High strength bolted connection may be shimmed to a maximum of 12 mm with shims Mk. "RS3" & "RS4".

REVISIONS					RAILING LAYOUT	AND DETA	ALLS
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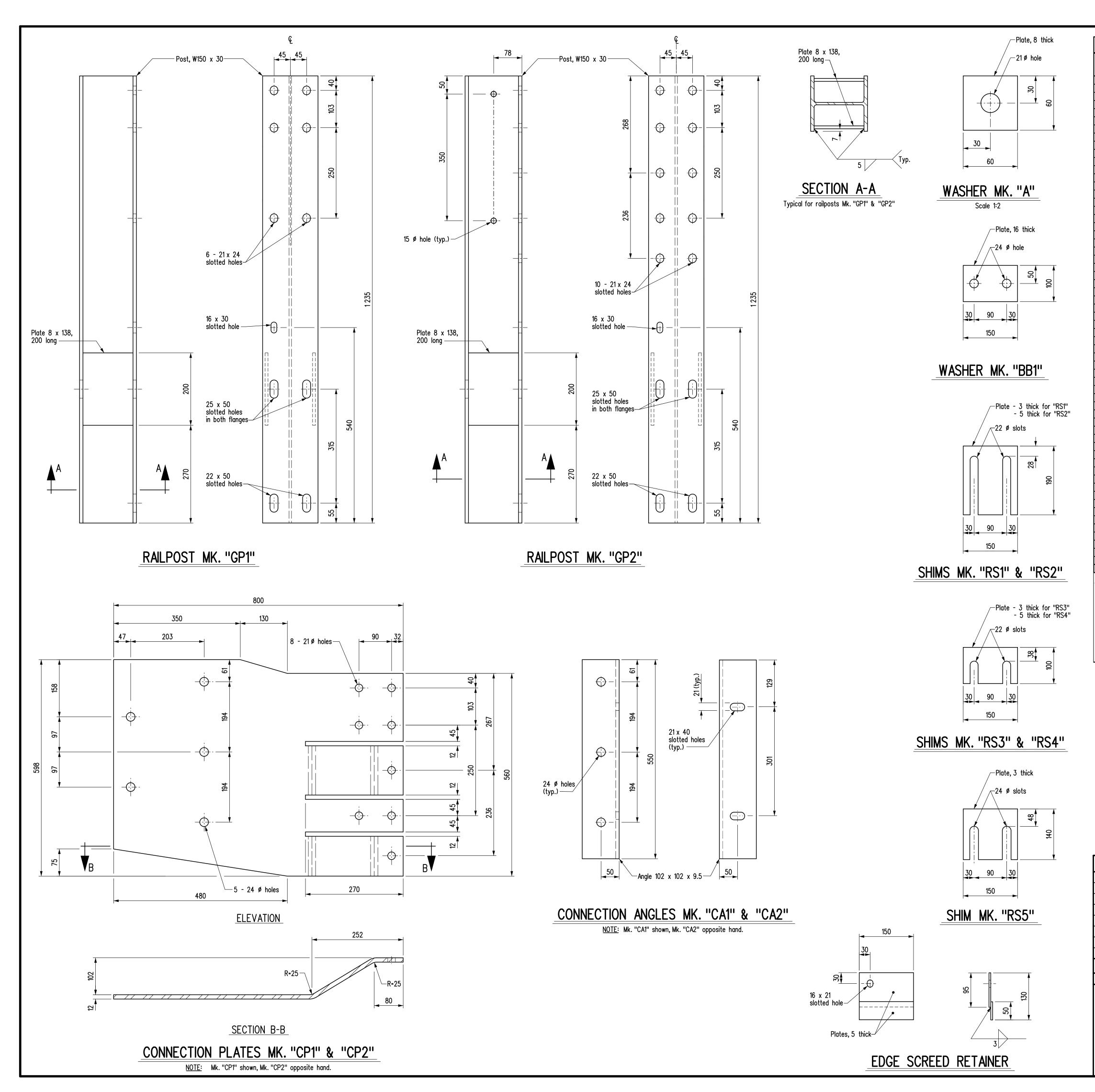
DETAILS OF BOTTOM RAILS



## <u>NOTES:</u>

- 1. It is imperative that all rail and sleeve holes in each pair of holes be opposite to each other.
- 2. The length of slotted holes shall not be less than shown.
- 3. The width and height of the sleeves shall not exceed the dimensions shown.
- 4. All dimensions are in millimeters (mm).

