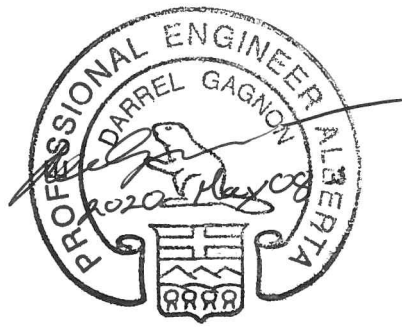


BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA

KM 108.6 - HIGHWAY 93N
NIGEL CREEK BRIDGE

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Client/client		
	Parks Canada Agence	L'Agence Parcs Canada

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Project title/Titre du projet
BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA

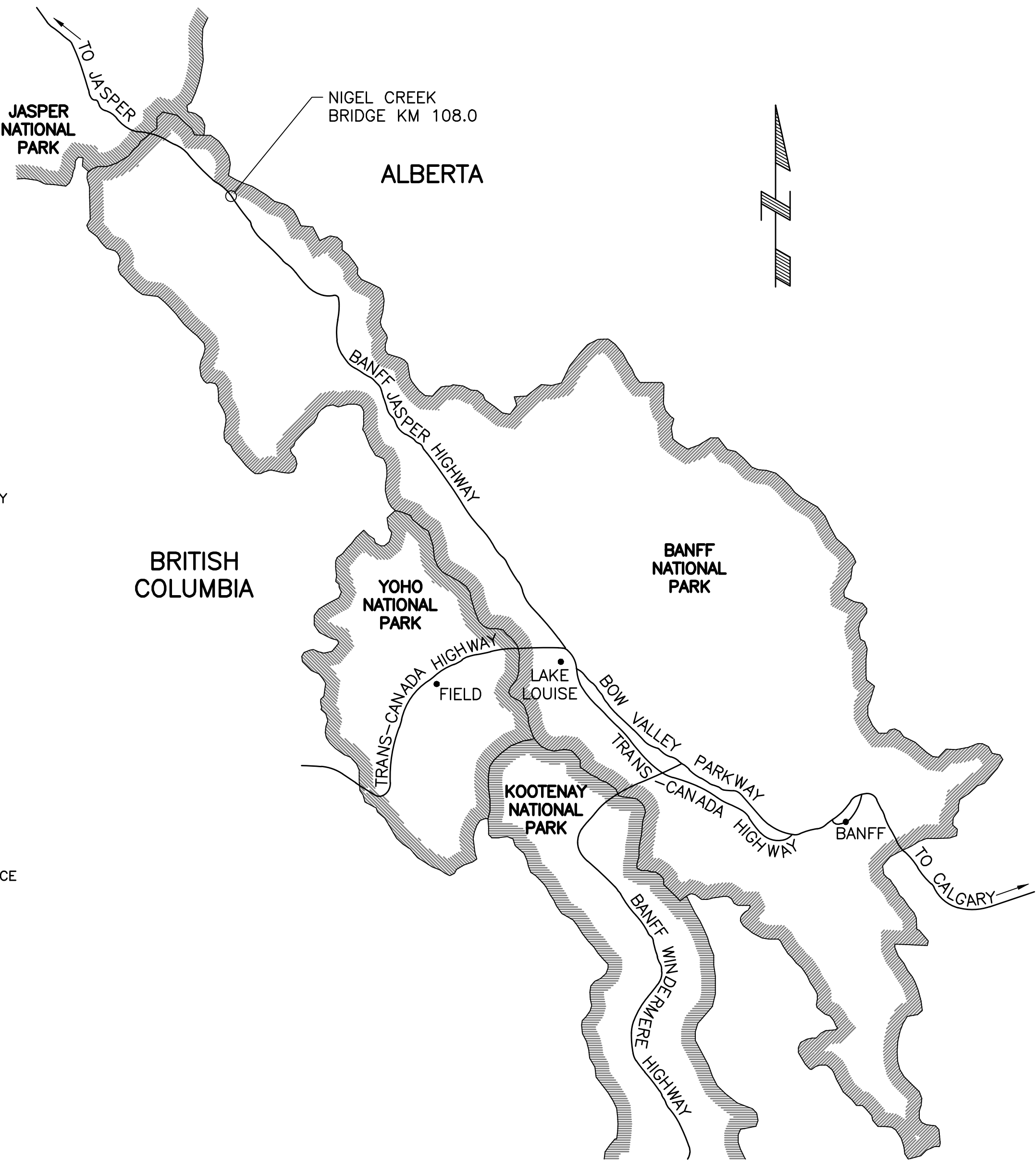
KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE

Approved by/Approuvé par DPG
Designed by/Conçu par TWB
Drawn by/Dessiné par MACM
PWGC Project Manager/Administrateur de Projets TPSCG
PWGC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie, TPSCG
Client/client PCA

Drawing title/Titre du dessin

COVER SHEET,
DRAWING LIST
AND LOCATION MAP

Project No./No. du projet 565-11	Sheet/Feuille 001 OF	Revision no./ La Révision no. 0
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LOCATION MAP
N.T.S.

DRAWING LIST:

BRIDGE DRAWINGS:

565-11-001	COVER SHEET, DRAWING LIST AND LOCATION MAP
565-11-002	GENERAL ARRANGEMENT EXISTING CONDITION
565-11-003	GENERAL ARRANGEMENT FINAL CONDITION
565-11-004	ABUTMENT MODIFICATIONS
565-11-005	DECK DIAPHRAGM AND PIER PYLON MODIFICATIONS
565-11-006	CONCRETE DECK MODIFICATIONS - SHEET 1
565-11-007	CONCRETE DECK MODIFICATIONS - SHEET 2
565-11-008	DECK JOINT MODIFICATIONS - SHEET 1
565-11-009	DECK JOINT MODIFICATIONS - SHEET 2
565-11-010	CAST-IN-PLACE BARRIER - LAYOUT AND REINFORCEMENT - SHEET 1
565-11-011	CAST-IN-PLACE BARRIER - LAYOUT AND REINFORCEMENT - SHEET 2
565-11-012	BICYCLE RAILING - SHEET 1
565-11-013	BICYCLE RAILING - SHEET 2

ROADWAY DRAWINGS: DRAWING REFERENCE 2121-00203-04

C000	COVER SHEET
C001	LOCALITY SKETCH, DRAWING INDEX AND LEGEND
C101	PLAN BARRIER FLARES
C301	TYPICAL SECTIONS
C302	BICYCLE RAILING DETAILS

REFERENCE DRAWINGS

1960 ORIGINAL DESIGN DRAWINGS, NIGEL CREEK BRIDGE BANFF-JASPER HIGHWAY
MILE 68.8 (KM 108.6), BANFF NATIONAL PARK:

1 OF 11	GENERAL LAYOUT
2 OF 11	NORTH ABUTMENT
3 OF 11	NORTH ABUTMENT REINFORCING
4 OF 11	SOUTH ABUTMENT
5 OF 11	SOUTH ABUTMENT STEEL REINFORCEMENT
6 OF 11	SKEWBACKS
7 OF 11	PIERS / BORE HOLES
8 OF 11	BEARINGS / REINFORCING STEEL SCHEDULE
9 OF 11	STRUCTURAL STEEL
10 OF 11	DECK
11 OF 11	STANDARD HANDRAIL

1960 ORIGINAL SHOP DRAWINGS OF NIGEL CREEK BRIDGE.

NIGEL CREEK BRIDGE 2004 REPAIRS, BANFF NATIONAL PARK, DRAWING REFERENCE
B2004RS.

