

PLANS OF PROPOSED P.P.C.C. BRIDGE OVER ON

LENGTH 24 368 OUT TO OUT OF ABUTMENT PRECAST BACKWALL PANELS

SUPERSTRUCTURE TWO SIMPLY SUPPORTED SPANS OF PRECAST PRESTRESSED CONCRETE CHANNEL GIRDERS WITH ASPHALT OVERLAY

SUBSTRUCTURE TWO PRECAST CONCRETE ABUTMENTS AND ONE INTERMEDIATE BENT WITH STEEL H-PILES

ROADWAY WIDTH 8 400 OUT TO OUT OF GIRDERS

LOCATION IN R.M. OF

SHEET LEGEND

1. COVER SHEET
2. GENERAL ELEVATION
3. BORING LOGS
4. SITE AND EROSION CONTROL DETAILS
5. ASSEMBLY DETAILS
6. ASSEMBLY DETAILS
7. STEEL PILE CAP DETAILS
8. STEEL PILE CAP DETAILS
9. BEARING AND ERECTION DETAILS
10. RAILING LAYOUT AND DETAILS
11. RAILING DETAILS
12. 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

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 - $f_c = 45 \text{ MPa}$ at 28 days
 $f_{ci} = 35 \text{ MPa}$ at time of de-stressing
2. PRECAST PANELS - $f_c = 35 \text{ MPa}$

REINFORCING STEEL

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

STRUCTURAL STEEL

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

PRESTRESSING STRAND

20-13 # low relaxation strands, $f_{pu} = 1860 \text{ MPa}$

PILE LOADING

MAXIMUM FACTORED LOAD FACTORED BEARING RESISTANCE	END PILE BENTS 582 kN	INTERMEDIATE PILE BENTS 531 kN
		

HYDRAULIC DESIGN DATA

DESIGN DISCHARGE

$Q = \text{-----} \text{ m}^3/\text{sec}$

SURVEY CONTROL

HORIZONTAL DATUM: NAD83CSRS

VERTICAL DATUM: CGVD28

ELLIPSOID: GRS 1980

GEOID (HT2.0): _____

UTM: ZONE _____

SCALE FACTOR: _____

SITE CONTROL POINT DATA

CONTROL POINT # _____	NORTHING: _____	EASTING: _____	ELEVATION: _____	DATE: _____
CONTROL POINT # _____	NORTHING: _____	EASTING: _____	ELEVATION: _____	DATE: _____
CONTROL POINT # _____	NORTHING: _____	EASTING: _____	ELEVATION: _____	DATE: _____



TP. - PLACE LOCATION
MAP HERE

RGE. -
LOCATION MAP
Not to Scale

MANITOBA INFRASTRUCTURE

WATER MANAGEMENT AND STRUCTURES

RELEASED FOR CONSTRUCTION BY : _____
EXECUTIVE DIRECTOR OF STRUCTURES
DATE _____

ENVIRONMENTAL APPROVALS

MANITOBA ENVIRONMENT ACT LICENCE
DATE : _____
FILE # : _____

FISHERIES AND OCEANS CANADA - AUTHORIZATION OR REVIEW
DATE : _____
FILE # : _____

TRANSPORT CANADA - NAVIGATION ACT
DATE : _____
FILE # : _____

MANITOBA INFRASTRUCTURE ENVIRONMENTAL APPROVAL
DATE : _____
FILE # : _____

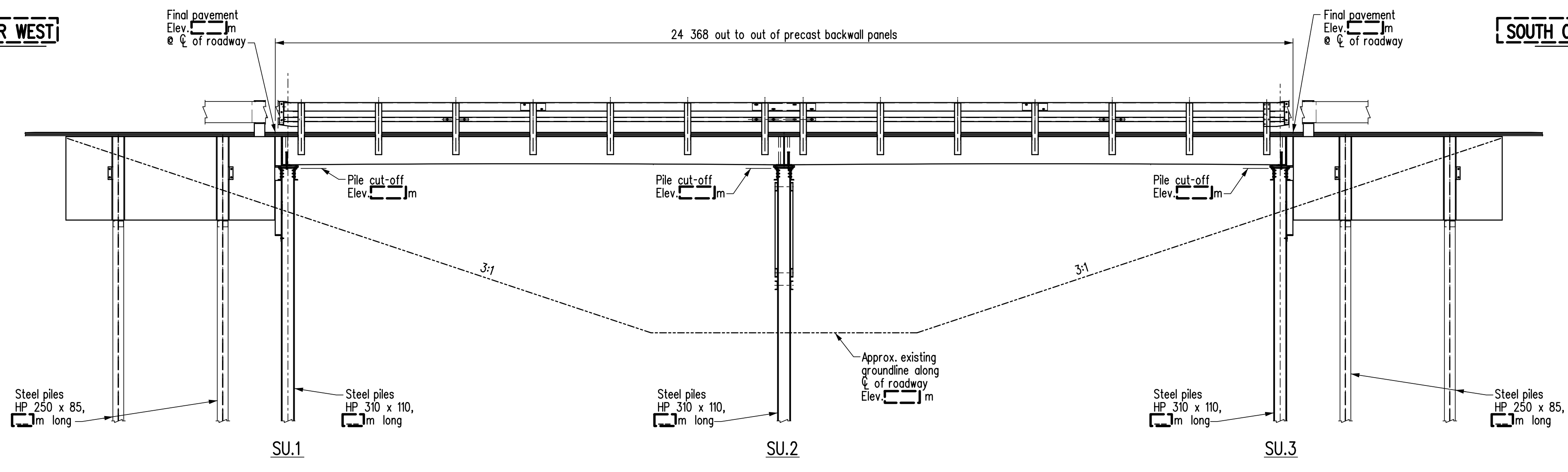
ENVIRONMENTAL REVIEW COMPLETED
DATE : _____
COMPLETED BY : _____

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

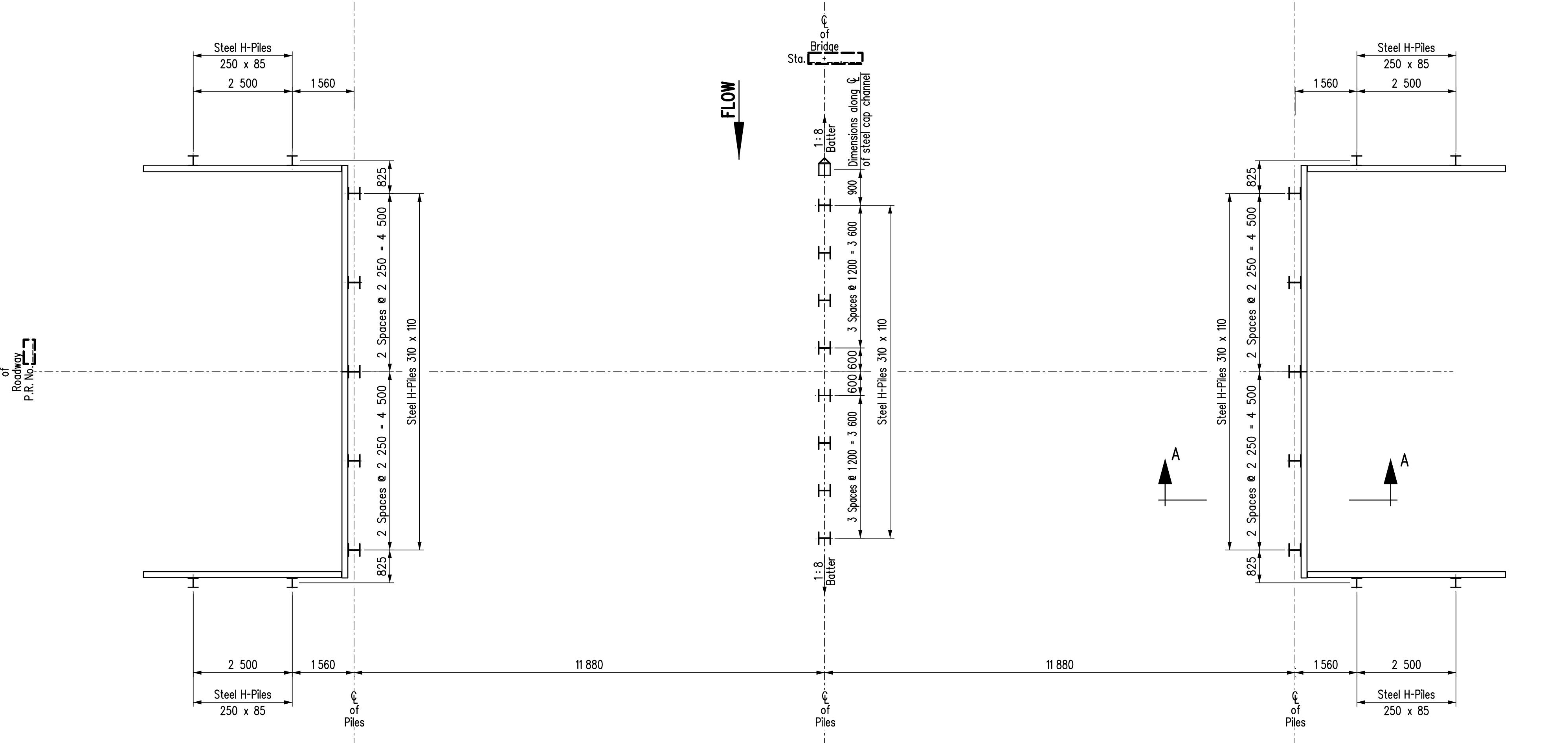


NORTH OR WEST

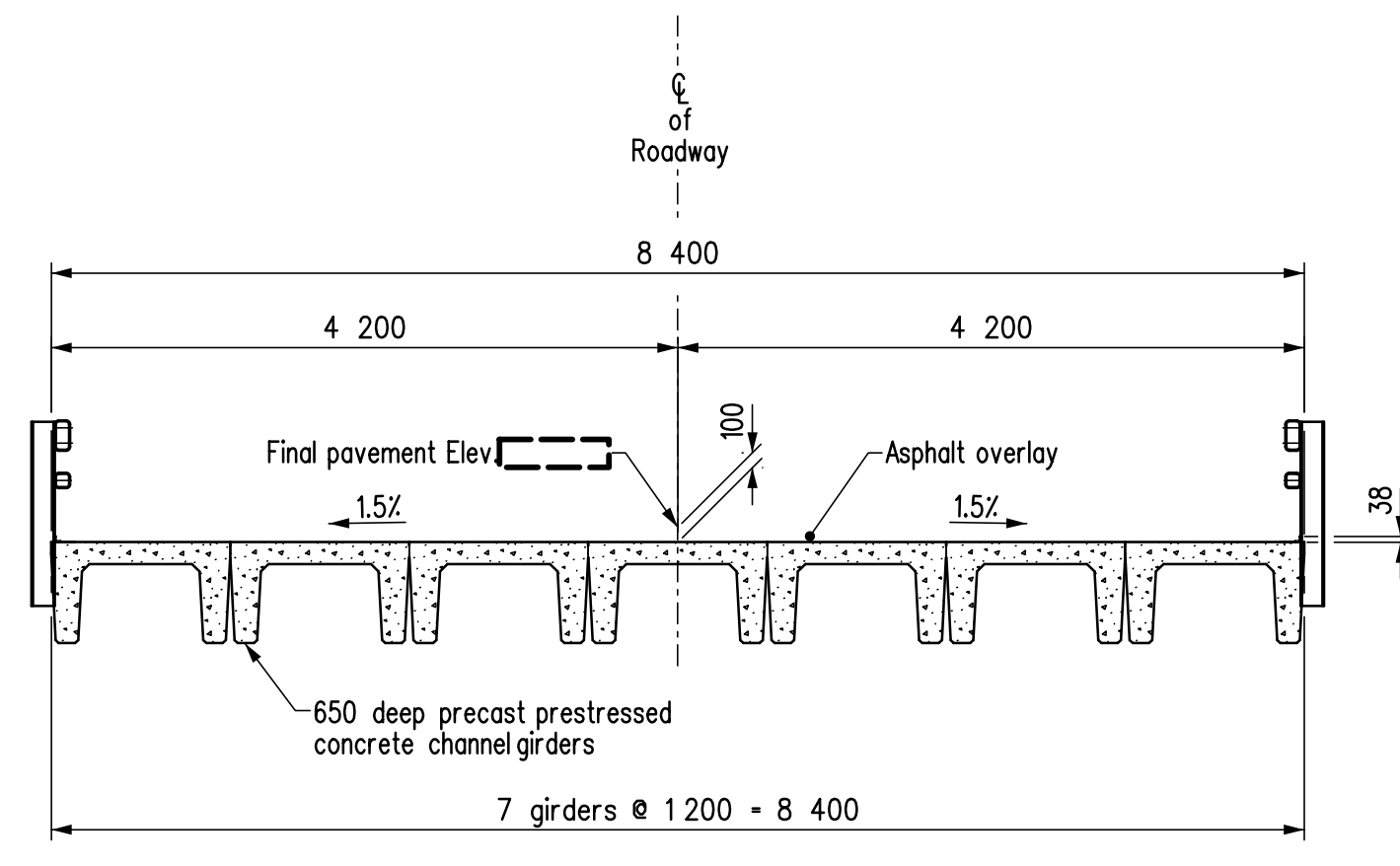
SOUTH OR EAST



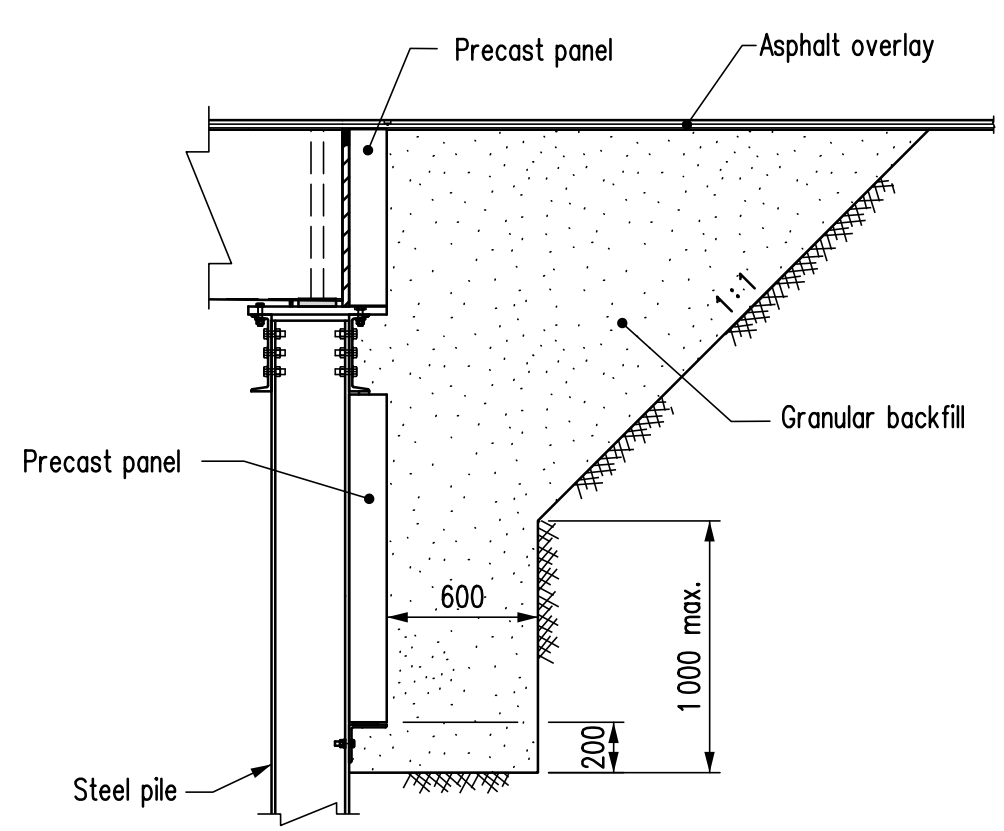
ELEVATION



PLAN



CROSS SECTION
Scale 1:50

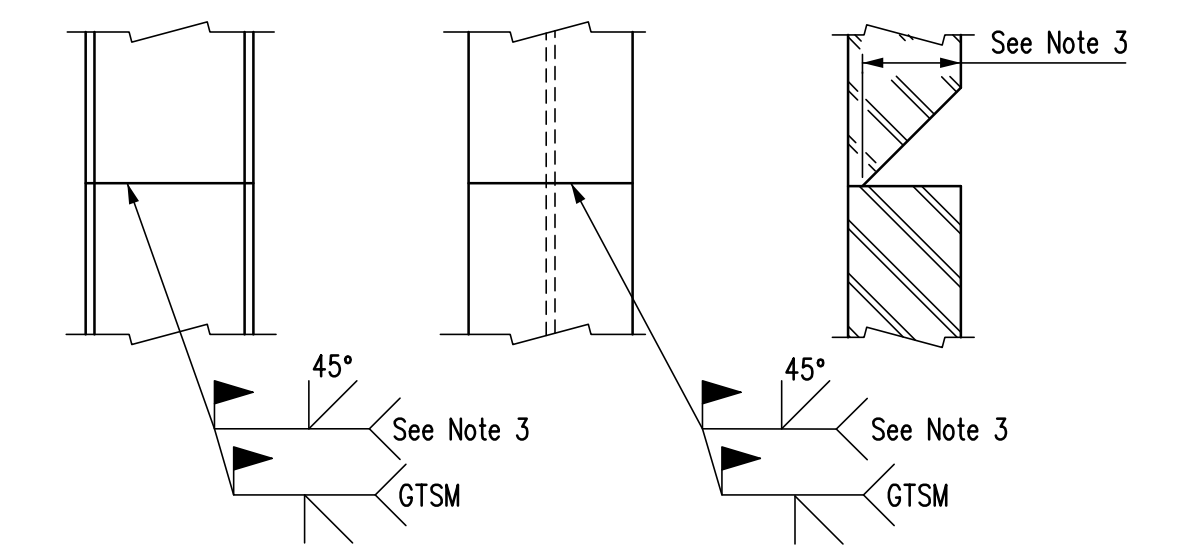


SECTION A-A
Typical at Su.1
Scale 1:30

- NOTES :
- re: Backfill Behind Abutment Ballast Walls
- 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.
 - Steel pile tip to be PRUYN "Hard-Bite" or equivalent.

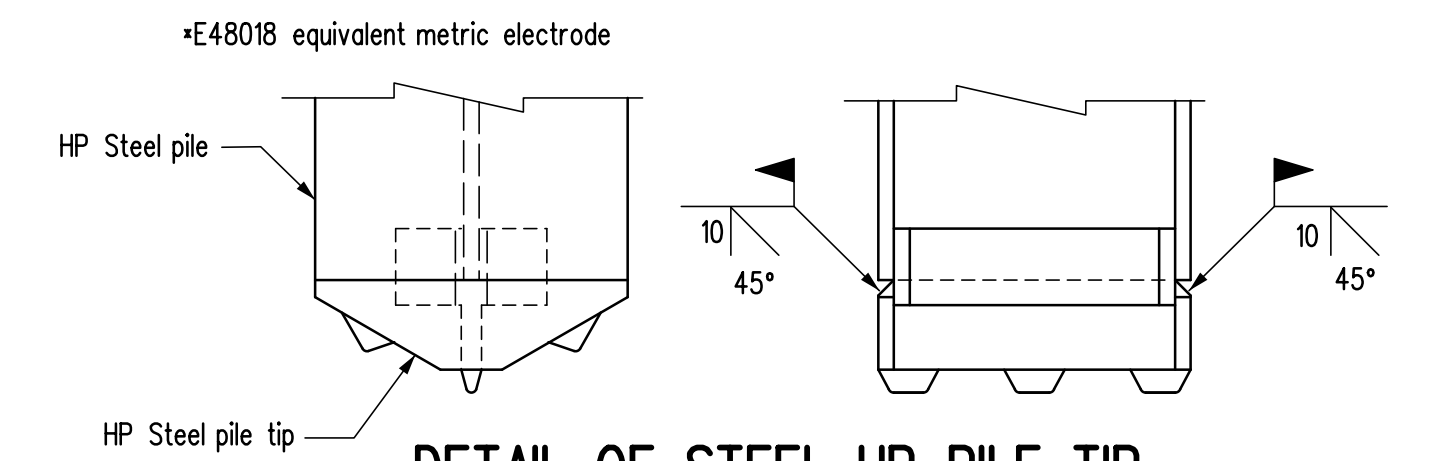
BILL OF PILES			Site No.	
LOCATION	DESCRIPTION	No. OF PILES	LENGTH	TOTAL LENGTH (m)
SU.1 & SU.3	Steel piles - HP310 x 110 (abutments)	10		0
SU.1 & SU.3	Steel piles - HP250 x 85 (wing walls)	8		0
				0
SU.2	Steel piles - HP310 x 110 (Intermediate bent)	8		0
SU.2	Steel piles - HP310 x 110 (Intermediate bent) - Ice Breaker Pile	1		0
				0
TOTAL LENGTH OF PILES (m) = 0				

BILL OF PILE TIPS		
LOCATION	DESCRIPTION	No. OF PILES
SU.1 & SU.3	Hard-Bite Point HP-77750-B for HP310 x 110 (Abutments)	10
SU.2	Hard-Bite Point HP-77750-B for HP310 x 110 (Intermediate bent)	8



DETAIL OF STEEL HP PILE SPLICE
Not To Scale

- NOTES:
- re: Welding
- Low hydrogen +E70 series electrodes shall be used.
 - The minimum root pass shall be 6 mm.
 - Preparation for welding requires 13 mm bevel for HP 250 piles and 14 mm bevel for HP 310 piles.
 - Weld both flanges and web as shown. The inside beveling and welds to be completed first.
 - Before undertaking the back welds, the weld preparation shall be carried out with a carbon Arc-Air gouger.



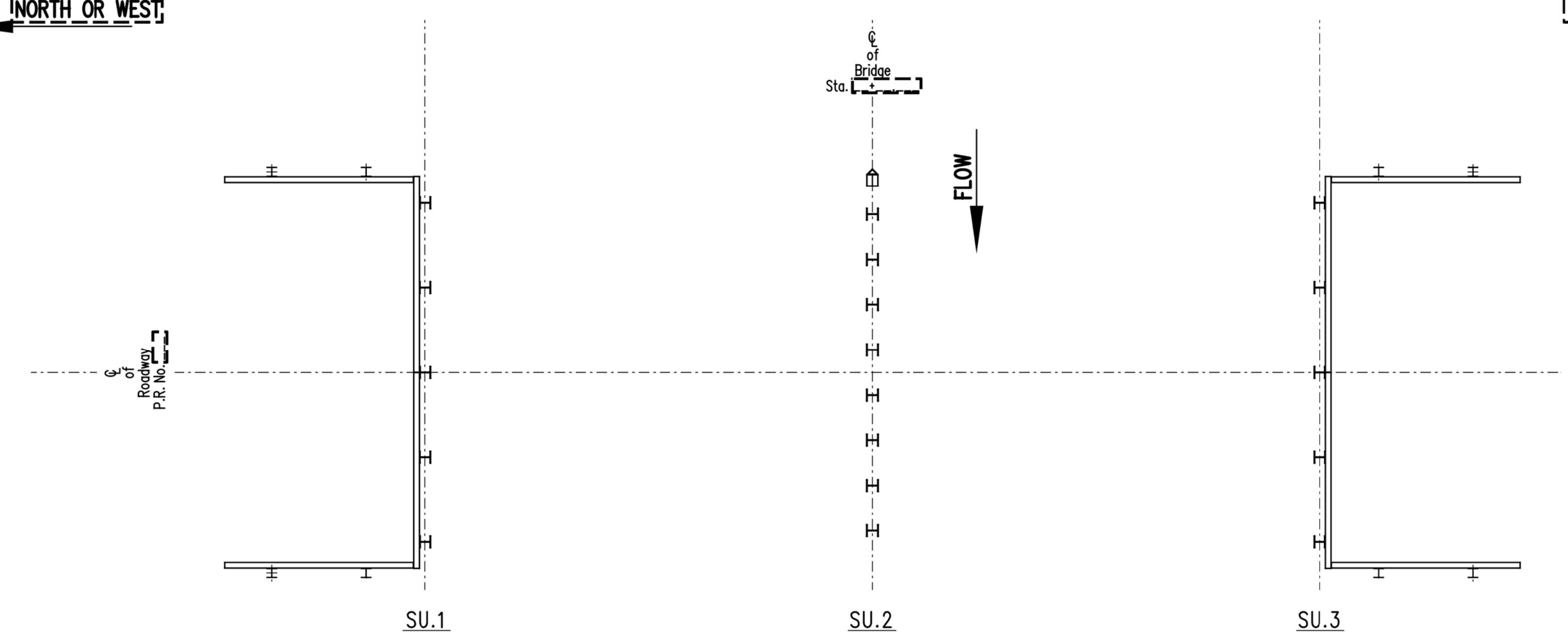
DETAIL OF STEEL HP PILE TIP
Not To Scale

- NOTES :
- Edges of HP Steel pile tip to be ground on 45° bevel for 10 mm.
 - Low hydrogen +E70 series electrodes shall be used.
 - The minimum root pass shall be 6 mm.
- +E48018 equivalent metric electrode

REVISIONS		GENERAL ELEVATION	
DATE	BY	DESIGN	RELEASED FOR CONSTRUCTION BY:
			EXECUTIVE DIRECTOR OF STRUCTURES DATE
DESIGN SEAL	RECORD SEAL	<p>Infrastructure Water Management and Structures</p>	SCALE: 1:75 SHEET No. 2
PLACE ENGINEERS ELECTRONIC SEAL HERE			DETAILS

NORTH OR WEST ←

→ **SOUTH OR EAST**



PLAN
Showing Bore Hole locations

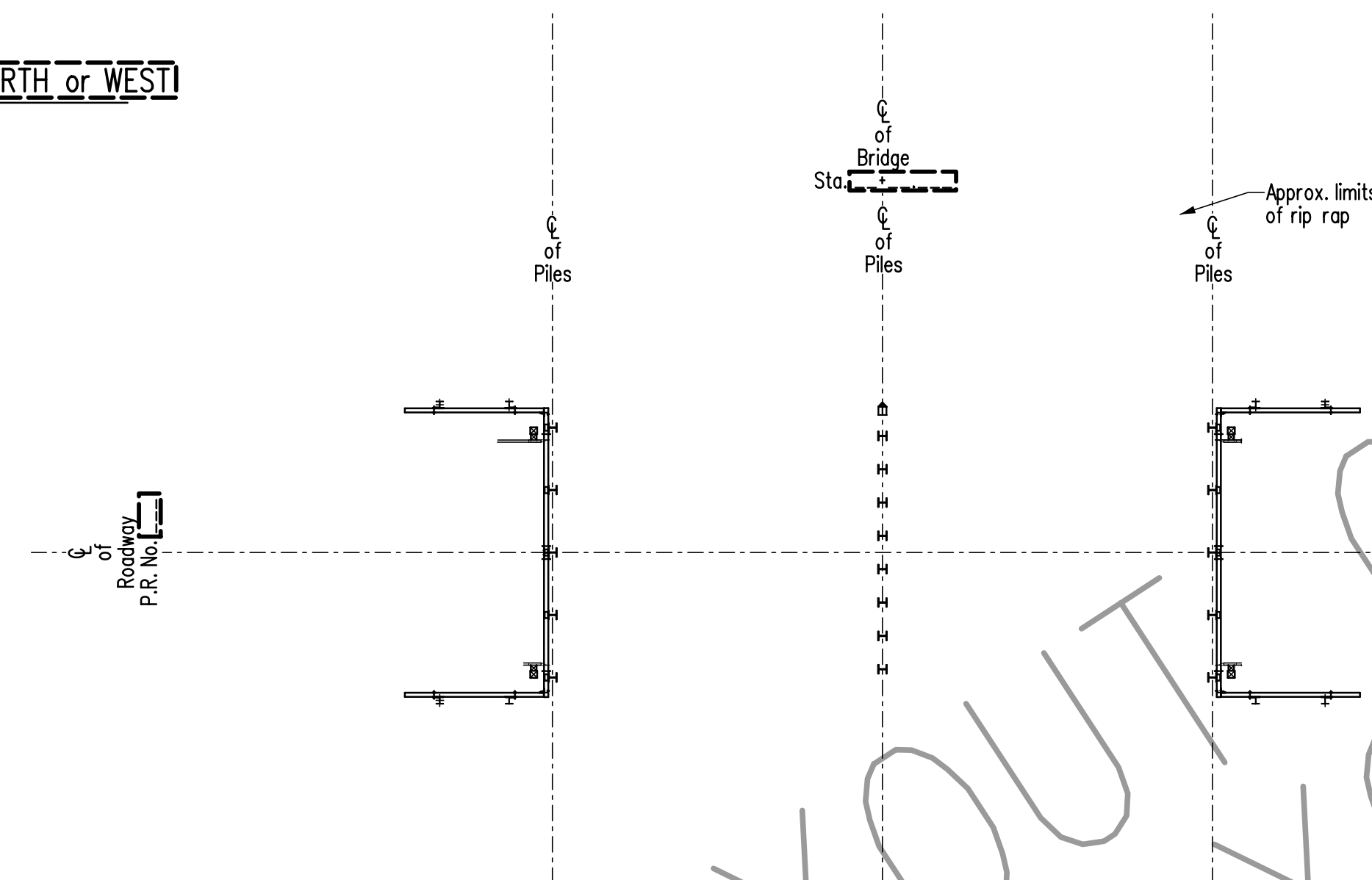
NOTES - re: Boring Logs

1. 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.
2. 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
3. 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.