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BIL	LO	F MISCELLANEC	OUS META	L	for BR	IDGE RAIL - 1 SPAN		Site No.	
IARK No.	No.	DESCRIPTION	CORROSION PROTECTION	SIZE	LENGTH	REMARKS	COMPONENT MASS	MASS PER UNIT	TOTAL MASS
GP1	10	Railpost	Hot dip galvanized					0	397.4
		Each unit to be fabricated from :							
		1 - Post		W150 x 30	1 235	As detailed	36.281	36.281	
		2 - Plates		PL8 x 138	200	As detailed	1.733	3.466	
								39.747	
SP2	4	Railpost	Hot dip galvanized						158.5
		Each unit to be fabricated from :							
		1 - Post		W150 x 30	1 235	As detailed	36.161	36.161	
		2 - Plates		PL8 x 138	200	As detailed	1.733	3.466	
								39.627	
T2	4	Top rail	Hot dip galvanized						677.
		Each unit to be fabricated from :							
		1 - Hollow structural section		HSS203x102x6.4	5 962	As detailed	167.982	167.982	
		1 - Plate		PL12 x 88	190	As detailed	1.514	1.514	
				-		1		169.496	
B3	2	Bottom rail	Hot dip galvanized		I				133.
-		Each unit to be fabricated from :	and gantamed		ļ				
		1 - Hollow structural section		HSS102x102x6.4	3 690	As detailed		66.712	
B4	4	Bottom rail	Hot dip galvanized		0.000			00.112	300.
- 1		Each unit to be fabricated from :	. Iot sip garvariized						500.
		1 - Hollow structural section		HSS102x102x6.4	4 112	As detailed		74.392	
		1 - Plate		PL12 x 88	88	As detailed	+	0.668	
		I - Flate		FL12 X00	00	As detailed		75.060	
ST2		Sleeve	List din aslumping					75.060	22
512	2		Hot dip galvanized						33.
		Each unit to be fabricated from :			000		0.000	10 500	
		2 - Plates			600	As detailed	8.263	16.526	
SB2	4	Sleeve	Hot dip galvanized						37.
		Each unit to be fabricated from :							
		2 - Plates			600	As detailed	4.646		
CP1	2	Connection plate	Hot dip galvanized			As detailed		41.605	83.
CP2	2	Connection plate	Hot dip galvanized			As detailed		41.605	83.
CA1	2	Connection angle	Hot dip galvanized	L102x102x9.5	550	As detailed		7.864	15.
CA2	2	Connection angle	Hot dip galvanized	L102x102x9.5	550	As detailed		7.864	15.
A	28	Washer	Hot dip galvanized	PL8x60	60	As detailed		0.226	6.
BB1	14	Washer	Hot dip galvanized	PL16x100	150	As detailed		1.884	26.3
C1	52	Bolts c/w hex. nuts	Hot dip galvanized	19 dia.	150	Round head, square neck bolt c/w 1 hex. nut		0.424	22.0
C2	24	Bolts c/w hex. nuts	Hot dip galvanized	19 dia.	165	Hex. bolt c/w 1 hex. nut		0.466	11.
C3	8	Bolts c/w hex. nuts	Hot dip galvanized	19 dia.	65	Hex. bolt c/w 1 hex. nut		0.249	1.
C4	8	Bolts c/w hex. nuts	Hot dip galvanized	22 dia.	50	Hex. bolt c/w 1 hex. nut		0.327	2.
C5	8	Bolts - no nuts	Hot dip galvanized	19 dia.	38	Hex. bolt - no nuts		0.145	1.
C6	14	Bolts c/w hex. nuts	Hot dip galvanized	13 dia.	38	Hex. bolt c/w 1 hex. nut		0.070	0.9
C7	12	Bolts c/w hex. nuts	Hot dip galvanized	22 dia.	65	Hex. bolt c/w 1 hex. nut		0.215	2.
	4	Edge screed angle	Hot dip galvanized	L38x38x4.8	6 000	As detailed		16.020	64.
	14	Edge screed retainers	Hot dip galvanized						11.
		Each unit to be fabricated from :							
		1 - Plate		PL5x95	150	As detailed	0.549	0.549	
		1 - Plate		PL5x50	150	As detailed	0.294	0.294	
								0.843	
	20	Standard flat washer	Hot dip galvanized	for 22 dia. bolts		1 per bolt Mk. "C4" & "C7"		0.032	0.
	92	Standard flat washer	Hot dip galvanized	for 19 dia. bolts		1 per bolt Mk. "C1", "C2", "C3" & "C5"		0.022	2.
	14	Standard flat washer	Hot dip galvanized	for 13 dia. bolts		1 per bolt Mk. "C6"		0.010	0.
	92	Standard lock washer	Hot dip galvanized	for 19 dia. bolts		1 per bolt Mk. "C1", "C2", "C3" & "C5"		0.019	1.
	14	Standard lock washer	Hot dip galvanized	for 13 dia. bolts	ļ	1 per bolt Mk. "C6"		0.007	0.
	20	Standard lock washer	Hot dip galvanized	for 22 dia. bolts	<u> </u>	1 per bolt Mk. "C4" & "C7"		0.007	0.
S1	20	Shims	Hot dip galvanized	PL3x150	190	As detailed		0.506	14.
S2	28	Shims	Hot dip galvanized	PL5x150	190	As detailed		0.843	23.
(SZ (S3	28 84	Shims	Hot dip galvanized	PL5x150 PL3x150	190	As detailed		0.843	23. 24.
RS4	28	Shims	Hot dip galvanized	PL5x150	100	As detailed		0.486	13.
RS5	56	Shims	Hot dip galvanized	PL3x140	150	As detailed	1	0.394	22.

NOTES: 1. HSS rail shall conform to CAN/CSA-G40.21-M92 Grade 350W.

2. All steel plates shall conform to the requirements of CAN/CSA-G40.21-M92 Grade 300W. 3. W150 x 30 railpost shall confrom to CAN/CSA-G40.21-M92 Grade 350W.

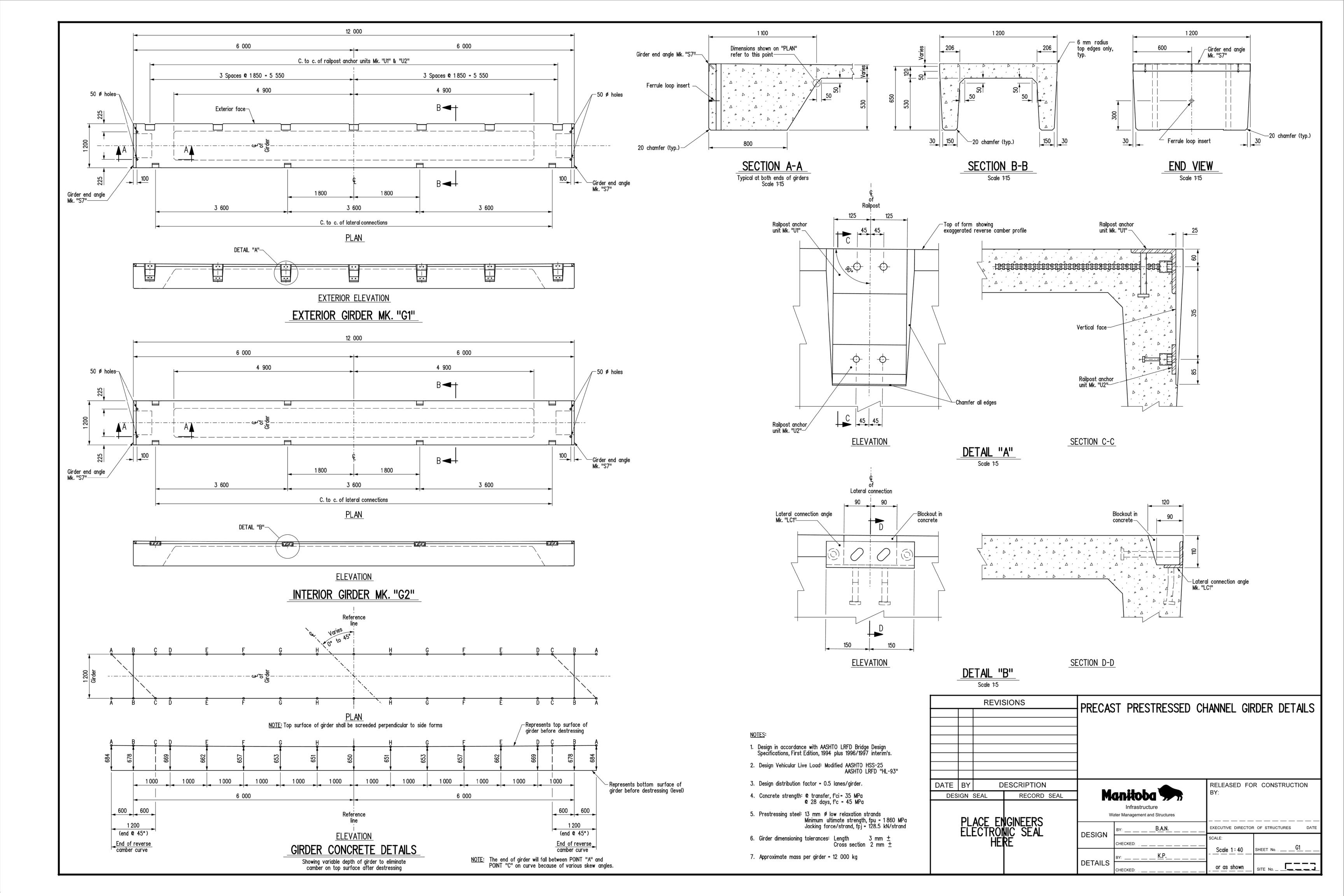
4. Welding shall meet the current requirements of the American Welding Society, Structural Welding Code ANSI/AASHTO/AWS D1.5.