S1 NIGEL CREEK BRIDGE MISCELLANEOUS REPAIRS

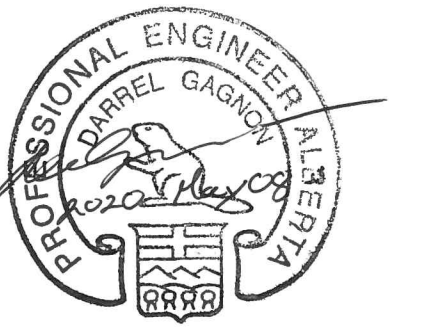
2008 NIGEL CREEK BRIDGE REHABILITATION PROJECT NO. 418894 HWY 93N -
ICEFIELDS PARKWAY KM 108.6, BANFF NATIONAL PARK:

S-100	COVER PAGE
S-101	GENERAL NOTES
S-102	GENERAL LAYOUT
S-103	EXPANSION JOINT DETAILS
S-104	APPROACH GUARDRAILS
S-105	MISCELLANEOUS DETAILS - SHEET 1
S-106	MISCELLANEOUS DETAILS - SHEET 2
S-1443-98	DECK WATERPROOFING SYSTEM WITH 80mm TWO COURSE HOT-MIX ASPHALT CONCRETE PAVEMENT
S-1471	DEEP BEAM GUARDRAIL AT BRIDGE APPROACHES SHEET 1

2020 BARRIER FLARE - NIGEL CREEK ROADWAY CROSS SECTIONS (10 SHEETS)




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Project title/Titre du projet
**BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA**

**KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE**

Approved by/Approuvé par

Designed by/Concept par
TWB

Drawn by/Dessiné par
MACM

PWGSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie TPSGC

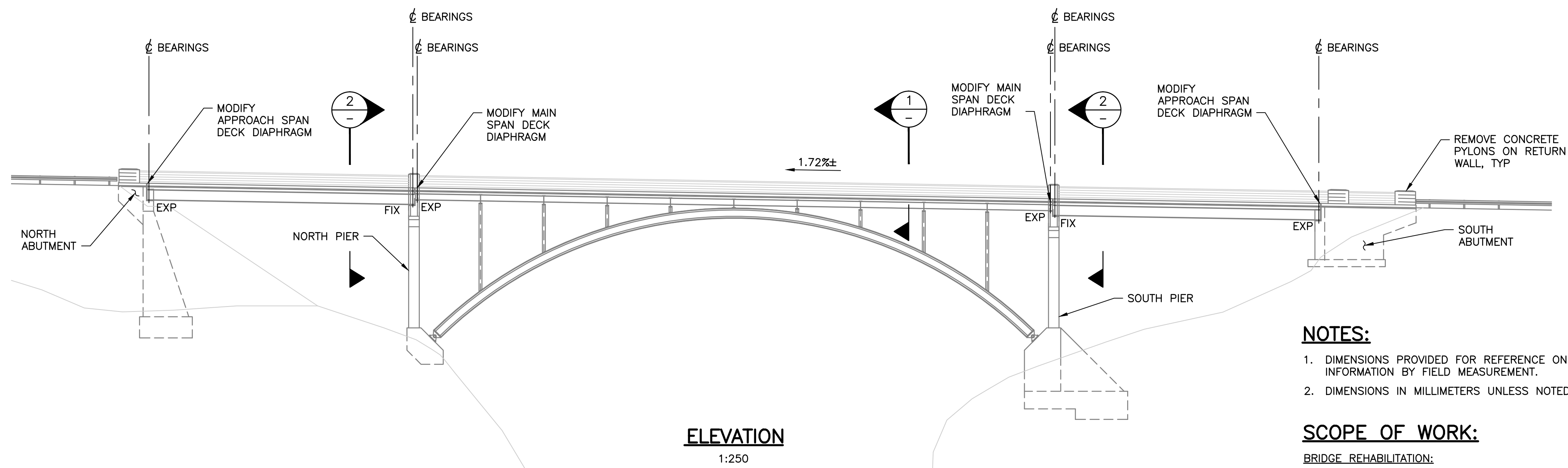
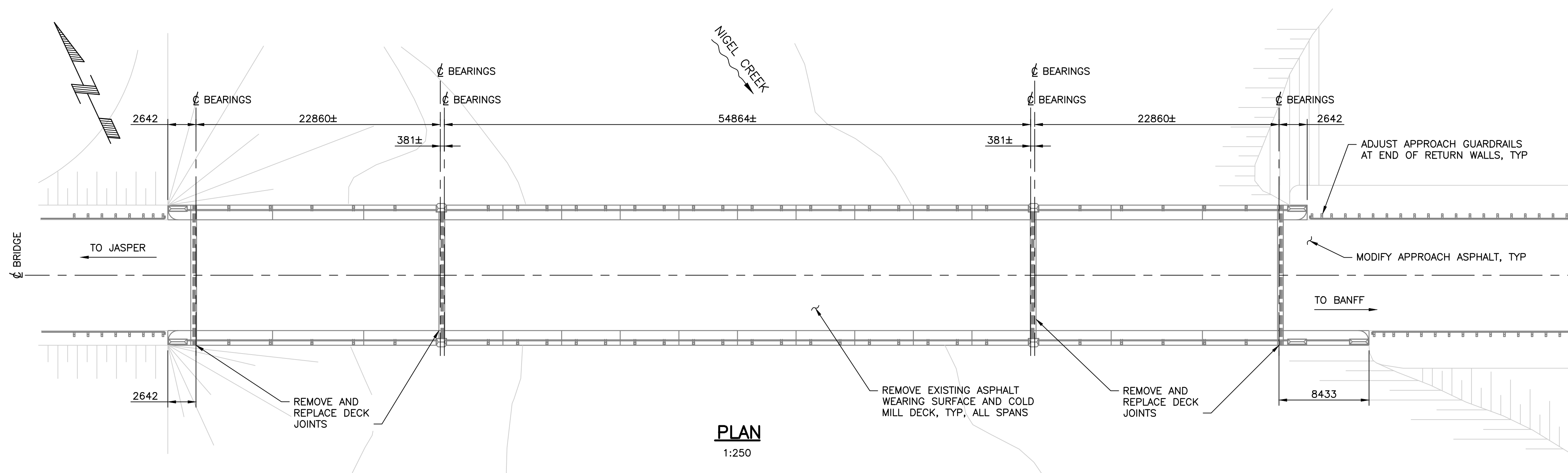
Client/client
PCA

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GENERAL ARRANGEMENT EXISTING CONDITION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision
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565-11 002 OF



NOTES:

1. DIMENSIONS PROVIDED FOR REFERENCE ONLY. CONTRACTOR TO VERIFY ACCURACY OF SUCH INFORMATION BY FIELD MEASUREMENT.
2. DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.