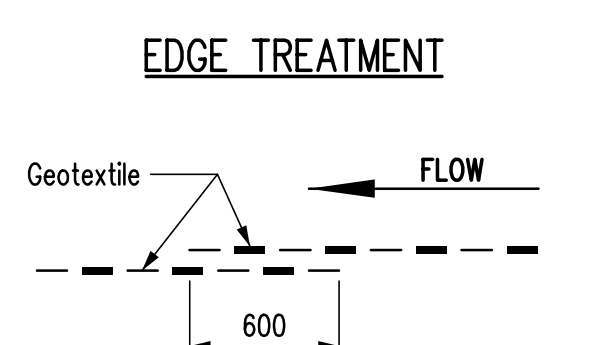
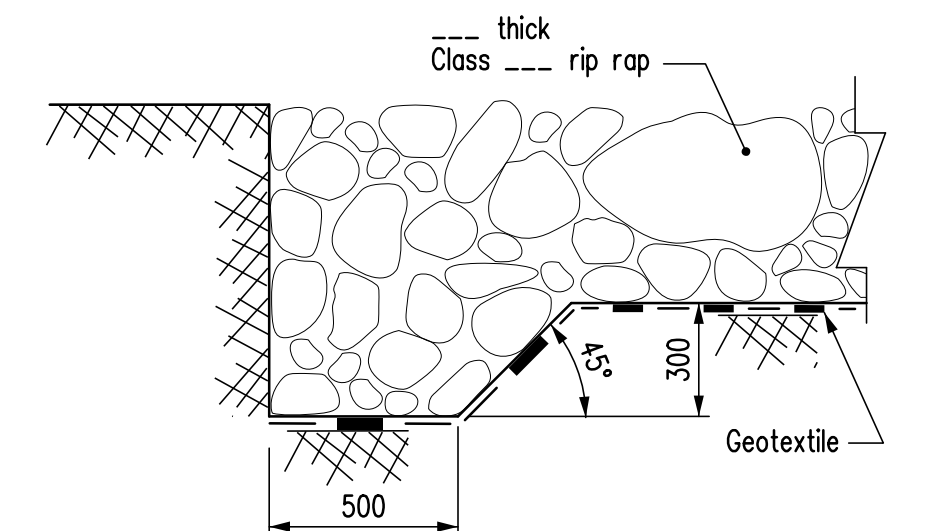
REVISIONS		BORING LOGS	
DATE	BY	DESCRIPTION	
		DESIGN SEAL	RECORD SEAL
PLACE ENGINEERS ELECTRONIC SEAL HERE		Manitoba Infrastructure Water Management and Structures	
DESIGN BY: [] CHECKED: []		RELEASED FOR CONSTRUCTION BY: _____ DATE _____ EXECUTIVE DIRECTOR OF STRUCTURES	
DETAILS BY: [] CHECKED: []		SCALE: 1 : 100	SHEET No. 3 SITE No. []

NORTH or WEST

SOUTH or EAST



GENERATED EXAMPLE SHEET ONLY SITE PLAN
 LAYOUT FROM YOUR SITE SPECIFIC DIMENSIONS



RIP RAP DETAILS

Not To Scale

- NOTES:
- All geotextile shall be Non-Woven Geotextile, Class 1 (Heavy Duty) from the Manitoba Infrastructure's Approved Product List.
 - Geotextile shall be placed under all rip rap, overlapping 600mm in direction of flow.

NOTE:
Existing pile bents to be removed by Bridge Contractor.

REVISIONS	

SITE AND EROSION CONTROL DETAILS

Manitoba Infrastructure
Water Management and Structures

RELEASED FOR CONSTRUCTION BY: _____

EXECUTIVE DIRECTOR OF STRUCTURES DATE

SCALE: 1:200 SHEET No. 4

or as shown SITE No. _____

DATE	BY	DESCRIPTION

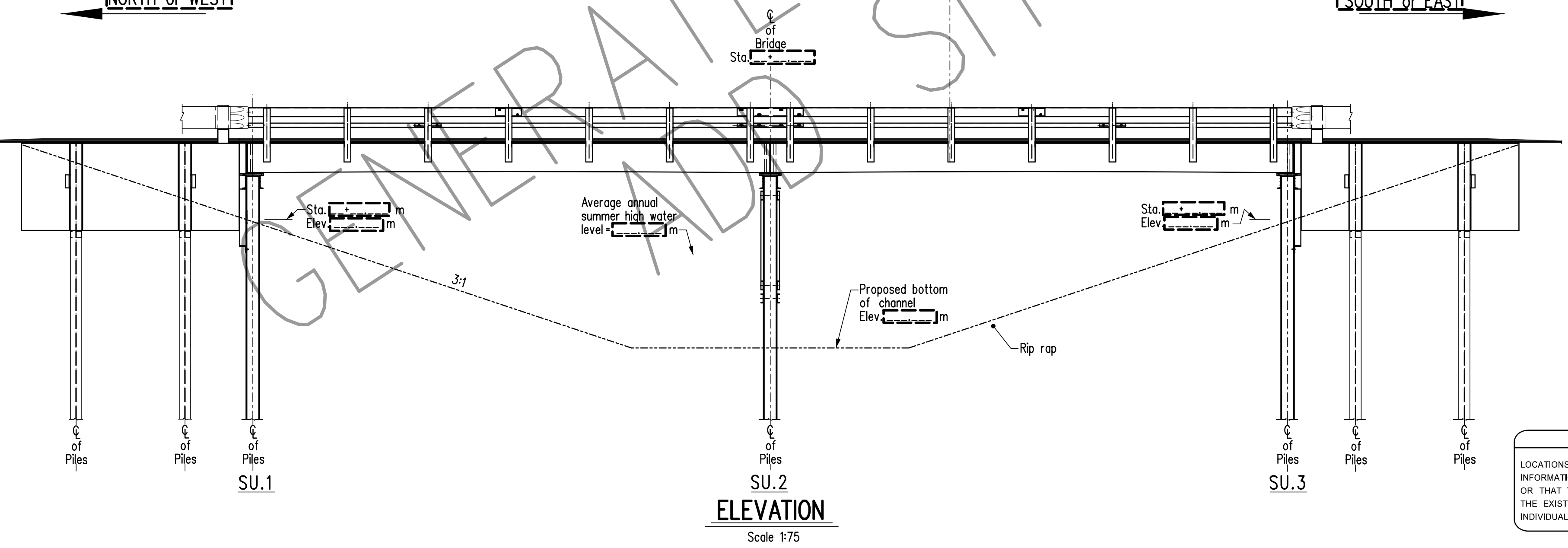
DESIGN SEAL RECORD SEAL

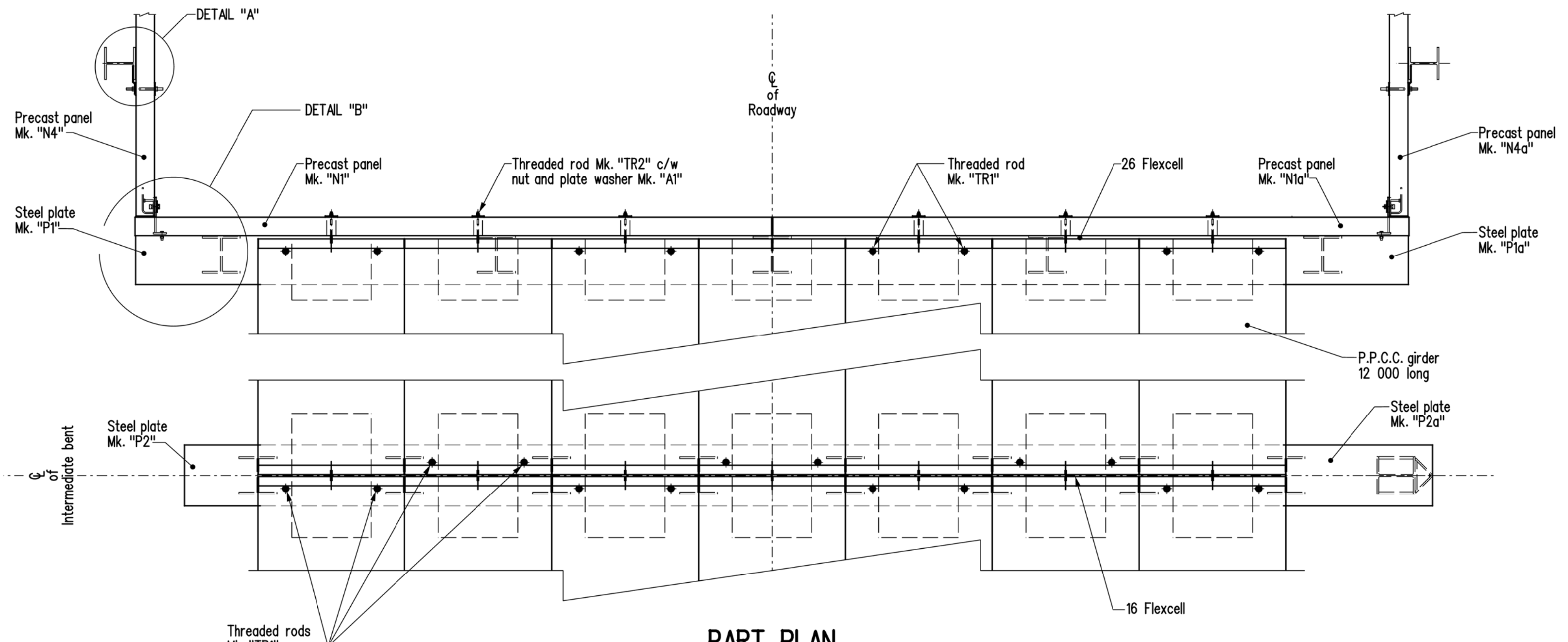
PLACE ENGINEERS ELECTRONIC SEAL HERE

UTILITY DISCLAIMER:
 LOCATIONS OF UTILITIES AS SHOWN ARE BASED ON READILY AVAILABLE INFORMATION. NO GUARANTEE IS GIVEN THAT ALL UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONTRACTOR SHALL CONFIRM THE EXISTENCE AND LOCATION OF UTILITIES BY OBTAINING FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

NORTH or WEST

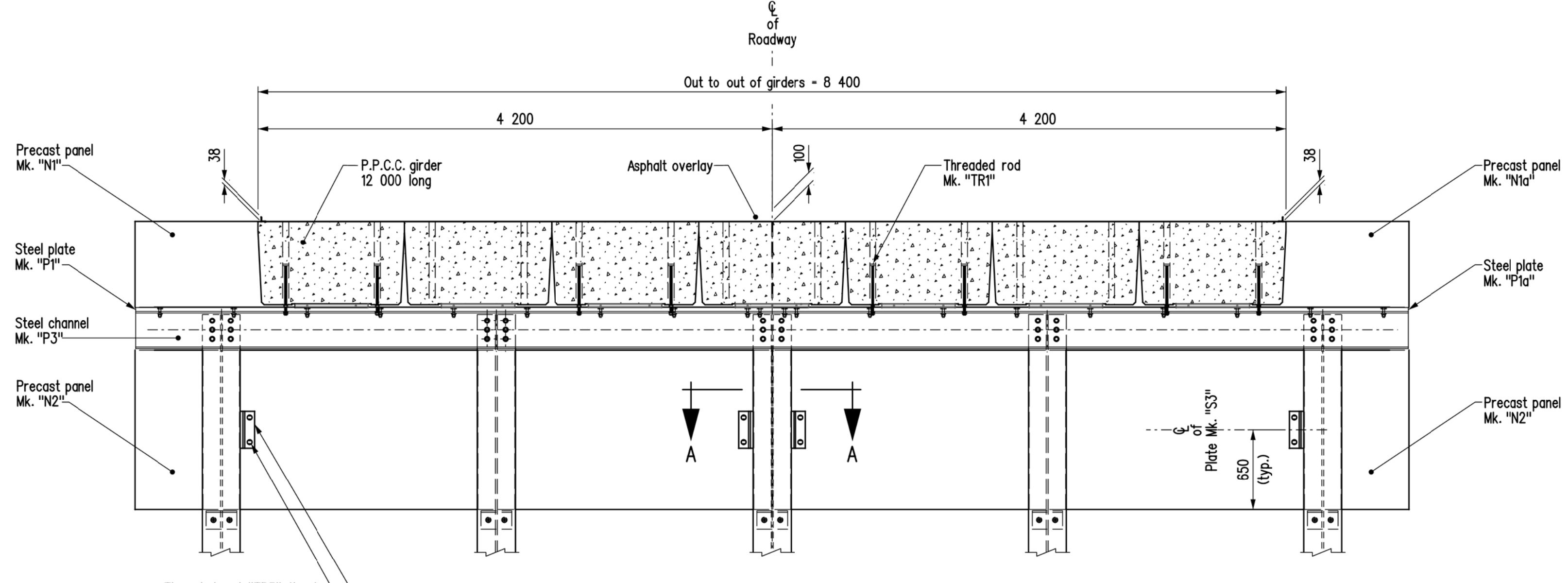
SOUTH or EAST





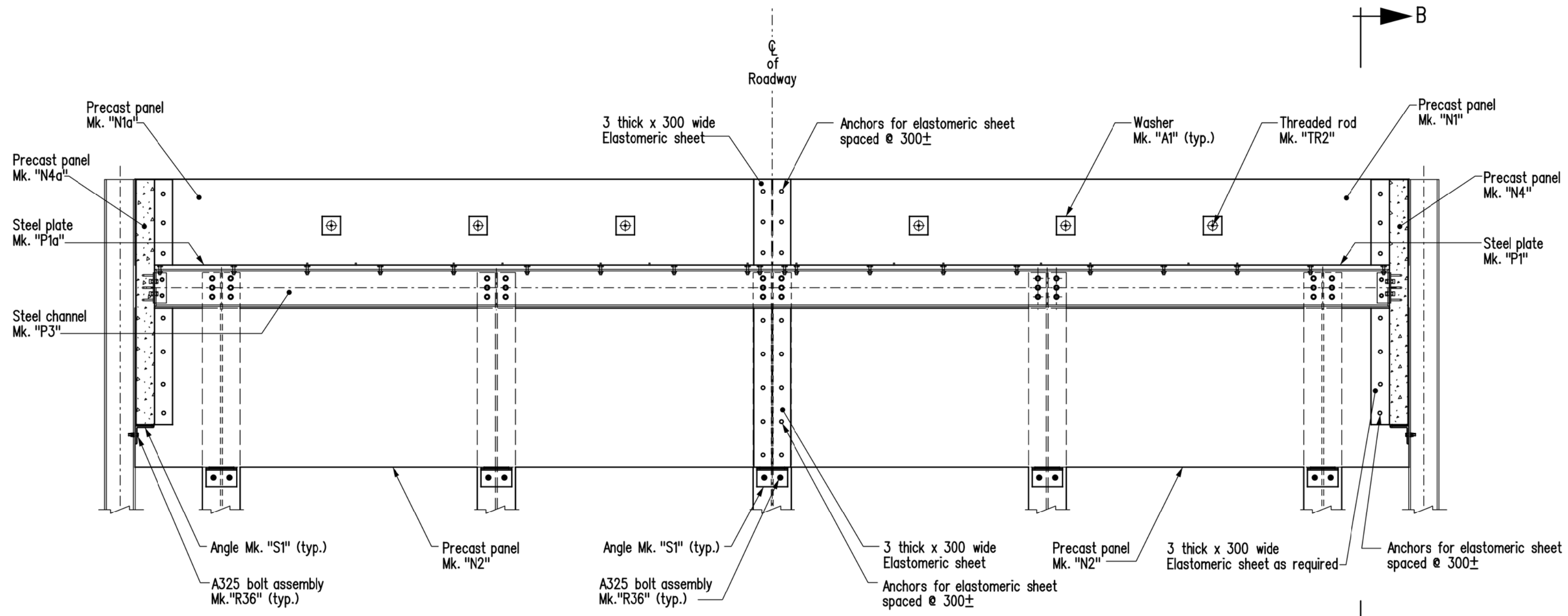
PART PLAN

Showing abutment SU.1 and pile bent SU.2
Asphalt and bridge railing not shown for clarity



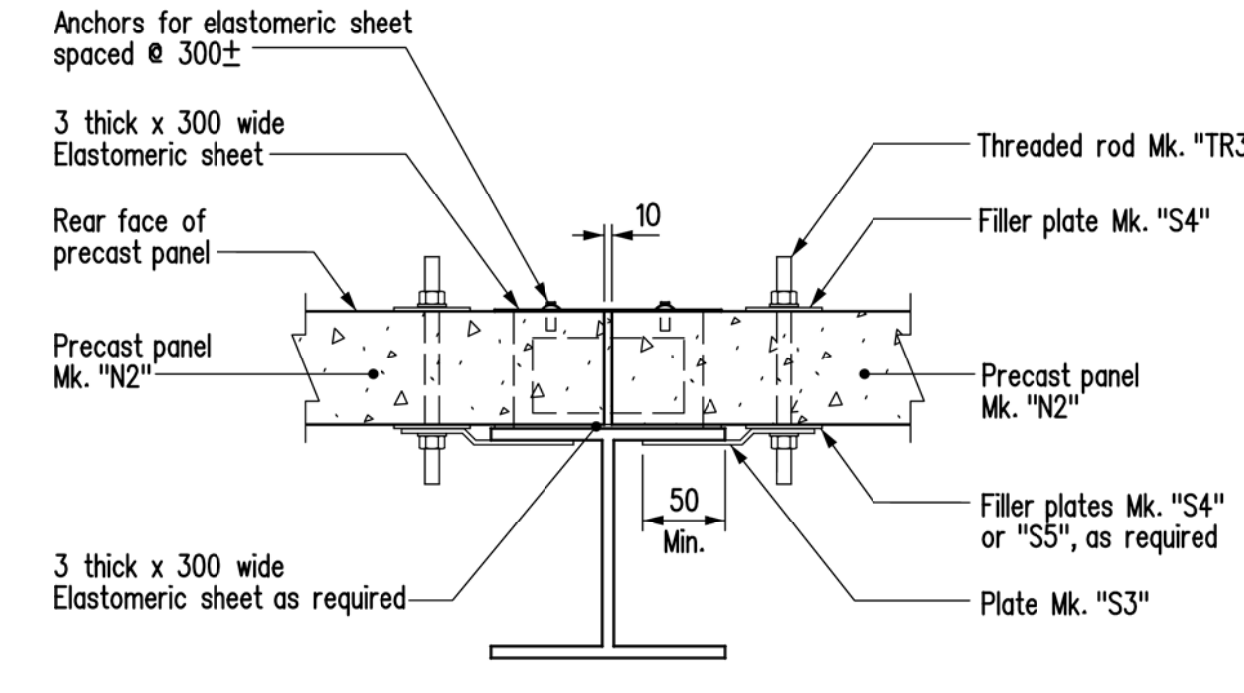
FRONT VIEW AT ABUTMENT

Bridge railing not shown for clarity

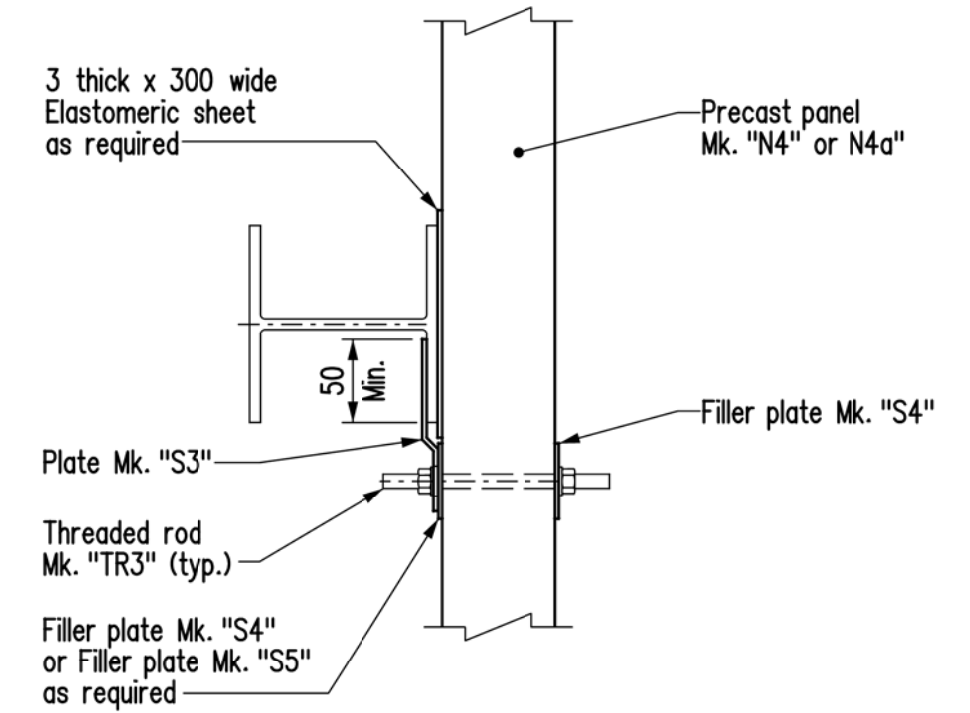


REAR VIEW AT ABUTMENT

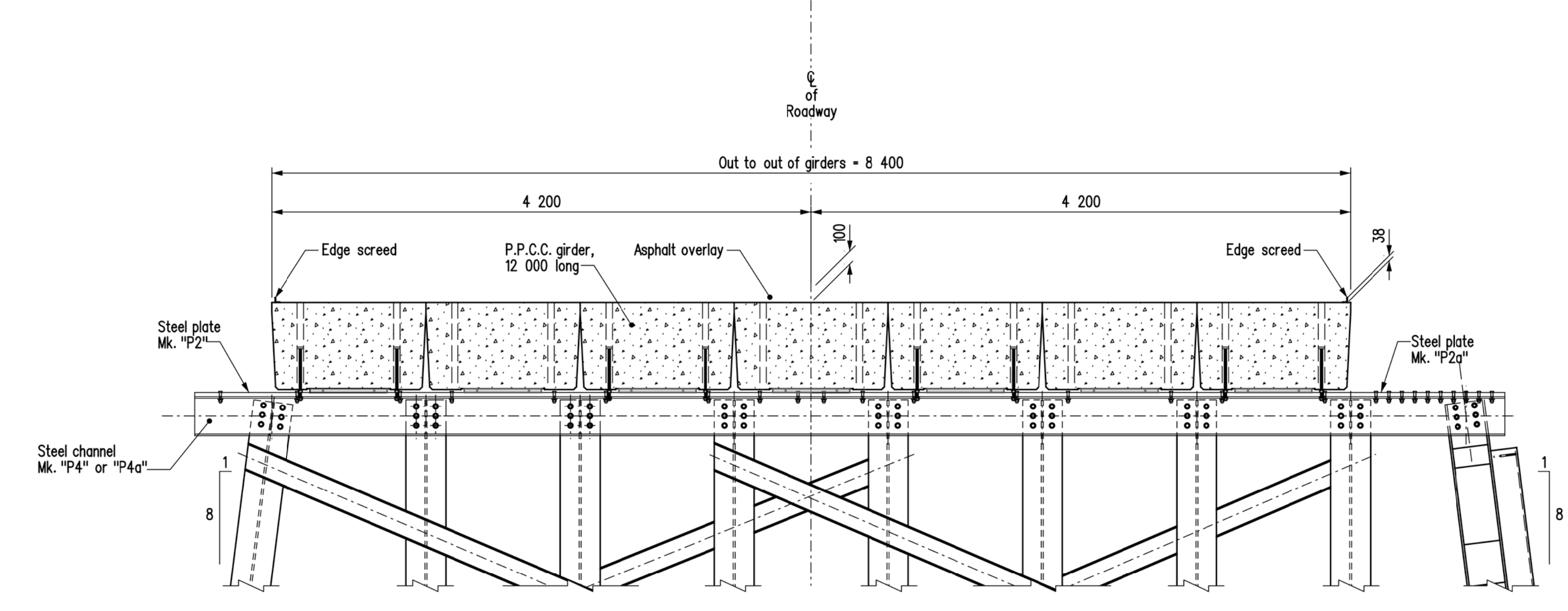
Bridge railing not shown for clarity



SECTION A-A
Scale 1:10



DETAIL 'A'
Scale 1:10



CROSS SECTION AT INTERMEDIATE PILE BENT

Bridge railing and intermediate pile bent cross bracing not shown for clarity

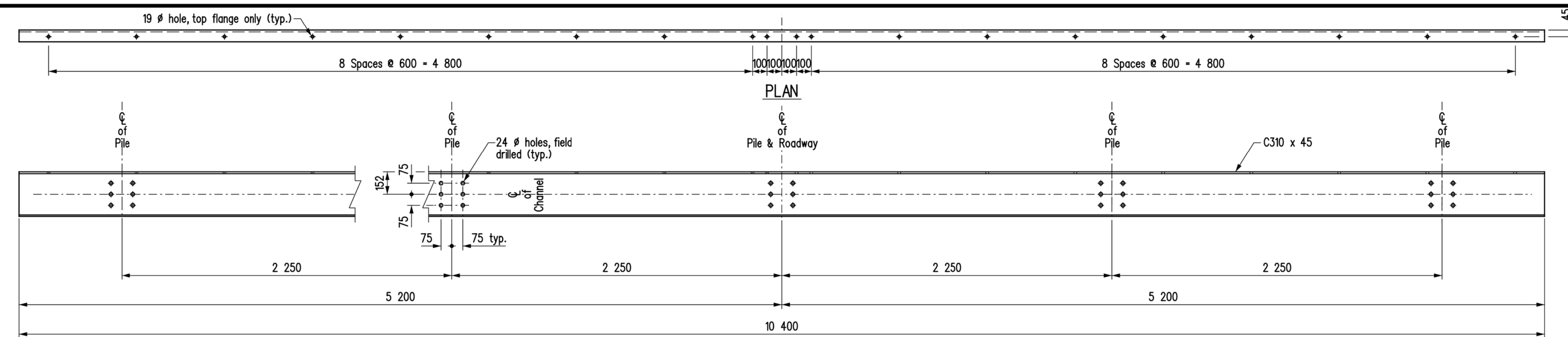
- NOTES:**
1. For Section "B-B" and DETAIL "B" see Sheet No. 1
 2. For "BILL OF MISCELLANEOUS METAL" see Sheet No. 1
 3. The Contractor shall field drill 22 # holes in the precast panels for threaded rods "TR3". Should rebar be encountered, abandon hole, patch and drill in new location. Rebar locations are marked on the panels by the Panel Fabricator.
 4. Back faces of the upper and lower ballast walls shall be aligned in the same vertical plane.
 5. The Contractor shall ensure that the upper ballast walls are placed with the edge 5mm from \hat{C} of roadway.