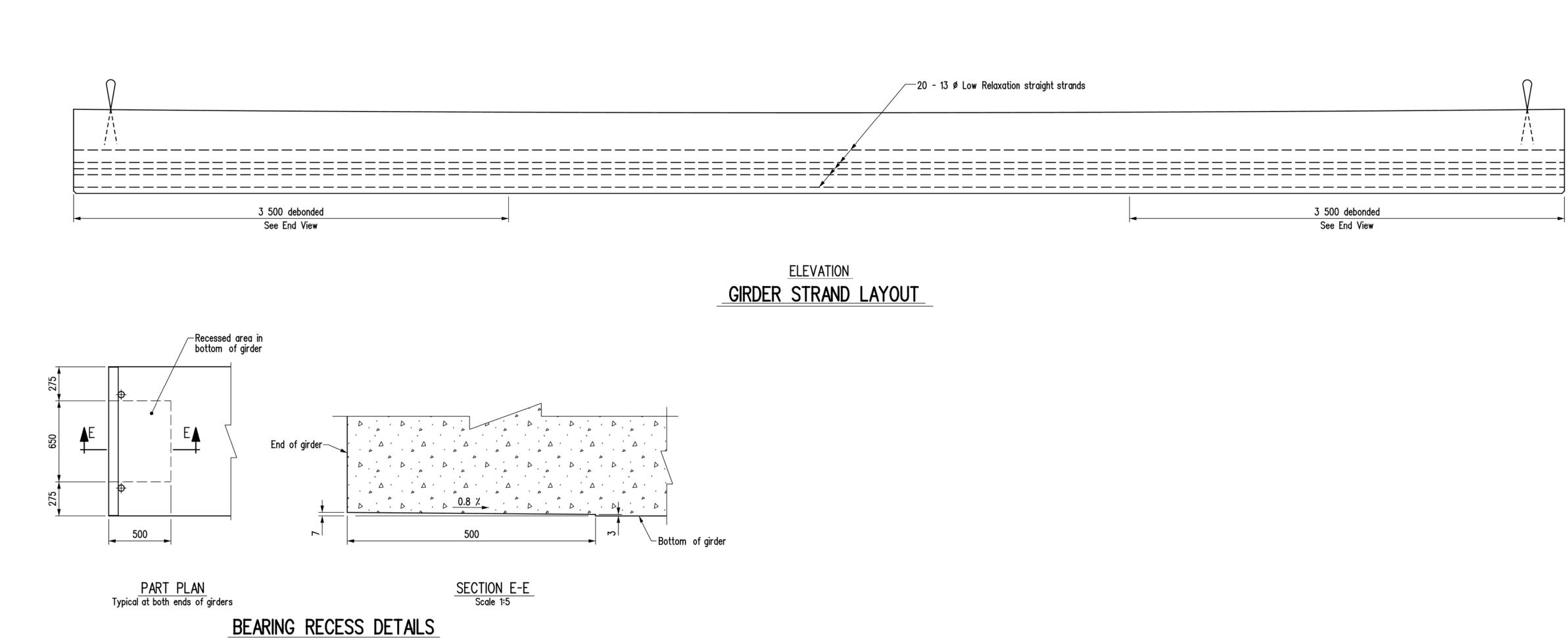
5. All bolts hall conform to the requirements of ASTM A307 or approved equal, unless noted otherwise.

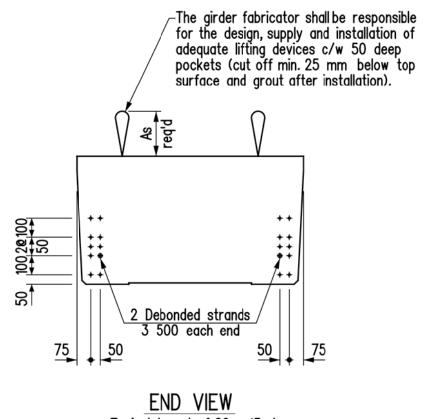
6. All material noted in the above Bill shall be hot dip galvanized after fabrication in accordance with CSA G164 for a minimum net retention of 610 g/m2 unless otherwise stated in the specified material ASTM standards. The fabricator and galvanizer shall safeguard against embrittlement using recommended practices from applicable standards.

Seal all welds prior to galvanizing.
 Apply Galvaloy to all field welds and areas where galvanizing has been damaged.
 All bolts and threaded rod in the above Bill shall be Imperial thread.

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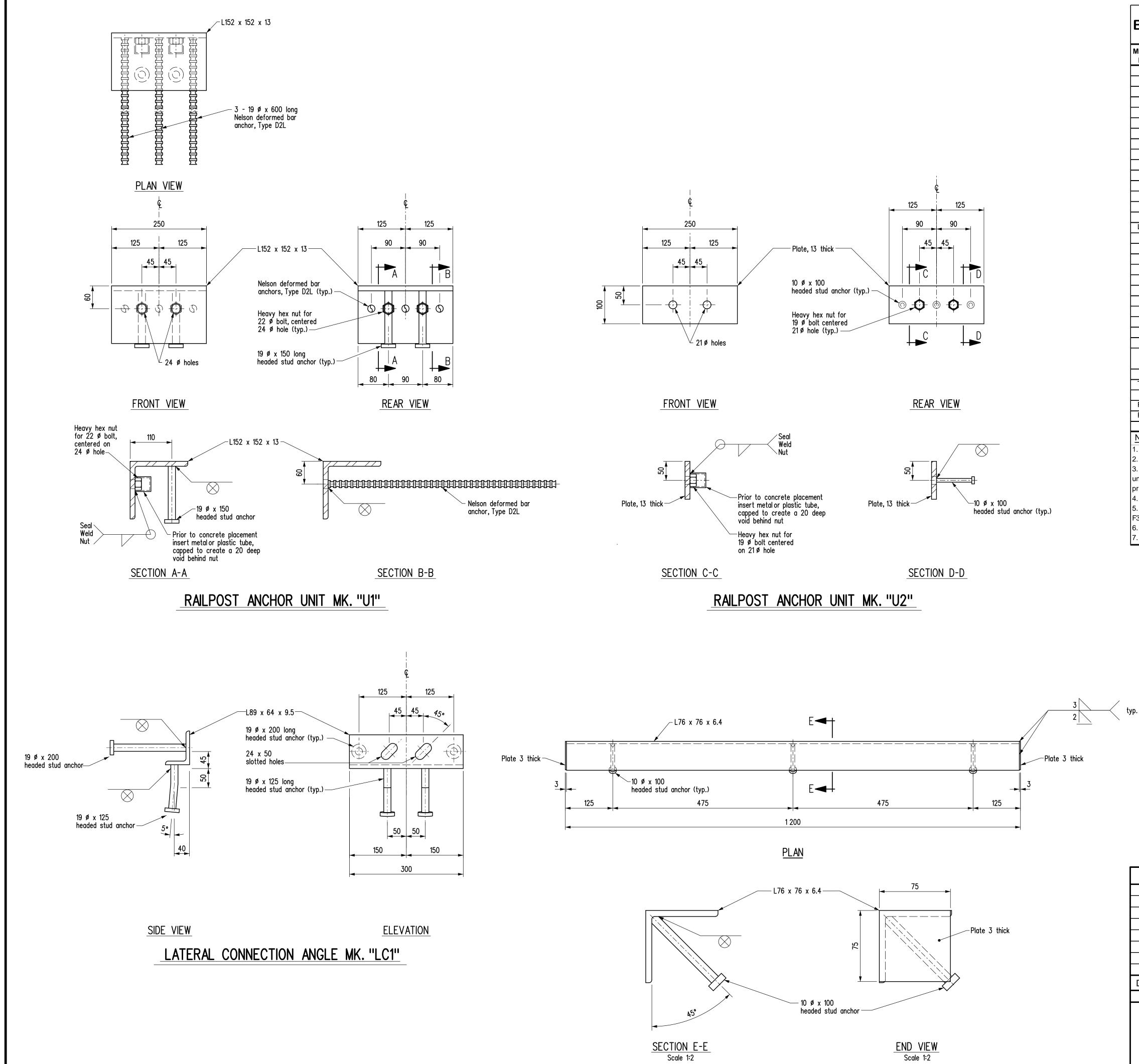