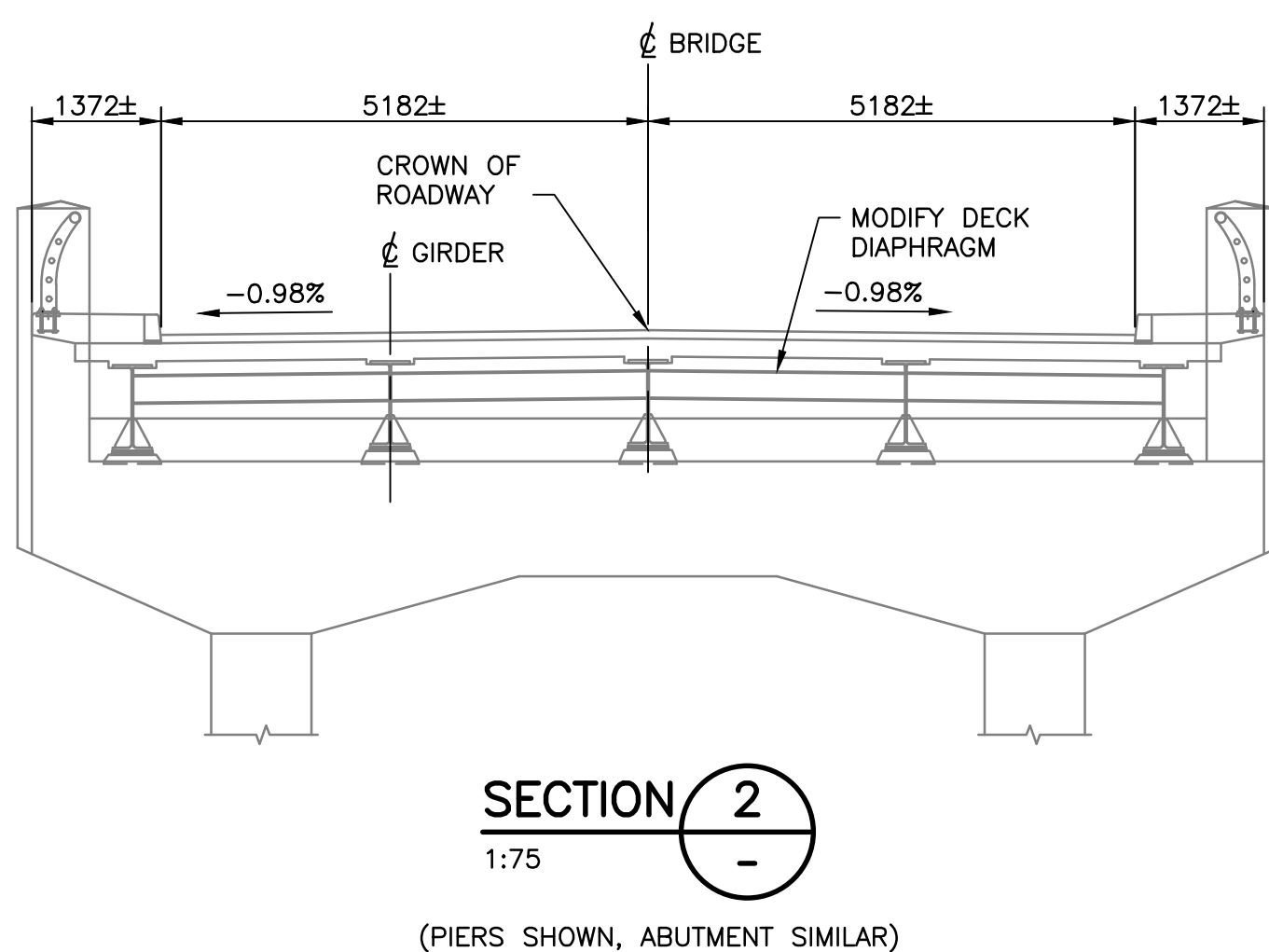
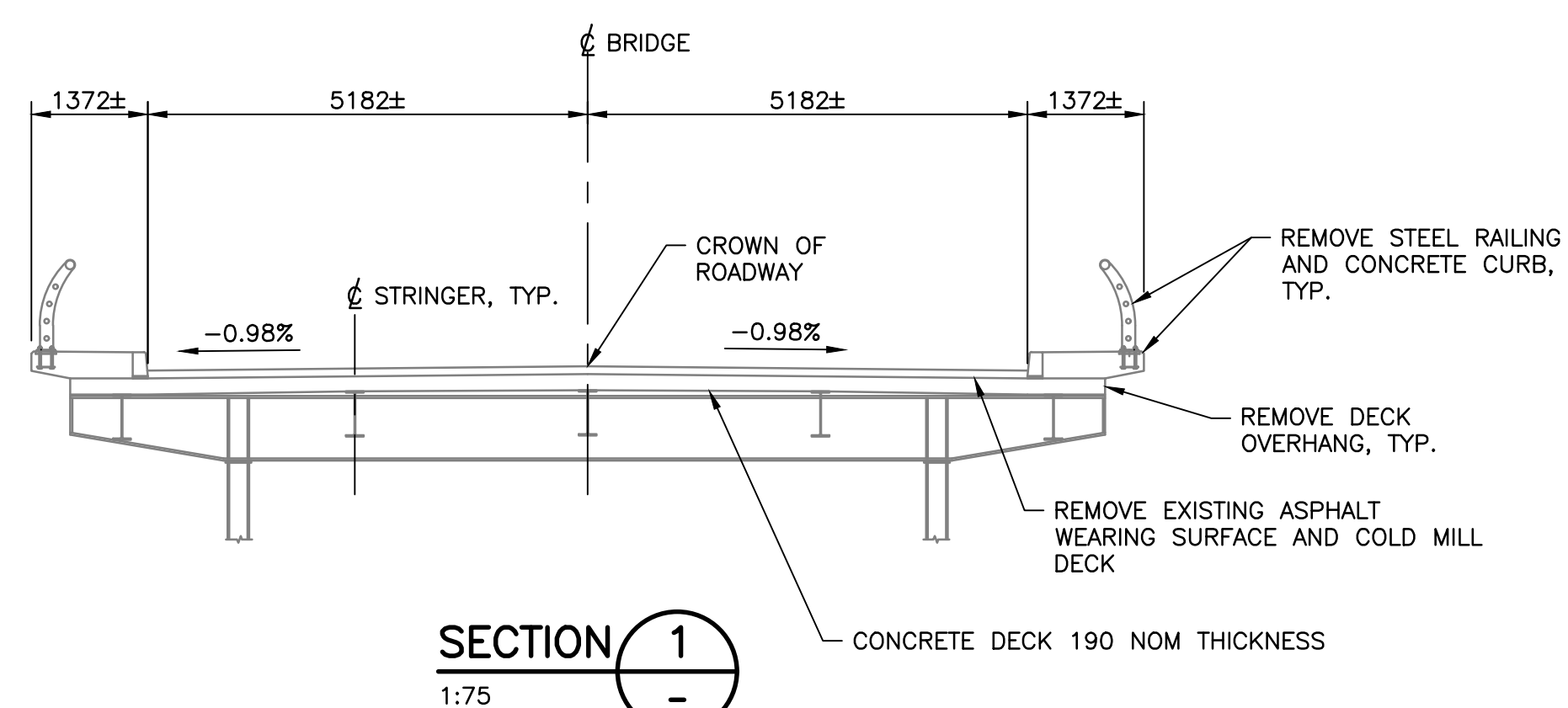
SCOPE OF WORK:

BRIDGE REHABILITATION:

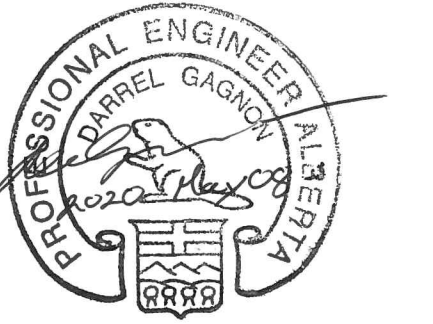
1. CONSTRUCTION TO BE COMPLETED IN TWO STAGES IN ACCORDANCE WITH SPECIFICATIONS.
2. REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURBS, RETURN WALL PYLONS, STEEL RAILINGS, ASPHALT, DECK OVERHANGS, AND DECK JOINTS.
3. COLD MILLING OF DECK AND APPROACH ASPHALT (INCLUDING WATERPROOFING MEMBRANE ON DECK).
4. LOCALIZED CONCRETE REMOVAL AT DECK JOINTS AND RETURN WALLS.
5. PARTIAL DEPTH CONCRETE REPAIRS WHEN AUTHORIZED BY DEPARTMENTAL REPRESENTATIVE.
6. SUPPLY AND CONSTRUCTION OF NEW CONCRETE DECK OVERHANGS, RAILING CURBS, BARRIER FOOTINGS, AND RETURN WALL TOPS.
7. SUPPLY AND INSTALLATION OF DECK DIAPHRAGM MODIFICATIONS AT PIERS AND ABUTMENTS.
8. SUPPLY AND CONSTRUCTION OF NEW CONCRETE OVERLAY.
9. SUPPLY AND CONSTRUCTION OF NEW CAST-IN-PLACE BARRIERS.
10. FABRICATION, SUPPLY AND INSTALLATION OF NEW STEEL BICYCLE RAILING.
11. SUPPLY AND INSTALLATION OF NEW DECK JOINTS.
12. MODIFICATION OF APPROACH PAVEMENT AND APPROACH GUARDRAILS.
13. APPLICATION OF LANE MARKINGS ON ROAD SURFACE.

ROADWAY WORKS (SEE ROADWAY DRAWINGS FOR DETAILS):

1. STRIPPING.
2. REMOVAL AND DISPOSAL OF EXISTING ASPHALT.
3. EXCAVATING MATERIALS FROM CUTS, HAULING, PLACING, GRADING, COMPACTING, AND DISPOSING AS INDICATED.
4. SUPPLY, LOAD, HAUL AND PLACE IMPORTED FILL AND GRANULAR MATERIALS.
5. SUPPLY, HAUL AND PLACE ASPHALT PAVEMENT.
6. SUPPLY AND INSTALLATION OF PRECAST BARRIERS.
7. SUPPLY AND INSTALL SIGNS, POSTS, AND HARDWARE.
8. SUPPLY AND INSTALLATION OF BICYCLE RAILING AND FOOTINGS.
9. REMOVE AND RELOCATE EXISTING W-BEAM GUARD RAIL.
10. SUPPLY AND INSTALL APPROACH RAIL TRANSITION, INCLUDING THRIE BEAM.
11. SUPPLY AND INSTALL IMPACT ABSORBING GUARDRAIL END TREATMENT AND GUARDRAIL WING END TREATMENT.
12. APPLICATION OF LANE MARKING.