REVISIONS		ASSEMBLY DETAILS	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:

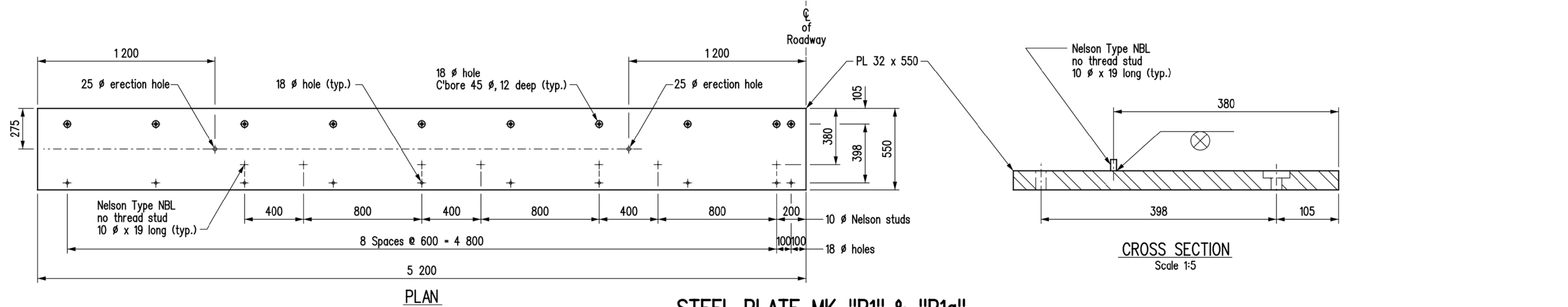
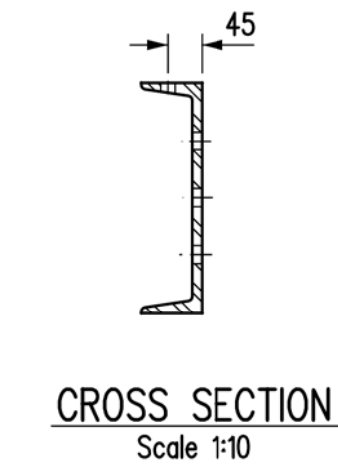
**PLACE ENGINEERS
ELECTRONIC SEAL
HERE**

Infrastructure
Water Management and Structures

EXECUTIVE DIRECTOR OF STRUCTURES	DATE
SCALE: 1:30	SHEET No. 6
or as shown	SITE No. 1-1-1



ELEVATION
STEEL CHANNEL MK "P3"

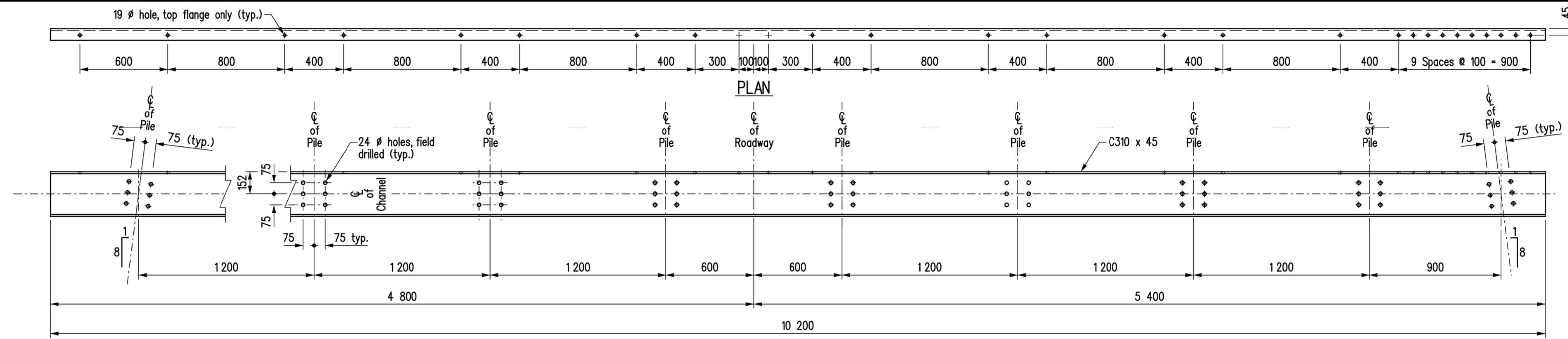


PLAN
STEEL PLATE MK "P1" & "P1a"

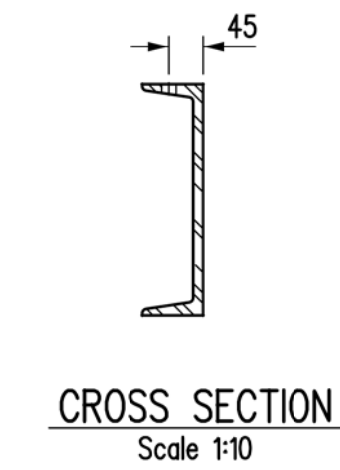
CROSS SECTION
Scale 1:5

Plate Mk. "P1" as shown, Plate "P1a" opposite hand

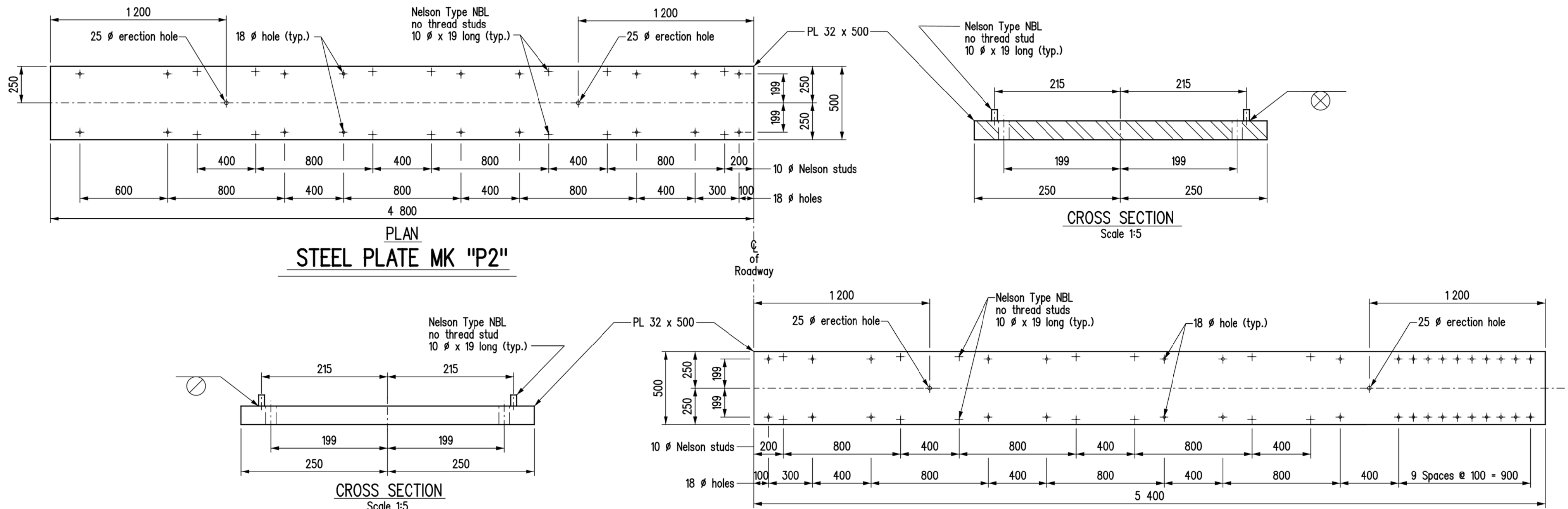
FOR ABUTMENTS



ELEVATION
STEEL CHANNEL MK "P4" & "P4a"



Channel Mk. "P4" as shown, Channel Mk. "P4a" opposite hand



PLAN
STEEL PLATE MK "P2"

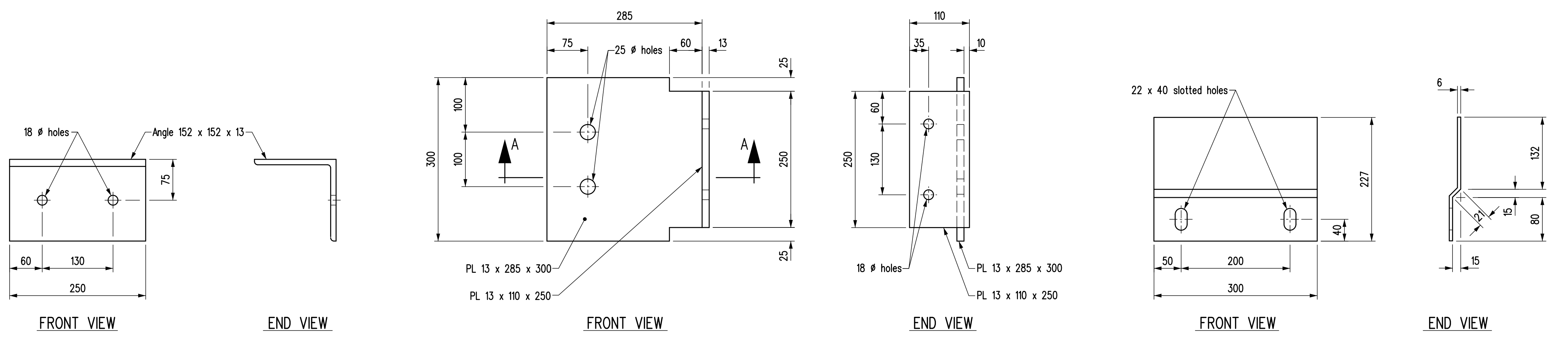
CROSS SECTION
Scale 1:5

PLAN
STEEL PLATE MK "P2a"

CROSS SECTION
Scale 1:5

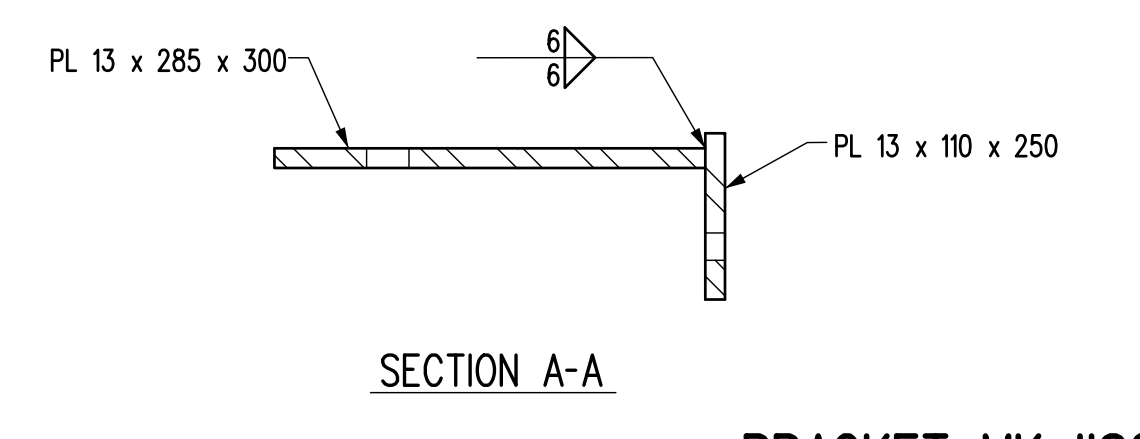
FOR INTERMEDIATE PILE BENTS

REVISIONS		STEEL PILE CAP DETAILS	
DATE	BY	DESIGN SEAL	RECORD SEAL
PLACE ENGINEERS ELECTRONIC SEAL HERE			
DESIGN		RELEASED FOR CONSTRUCTION BY:	
DETAILS		EXECUTIVE DIRECTOR OF STRUCTURES DATE	
BY: [Signature]		SCALE: 1:20	
CHECKED: [Signature]		SHEET No. 8	
BY: [Signature]		OF AS SHOWN	
CHECKED: [Signature]		SITE No. []	

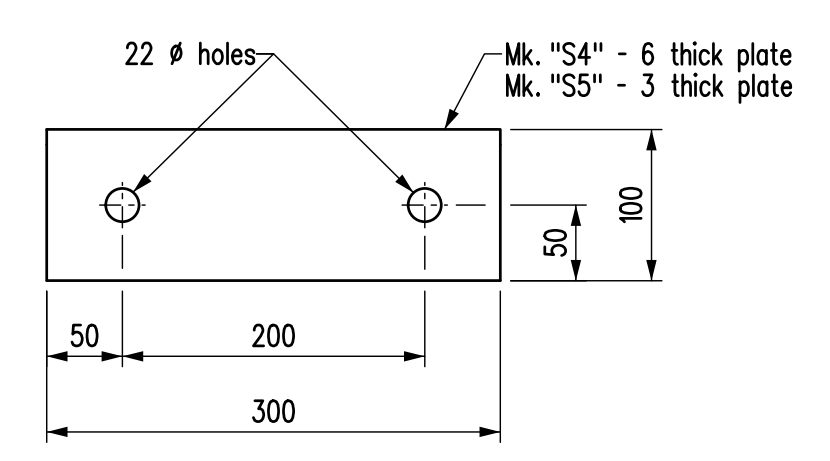


ANGLE MK. "S1"
Scale 1:5

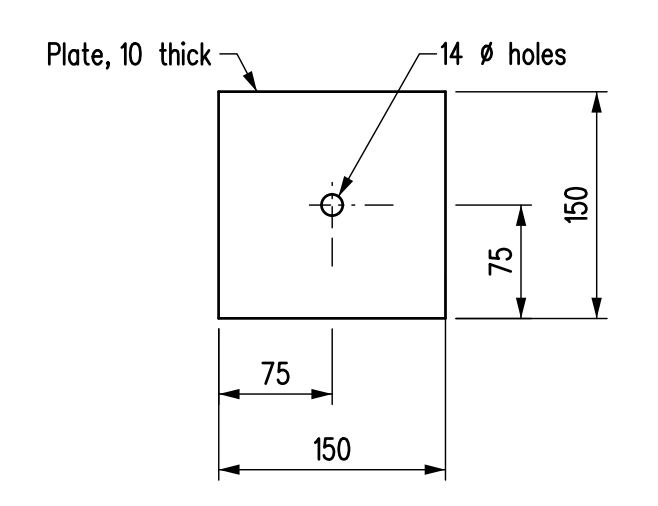
PLATE MK. "S3"
Scale 1:5



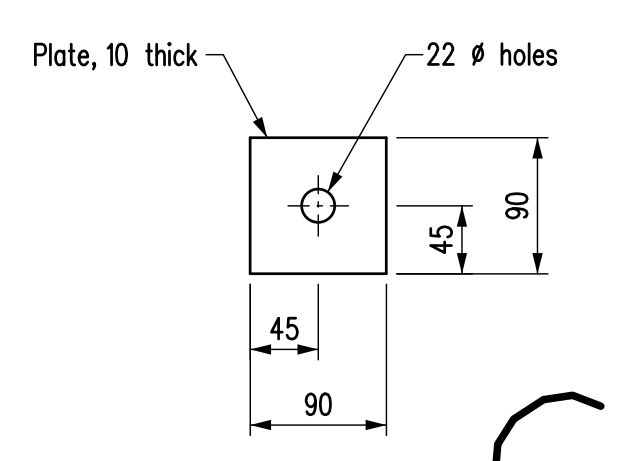
BRACKET MK. "S2"
Scale 1:5



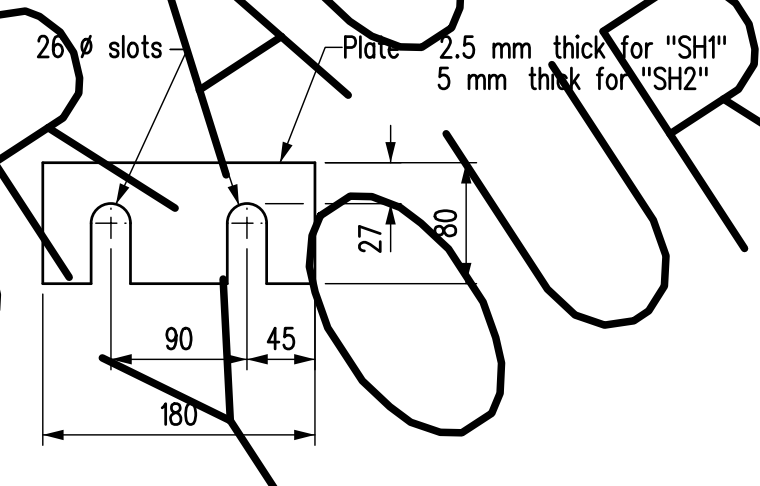
FILLER PLATES MK. "S4" & "S5"
Scale 1:5



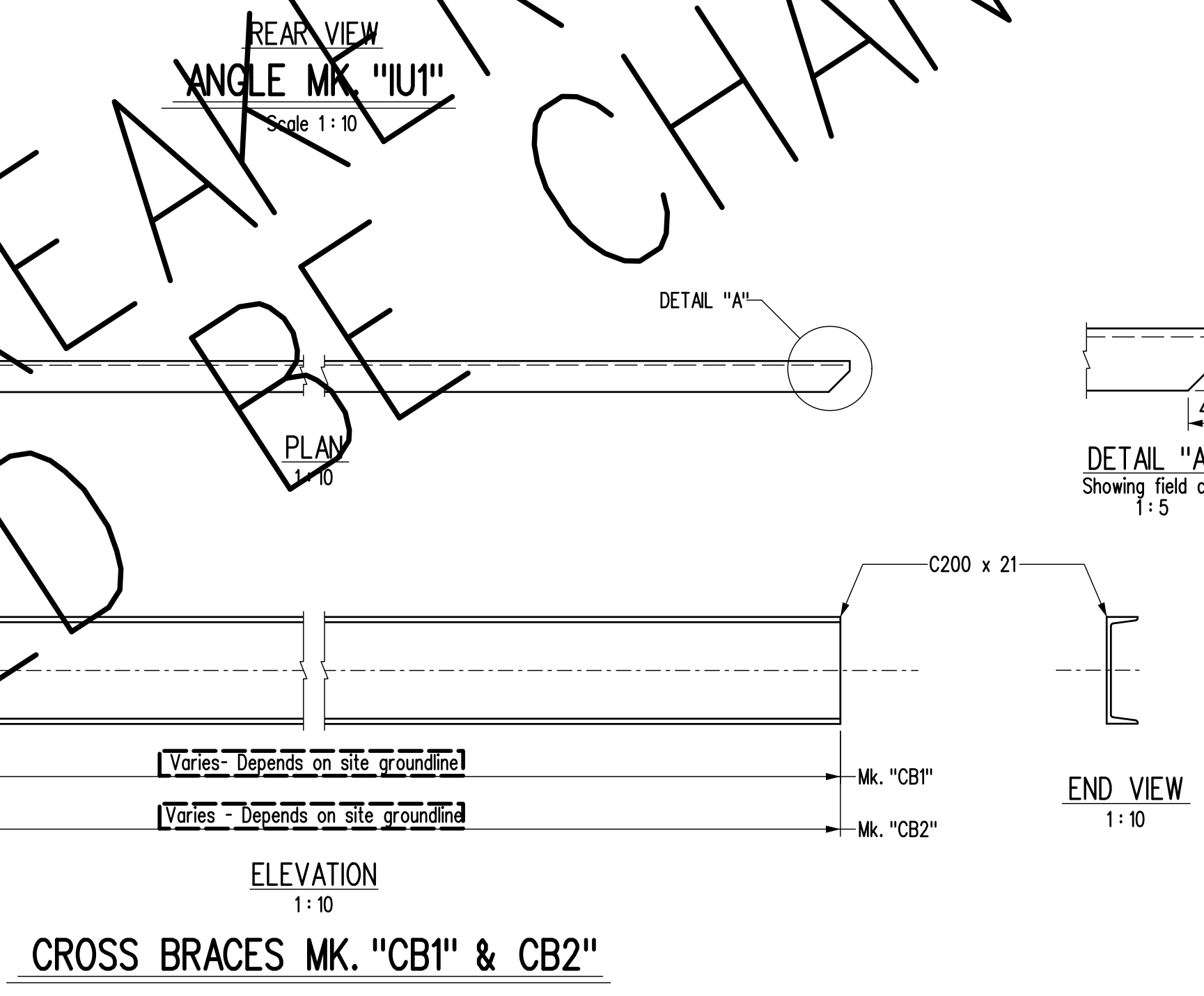
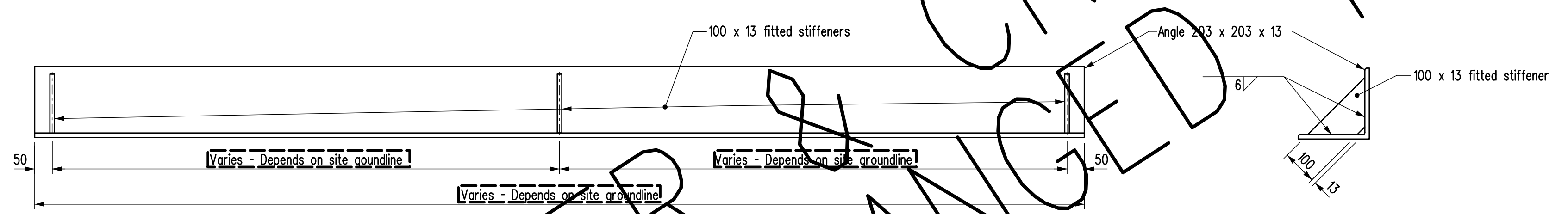
WASHER MK. "A1"
Scale 1:5



WASHER MK. "A2"
Scale 1:5



SHIM PLATES MK. "SH1" & "SH2"
Scale 1:5



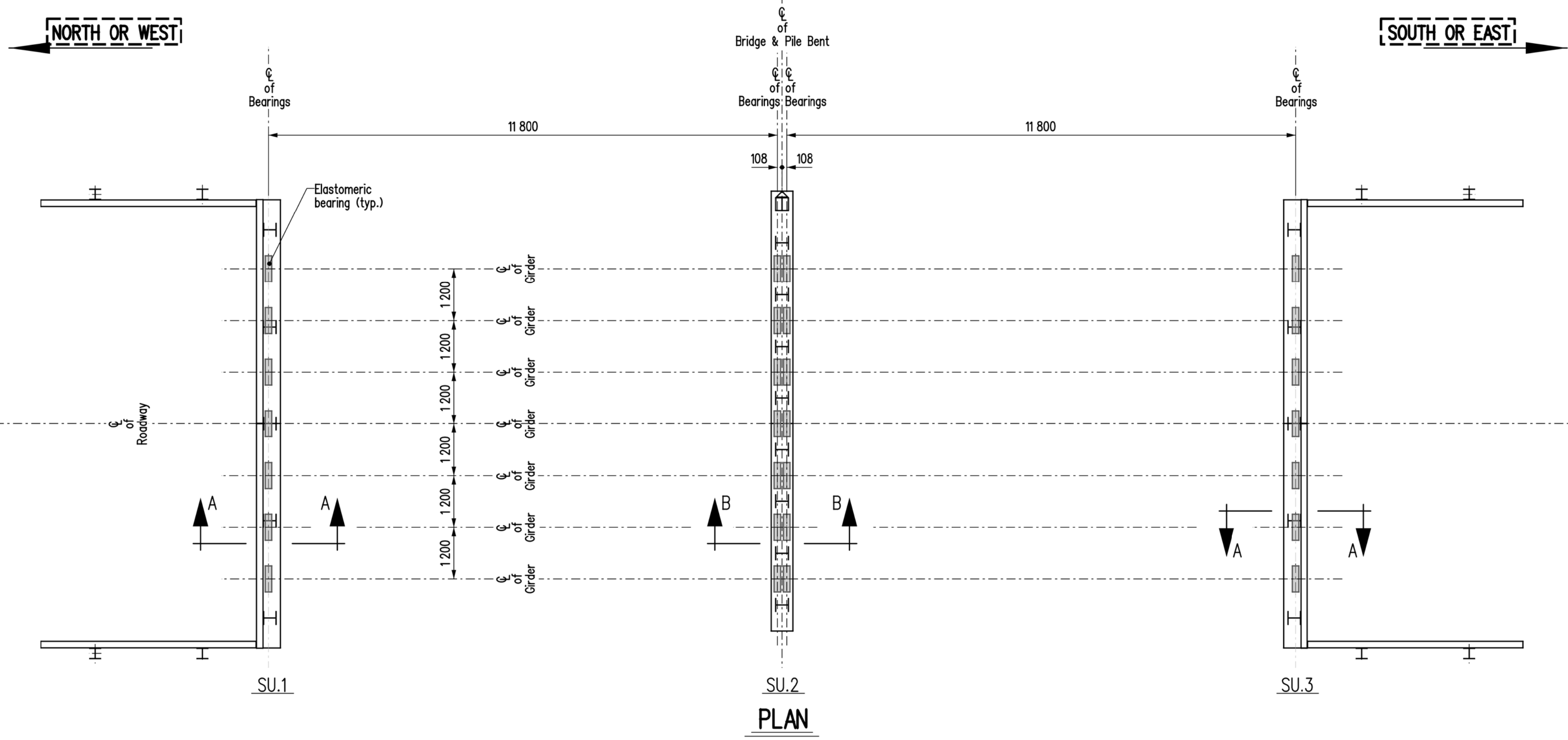
CROSS BRACES MK. "CB1" & "CB2"
Scale 1:10

BILL OF MISCELLANEOUS METAL 8 400 ROADWAY WIDTH - 2 SPAN - 0 DEGREE SKEW										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						1437.03	
Each unit to be fabricated from:										
		1 - Steel plate		PL 32x550	5 200	See detail for Abutment	718.432	718.432		
		7 - Nelson Type NBL, no thread studs		10 dia.	19	Part No. 101-063-167	0.012	0.082		
								718.514		
P1a	2	Steel plate	Hot dip galvanized						1437.03	
Each unit to be fabricated from:										
		1 - Steel plate		PL 32x550	5 200	See detail for Abutment	718.432	718.432		
		7 - Nelson Type NBL, no thread studs		10 dia.	19	Part No. 101-063-167	0.012	0.082		
								718.514		
P2	1	Steel plate	Hot dip galvanized						603.04	
Each unit to be fabricated from:										
		14 - Nelson Type NBL, no thread studs		10 dia.	4 800	See detail for Intermediate Bent	602.880	602.880		
						Part No. 101-063-167	0.012	0.164		
								603.044		
P2a	1	Steel plate	Hot dip galvanized						678.40	
Each unit to be fabricated from:										
		1 - Steel plate		PL 32x550	5 400	See detail for Intermediate Bent	678.240	678.240		
		14 - Nelson Type NBL, no thread studs		10 dia.	19	Part No. 101-063-167	0.012	0.164		
								678.404		
P3	4	Steel channel	Hot dip galvanized	C310x45	10 400	See detail for Abutment	464.880	1859.52		
P4	4	Steel channel	Hot dip galvanized	C310x45	10 200	See detail for Intermediate Bent	455.940	455.94		
P4a	4	Steel channel	Hot dip galvanized	C310x45	10 200	See detail for Intermediate Bent	455.940	455.94		
R30	76	A325 bolt assembly	Hot dip galvanized	16 dia.	89	Steel plate to channels	0.245	18.62		
R32	40	A325 bolt assembly	Hot dip galvanized	16 dia.	76	Steel plate to channels C bore holes	0.225	9.00		
R35	216	A325 bolt assembly	Hot dip galvanized	22 dia.	64	Channels to piles	0.461	99.58		
R36	44	A325 bolt assembly	Hot dip galvanized	16 dia.	64	Angles Mk. "S1" to piles & bracket Mk. "S2" to cap	0.205	9.02		
S1	18	Angle	Hot dip galvanized	L 152x152x13	250	As detailed	7.250	130.50		
S2	4	Bracket	Hot dip galvanized			As detailed	11.226	44.90		
S3	16	Plate	Hot dip galvanized	PL 6x300		As detailed	3.223	51.57		
S4	32	Filler plate	Hot dip galvanized	PL 6x100	300	As detailed	1.413	45.22		
S5	16	Filler plate	Hot dip galvanized	PL 3x100	300	As detailed	0.707	11.31		
A1	8	Structural plate w washer	Hot dip galvanized	PL 10x150	150	As detailed - One to threaded rod Mk. "TR2"	1.766	21.19		
A2	8	Structural plate w washer	Hot dip galvanized	PL 10x90	90	As detailed - One to bolt Mk. "R34"	0.636	5.09		
TR1	28	Threaded rods c/w w/o hex. nuts	Hot dip galvanized	19 dia.	400	Girder to steel cap plate	0.940	26.32		
TR3	32	Threaded rods c/w w/o hex. nuts	Hot dip galvanized	19 dia.	300	Steel plates Mk. "S3" to precast panels	0.660	21.12		
116		Hardened bevel washer	Hot dip galvanized	for 16 dia. bolts		One to bolts Mk. "R30" & "R32"	0.110	12.76		
14		Standard flat washer	Hot dip galvanized	for 12 dia. rod		One to threaded rod Mk. "TR2"	0.010	0.14		
92		Standard flat washer	Hot dip galvanized	for 19 dia. rod		One to "TR1", two to "TR3"	0.020	1.84		
14		Structural lock washer	Hot dip galvanized	for 12 dia. rod		One to threaded rod Mk. "TR2"	0.010	0.14		
60		Structural lock washer	Hot dip galvanized	for 19 dia. rod		One to "TR1" & "TR3"	0.020	1.20		
216		F436 Hardened washer	Hot dip galvanized	for 22 dia. bolts		One to bolt Mk. "R35"	0.032	6.91		
44		F436 Hardened washer	Hot dip galvanized	for 16 dia. bolts		One to bolt Mk. "R36"	0.014	0.62		
R1	96	A325 bolt assembly	Hot dip galvanized	22 dia.	76	R.C. girder connection	0.499	47.90		
W1	96	Structural flat washer	Hot dip galvanized	for 22 dia. bolts		One to bolt Mk. "R1"	0.050	4.80		
96		Pair Nord-Lock lock washers		for 22 dia. bolts		One pair to bolt Mk. "R1"	0.020	1.92		
SH1	48	Shim plate	Hot dip galvanized	PL 2.5x80	180	As detailed - use as required	0.231	11.09		
SH2	48	Shim plate	Hot dip galvanized	PL 5x80	180	As detailed - use as required	0.463	22.22		
IP1	2	Plate	Shop Primed	PL277x20	350	See Ice Breaker Details		15.221	30.44	
IP2	1	Plate	Shop Primed	PL277x20	500	See Ice Breaker Details		21.745	0.00	
IJ1	1	Ice Breaker Unit	Shop Primed						2.35	
Each unit to be fabricated from:										
		1 - Angle		L203x203x13		As detailed	0.000	0.000		
		- Stiffener Steel Plates		100x13	230	Fitted stiffeners as detailed	2.347	2.347		
CB1	2	Channel	Shop Primed	C200x21				0.000	0.00	
CB2	4	Channel	Shop Primed	C200x21				0.000	0.00	
							TOTAL MASS (kg) = 7564.67			