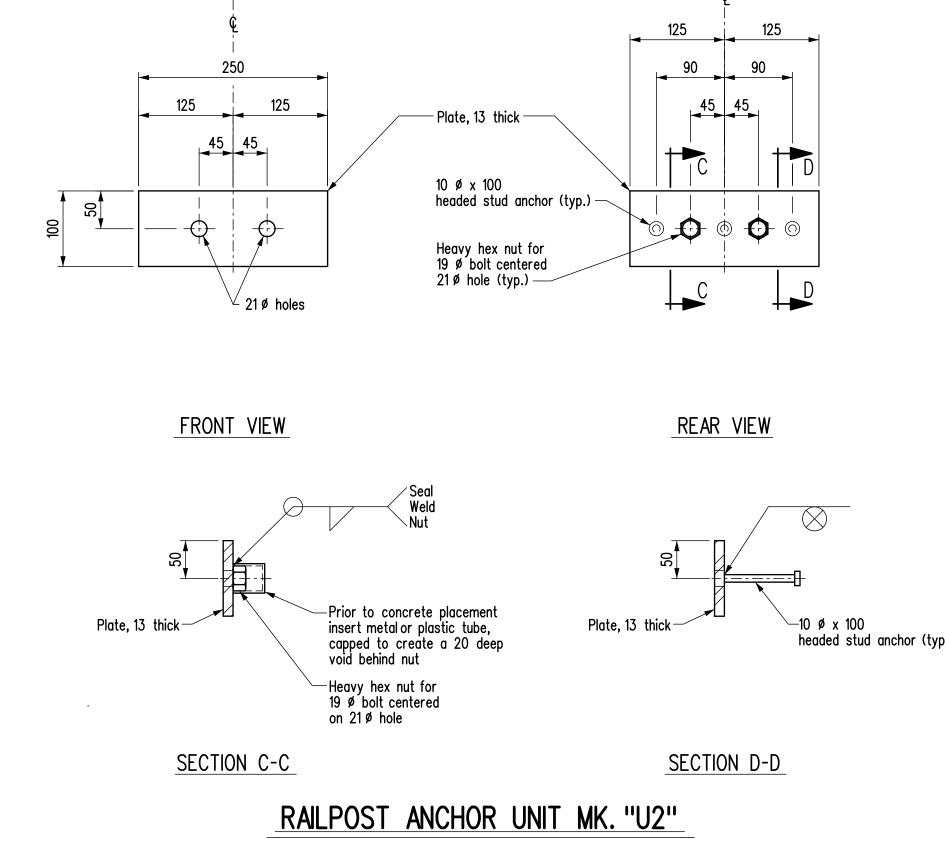




Typical layout of 20 - 13 Ø Low Relaxation straight strands

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GIRDER END ANGLE MK. "S7"

BIL	LO	F MISCELLANEOU	S METAL	for 12 m L 10 800 RC		RDERS Y WIDTH - 1 SPAN
IARK No.	No.	DESCRIPTION	CORROSION PROTECTION	SIZE	LENGTH	REMARKS
U1	14	Railpost anchor unit	Hot dip galvanized			
		Each unit is fabricated from:				
		1 - Angle		L152x152x13	250	As detailed
		2 - Heavy hex. nuts		for 22 dia. bolt		Grade DH or 2H
		2 - Studs		19 dia.	150	Headed stud anchors, ASTM A108
		3 - Bars		for 19 dia. bolt	600	Nelson deformed bar anchors, Type D2L
		2 - Tubes				Metal or plastic capped - As detailed
U2	14	Railpost anchor unit	Hot dip galvanized			
		Each unit is fabricated from:				
		1 - Plate		PL 13x100	250	As detailed
		2 - Heavy hex. nuts		for 19 dia. bolt		Grade DH or 2H
		3 - Studs		10 dia.	100	Headed stud anchors, ASTM A108
		2 - Tubes				Metal or plastic capped - As detailed
LC1	64	Lateral connection angle	Hot dip galvanized			
		Each unit is fabricated from:				
		1 - Angle		L89x64x9.5	300	As detailed
		2 - Studs		19 dia.	200	Headed stud anchors, ASTM A108
		2 - Studs		19 dia.	125	Headed stud anchors, ASTM A108
S7	18	Girder end angle	Hot dip galvanized			
		Each unit is fabricated from:				
		1 - Angle		L76x76x6.4	1 194	As detailed
		2 - Plates		PL 3x75	75	As detailed
		3 - Studs		10 dia.	100	Headed stud anchors, ASTM A108
	18	Ferrule loop insert	Stainless steel	for 13 dia. bolt		Richmond anchor, Type LF-W with mounting washer
TR2	18	Threaded rod	Stainless steel	13 dia.	250	c/w hex. nut
R27	28	A325 bolt c/w F436 hardened washer	Hot dip galvanized	22 dia.	229	Heavy hex. no nut, ASTM F3125
RZ1						

NOTES:

1. All material in the above Bill shall be supplied by the GIRDER CONTRACTOR.

2. All structural steel shall conform to CAN/CSA G40.21-M92 Grade 300W.

3. All material noted in the above Bill shall be hot dip galvanized after fabrication in accordance with CSA G164 for a minimum net retention of 610 g/m2 unless otherw ise stated in the specified material ASTM standards. The fabricator and galvanizer shall safeguard against embrittlement using recommended practices from applicable standards.