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Project title/Titre du projet
**BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA**

**KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE**

Approved by/Approuvé par
DPG

Designed by/Concept par
TWB

Drawn by/Dessiné par
MACM

PWOSC Project Manager/Administrateur de Projets TPSCG

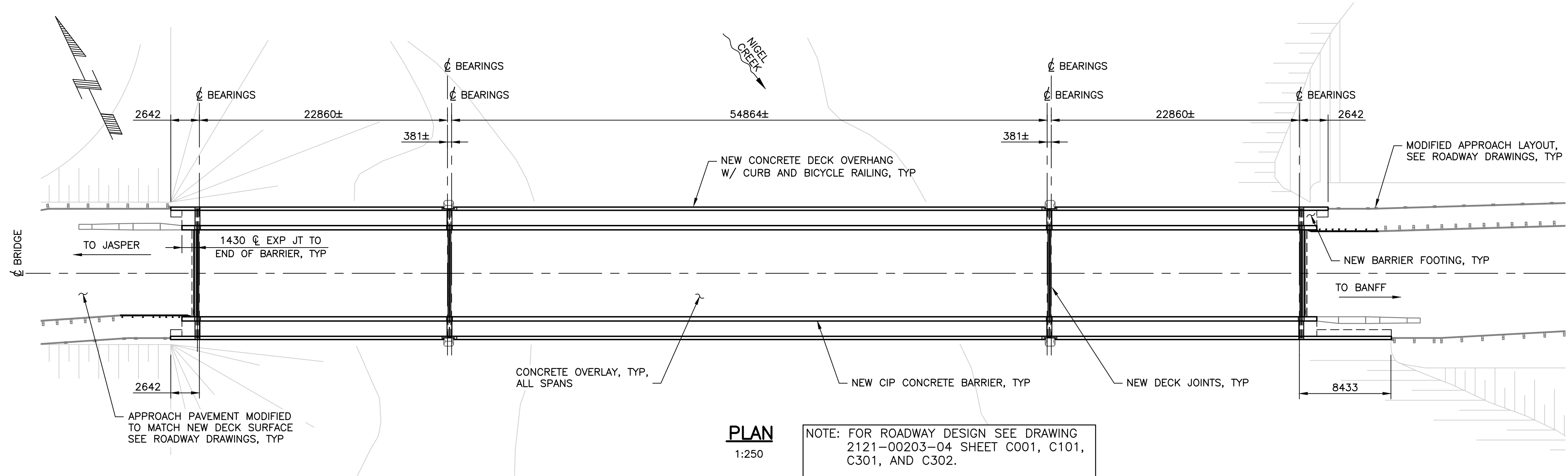
PWOSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

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PCA

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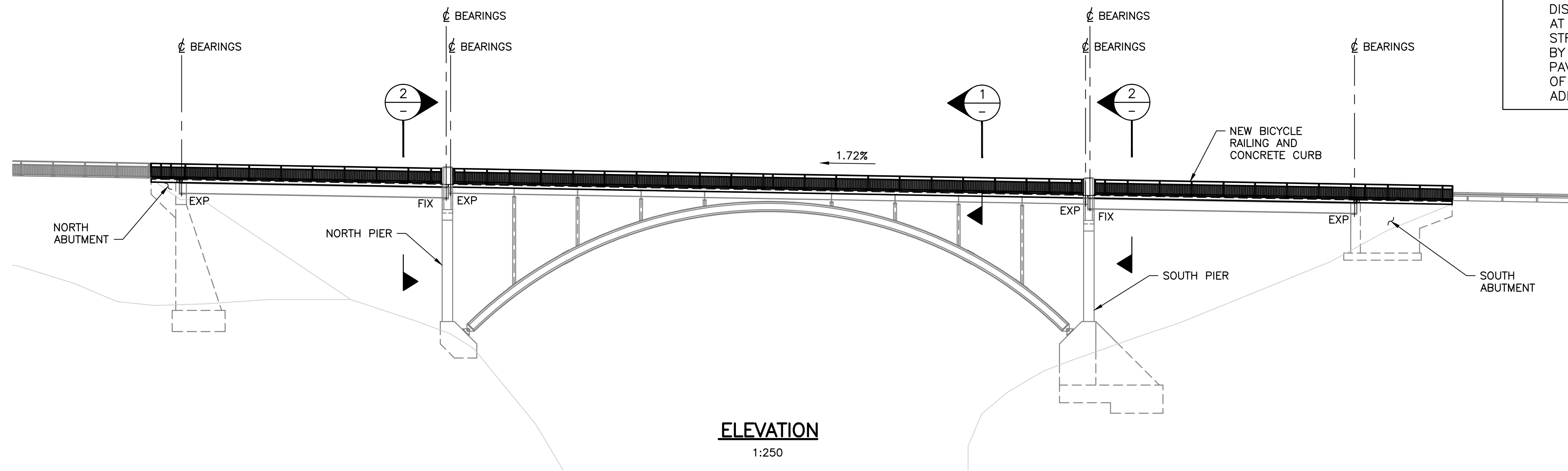
**GENERAL ARRANGEMENT
FINAL CONDITION**