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

ICE BREAKER & CROSS BRACES TO BE CHANGED TO FOUR

REVISIONS			STEEL PILE CAP DETAILS			
DATE	BY	DESCRIPTION	DESIGN SEAL		RECORD SEAL	RELEASED FOR CONSTRUCTION BY:
Manitoba Infrastructure Water Management and Structures						EXECUTIVE DIRECTOR OF STRUCTURES DATE
PLACE ENGINEERS ELECTRONIC SEAL HERE			BY: _____	CHECKED: _____	BY: _____	SCALE: 1:20
			CHECKED: _____	CHECKED: _____	or as shown	SHEET No. 9 SITE No. _____



BILL OF BEARINGS			8 400 ROADWAY WIDTH - 2 SPAN	Site No.
No.	LOCATION	DESCRIPTION	REMARKS	
28	SU.1 - SU.3	Elastomeric bearings	As detailed	

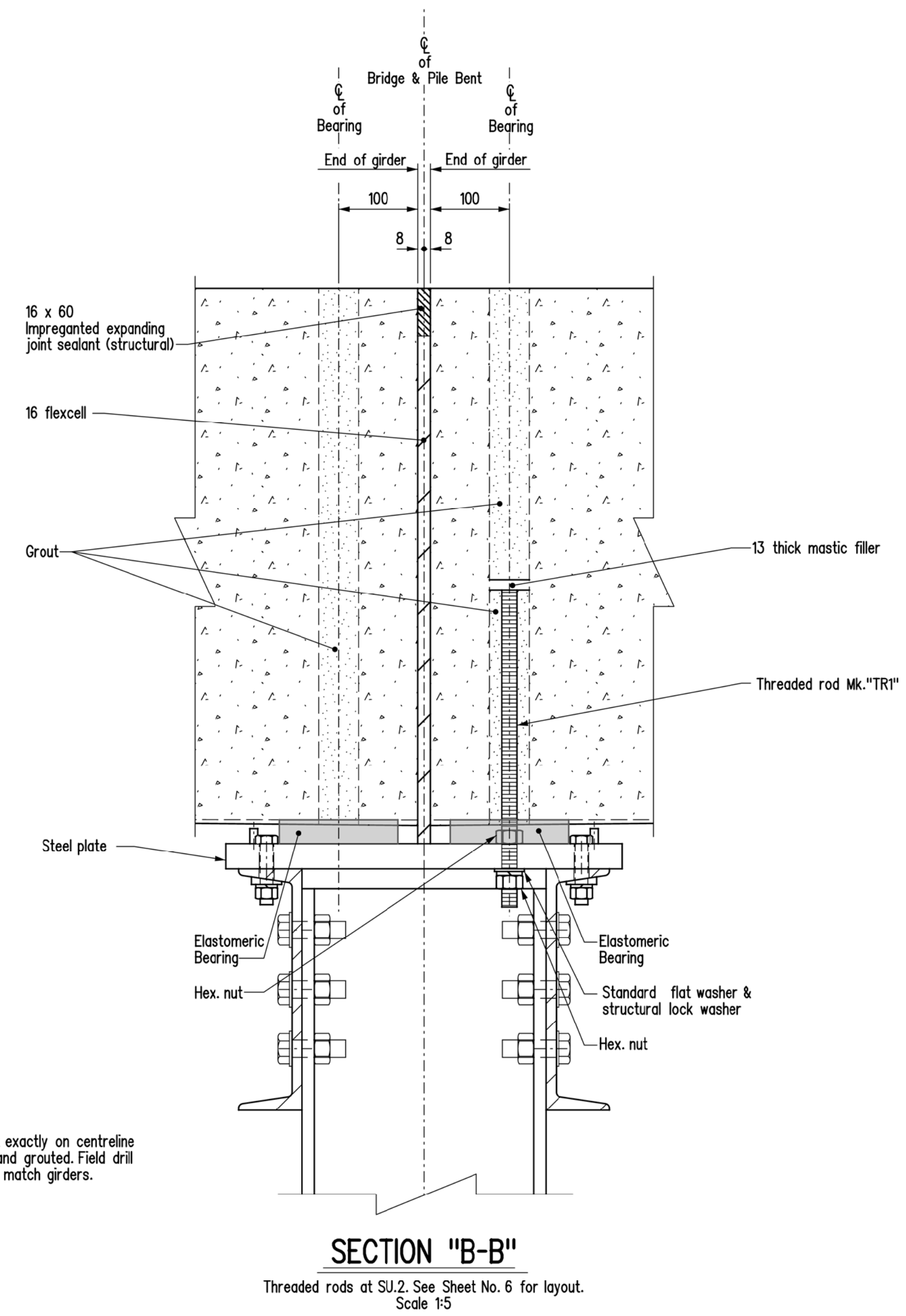
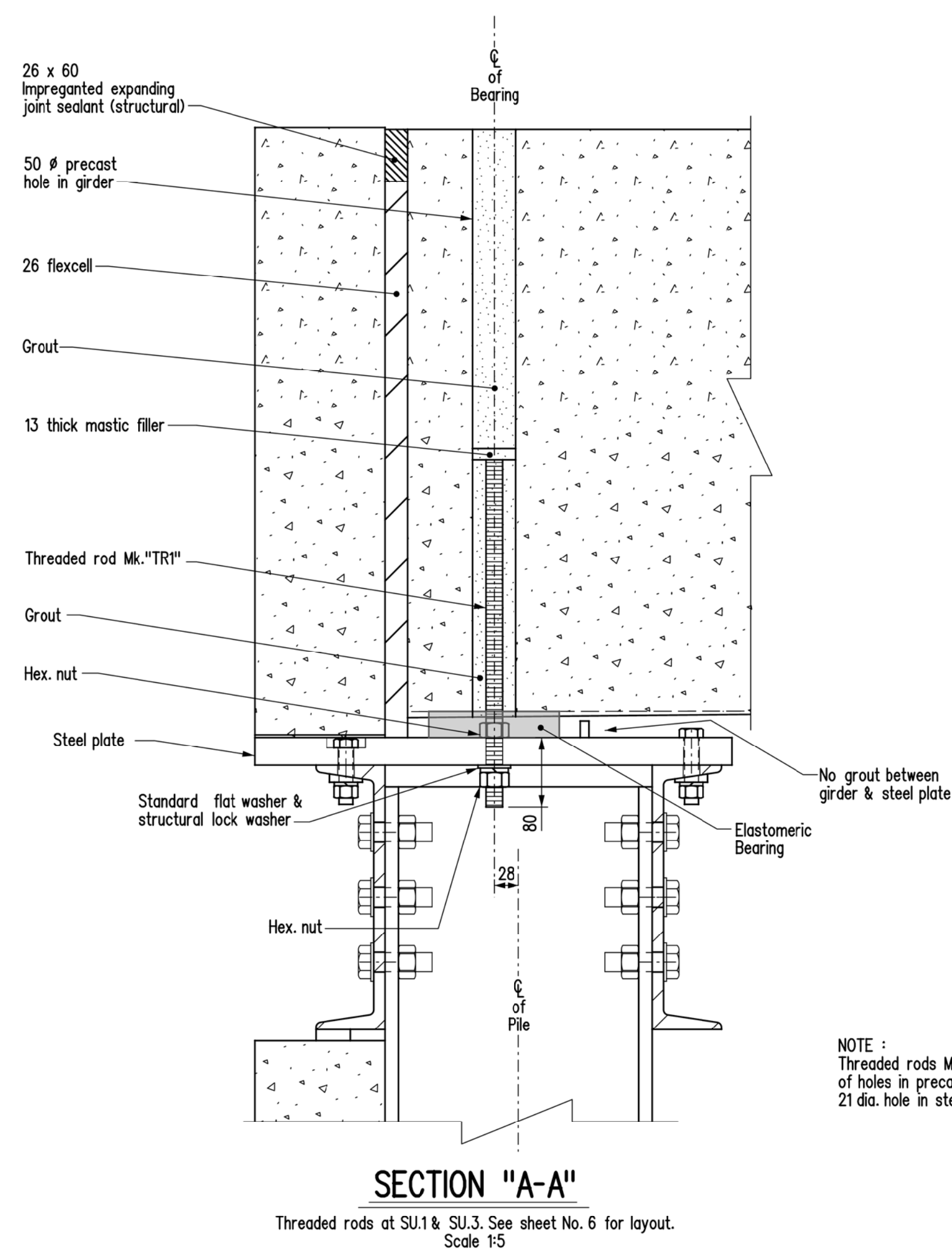
NOTE:

- Elastomer shall be natural rubber. Elastomer shall be AASHTO low temperature Grade 5 with a minimum shear modulus $G \geq 0.9$ MPa and a 60 durometer Shore A hardness.
- Internal steel reinforcing plates for laminate bearings shall be rolled mild steel with a minimum yield strength of 300 Mpa.

PLAN
Scale 1:10

PART CROSS SECTION
Scale 1:2

ELASTOMERIC BEARINGS



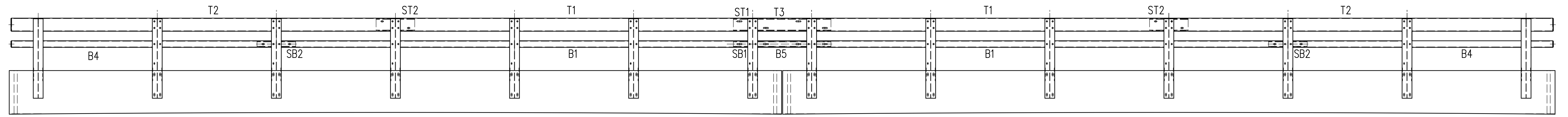
NOTE:
Threaded rods Mk.'TR1', set exactly on centreline of holes in precast girders and grouted. Field drill 21 dia. hole in steel plate to match girders.

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.
- 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 m².

REVISIONS		BEARING AND ERECTION DETAILS		
DATE	BY			
		Manitoba Infrastructure Water Management and Structures		
		RELEASED FOR CONSTRUCTION BY: _____ DATE: _____		
		DESIGN	EXECUTIVE DIRECTOR OF STRUCTURES	DATE
			SCALE: 1:75	SHEET No. 10
PLACE ENGINEERS ELECTRONIC SEAL HERE		DETAILS	BY: _____	or as shown
			CHECKED: _____	SITE No. _____



SU.1 GP2 SU.2 SU.3

END SPAN

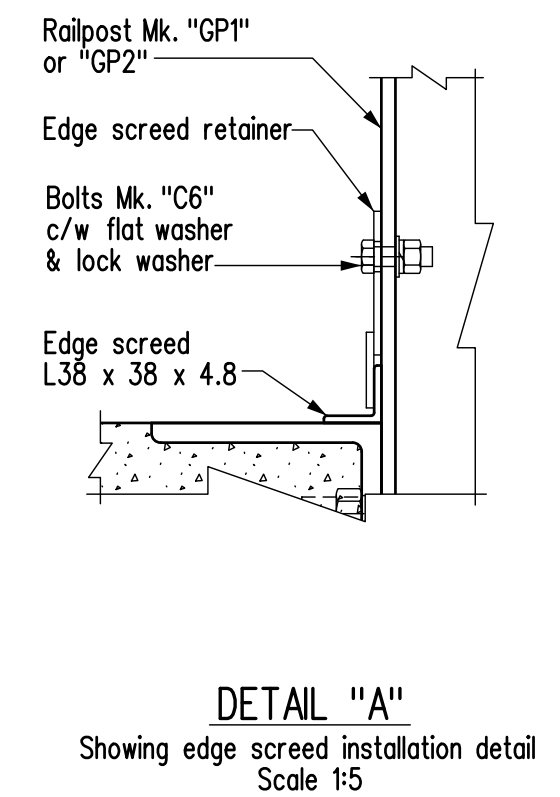
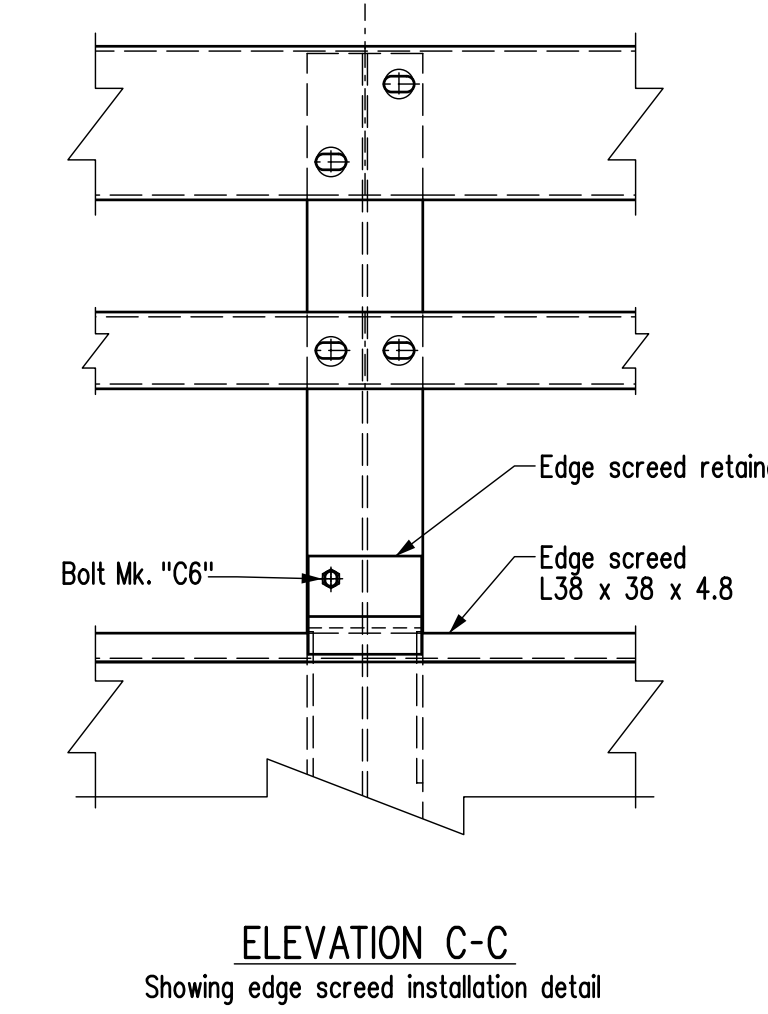
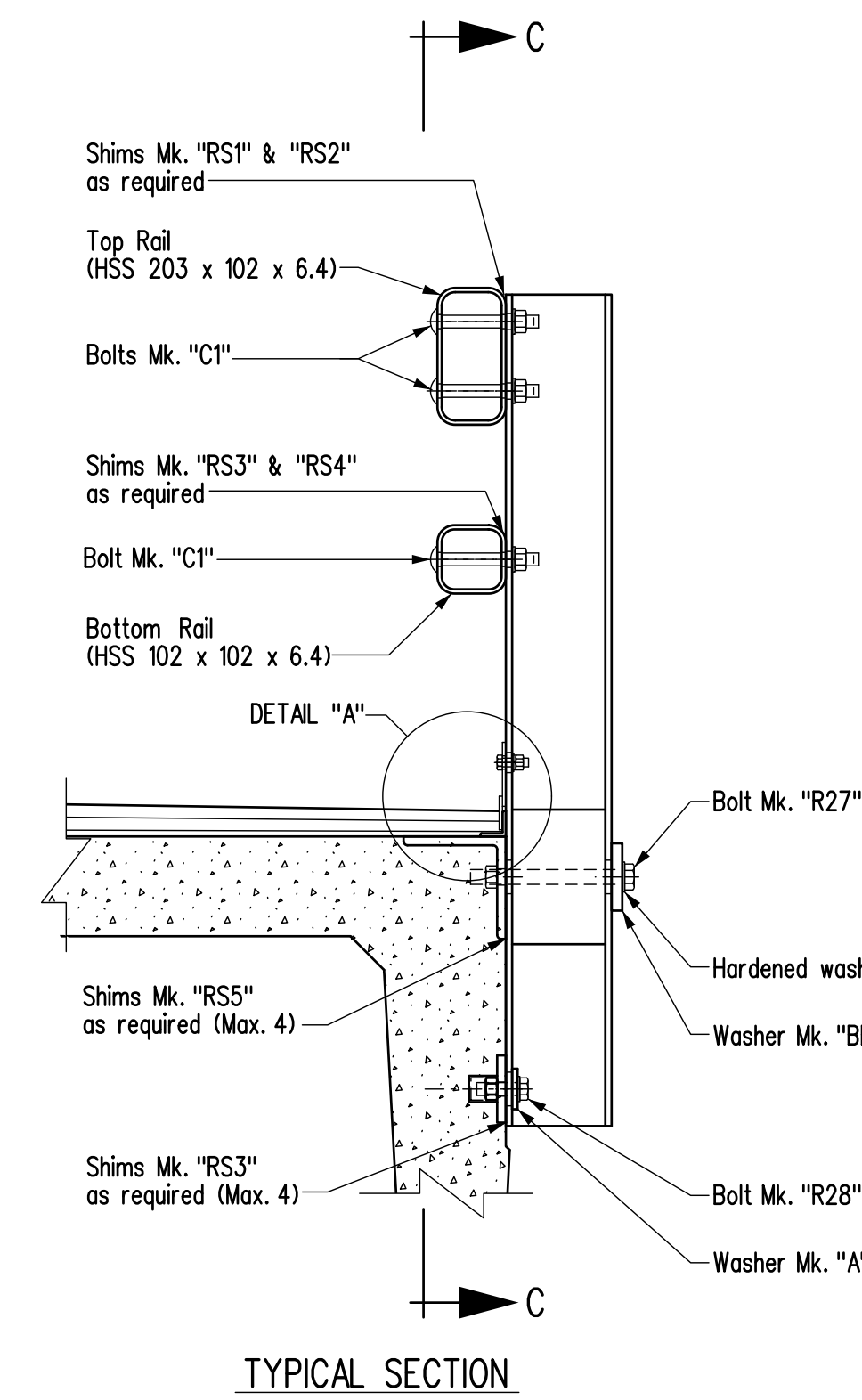
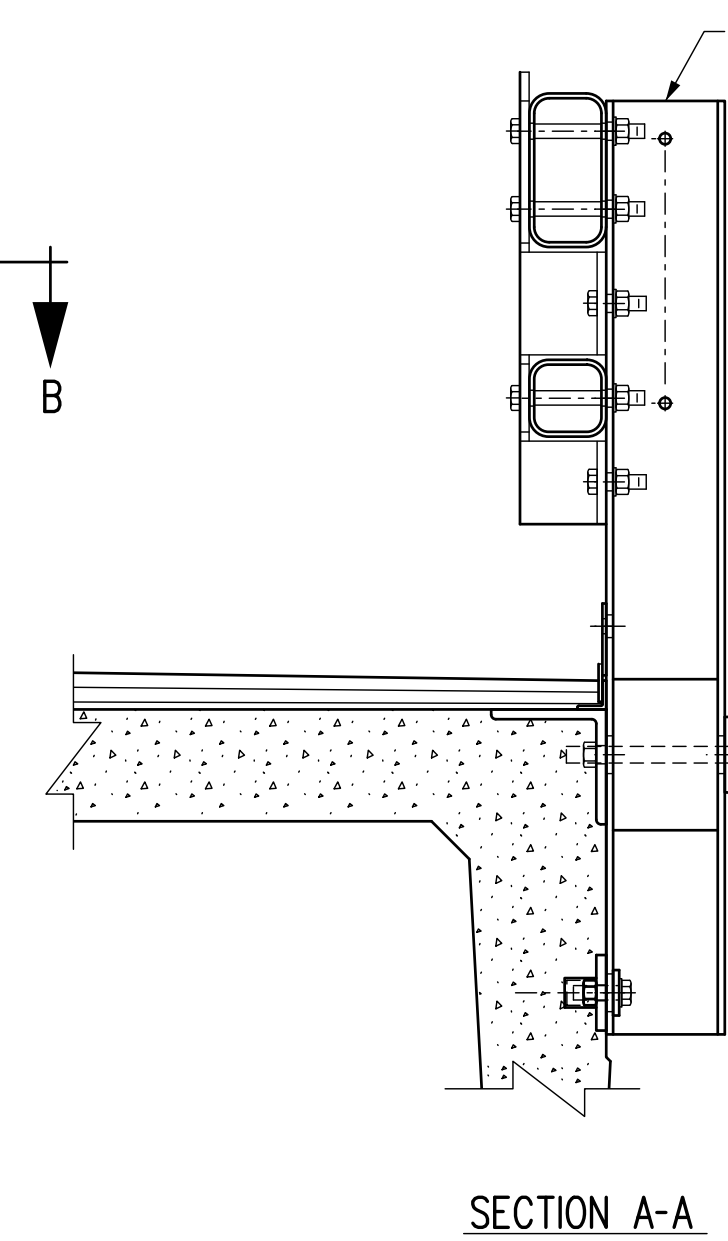
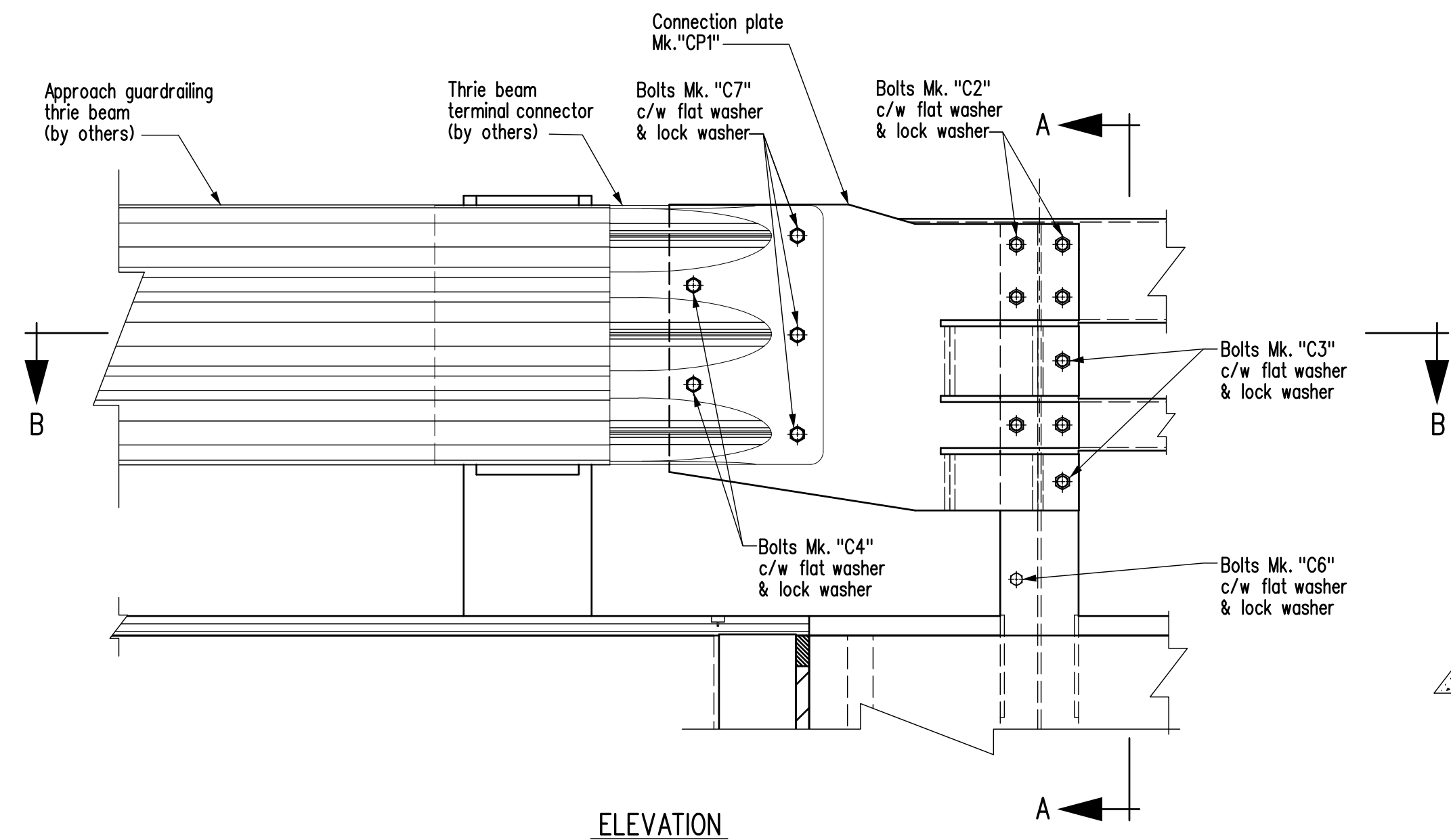
RAILS				SLEEVES		RAILPOSTS	
T1	T2	B1	B4	ST2	SB2	GP1	GP2
2	2	2	2	2	2	12	2

RAILS		SLEEVES	
T3	B5	ST1	SB1
2	2	2	2

END SPAN

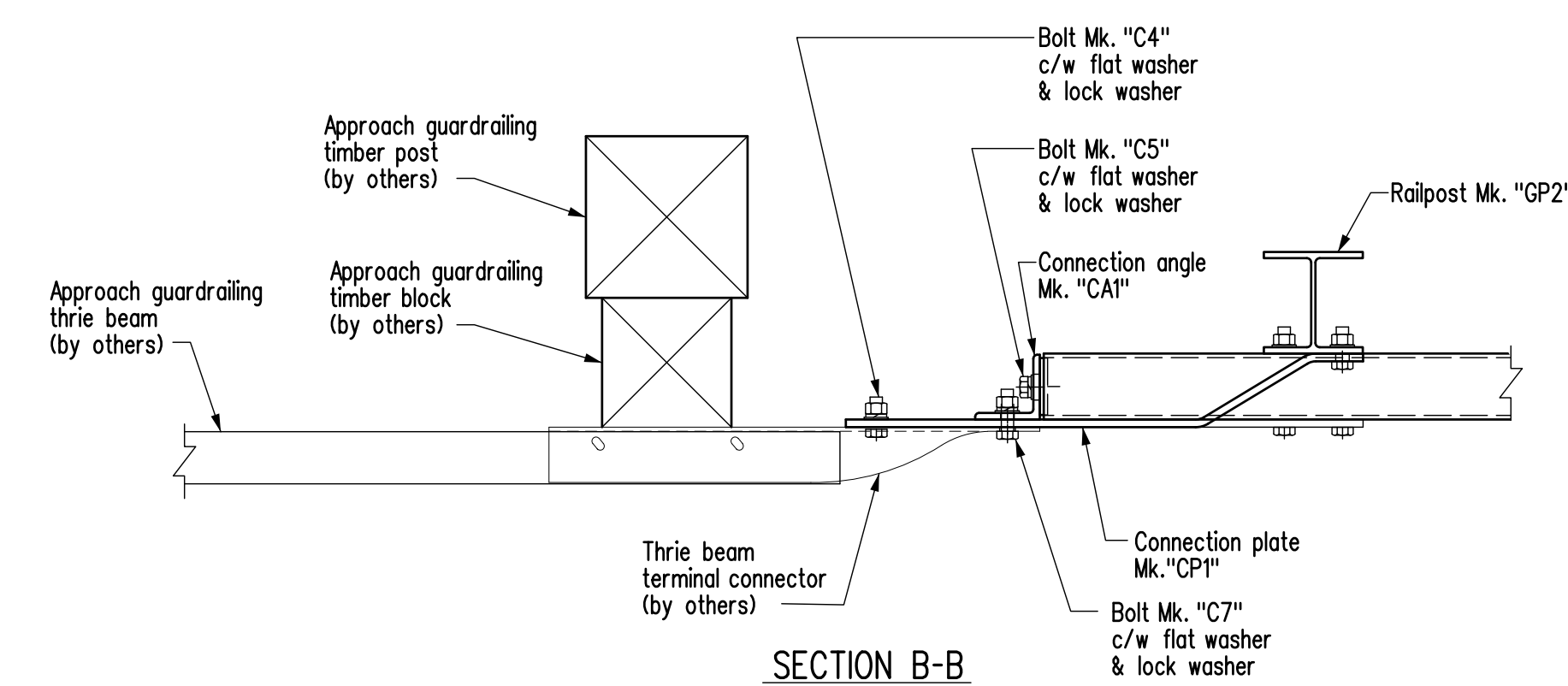
RAILS				SLEEVES		RAILPOSTS	
T1	T2	B1	B4	ST2	SB2	GP1	GP2
2	2	2	2	2	2	12	2

RAILING LAYOUT
Not to Scale



NOTES:

- All railposts shall be Mk. "GP1" unless noted otherwise.
- This sheet to be read in conjunction with Sheets & .