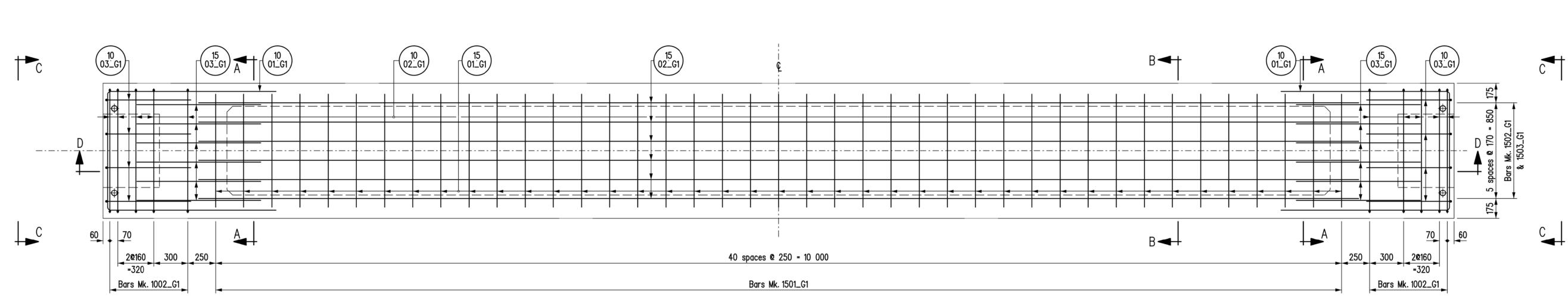
4. Seal all welds prior to galvanizing.

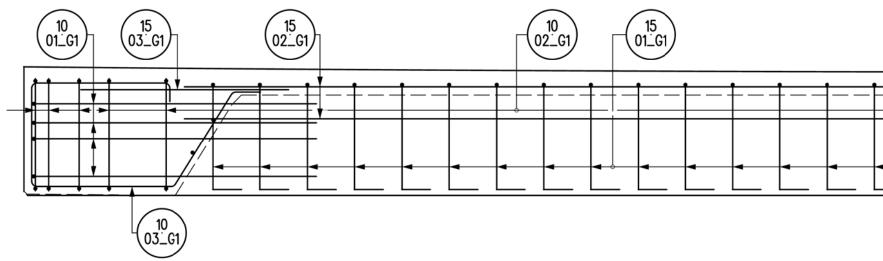
5. Grade DH or 2H galvanized nuts for A325 bolts shall be overtapped to a minimum amount required for the fastener assembly in accordance with ASTM F3125. The nuts shall be lubricated with a lubricant containing a visible dye. The lubricant shall be clean and dry to the touch.

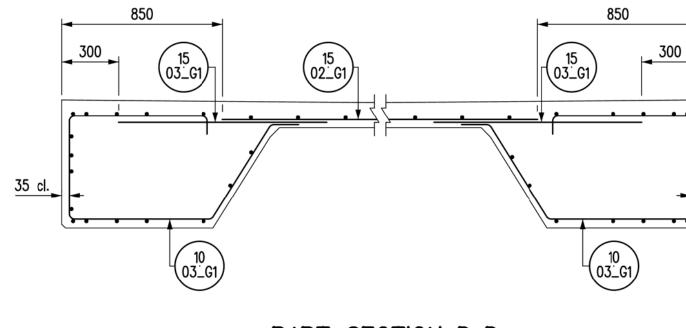
6. All bolts and inserts in the above Bill shall be Imperial thread.

7. Stainless steel shall conform to the requirements of ASTM A320, Class B8.

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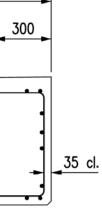


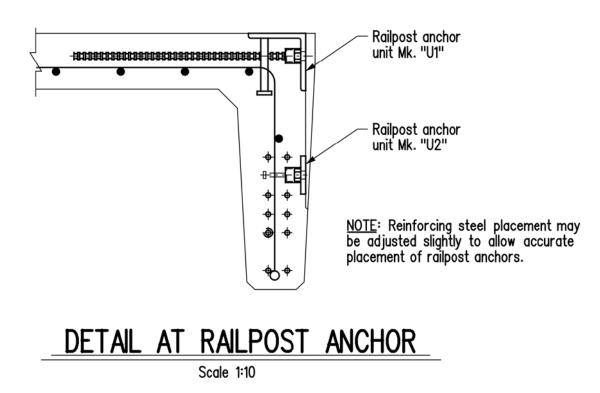
PART SECTION D-D

# PLAN OF GIRDER

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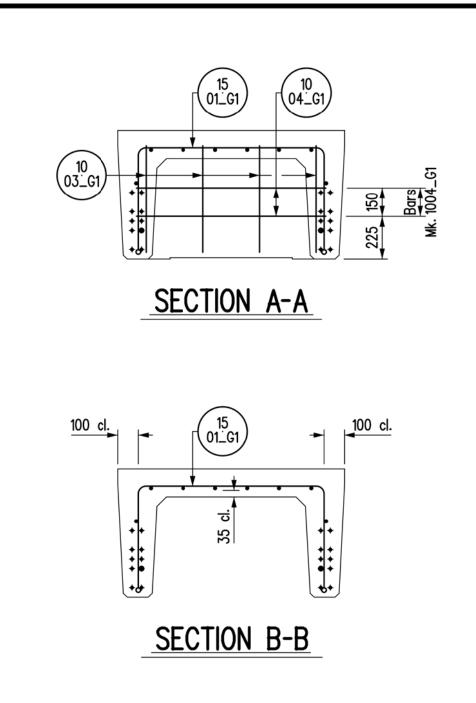
# ELEVATION OF GIRDER

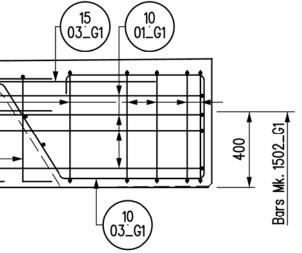


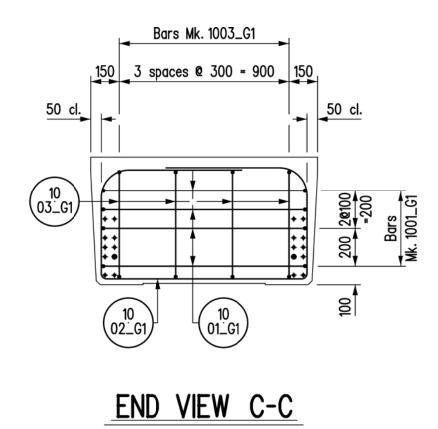


#### NOTES:

- 1. Concrete cover shall be 25 mm unless noted otherwise.
- 2. Reinforcing details are typical for all 12 m girders unless noted otherwise.
- Bar Mark labels with suffix \_G1 are Exterior girders and suffix \_G2 are Interior girders. See Bill of Reinforcing Sheet No. G