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565-11	003 OF	0

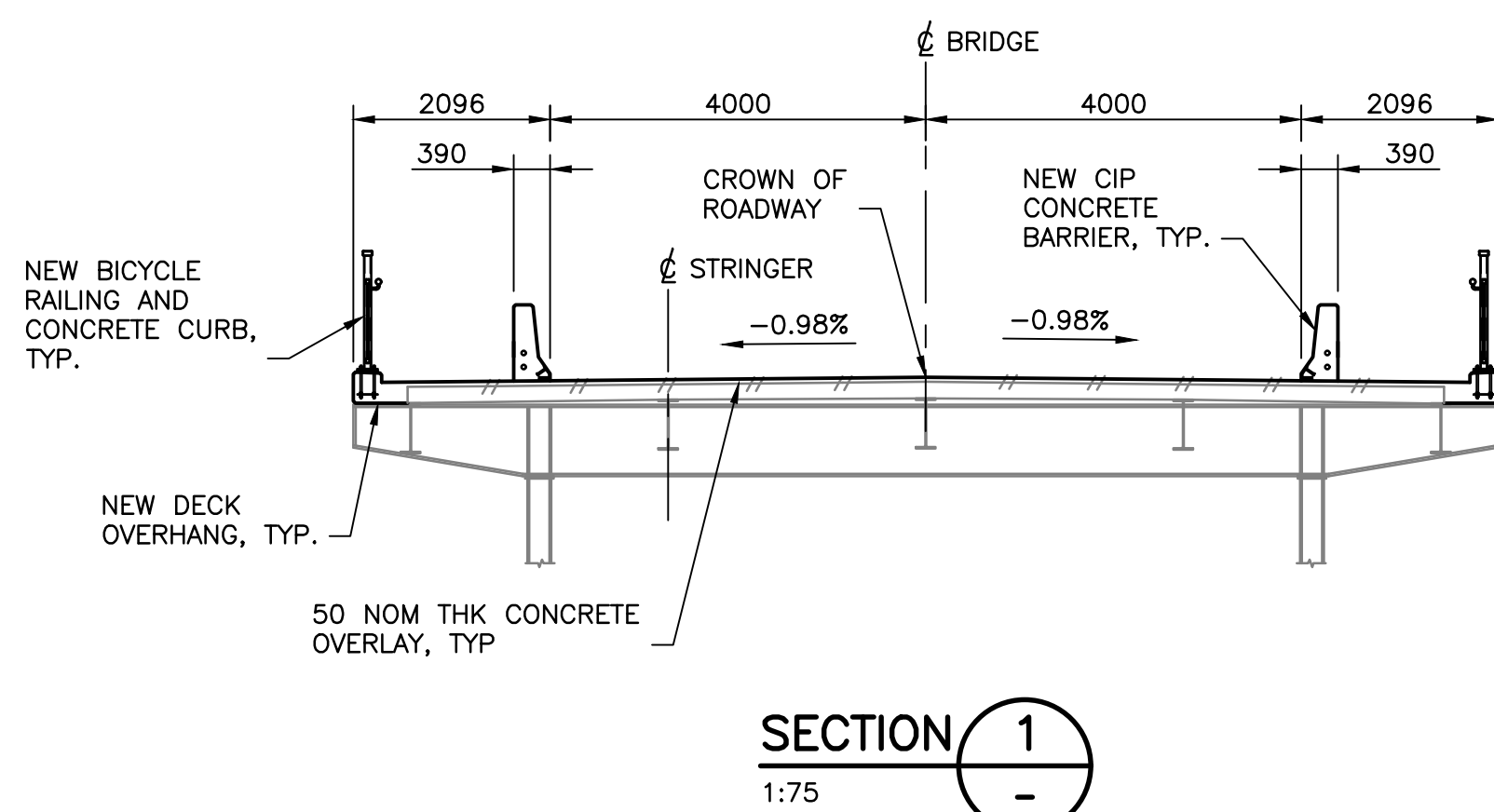


PLAN
1:250

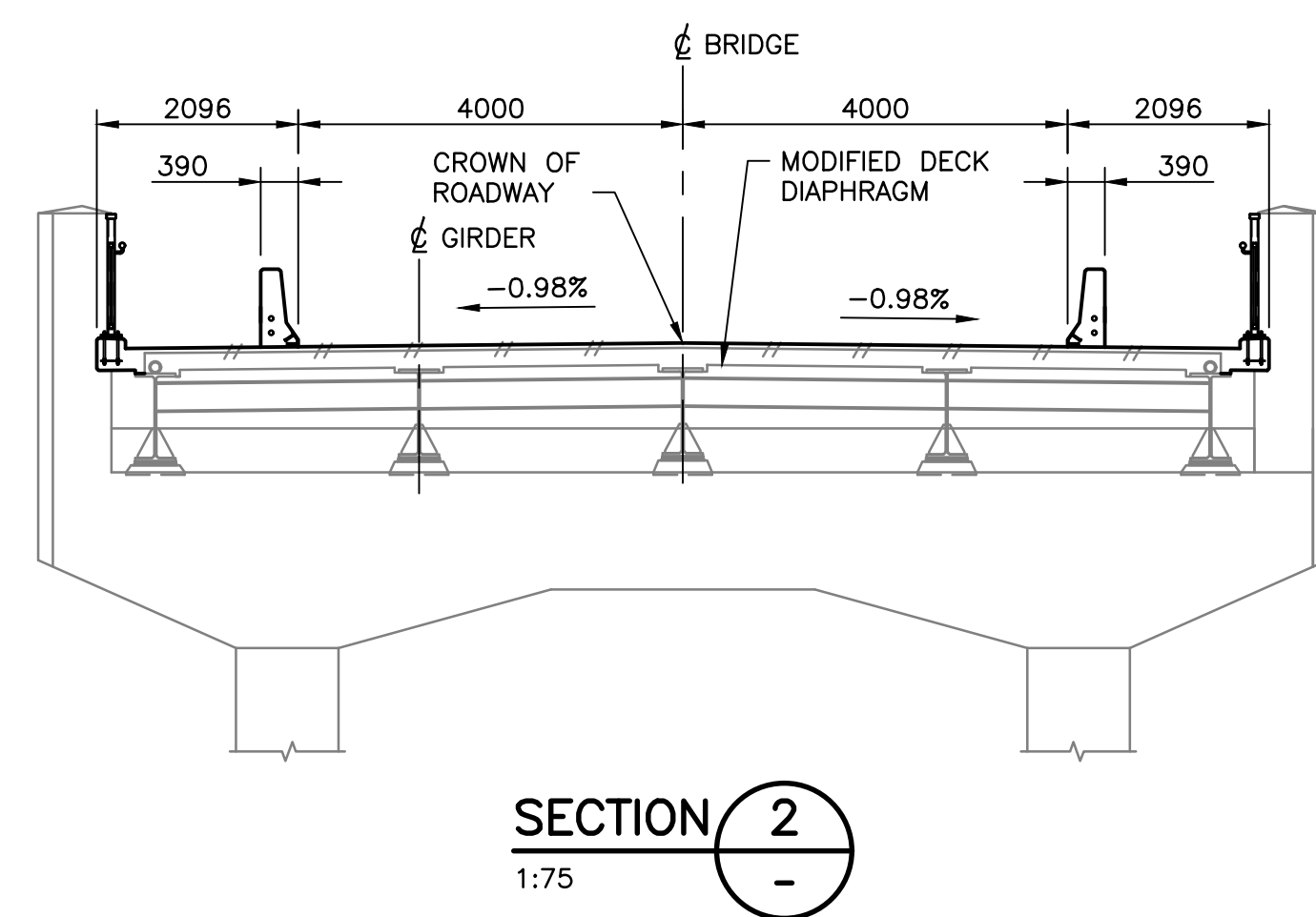
NOTE: THE GRADE AND CROSS SLOPE OF THE COMPLETED DECK SHALL BE TRANSITIONED TO THE GRADE AND CROSS SLOPE OF THE EXISTING APPROACH ROADWAY OVER A DISTANCE OF AT LEAST 20m PAST THE DECK AT EACH END OF THE COMPLETE BRIDGE STRUCTURE. THE TRANSITION SHALL BE DONE BY PARTIAL DEPTH MILLING OF THE EXISTING PAVEMENT AND PLACING AN ASPHALT LAYER OF NO LESS THEN 50 mm THICKNESS SEE ADDITIONAL DETAILS ON ROADWAY DRAWINGS.



ELEVATION
1:250



SECTION 1
1:75



SECTION 2
1:75

(PIERS SHOWN, ABUTMENT SIMILAR)

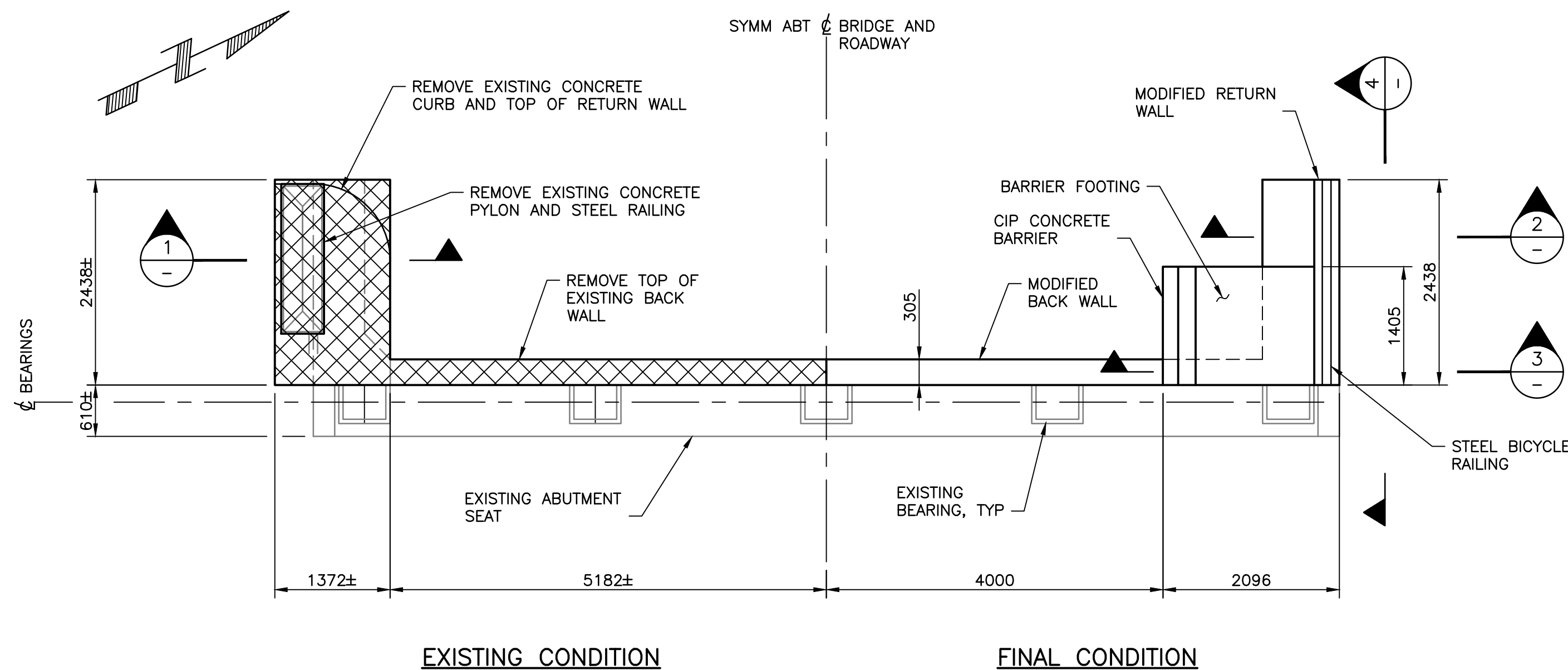
NOTES:

- DESIGN STANDARDS: CANADIAN STANDARDS ASSOCIATION
-CAN/CSA-S6-14 - JULY 2017. DESIGN LIFE: 30 YEARS
- DESIGN LOADS:
 - UNIT MATERIAL WEIGHTS
 - REINFORCED CONCRETE: 24.0 kN/m³
 - STEEL: 77.0 kN/m³
 - CONCRETE BARRIER: 5.2 kN/m
 - BICYCLE RAILING: 0.50 kN/m
 - TRAFFIC BARRIER: TL-4
 - WIND LOADS
 - REFERENCE WIND PRESSURE q = 455 kPa FOR 50 YEAR RETURN PERIOD
 - 20% INCREASE OF WIND PRESSURE DUE TO POSSIBLE FUNNELING EFFECT.
 - TEMPERATURE DATA:
 - MAXIMUM MEAN DAILY TEMPERATURE: 26°C
 - MINIMUM MEAN DAILY TEMPERATURE: -40°C
 - SEISMIC DESIGN PARAMETERS:
 - RETURN PERIOD : 475 YEARS
 - IMPORTANCE CATEGORY : OTHER BRIDGES
 - SITE CLASS : A