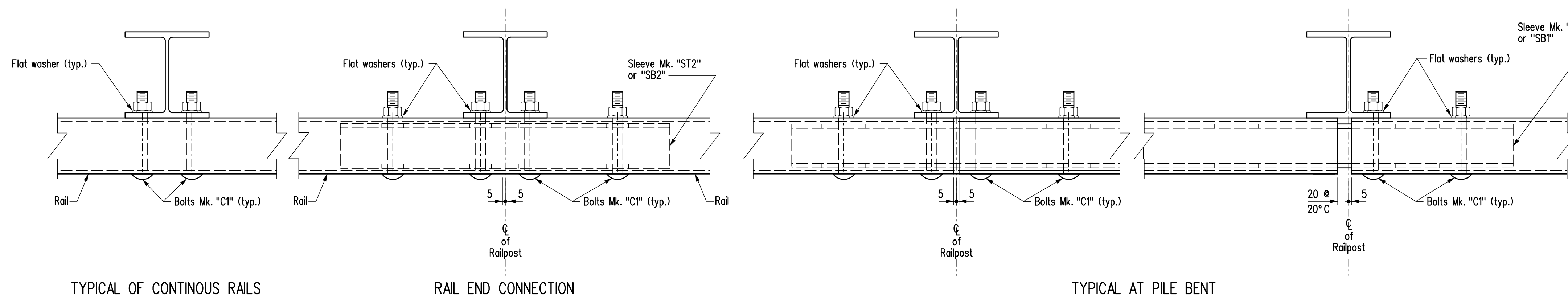


APPROACH RAIL CONNECTION DETAILS

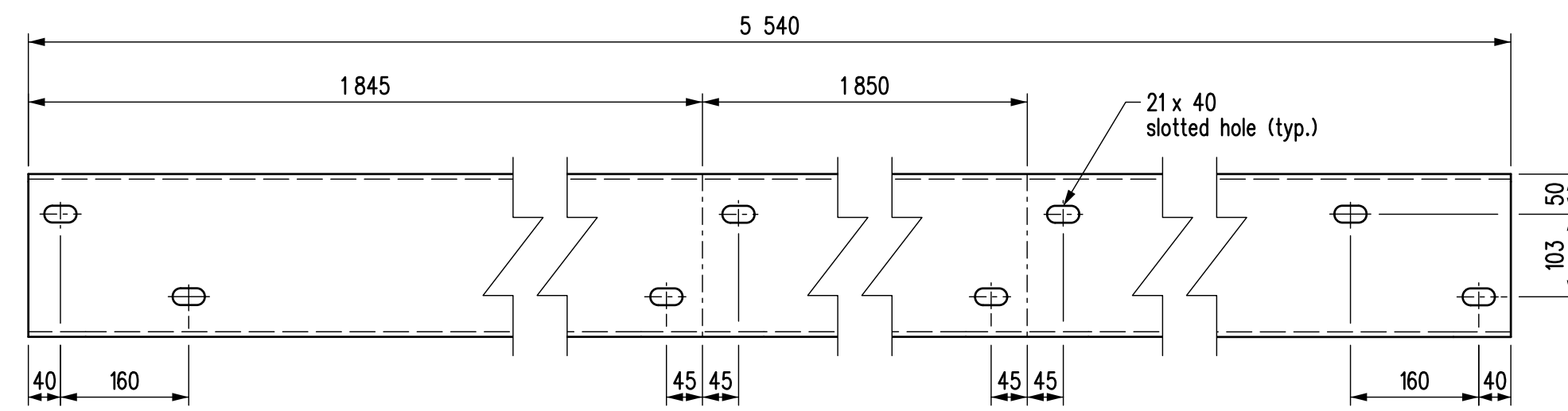
RAILPOST ERECTION DETAILS

NOTES:

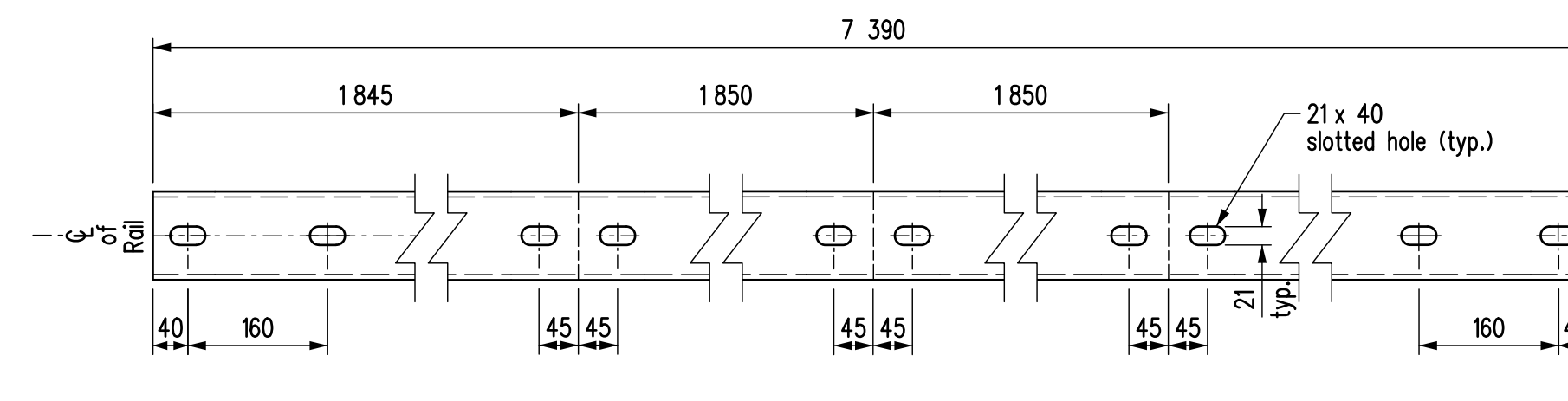
- High strength bolts Mk. "R27" & "R28" shall be tightened by turn-of-nut method as per Specification 1061. These bolts to be supplied by the Girder Fabricator. For quantities see Bill of Miscellaneous Metal on Girder sheet.
- High strength bolted connection may be shimmed to a maximum of 12 mm with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



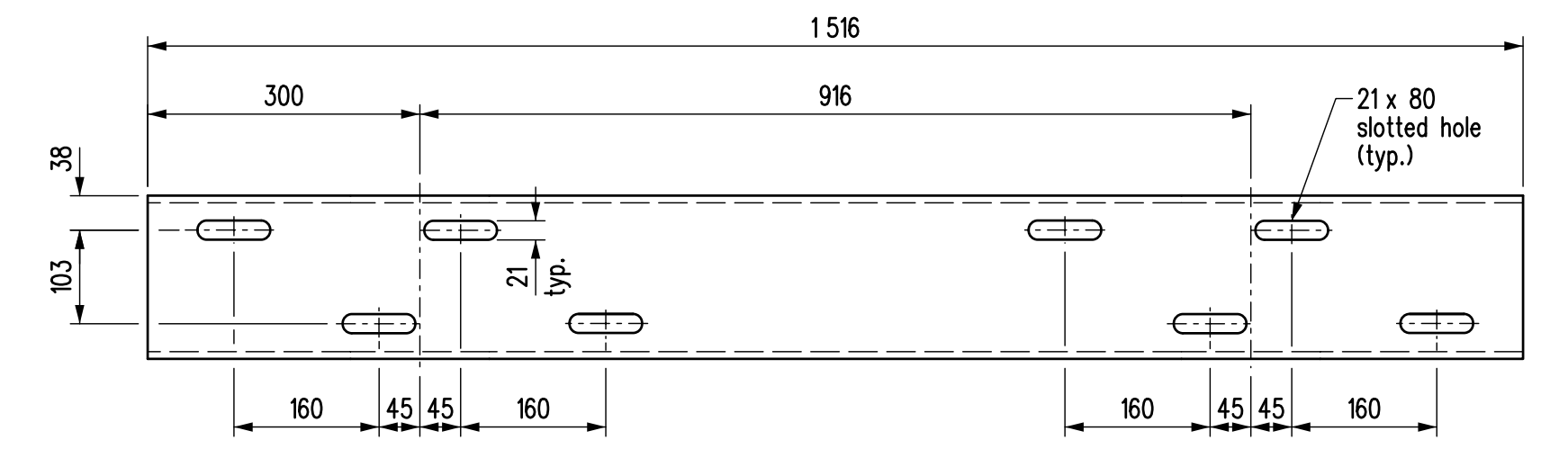
REVISIONS		RAILING LAYOUT AND DETAILS	
DATE	BY		
		<p style="text-align: center;">Manitoba Infrastructure Water Management and Structures</p>	
		<p>RELEASED FOR CONSTRUCTION BY: _____ DATE: _____</p>	
		<p>DESIGN BY: _____</p> <p>CHECKED: _____</p>	<p>EXECUTIVE DIRECTOR OF STRUCTURES DATE: _____</p>
		<p>DETAILS BY: _____</p> <p>CHECKED: _____</p>	<p>SCALE: 1:10 SHEET No. _____</p> <p>or as shown SITE No. _____</p>



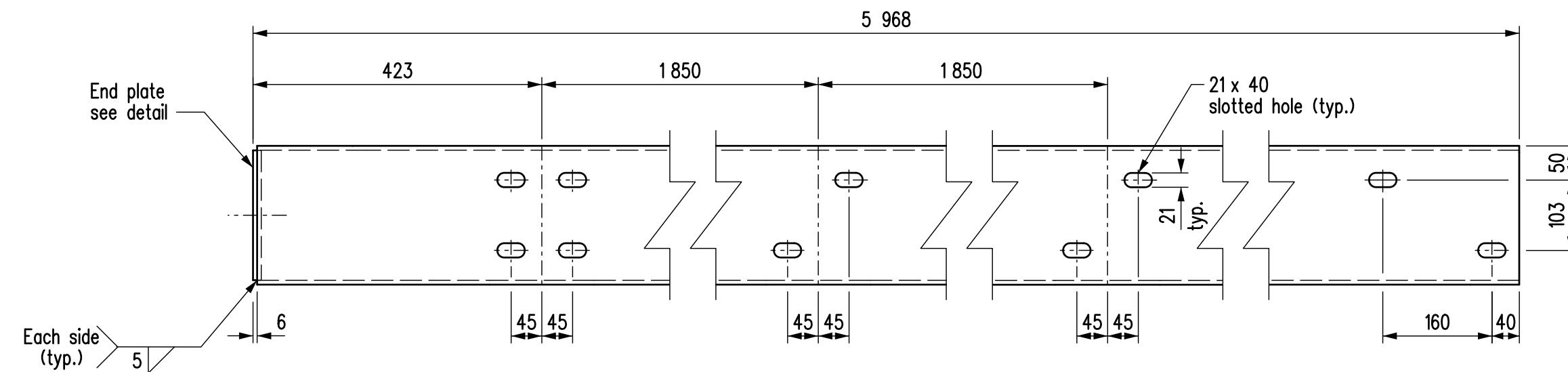
Mk. "T1"



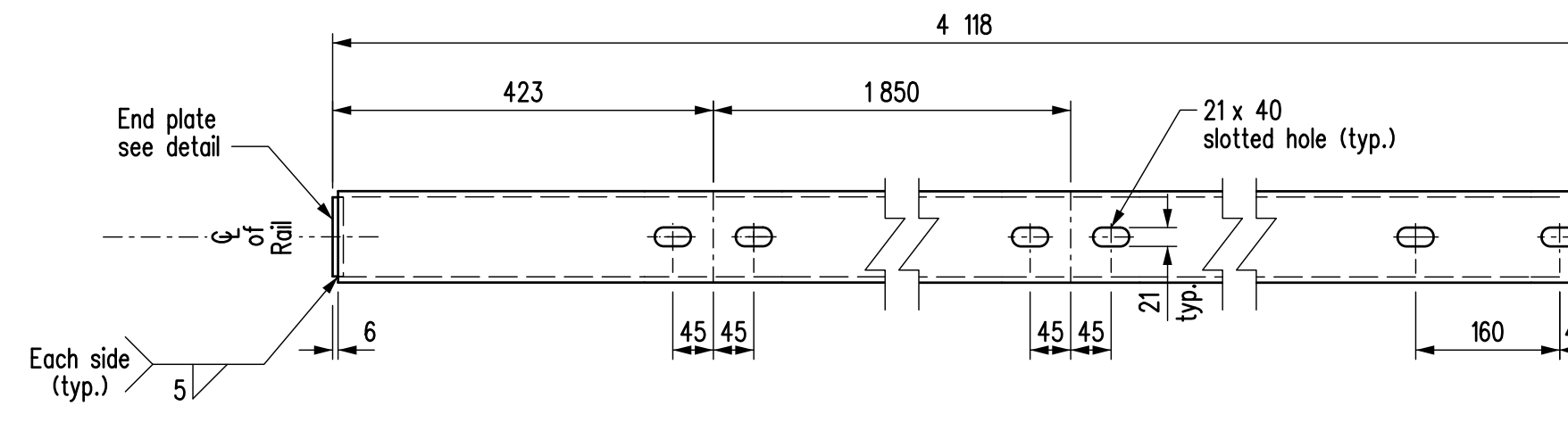
Mk. "B1"



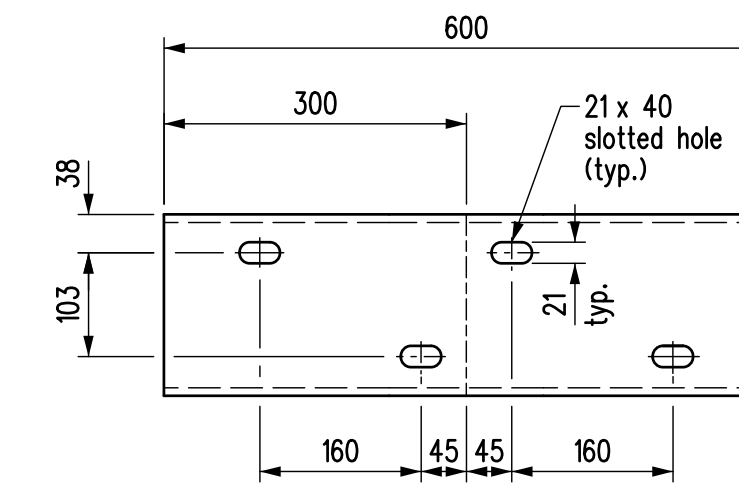
Mk. "ST1"



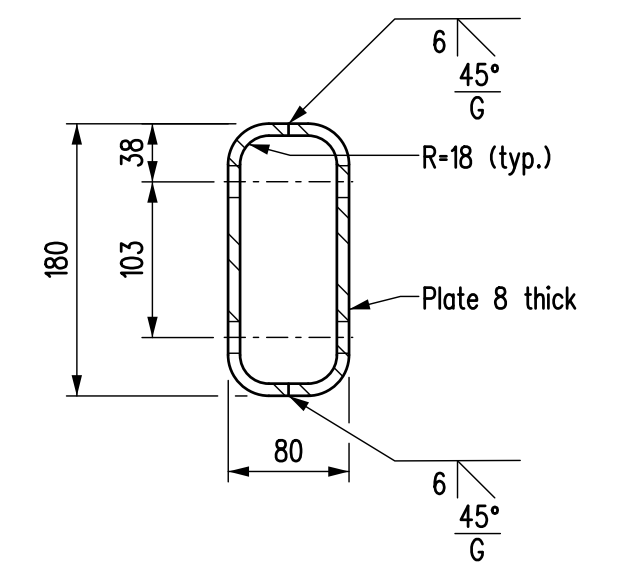
Mk. "T2"



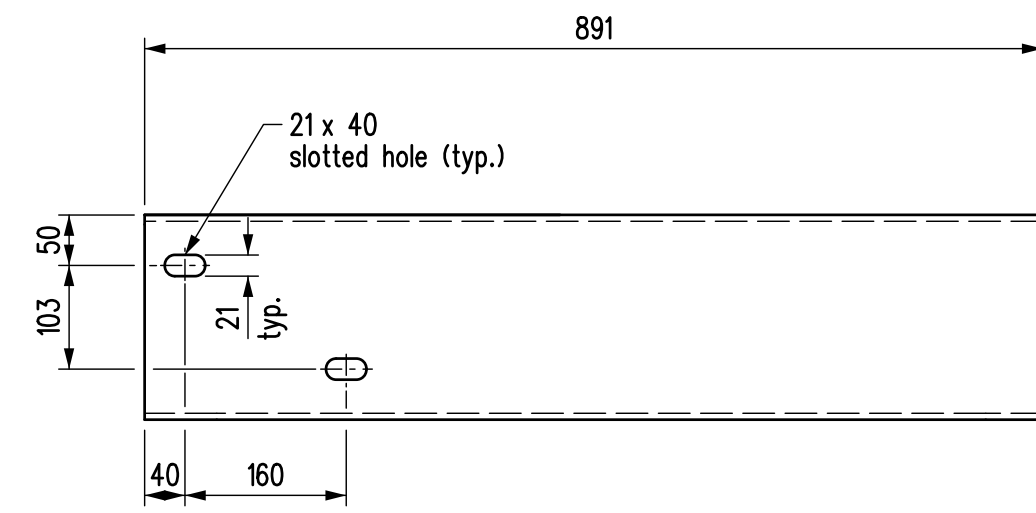
Mk. "B4"



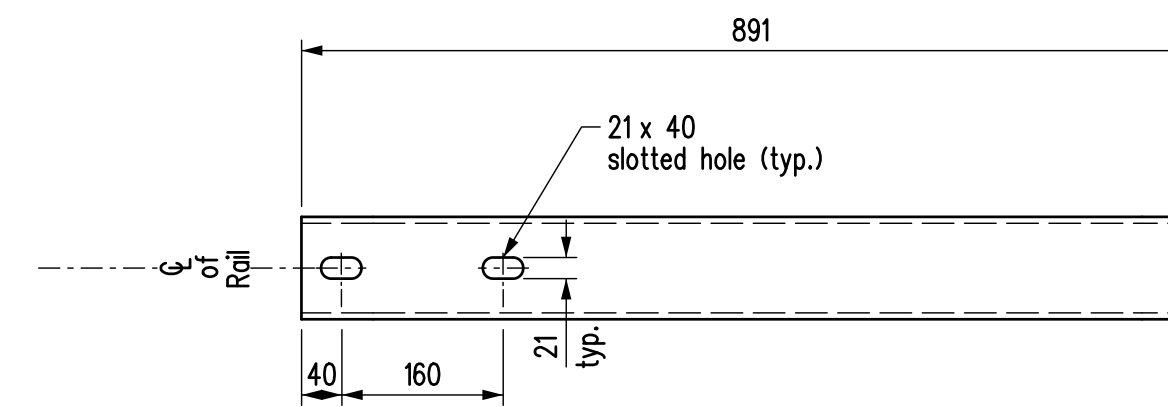
Mk. "ST2"



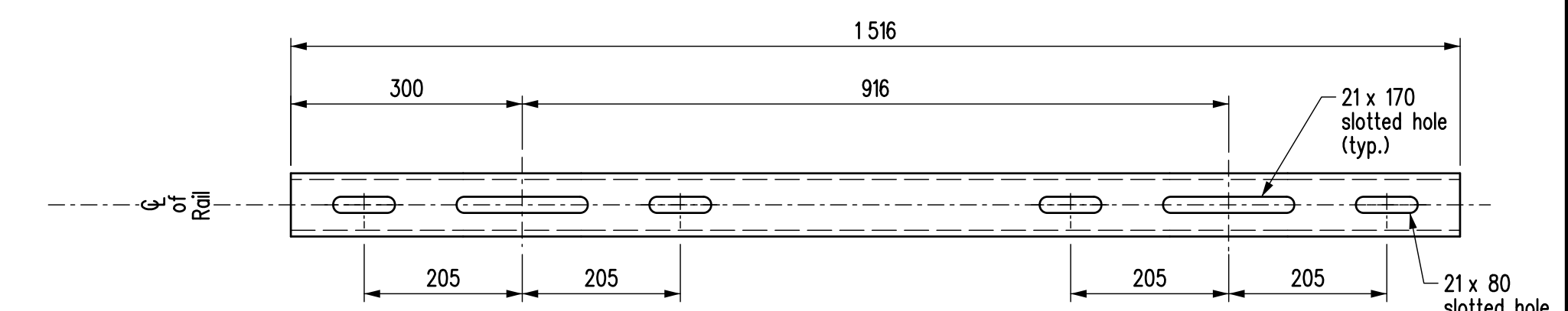
TYPICAL CROSS SECTION
Scale 1:5



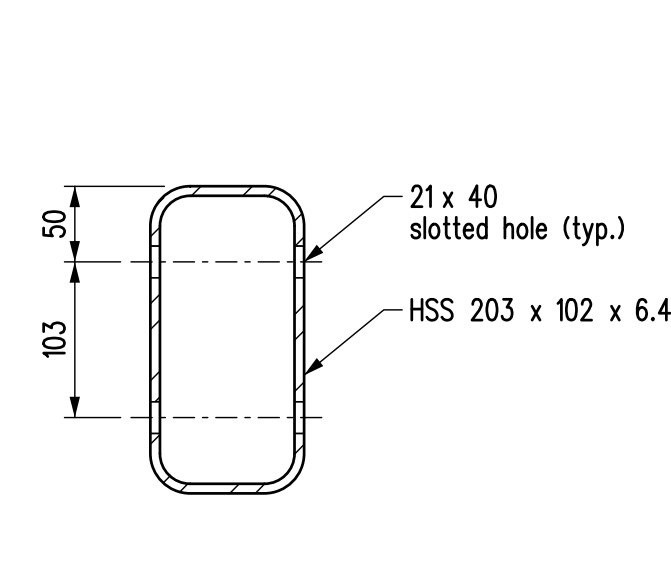
Mk. "T3"



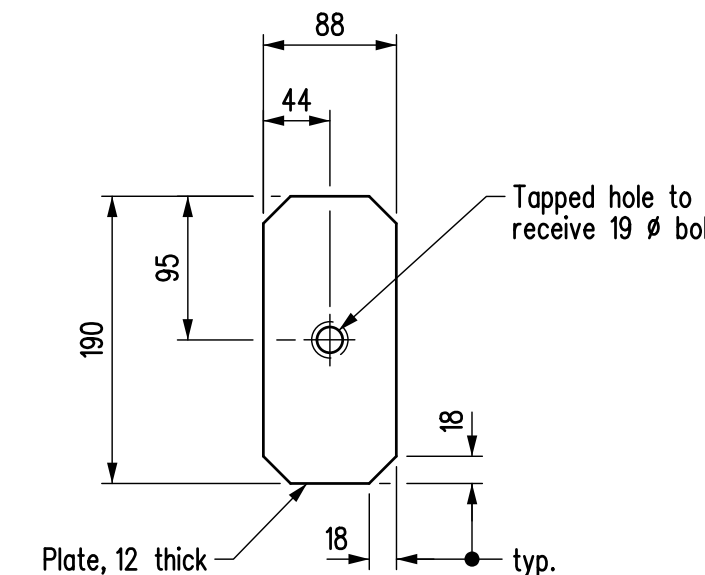
Mk. "B5"



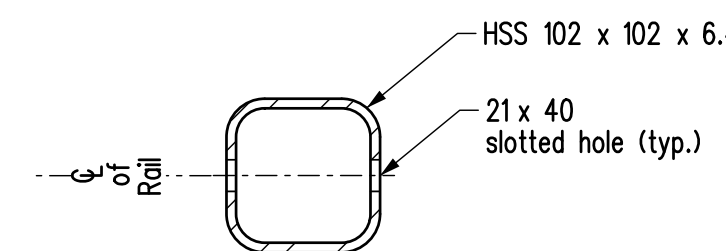
Mk. "SB1"



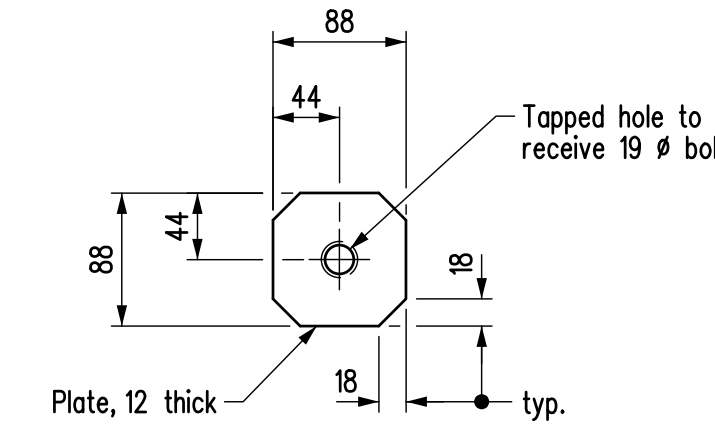
TYPICAL CROSS SECTION
Typical for rail Mk. "T1", "T2" & "T3"
Scale 1:5



END PLATE
For rail Mk. "T2"
Scale 1:5

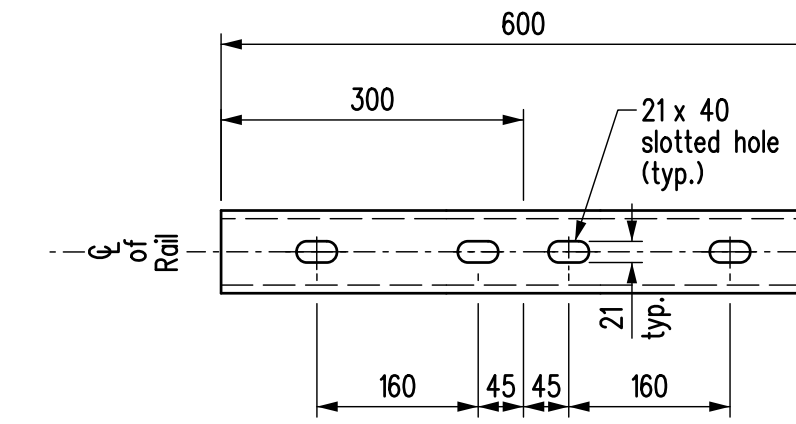


TYPICAL CROSS SECTION
Typical for rails Mk. "B1", "B4" & "B5"
Scale 1:5

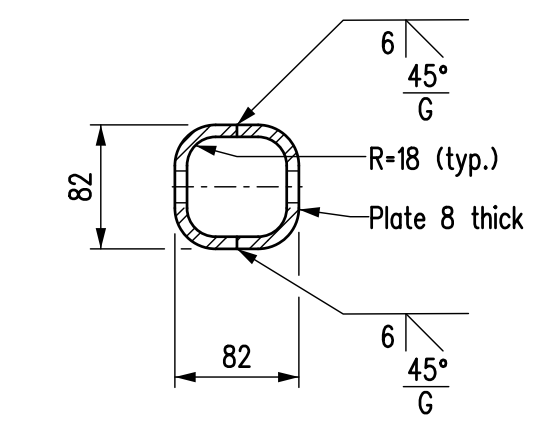


END PLATE
For rail Mk. "B4"
Scale 1:5

DETAILS OF BOTTOM RAILS



Mk. "SB2"



TYPICAL CROSS SECTION
Scale 1:5

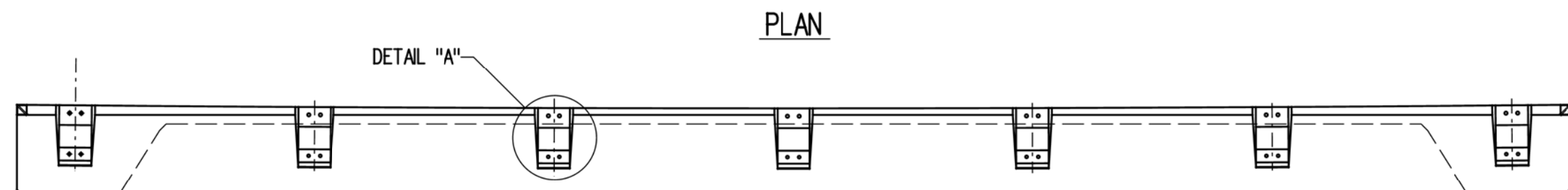
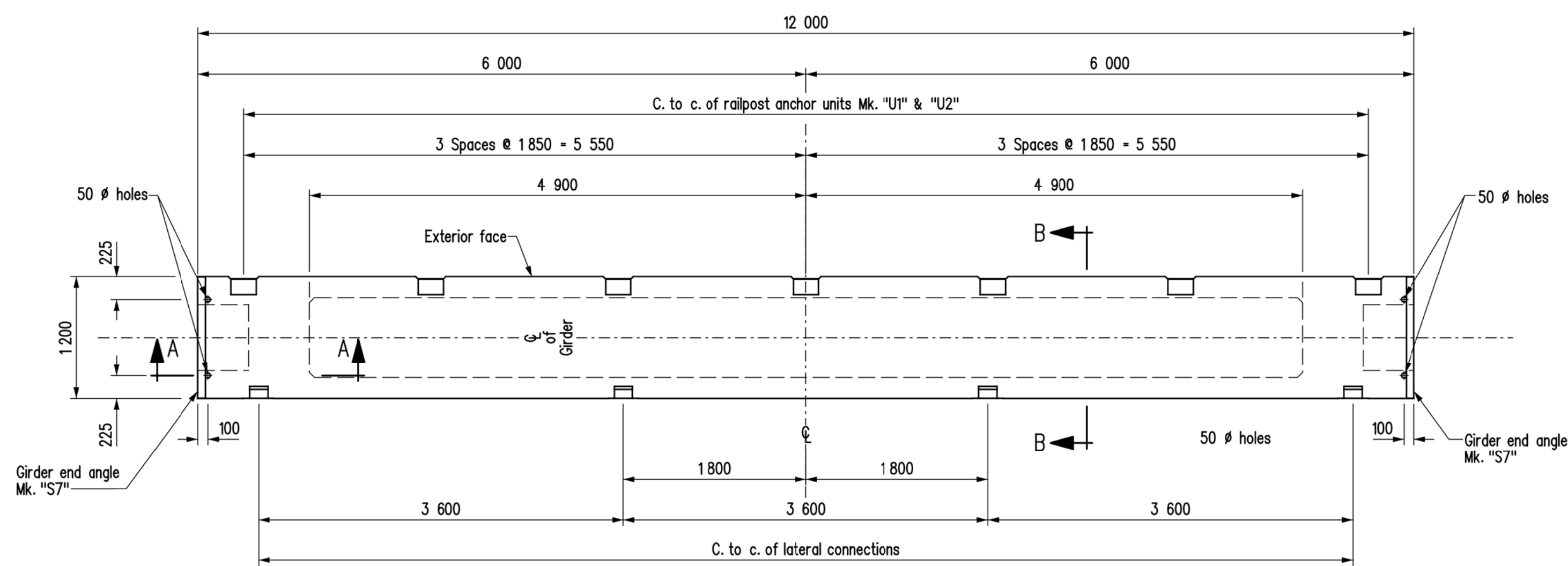
DETAILS OF SLEEVES