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MARK	TYPE	PIN DIAMETER	LENGTH	GIRDER TYPE	No. of GIRDERS	No. of BARS PER GIRDER	TOTAL No. of BARS PER GIRDER TYPE	BENDING DIAGRAM	MARK TYPE PIN LENGTH GIR DIAMETER
1001_G1	BENT	45	4 080	61	2	8	16		1501_G2 BENT 65 2 440 (
1002_G1	BENT	45	3 660	61	2	10	20	R=140 R=140	1502_G2       STR       10 300       0         1503_G2       STR       1 100       0         Total volume of structural concrete per       Total volume of structural concrete per         NOTES:       1.       All dimensions given in bending diagram
1003_G1	BENT	45	2 950	G1	2	8	16		<ol> <li>All dimensions given in bending diagra on 90°, 135° &amp; 180° hooks are the "Manual of Standard Practice". Radii a of C.S.A. A23.1-04, unless noted other</li> <li>All reinforcing steel shall be deforme</li> <li>All reinforcing steel shall conform to unless noted otherwise in the BILL OI</li> <li>Like bars shall be bundled, securely to All other items to be identified in a statement.</li> </ol>
1004_G1	STR		1 000	G1	2	4	8		5. All bars shall be bent in accordance w
1501_G1	BENT	65	2 440	G1	2	41	82	1000 150	
1502_G1	STR		10 300	G1	2	8	16		
1503_G1	STR		1 100	61	2	12	24		
1001_G2	BENT	45	4 080	G2	7	8	56		
1002_G2	BENT	45	3 660	G2	7	10	70	1 100	
1003_G2	BENT	45	2 950	G2	7	8	56	740	
			1 000	G2	7	4	28		

## - 12 M GIRDERS



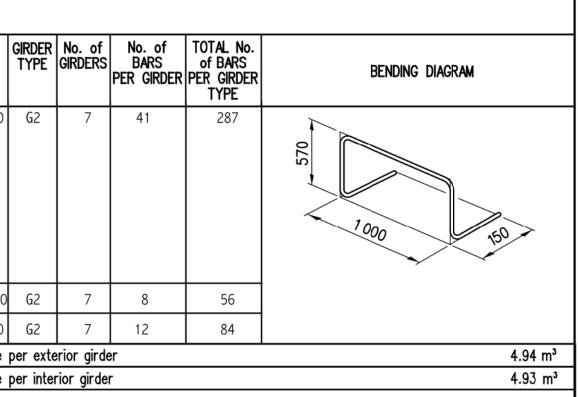


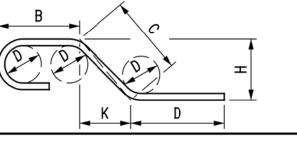
diagram are out to out, except radii and extensions on 90°, 135° & 180° hooks. Extensions e the "A" or "G" dimensions for standard 90°, 135° & 180° hooks referenced from the RSIC 'adii are inside dimensions. All reinforcing steel bends and hooks shall conform to Clause 6.6.2 otherwise in the BILL OF REINFORCING STEEL.

ormed steel, unless noted otherwise in the BILL OF REINFORCING STEEL.

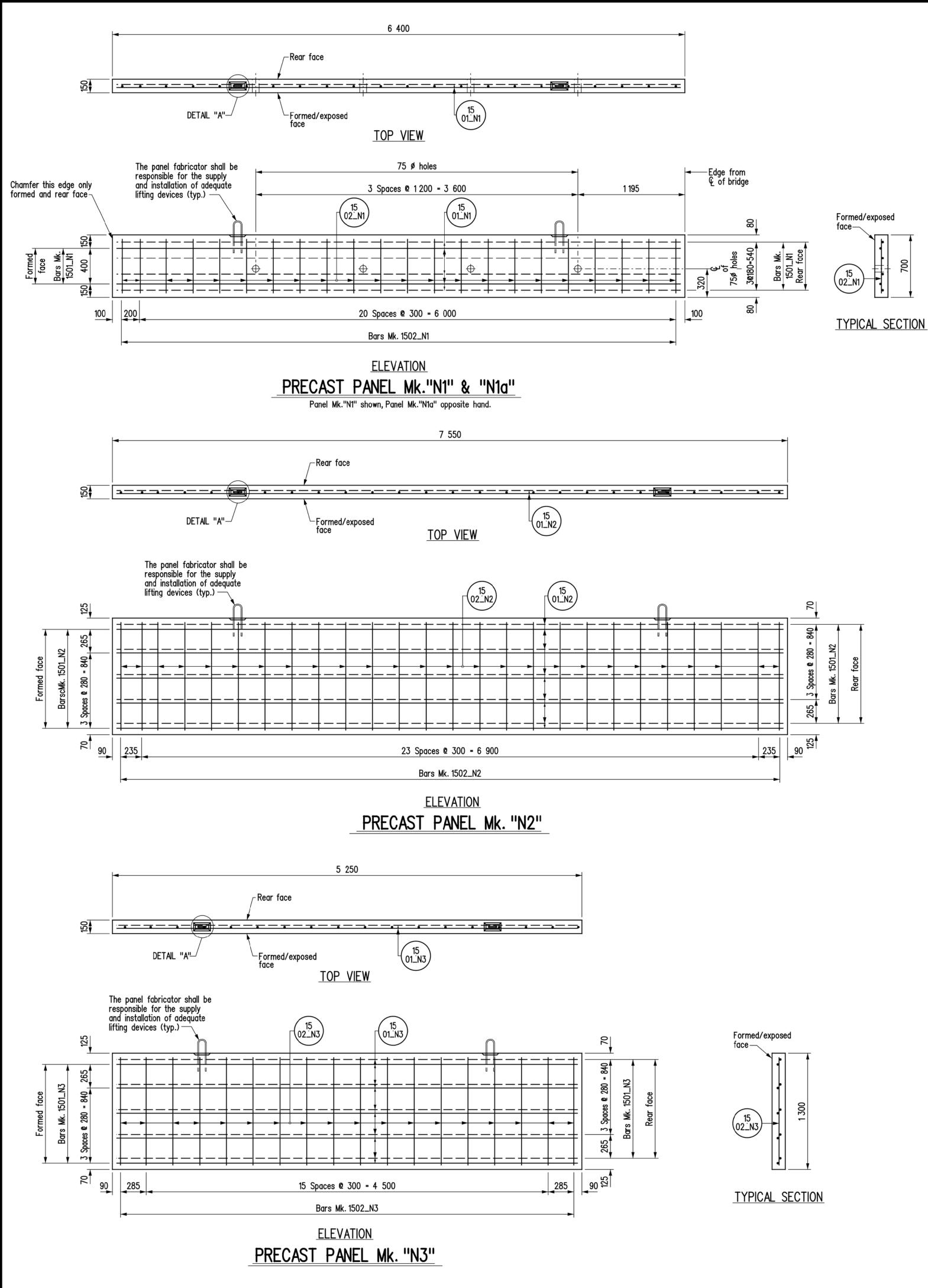
n to CSA G30.18-M92 "Billet Steel Bars for Concrete Reinforcement" Grade 400W, L OF REINFORCING STEEL.