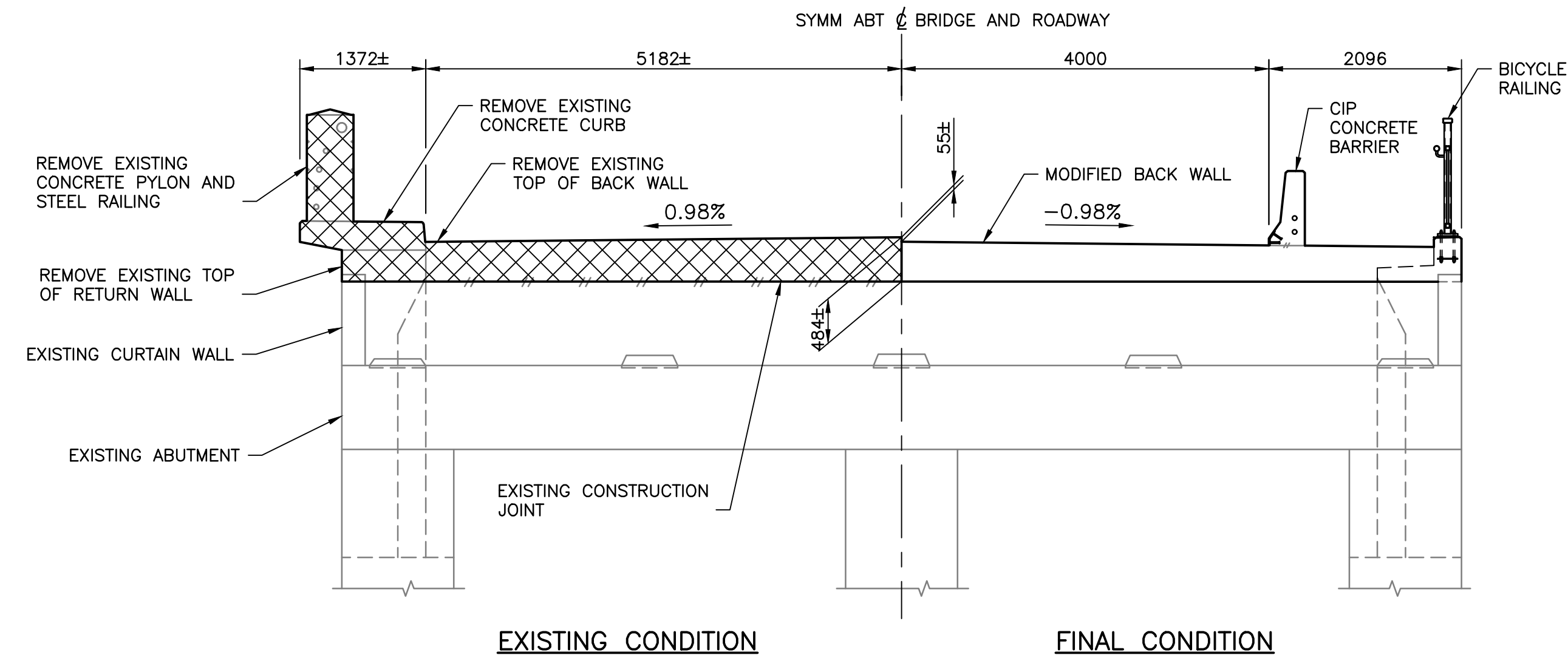
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PWOSC - A1 - 841X594



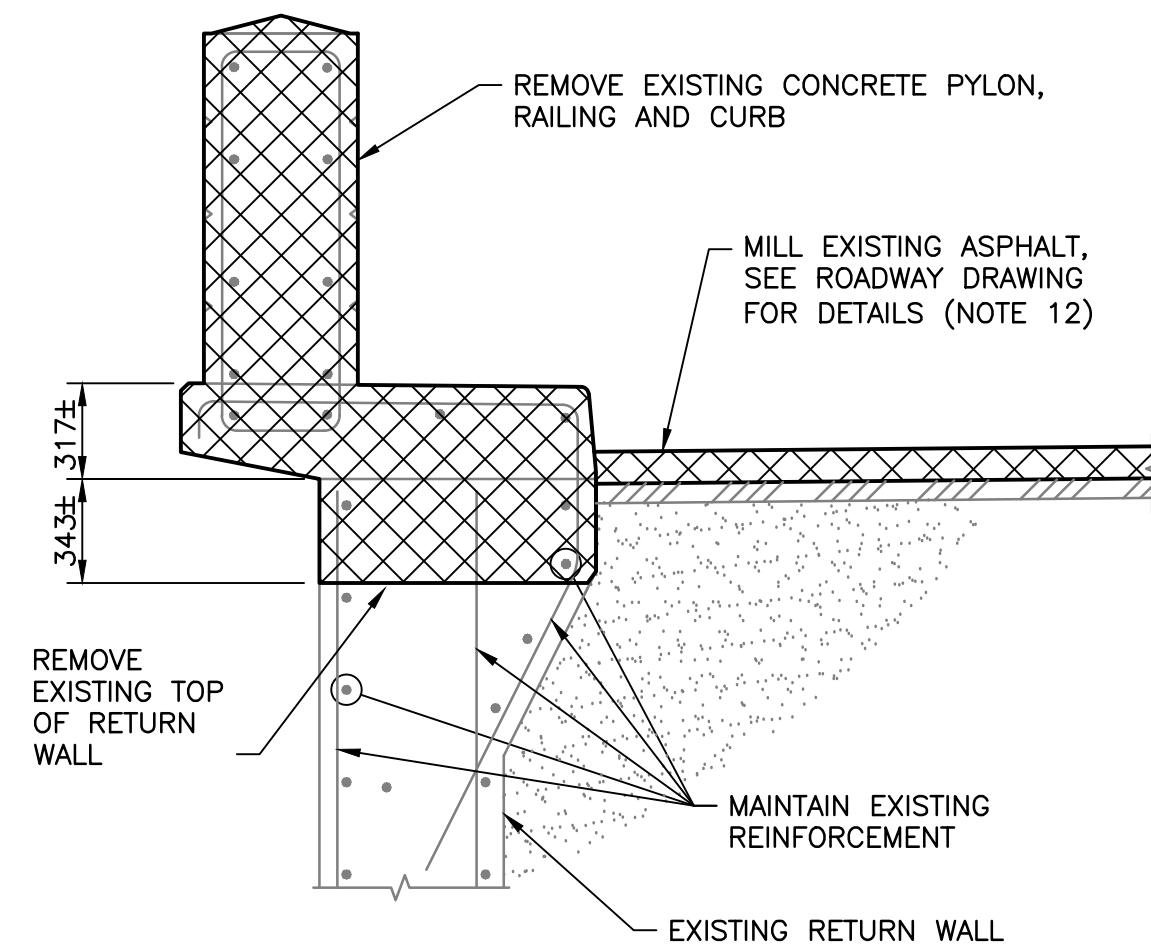
ABUTMENT PLAN

1:50
(NORTH ABUTMENT SHOWN - SOUTH ABUTMENT SIMILAR)



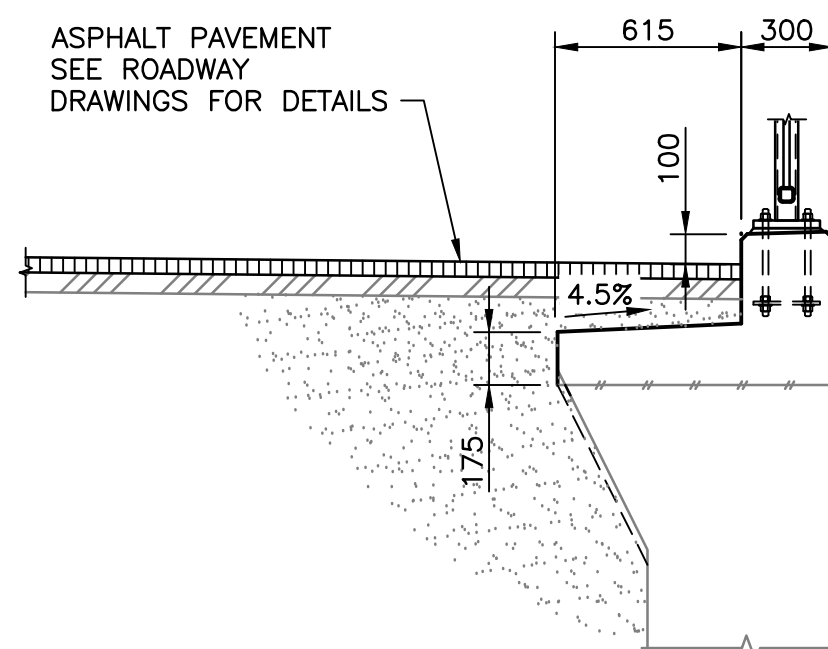
ABUTMENT ELEVATION

1:50
(NORTH ABUTMENT - LOOKING NORTH)