DETAILS OF TOP RAILS

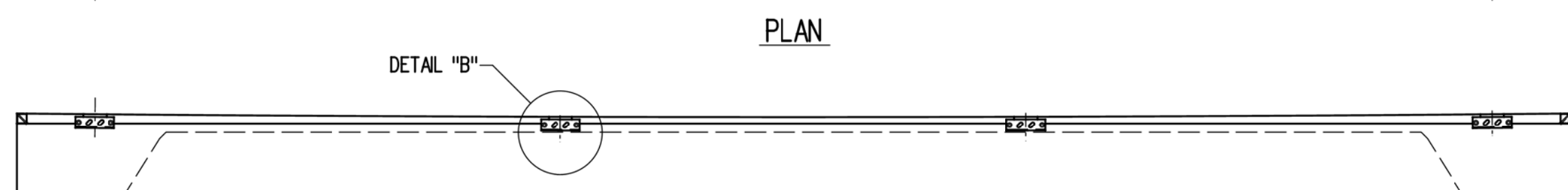
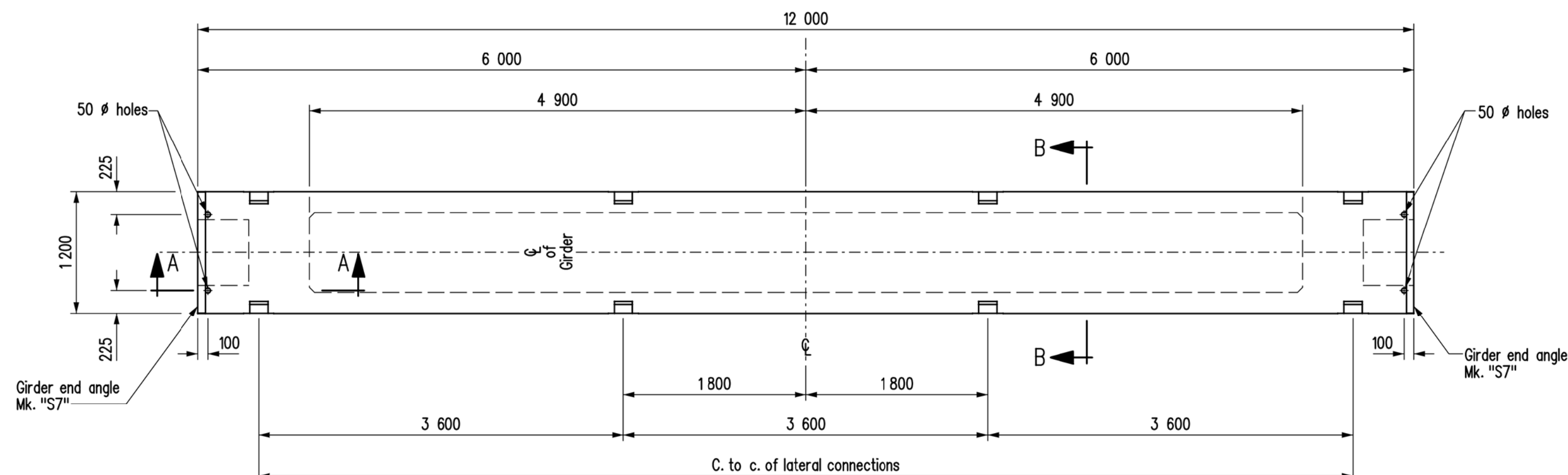
NOTES:

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).

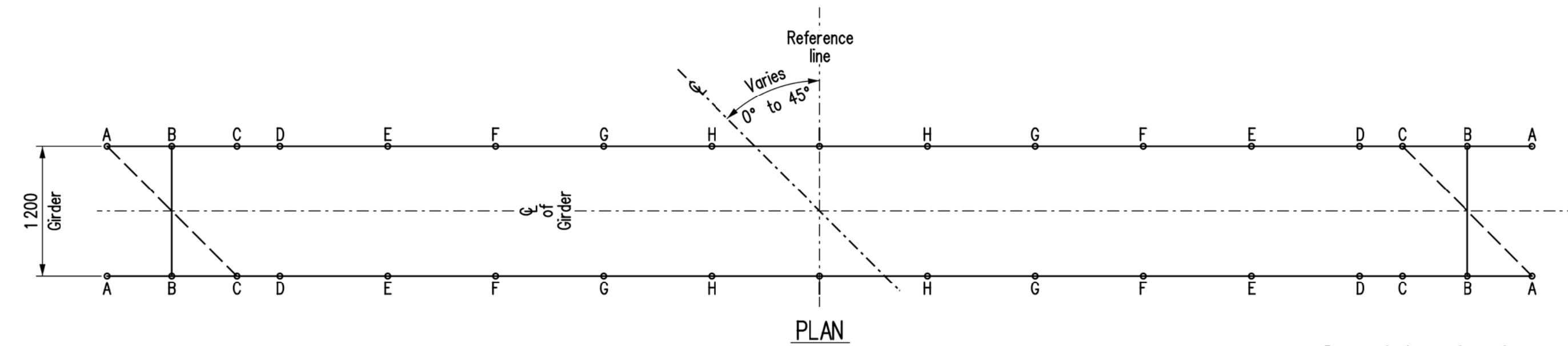
REVISIONS			RAILING DETAILS		
			Manitoba Infrastructure Water Management and Structures		
DATE	BY	DESCRIPTION	RELEASSED FOR CONSTRUCTION BY:	EXECUTIVE DIRECTOR OF STRUCTURES DATE	
DESIGN SEAL	RECORD SEAL				
			DESIGN BY: _____ CHECKED: _____	SCALE: 1:7.5	SHEET No: _____
			DETAILS BY: _____ CHECKED: _____	or as shown	SITE No: _____



EXTERIOR ELEVATION
EXTERIOR GIRDER MK. "G1"



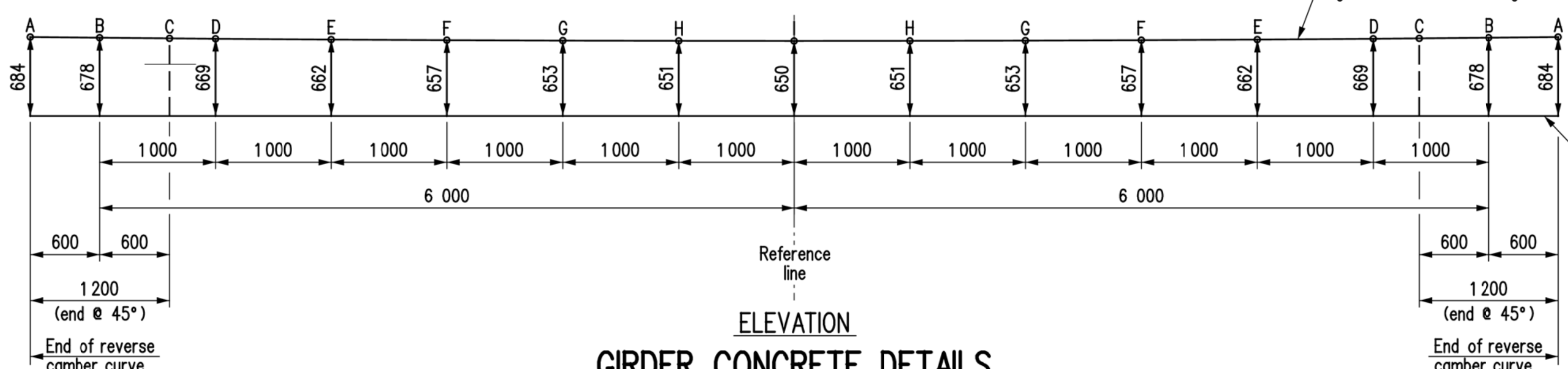
ELEVATION
INTERIOR GIRDER MK. "G2"



NOTE: Top surface of girder shall be screeded perpendicular to side forms

Represents top surface of girder before distressing

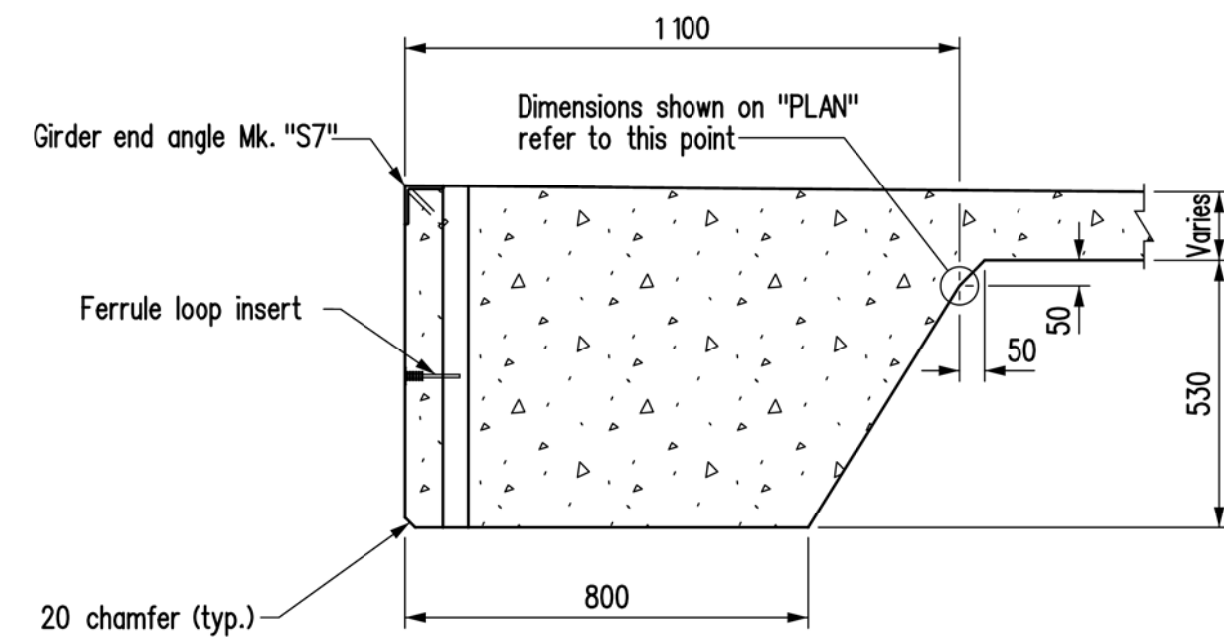
Represents bottom surface of girder before distressing (level)



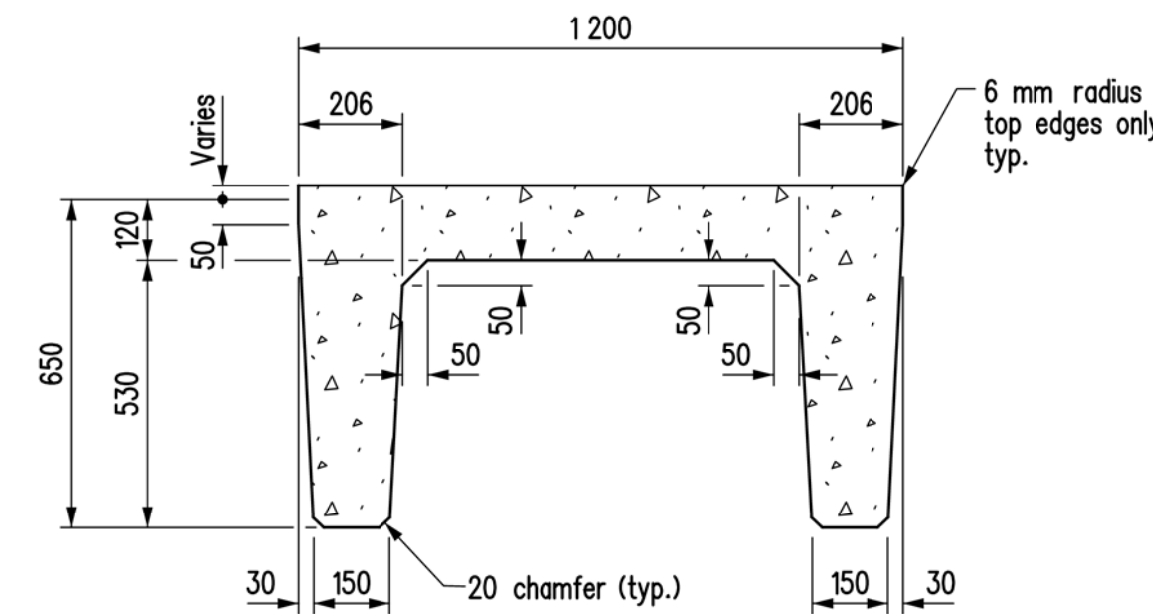
ELEVATION
GIRDER CONCRETE DETAILS

Showing variable depth of girder to eliminate camber on top surface after distressing

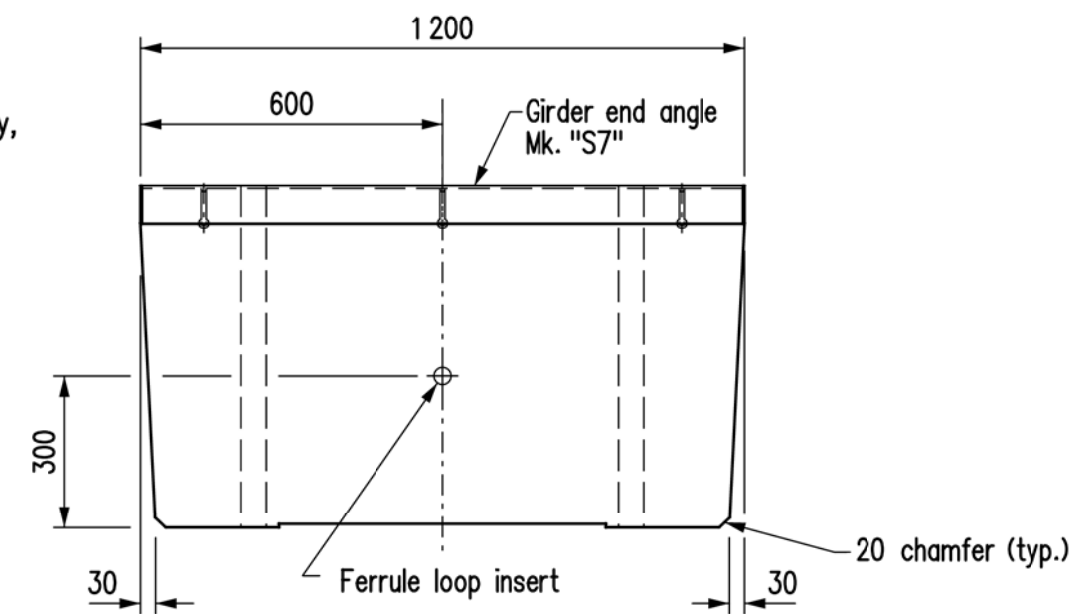
NOTE: The end of girder will fall between POINT "A" and POINT "C" on curve because of various skew angles.



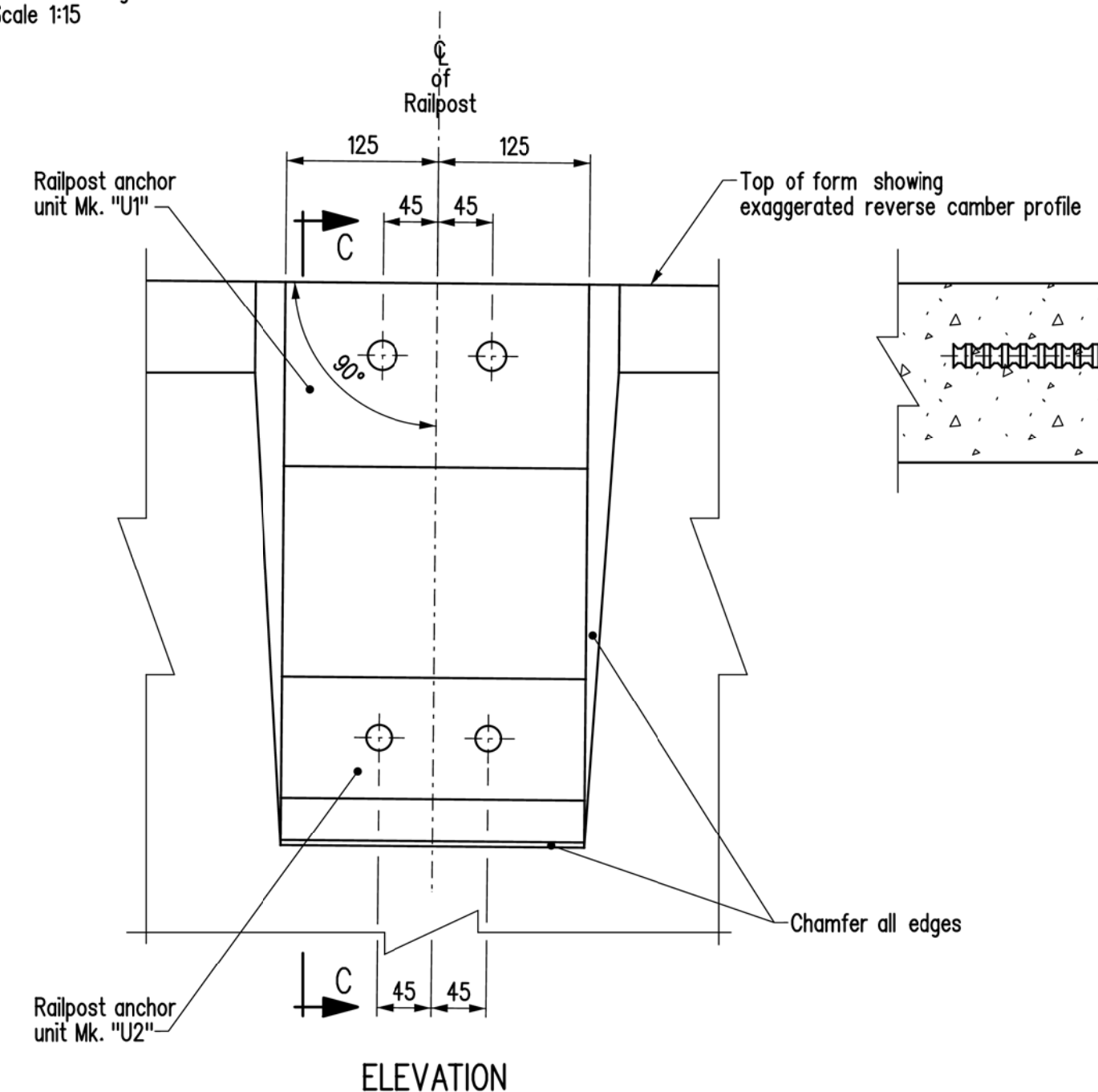
SECTION A-A
Typical at both ends of girders
Scale 1:15



SECTION B-B
Scale 1:15

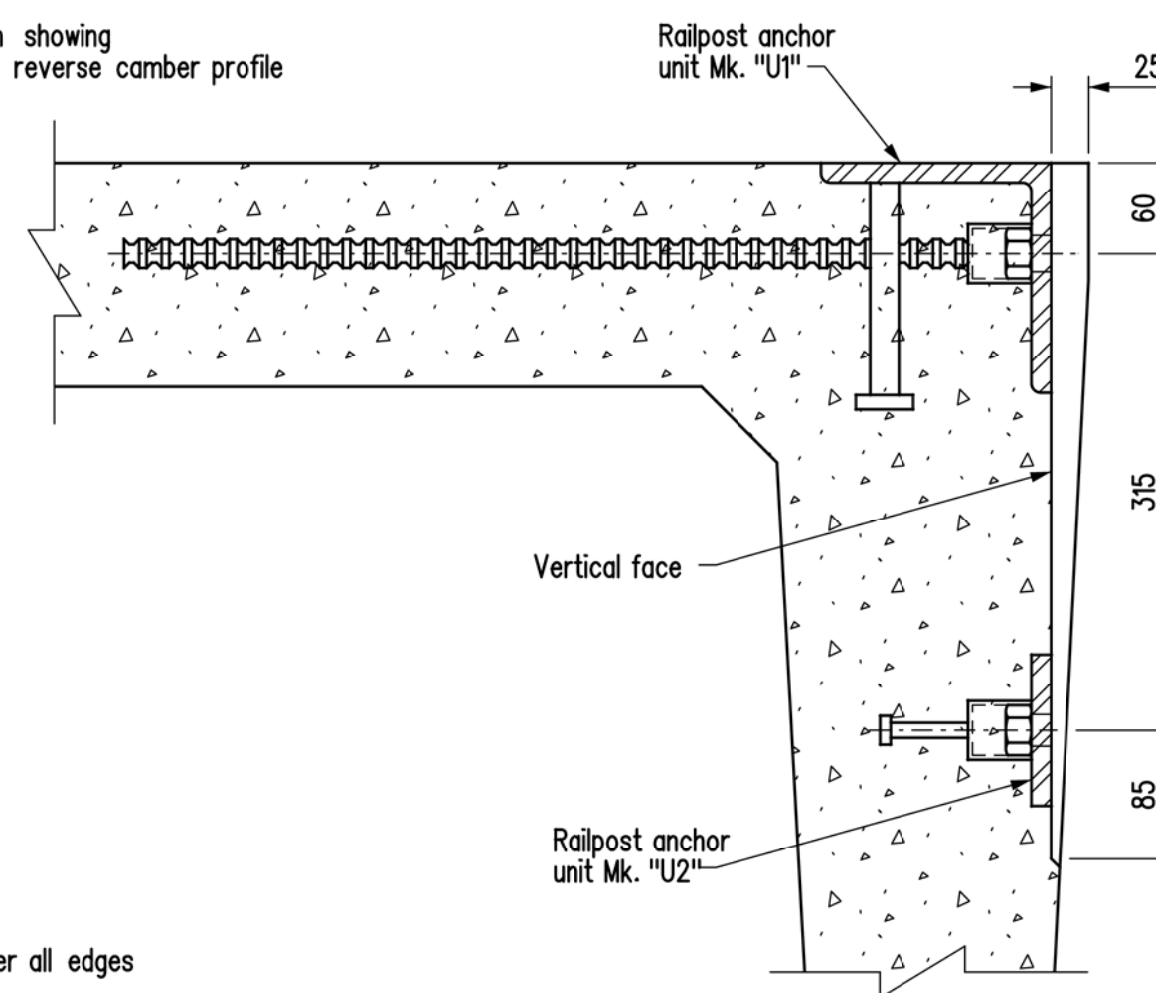


END VIEW
Scale 1:15

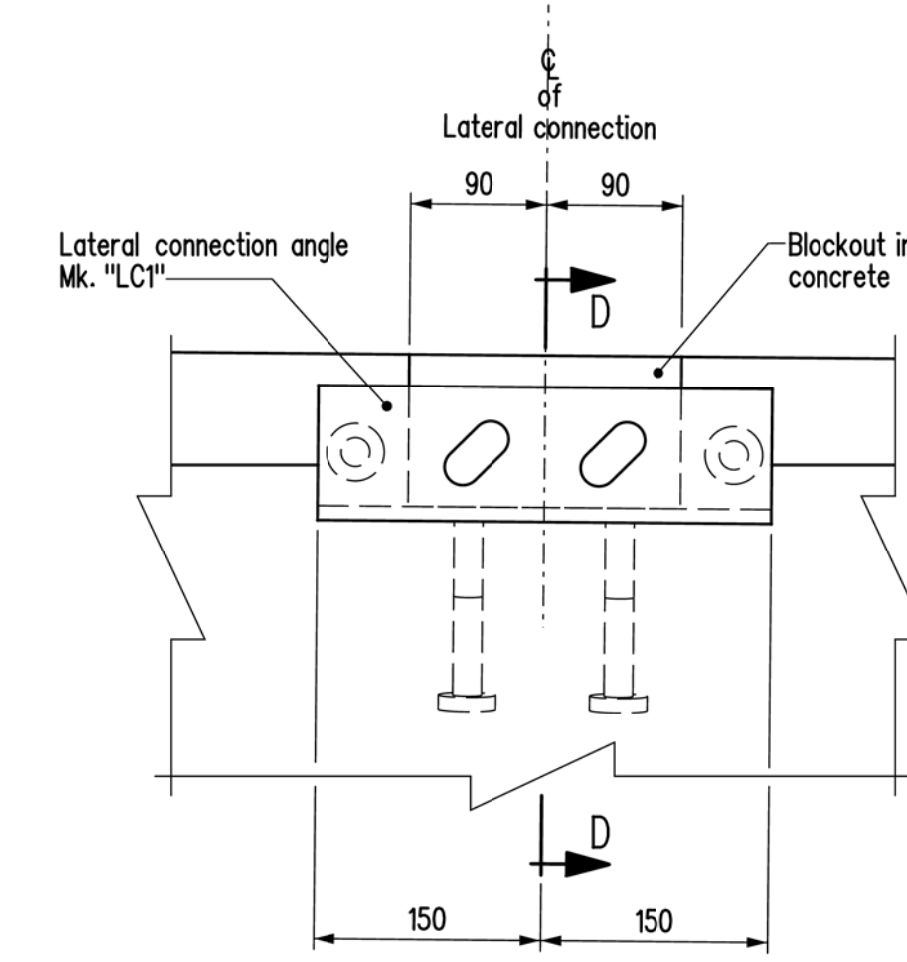


ELEVATION

DETAIL "A"
Scale 1:5

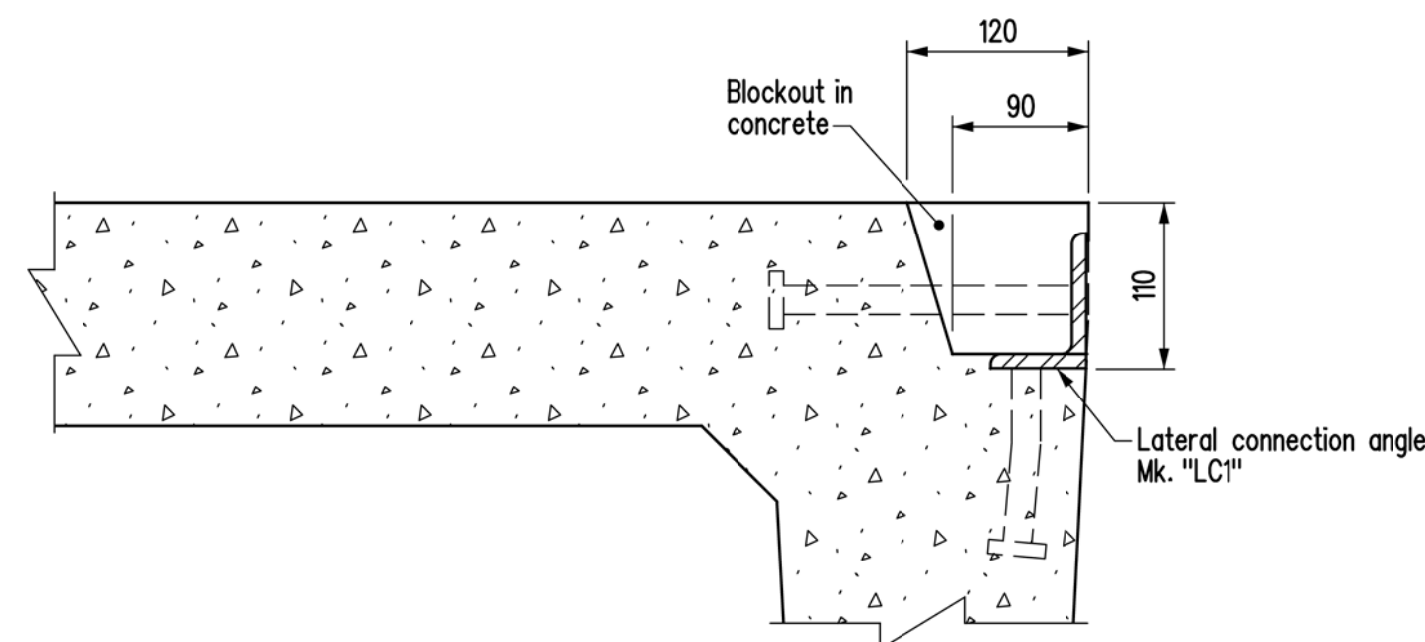


SECTION C-C



ELEVATION

DETAIL "B"
Scale 1:5



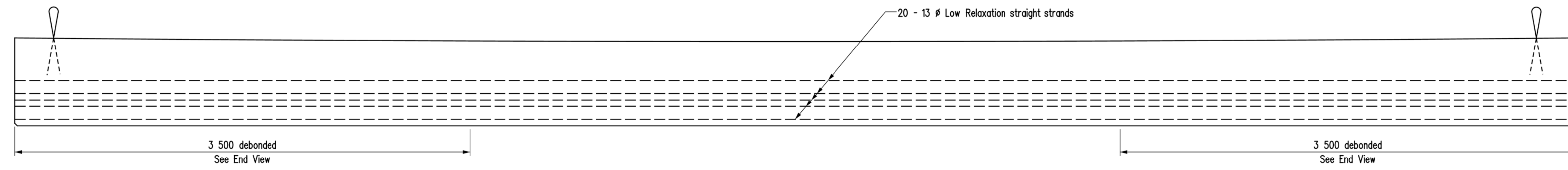
SECTION D-D

NOTES:

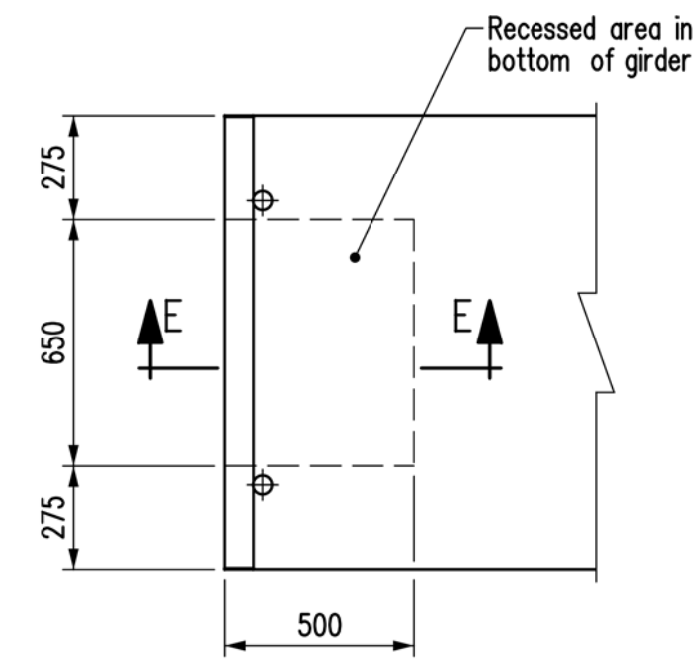
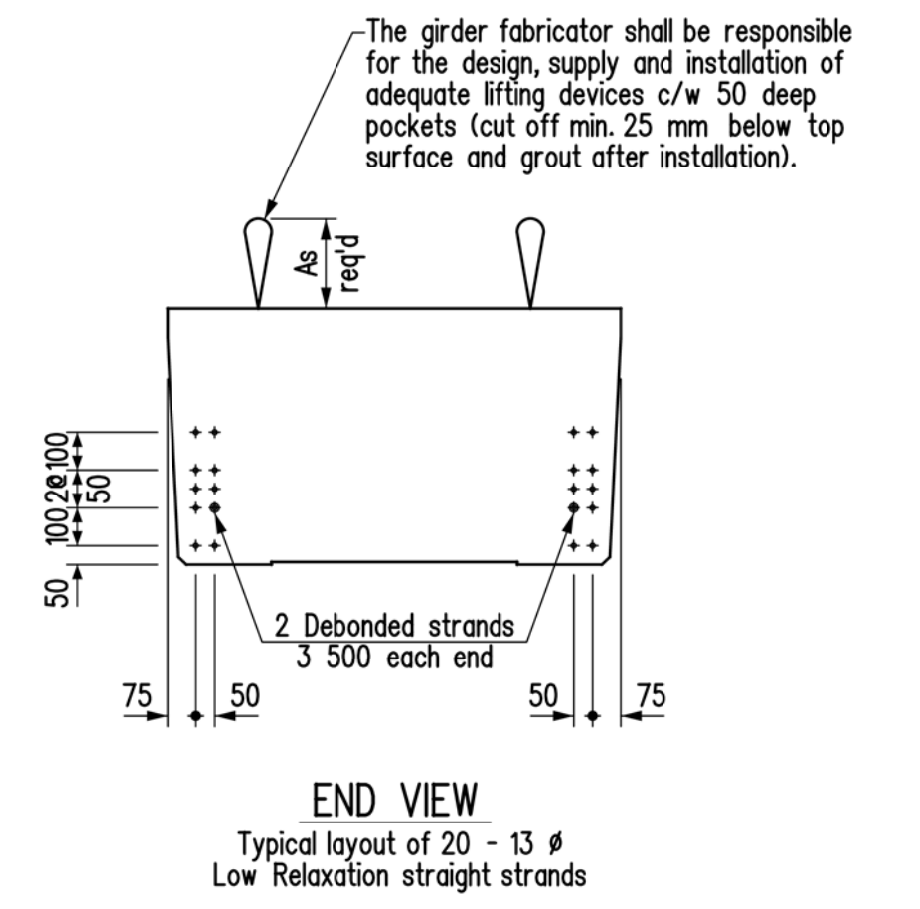
- Design in accordance with AASHTO LRFD Bridge Design Specifications, First Edition, 1994 plus 1996/1997 interim's.
- Design Vehicular Live Load: Modified AASHTO HSS-25 AASHTO LRFD "HL-93"
- Design distribution factor = 0.5 lanes/girder.
- Concrete strength: σ transfer, f_{ci} = 35 MPa
 σ 28 days, f_c = 45 MPa
- Prestress steel: 13 mm ϕ low relaxation strands
Minimum ultimate strength, f_{pu} = 1860 MPa
Jacking force/strand, f_{pj} = 128.5 kN/strand
- Girder dimensioning tolerances: Length 3 mm \pm
Cross section 2 mm \pm
- Approximate mass per girder = 12 000 kg

REVISIONS		PRECAST PRESTRESSED CHANNEL GIRDER DETAILS	
DATE	BY	DESIGN SEAL	RECORD SEAL
DESIGN		DETAILS	
BY: _____		EXECUTIVE DIRECTOR OF STRUCTURES DATE	
CHECKED: _____		SCALE: 1:40 SHEET No. G1	
BY: _____		or as shown SITE No. _____	
CHECKED: _____			

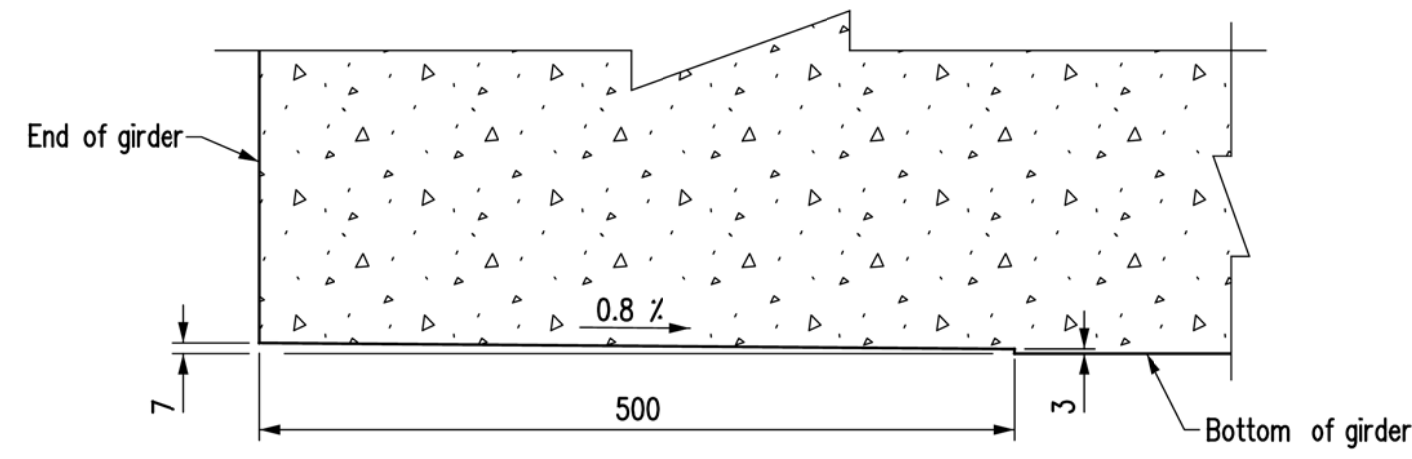
PLACE ENGINEERS
ELECTRONIC SEAL
HERE



ELEVATION
GIRDER STRAND LAYOUT



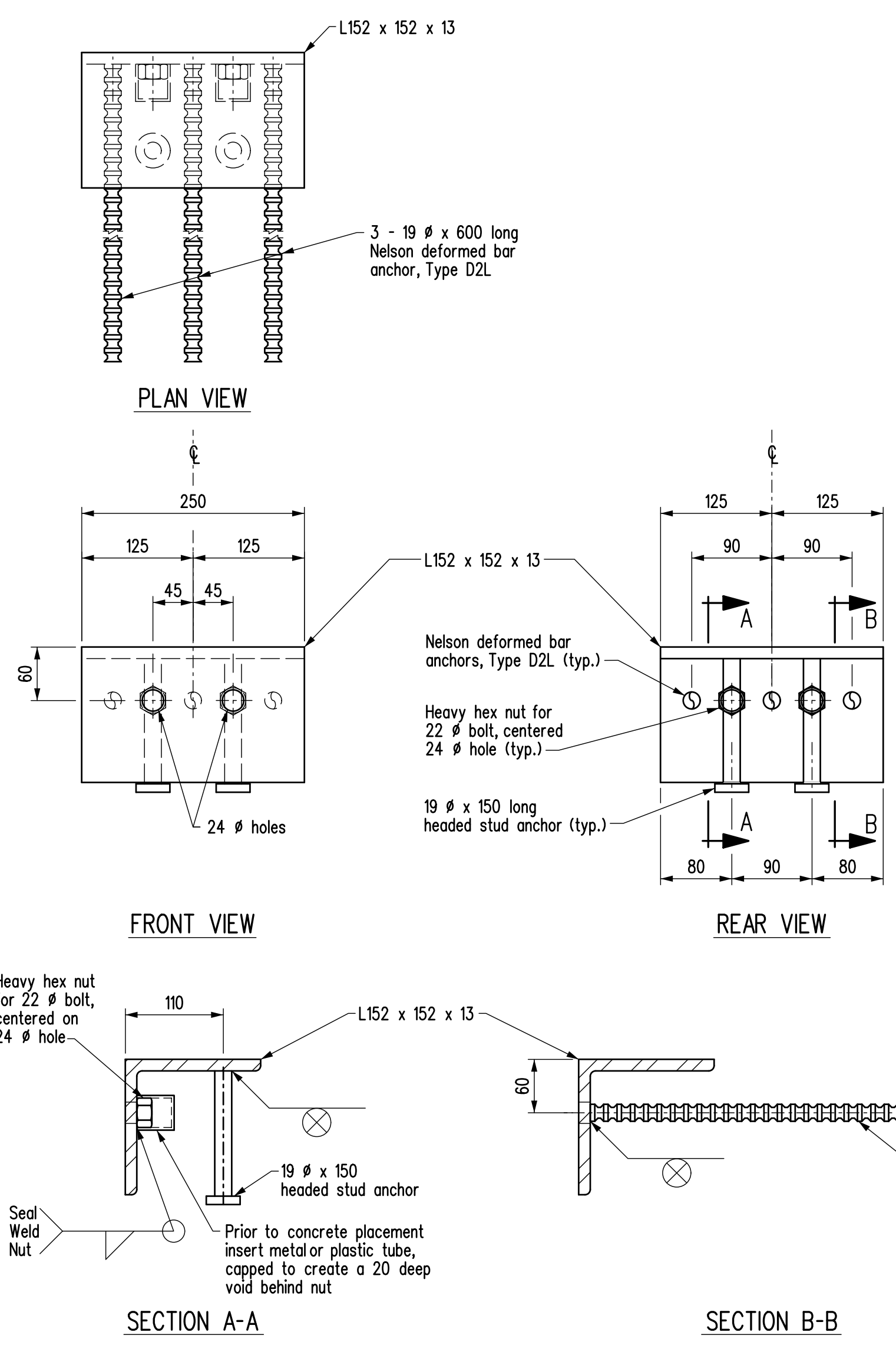
PART PLAN
Typical at both ends of girders



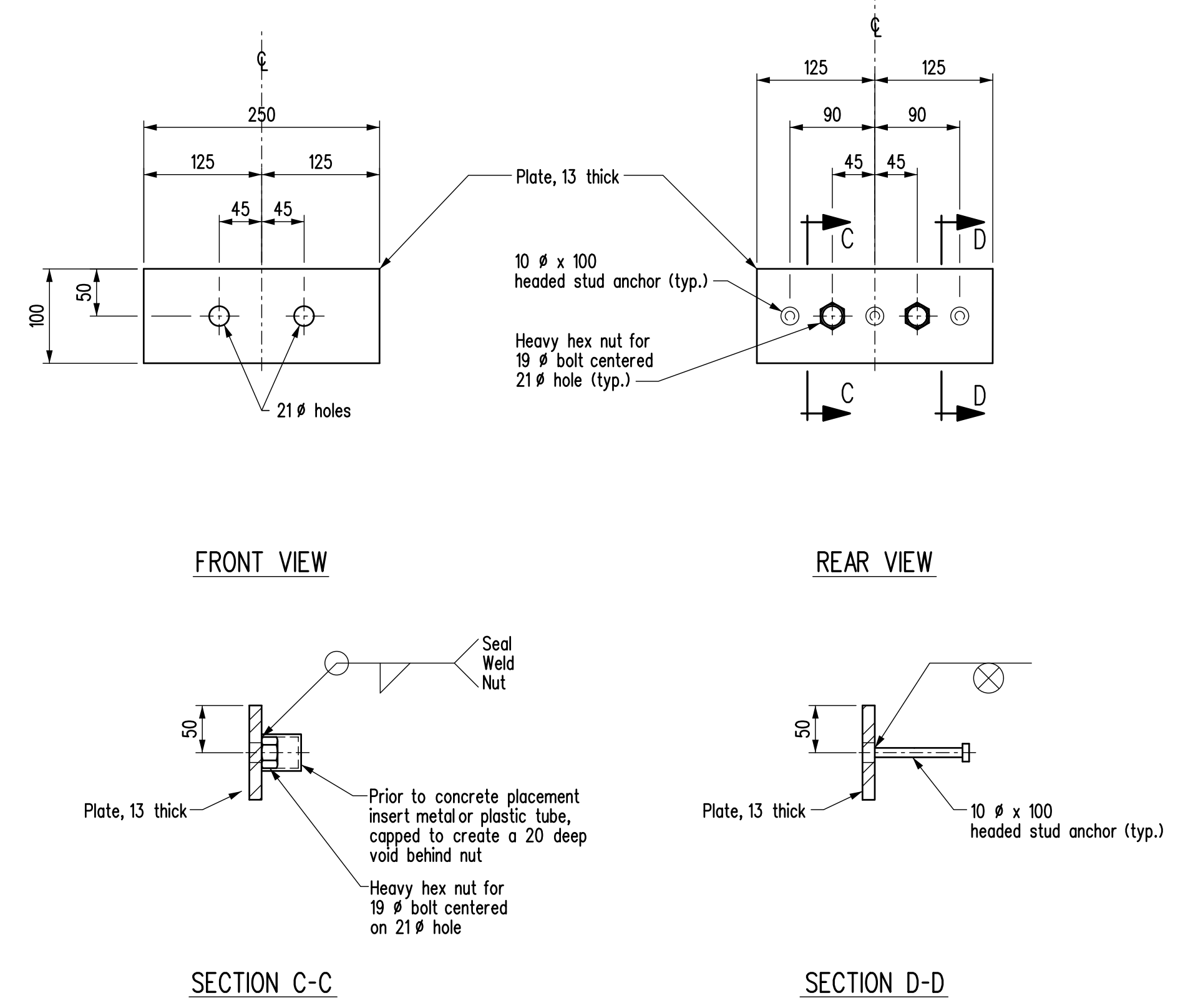
SECTION E-E
Scale 1:5

BEARING RECESS DETAILS

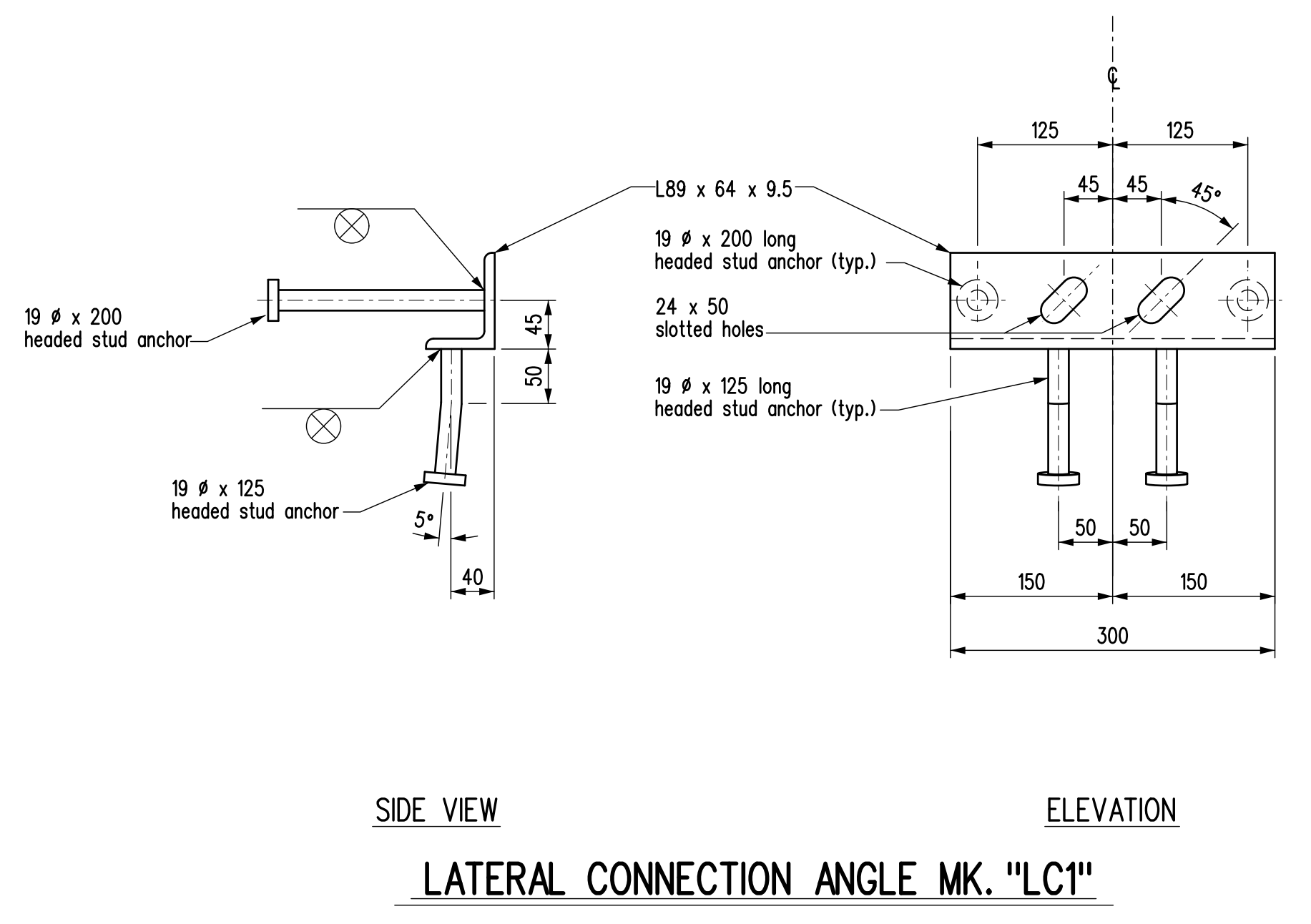
REVISIONS		PRECAST PRESTRESSED CHANNEL GIRDER DETAILS	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:
DESIGN SEAL	RECORD SEAL		
<p>PLACE ENGINEERS ELECTRONIC SEAL HERE</p>		<p>Manitoba Infrastructure Water Management and Structures</p> <p>BY: _____ CHECKED: _____</p> <p>DESIGN</p> <p>BY: _____ CHECKED: _____</p> <p>DETAILS</p> <p>BY: _____ CHECKED: _____</p>	<p>EXECUTIVE DIRECTOR OF STRUCTURES DATE</p> <p>SCALE: 1:20 SHEET No. <u>G2</u></p> <p>or as shown SITE No. _____</p>



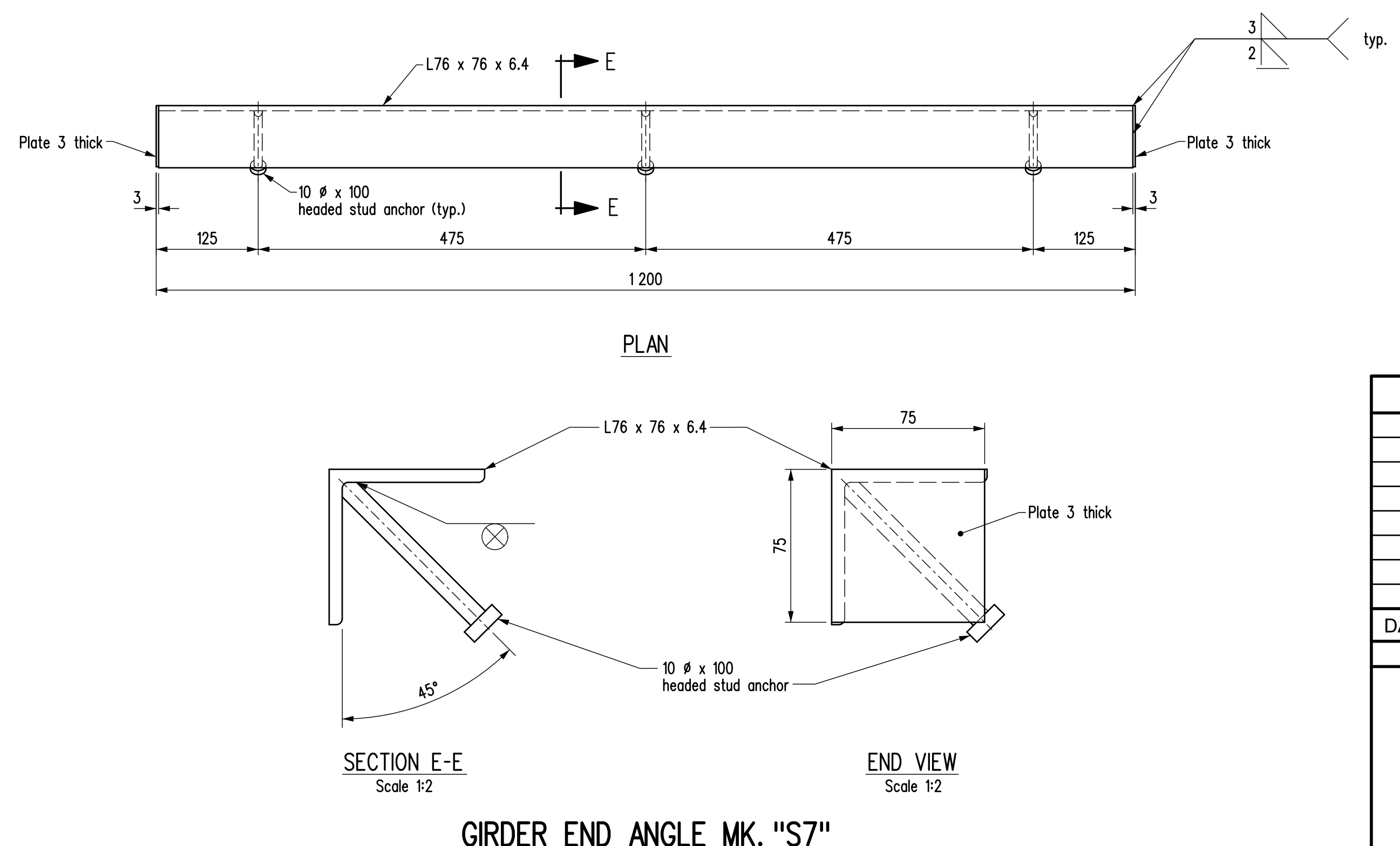
RAILPOST ANCHOR UNIT MK. "U1"



RAILPOST ANCHOR UNIT MK. "U2"



LATERAL CONNECTION ANGLE MK. "LC1"



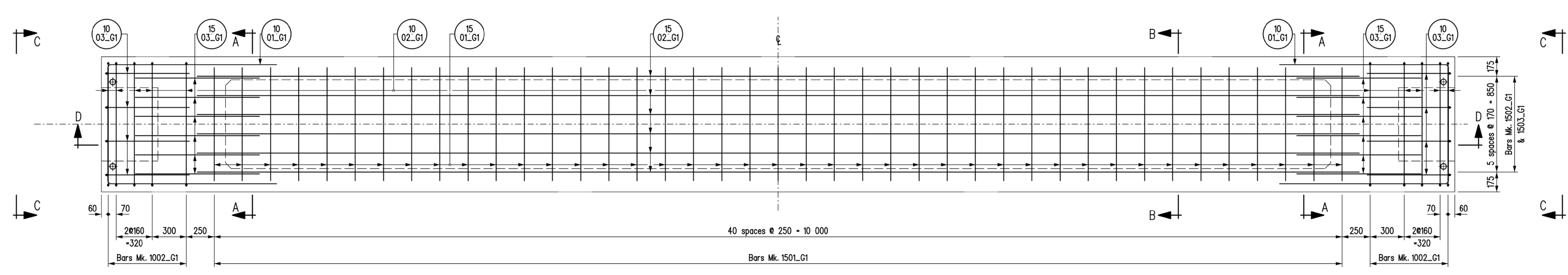
GIRDER END ANGLE MK. "S7"

BILL OF MISCELLANEOUS METAL				for 12 m LONG GIRDERS 8 400 ROADWAY WIDTH - 2 SPAN		Site No.
MARK No.	No.	DESCRIPTION	CORROSION PROTECTION	SIZE	LENGTH	REMARKS
U1	28	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	28	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	96	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	28	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
28		Ferrule loop insert	Stainless steel	for 13 dia. bolt		Richmond anchor, Type LF-W with mounting washer
TR2	14	Threaded rod	Stainless steel	13 dia.	250	c/w hex. nut
R27	56	A325 bolt c/w F436 hardened washer	Hot dip galvanized	22 dia.	229	Heavy hex. no nut, ASTM F3125
R28	56	A325 bolt c/w F436 hardened washer	Hot dip galvanized	19 dia.	64	Heavy hex. no nut, ASTM F3125

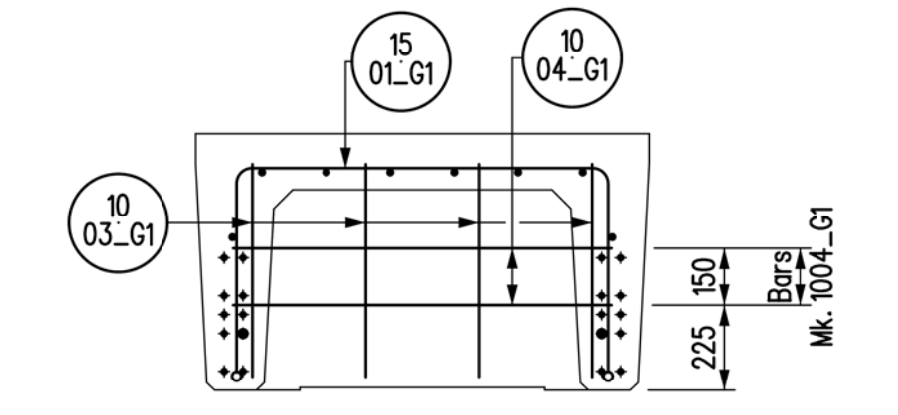
NOTES:

- All material in the above Bill shall be supplied by the GIRDER CONTRACTOR.
- All structural steel shall conform to CAN/CSA G40.21-M92 Grade 300W.
- 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.
- Grade DH or 2H galvanized nuts for A325 bolts shall be overlapped 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.
- All bolts and inserts in the above Bill shall be Imperial thread.
- Stainless steel shall conform to the requirements of ASTM A320, Class B8.