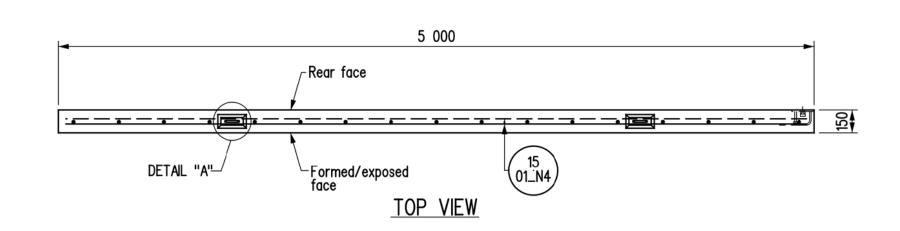
by tied and identified as to Mark and Site No. by appropriate means. , similar fashion.  $\swarrow$ 

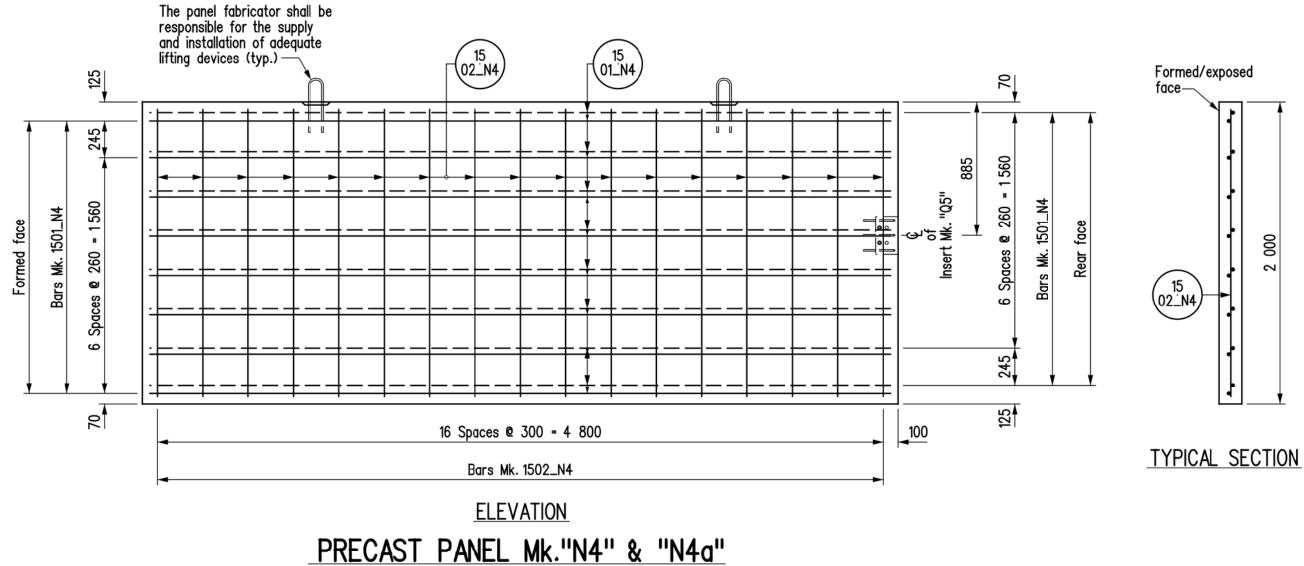
e with the following detail:



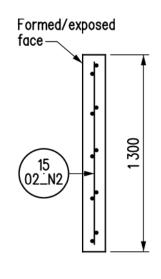
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Panel Mk."N4" shown, "N4a" similar except location of insert Mk."Q5" at opposite end.

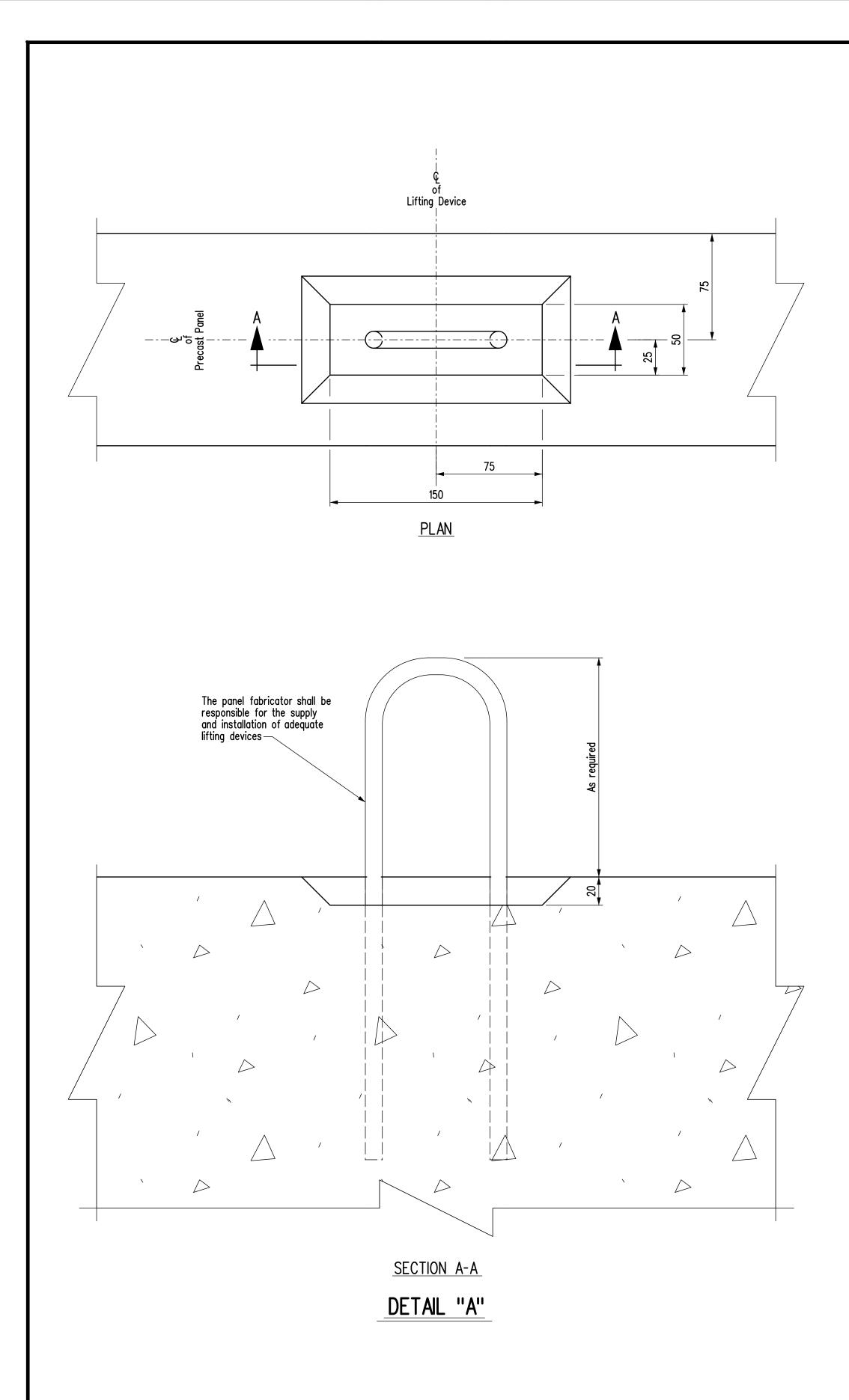


TYPICAL SECTION

NOTES:

- All panel exposed edges to be chamfered 20 mm except no chamfer on panels Mk. "N1" & "N1a", or if shown.
- Mark reinforcing steel location on the edges of the back face of panels after casting.
- 3. Concrete cover shall be 50 mm unless noted otherwise.
- 4. Formed face to be placed as exposed face during construction.
- After precast panel installation, all lifting devices to be cut-off flush and grouted as directed by Engineer.
- 6. For DETAL "A" see sheet No. P2.
- 7. For BILL OF REINFORCING STEEL see Sheet No. P2.

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MARK	TYPE	PIN Diameter	LENGTH	P <b>anel</b> Type	No. of PANELS	No. of BARS PER PANEL	TOTAL No. of BARS PER PANEL TYPE		Bending Diagra	И
1501 <u>N</u> 1	STR		6 300	<b>N</b> 1	2	6	12			
1502 <u>N</u> 1	STR		600	<b>N</b> 1	2	22	44			
501_N1a	STR		6 300	N1a	2	6	12			
502_N1a	STR		600	N1a	2	22	44			
1501_N2	STR		7 450	N2	2	10	20			
1502 <u>N</u> 2	STR		1 200	N2	2	26	52			
1501_N3	STR		5 150	<b>N</b> 3	2	10	20			
1502 <u>N</u> 3	STR		1 200	N3	2	18	36			
1501 <b>_N</b> 4	STR		4 900	N4	2	16	32			
1502 <b>_N</b> 4	STR		1 900	N4	2	17	34			
501_N4a	STR		4 900	N4a	2	16	32			
502_N4a	STR		1 900	N4a	2	17	34			
Total ma	es of r	einforcing s								1576.91 <b>kg</b>
Panel Ty			N1	1	V1a	1	N2	N3	N4	N4a
Area m²/	panel	ecast Pane	4.50	_	.50		9.80	6.80	10.00	10.00 91.20 m <sup>2</sup>
NOTES:										020 11

 All reinforcing steel shall conform to CSA G30.18-M92 "Billet Steel Bars for Concrete Reinforcement" Grade 400W, unless noted otherwise in the BILL OF REINFORCING STEEL.

4. Like bars shall be bundled, securely tied and identified as to Mark and Site No. by appropriate means. All other items to be identified in a similar fashion.

5. All bars shall be bent in accordance with the following detail:

K 

## BILL OF MISCELLANEOUS METAL

### for PRECAST PANELS

Site No.

MARK No.	No.	DESCRIPTION	CORROSION PROTECTION	SIZE	LENGTH	REMARKS					
Q5	4	Insert units	Hot dip galvanized								
		Each unit is fabricated from:									
		Steel plate		PL 10 x 150	250	As detailed					
		2 - Studs Mk. "A1"		13 dia.	75	Nelson headed concrete anchors, Type H4L, Part No. 101-053-002 - As detailed					
		3 - Bars Mk. "A2"		10 dia.	300	Nelson deformed bar anchors, Type D2L, Part No. 101-064-537 - As detailed					
		2 - Heavy hex. nuts		for 19 dia. bolt		Grade DH or 2H heavy hex. nut, c/w metal or plastic sleeve					
R34	8	A325 bolt c/w F436 hardened washer		19 dia.	60						
NOTES											

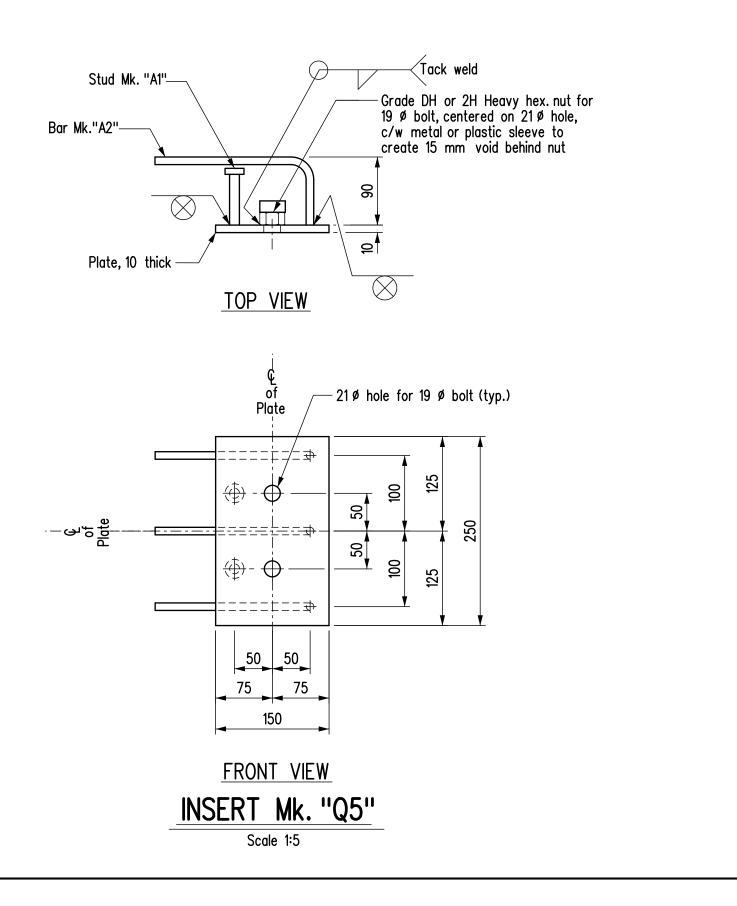
NOTES:

1. All material noted in the above Bill shall be hot dip galvanized after fabrication in accordance with CSA G164 for a minimum net retention of 610 g/m2 unless otherwise stated in the specified material ASTM standards. The fabricator and galvanizer shall safeguard against embrittlement using recommended practices from applicable standards.

2. Seal all welds prior to galvanizing.

3. All structural steel to be CSA G40.21 Grade 300W.

4. All bolts and inserts in the above Bill shall be Imperial thread.



#### <u>NOTES:</u>

1. For location of DETAIL "A" see sheet No. P1.

2. Precast panel concrete strength: f'c = 35 MPa.

	REVI	SIONS	PRECAST PANEL DETAILS					
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