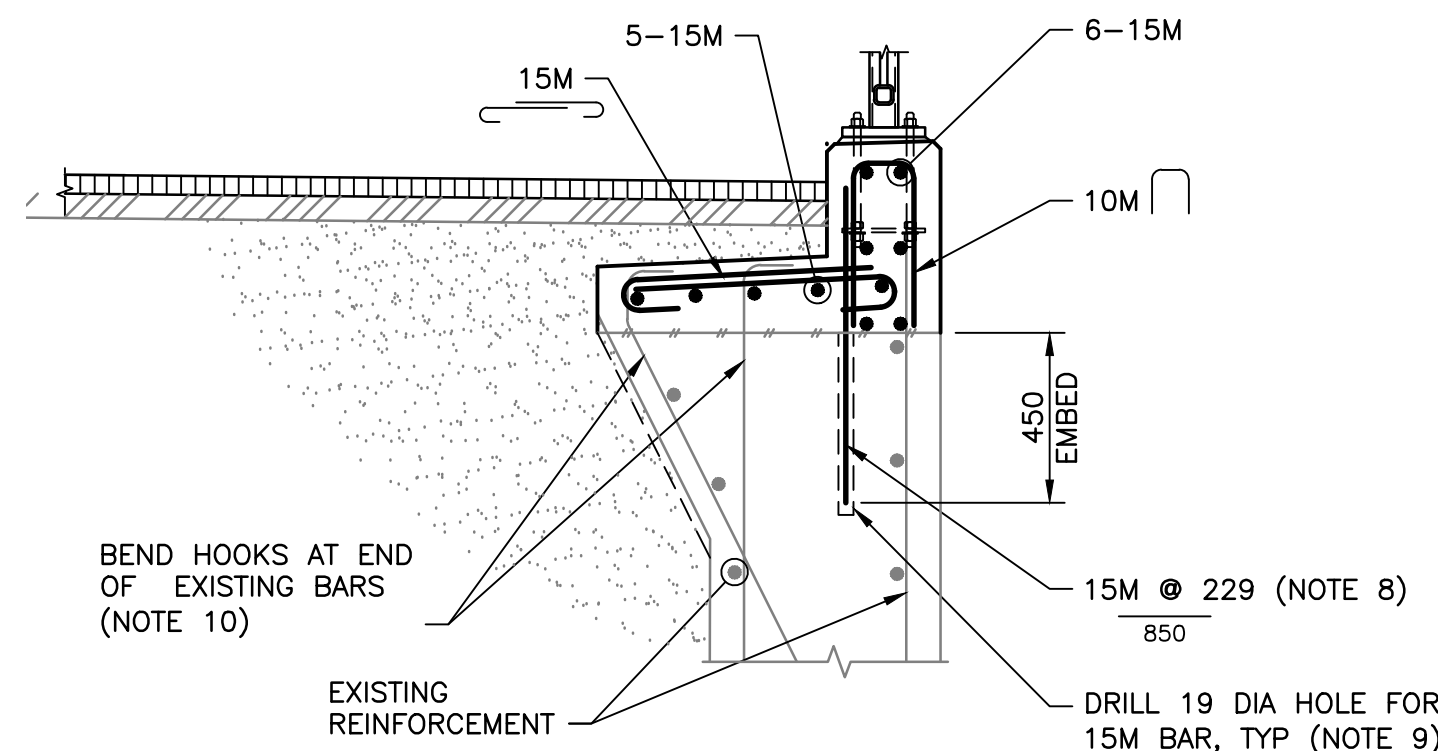
SECTION 1

1:25



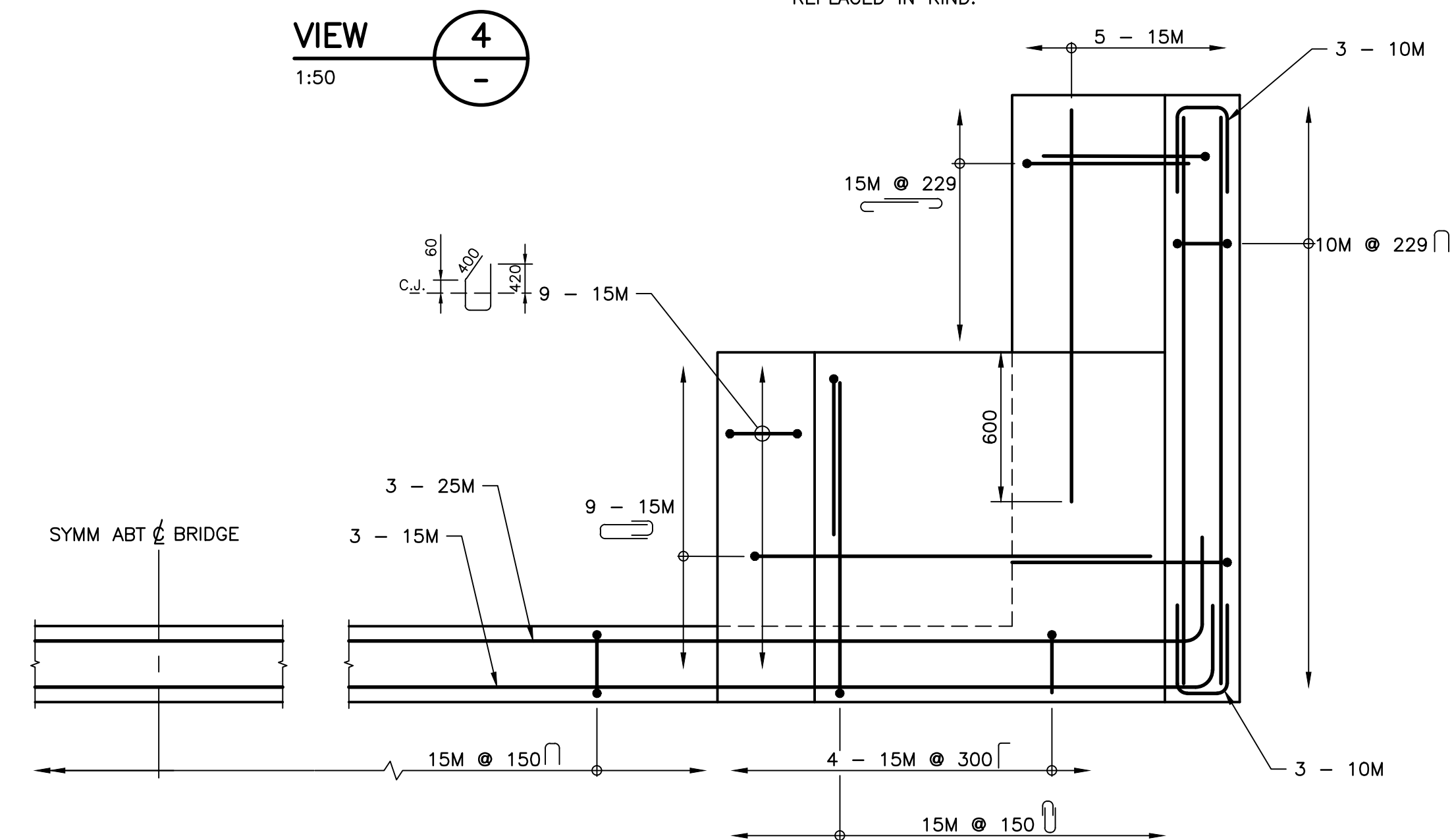
SECTION 2 OUTLINE

1:25



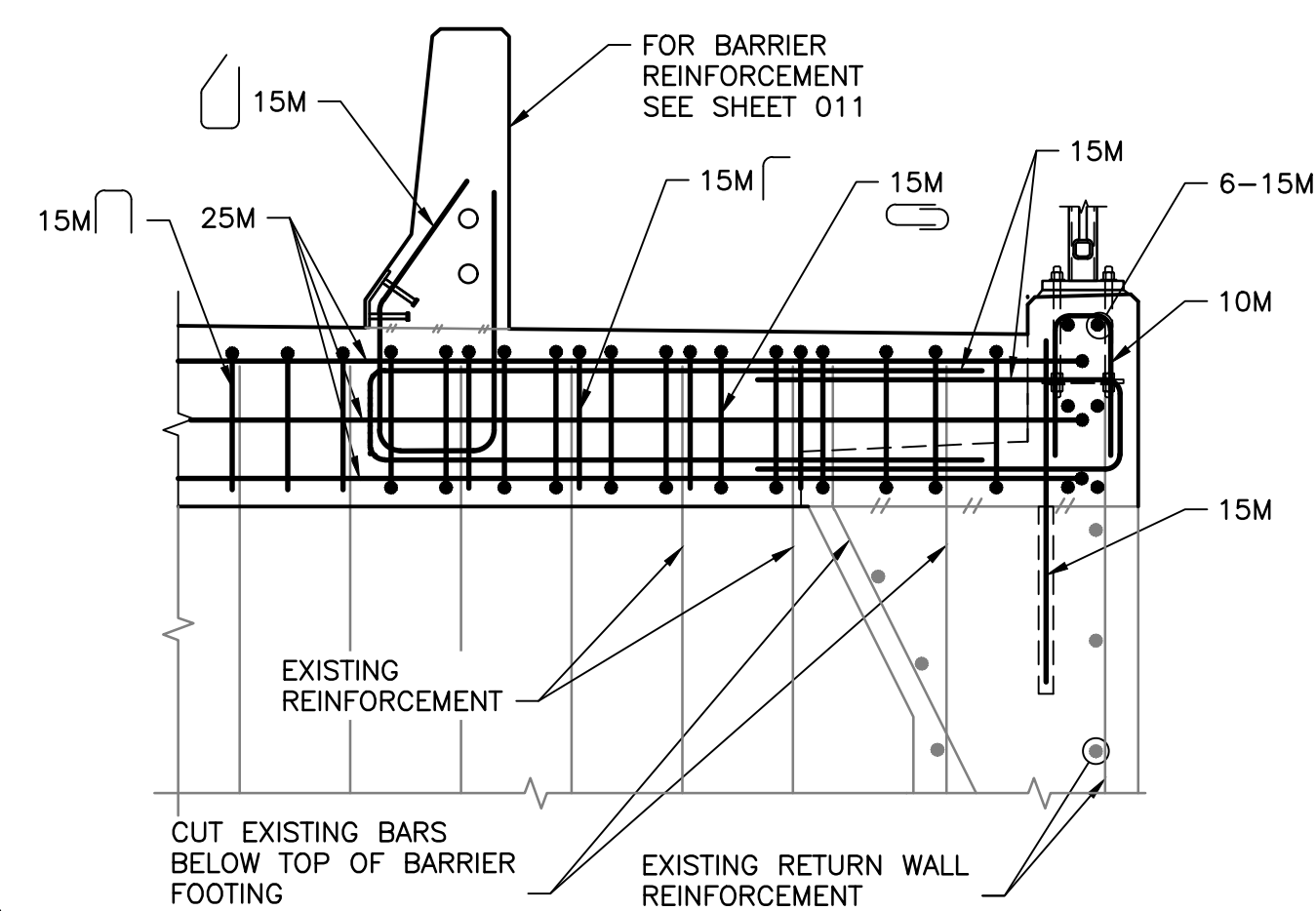
SECTION 2 REINFORCEMENT

1:20



SLAB REINFORCEMENT FINAL CONDITION PLAN

1:20
(DECK JOINT NOT SHOWN FOR CLARITY. SEE SHEET 008 FOR DETAILS.)



SECTION 3 REINFORCEMENT

1:20

LEGEND:

REMOVALS

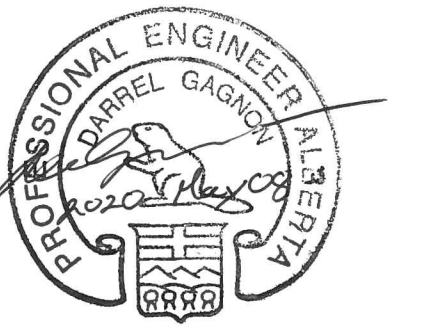
NOTES:

- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPa AT 28 DAYS.
- CHAMFER EXPOSED EDGES 20.
- REINFORCING STEEL: G30.18M GRADE 400W.
- MINIMUM COVER: 50 UNO.
- MINIMUM LAP UNO: 25M: 1200
15M: 600
10M: 320
USE REBAR COUPLERS FOR TRANSVERSE BARS AS REQUIRED AT STAGE 1/STAGE 2 CONSTRUCTION JOINT. REBAR COUPLERS IN ACCORDANCE WITH CSA/CAN S6-14, SECTION 8.4.4.4.
- NOT MORE THEN 50% OF REINFORCING SHALL BE SPLICED AT ONE LOCATION UNLESS NOTED OTHERWISE. LAP SPLICES SHALL BE STAGGERED BY A MINIMUM OF 1.3 TIMES THE SPLICE LENGTH.
- SAWCUT 25 DEPTH ALONG EDGE OF CONCRETE REMOVALS.
- PLACE ANCHOR DOWELS AT AND CENTERED BETWEEN EXISTING REBAR.
- DOWELS TO BE ANCHORED WITH HILTI HIT-HY200 OR APPROVED EQUIVALENT. HOLES TO BE HAMMER DRILLED.