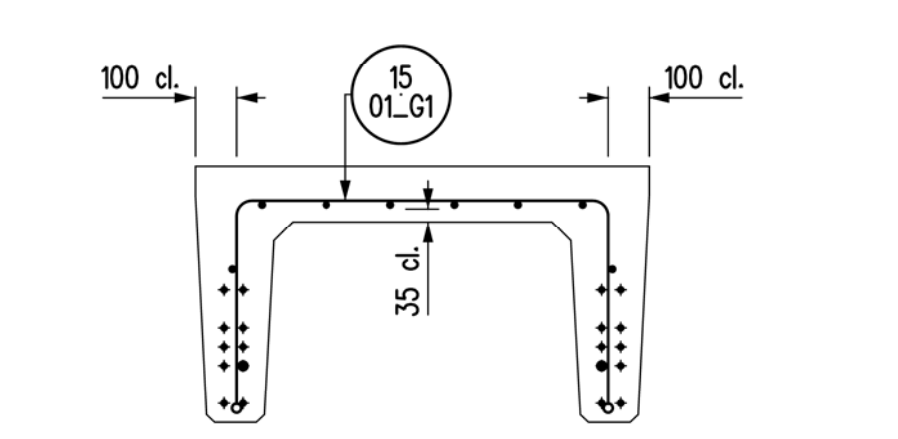
REVISIONS		PRECAST PRESTRESSED CHANNEL GIRDER DETAILS			
DATE	BY	DESIGN SEAL	RECORD SEAL		
PLACE ENGINEERS ELECTRONIC SEAL HERE		 Water Management and Structures			
				BY: _____	EXECUTIVE DIRECTOR OF STRUCTURES DATE
				CHECKED: _____	SCALE: 1:5 SHEET No. G3
DETAILS		BY: _____	or as shown SITE No. _____		
CHECKED: _____					



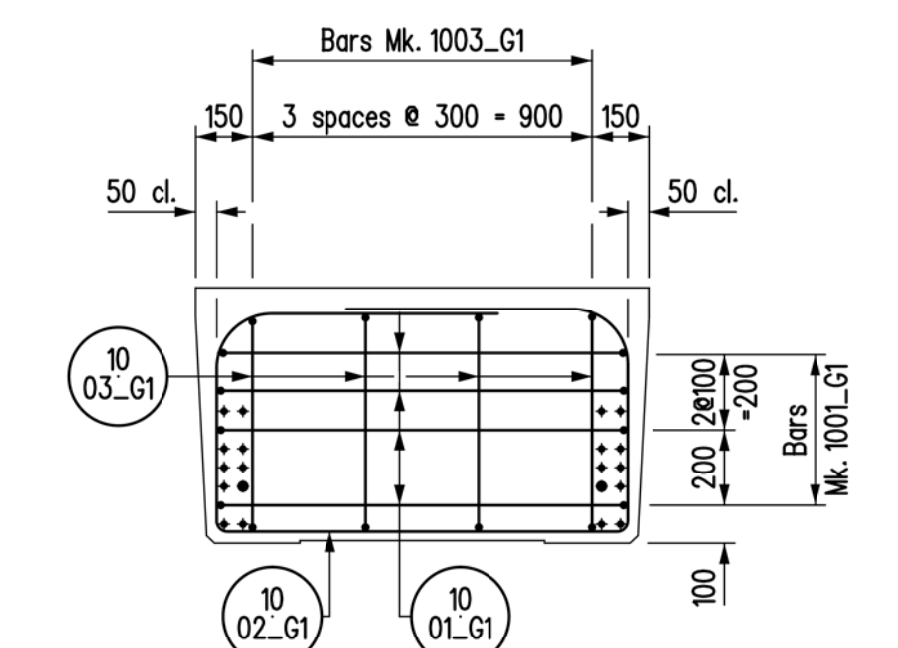
PLAN OF GIRDER



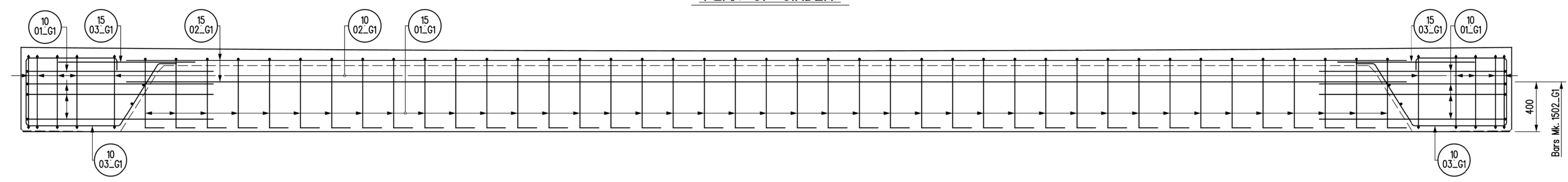
SECTION A-A



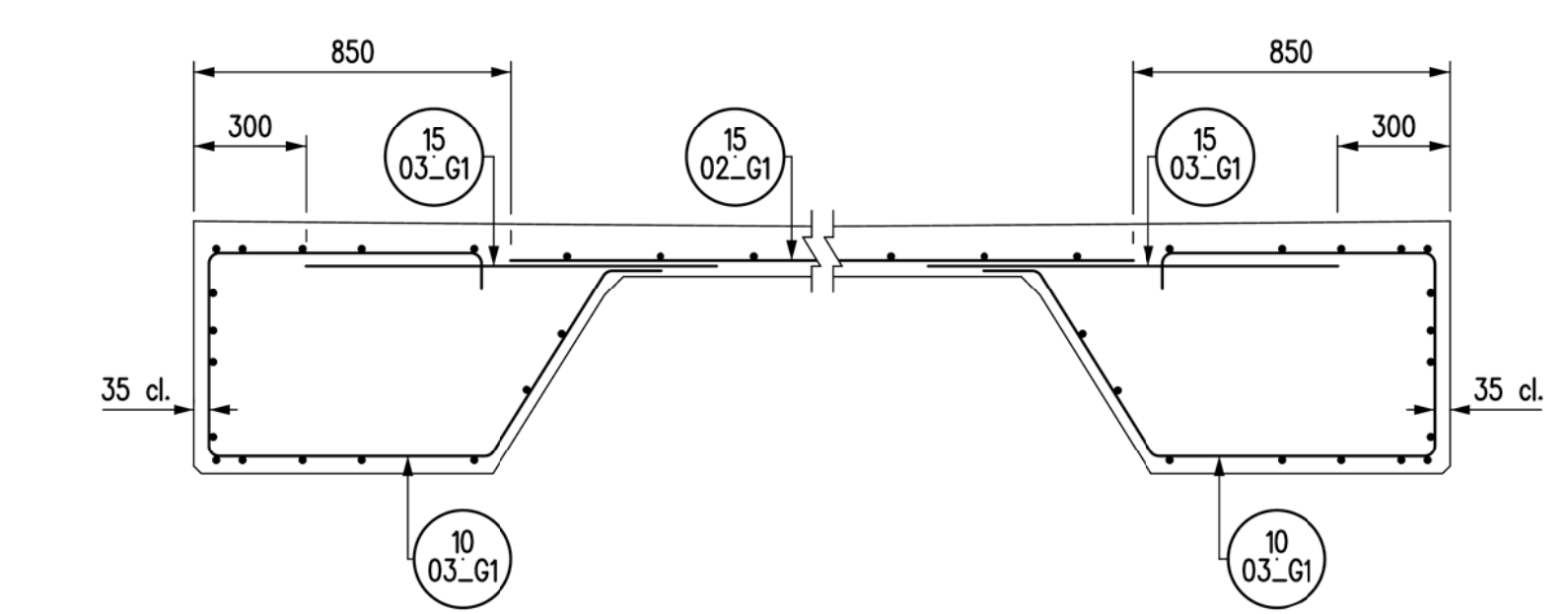
SECTION B-B



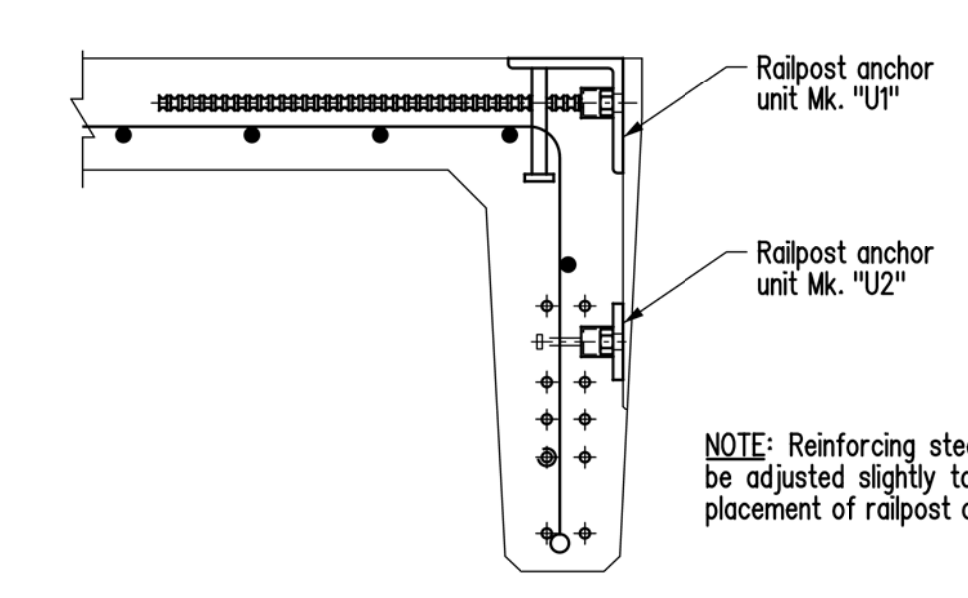
END VIEW C-C



ELEVATION OF GIRDER



PART SECTION D-D



DETAIL AT RAILPOST ANCHOR
Scale 1:10

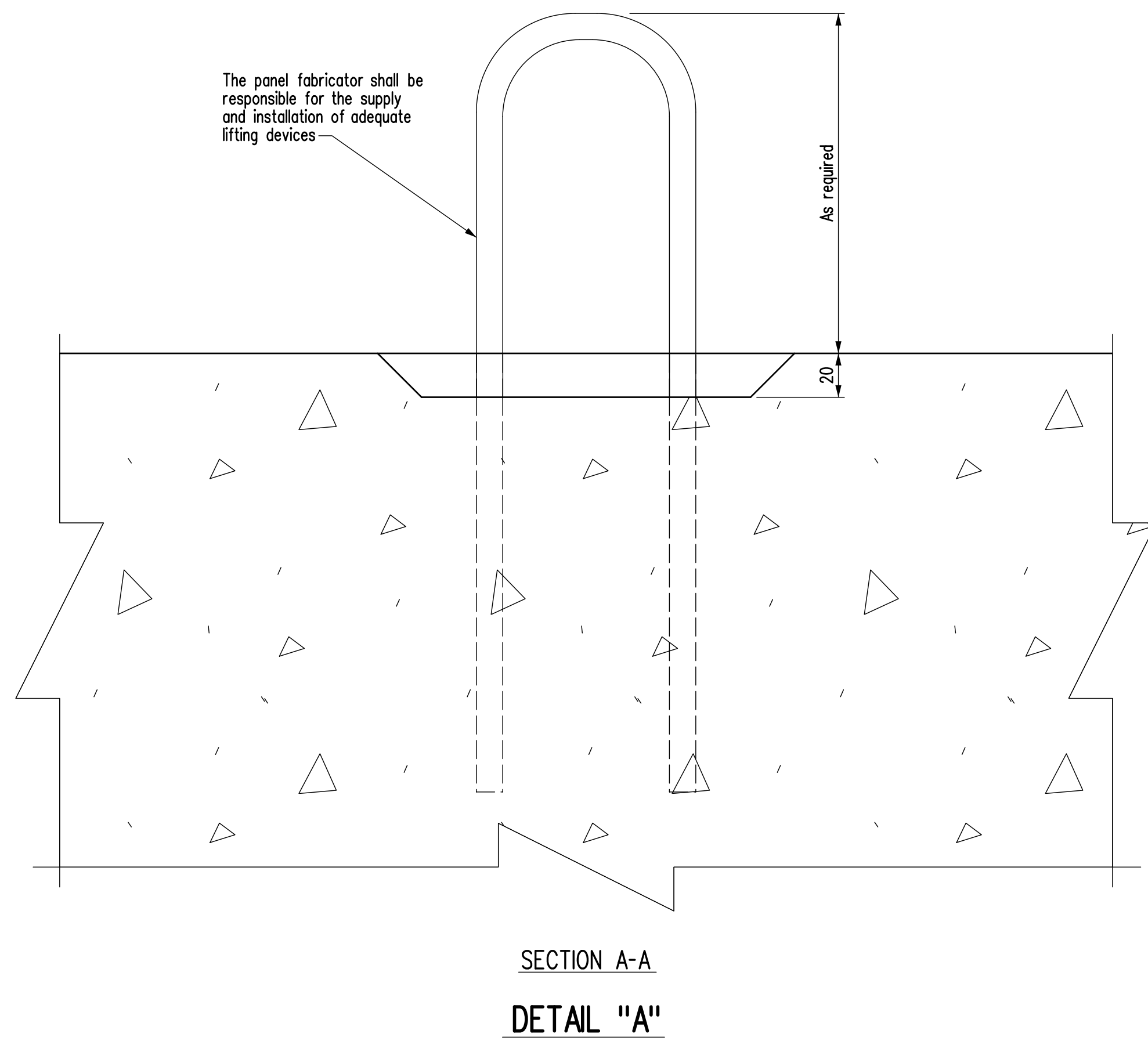
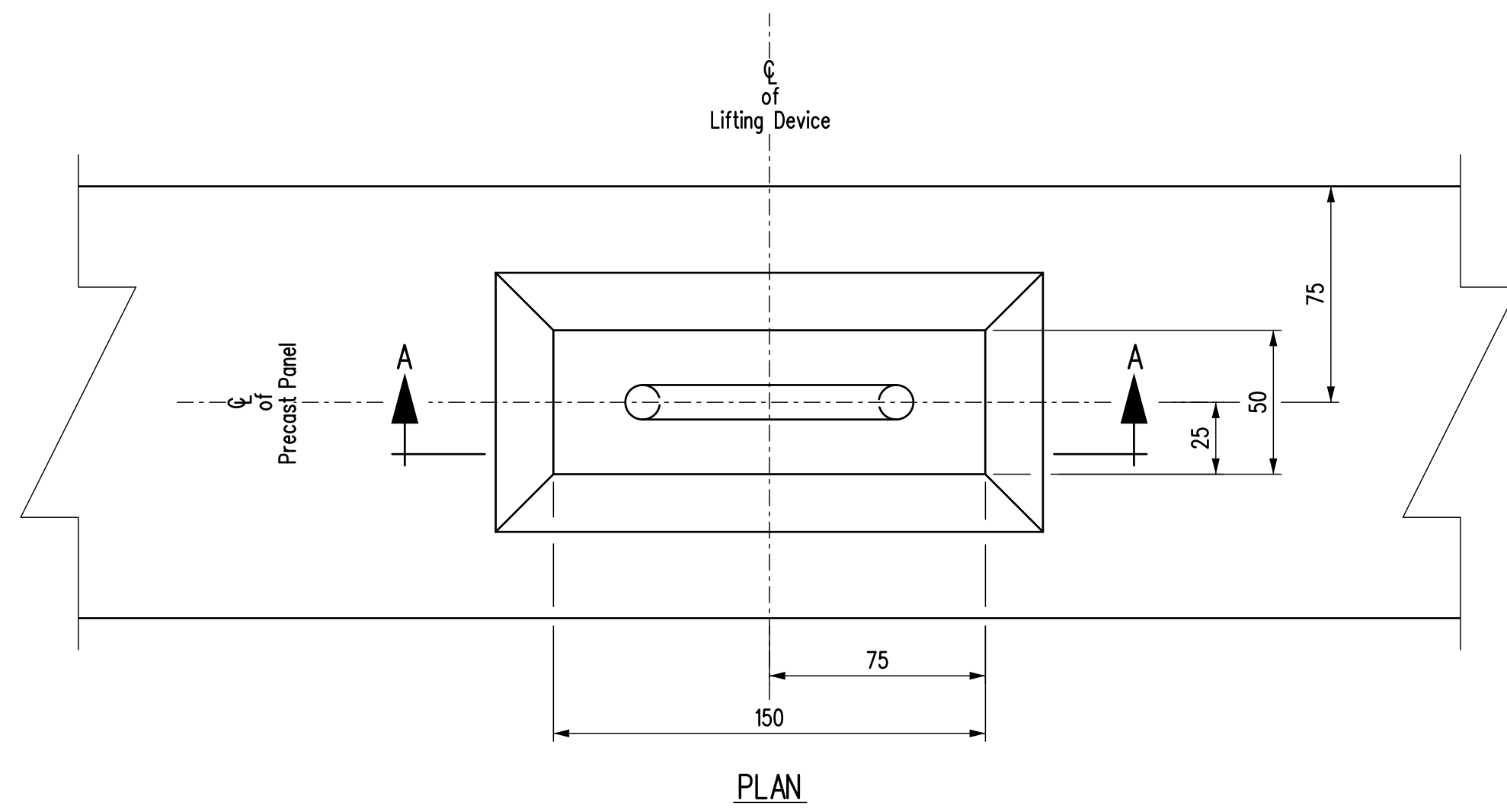
- NOTES:**
- Concrete cover shall be 25 mm unless noted otherwise.
 - Reinforcing details are typical for all 12 m girders unless noted otherwise.
 - Bar Mark labels with suffix _G1 are Exterior girders and suffix _G2 are Interior girders. See Bill of Reinforcing Sheet No. G

REVISIONS		PRECAST PRESTRESSED CHANNEL GIRDER DETAILS	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:
DESIGN SEAL	RECORD SEAL		
PLACE ENGINEERS ELECTRONIC SEAL HERE			
		Infrastructure Water Management and Structures	
		EXECUTIVE DIRECTOR OF STRUCTURES DATE	
		SCALE: Scale 1:20 SHEET No. G4	
DESIGN BY: _____ CHECKED: _____		or as shown SITE No. _____	
DETAILS BY: _____ CHECKED: _____			

BILL OF REINFORCING STEEL - 12 M GIRDERS								SITE No.
MARK	TYPE	PIN DIAMETER	LENGTH	GIRDER TYPE	No. of GIRDERS	No. of BARS PER GIRDER	TOTAL No. of BARS PER GIRDER TYPE	BENDING DIAGRAM
1001_G1	BENT	45	4 080	G1	4	8	32	
1002_G1	BENT	45	3 660	G1	4	10	40	
1003_G1	BENT	45	2 950	G1	4	8	32	
1004_G1	STR		1 000	G1	4	4	32	
1501_G1	BENT	65	2 440	G1	4	41	164	
1502_G1	STR		10 300	G1	4	8	32	
1503_G1	STR		1 100	G1	4	12	48	
1001_G2	BENT	45	4 080	G2	10	8	80	
1002_G2	BENT	45	3 660	G2	10	10	100	
1003_G2	BENT	45	2 950	G2	10	8	80	
1004_G2	STR		1 000	G2	10	4	80	

BILL OF REINFORCING STEEL - 12 M GIRDERS								SITE No.
MARK	TYPE	PIN DIAMETER	LENGTH	GIRDER TYPE	No. of GIRDERS	No. of BARS PER GIRDER	TOTAL No. of BARS PER GIRDER TYPE	BENDING DIAGRAM
1501_G2	BENT	65	2 440	G2	10	41	410	
1502_G2	STR		10 300	G2	10	8	80	
1503_G2	STR		1 100	G2	10	12	120	
Total volume of structural concrete per exterior girder							4.94	m³
Total volume of structural concrete per interior girder							4.93	m³
NOTES:								
1. All dimensions given in bending diagram are out to out, except radii and extensions on 90°, 135° & 180° hooks. Extensions on 90°, 135° & 180° hooks are the "A" or "G" dimensions for standard 90°, 135° & 180° hooks referenced from the RSIC "Manual of Standard Practice". Radii are inside dimensions. All reinforcing steel bends and hooks shall conform to Clause 6.6.2 of C.S.A. A23.1-04, unless noted otherwise in the BILL OF REINFORCING STEEL.								
2. All reinforcing steel shall be deformed steel, unless noted otherwise in the BILL OF REINFORCING STEEL.								
3. 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:								

REVISIONS		PRECAST PRESTRESSED CHANNEL GIRDER DETAILS	
DATE	BY	DESCRIPTION	RELEASED FOR CONSTRUCTION BY:
DESIGN SEAL	RECORD SEAL		
PLACE ENGINEERS ELECTRONIC SEAL HERE		 Infrastructure Water Management and Structures	EXECUTIVE DIRECTOR OF STRUCTURES DATE
			SCALE: SHEET No. 05 SITE No.
		DESIGN BY: []	
		CHECKED: []	
		DETAILS BY: []	
		CHECKED: []	



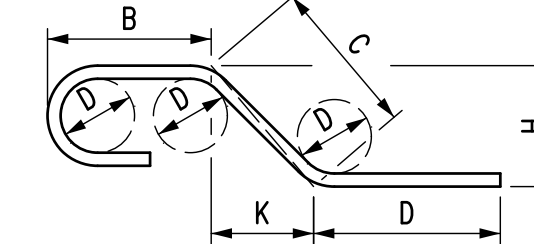
BILL OF REINFORCING FOR PRECAST PANELS

SITE No. _____

MARK	TYPE	PIN DIAMETER	LENGTH	PANEL TYPE	No. of PANELS	No. of BARS PER PANEL	TOTAL No. of BARS PER PANEL TYPE	BENDING DIAGRAM
1501_N1	STR		5 100	N1	2	6	12	
1502_N1	STR		600	N1	2	18	36	
1501_N1a	STR		5 100	N1a	2	6	12	
1502_N1a	STR		600	N1a	2	18	36	
1501_N2	STR		5 100	N2	4	10	40	
1502_N2	STR		1 200	N2	4	18	72	
1501_N4	STR		4 900	N4	2	16	32	
1502_N4	STR		1 900	N4	2	17	34	
1501_N4a	STR		4 900	N4a	2	16	32	
1502_N4a	STR		1 900	N4a	2	17	34	

Total mass of reinforcing steel							1411.12	kg
Panel Type	N1	N1a	N2	N3	N4	N4a		
Area m ² /panel	3.60	3.60	6.80	--	10.00	10.00		
Total area of precast Panels							81.60	m ²

- NOTES:**
- All dimensions given in bending diagram are out to out, except radii and extensions on 90°, 135° & 180° hooks. Extensions on 90°, 135° & 180° hooks are the "A" or "C" dimensions for standard 90°, 135° & 180° hooks referenced from the RSC "Manual of Standard Practice". Radii are inside dimensions. All reinforcing steel bends and hooks shall conform to Clause 6.6.2 of C.S.A. A23.1-04, unless noted otherwise in the BILL OF REINFORCING STEEL.
 - All reinforcing steel shall be deformed steel, unless noted otherwise in the BILL OF REINFORCING STEEL.
 - 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.
 - 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.
 - All bars shall be bent in accordance with the following detail:

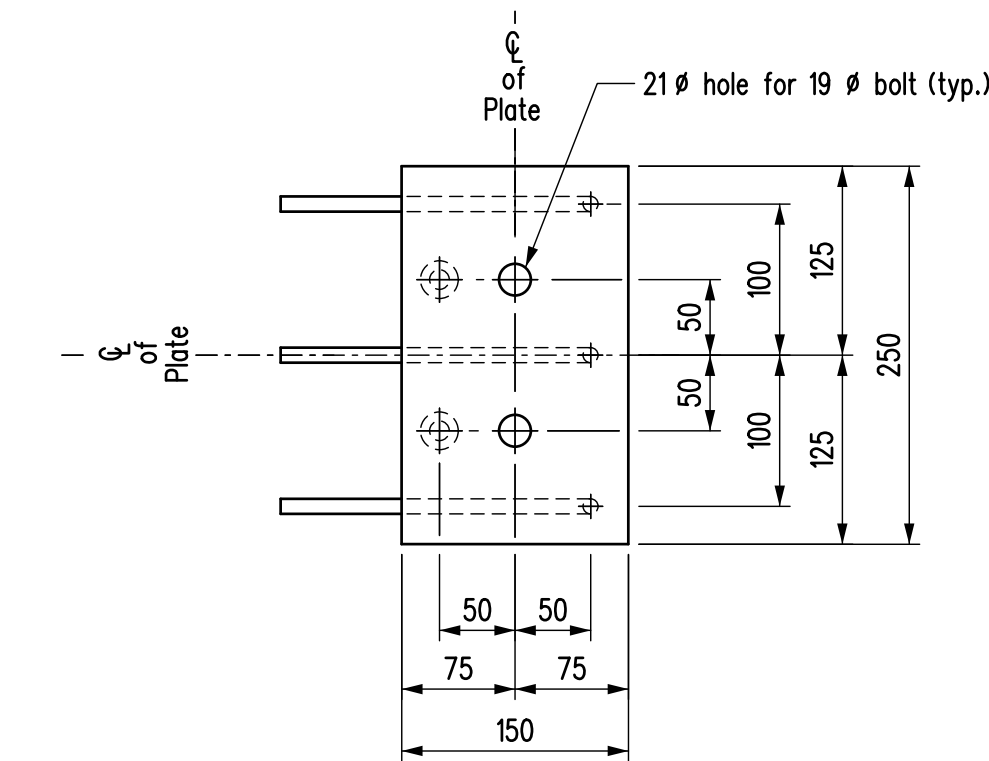
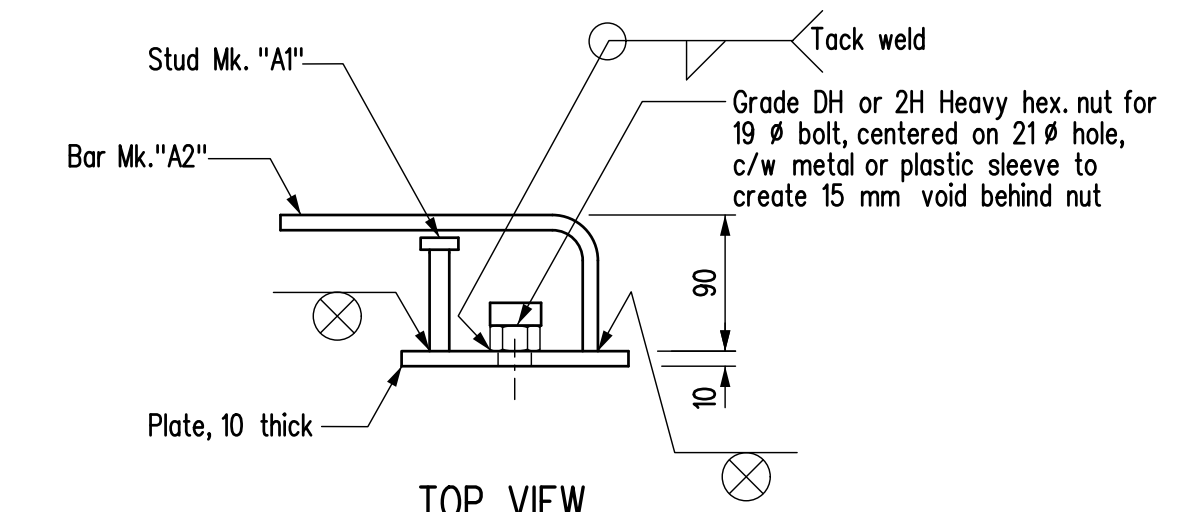


BILL OF MISCELLANEOUS METAL for PRECAST PANELS

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:**
- 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.
 - All structural steel to be CSA G40.21 Grade 300W.
 - All bolts and inserts in the above Bill shall be Imperial thread.



Scale 1:5

- NOTES:**
- For location of DETAIL "A" see sheet No. P1.
 - Precast panel concrete strength: $f'_c = 35 \text{ MPa}$.

REVISIONS			PRECAST PANEL DETAILS			
		ISSUED FOR CONSTRUCTION				
DATE	BY	DESCRIPTION		EXECUTIVE DIRECTOR OF STRUCTURES DATE		
		DESIGN SEAL	RECORD SEAL			
PLACE ENGINEERS ELECTRONIC SEAL HERE						
DESIGN		BY: [Signature]		EXECUTIVE DIRECTOR OF STRUCTURES DATE		
		CHECKED: [Signature]		SCALE: 1:2		
DETAILS		BY: [Signature]		SHEET No. P2		
		CHECKED: [Signature]		OF AS SHOWN SITE No. []		