- FIELD BENDING SHALL BE DONE CAREFULLY, COLD AND SHALL SATISFY THE MINIMUM BEND DIAMETERS OF CAN/CSA S6-14.
- CONSTRUCTION JOINTS TO BE CLEAN, FREE OF LAITANCE AND ROUGHENED TO AN AMPLITUDE OF 5 mm.
- LOCAL FULL DEPTH ASPHALT REMOVALS AND EXCAVATION ADJACENT TO RETURN WALL AS REQUIRED TO COMPLETE RETURN WALL MODIFICATIONS NOT SHOWN. ASPHALT AND FILL REMOVED TO BE REPLACED IN KIND.

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

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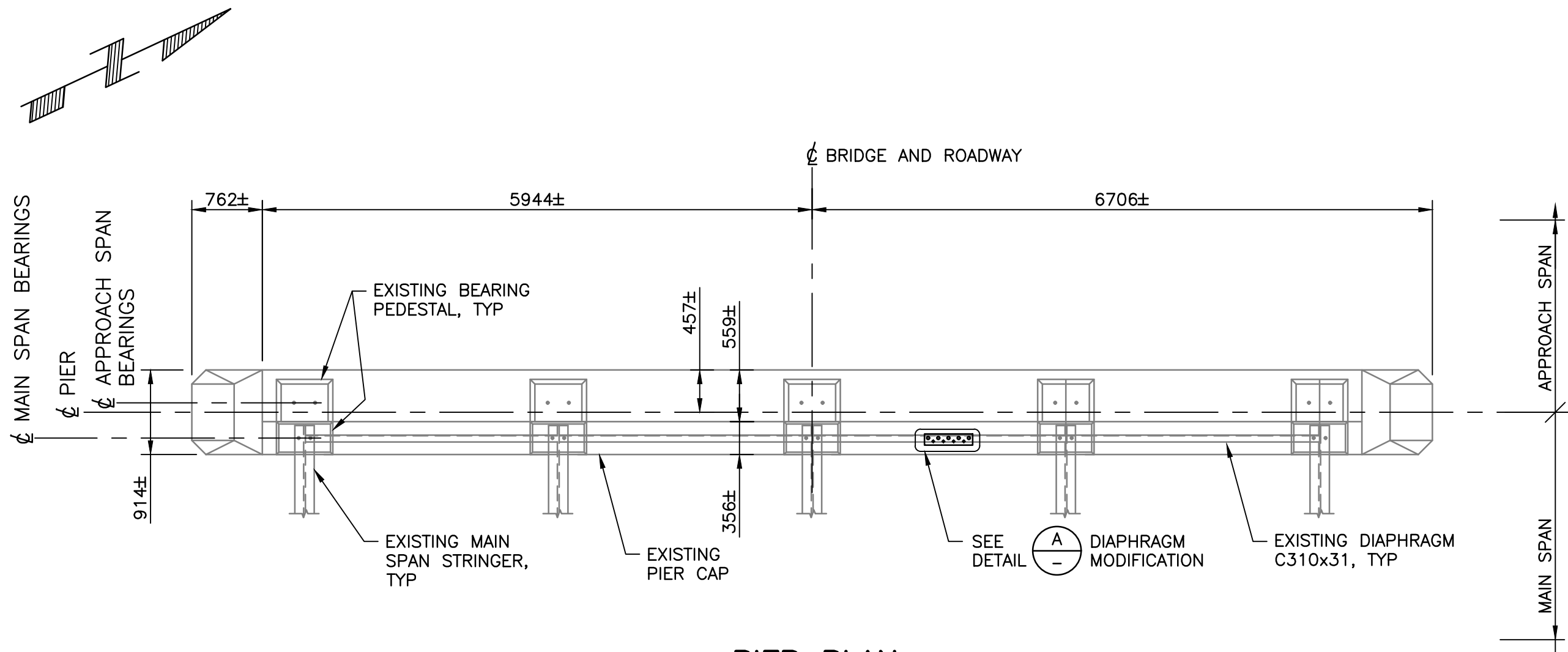
Project title/Titre du projet
BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA
KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE

Approved by/Approuvé par DPG
Designed by/Concept par TWB
Drawn by/Dessiné par MACM
PWOSC Project Manager/Administrateur de Projets TPSCG
PWOSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie, TPSCG
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Drawing title/Titre du dessin

ABUTMENT MODIFICATIONS

Project No./No. du projet 565-11	Sheet/Feuille 004 OF	Revision no./ La Révision no. 0
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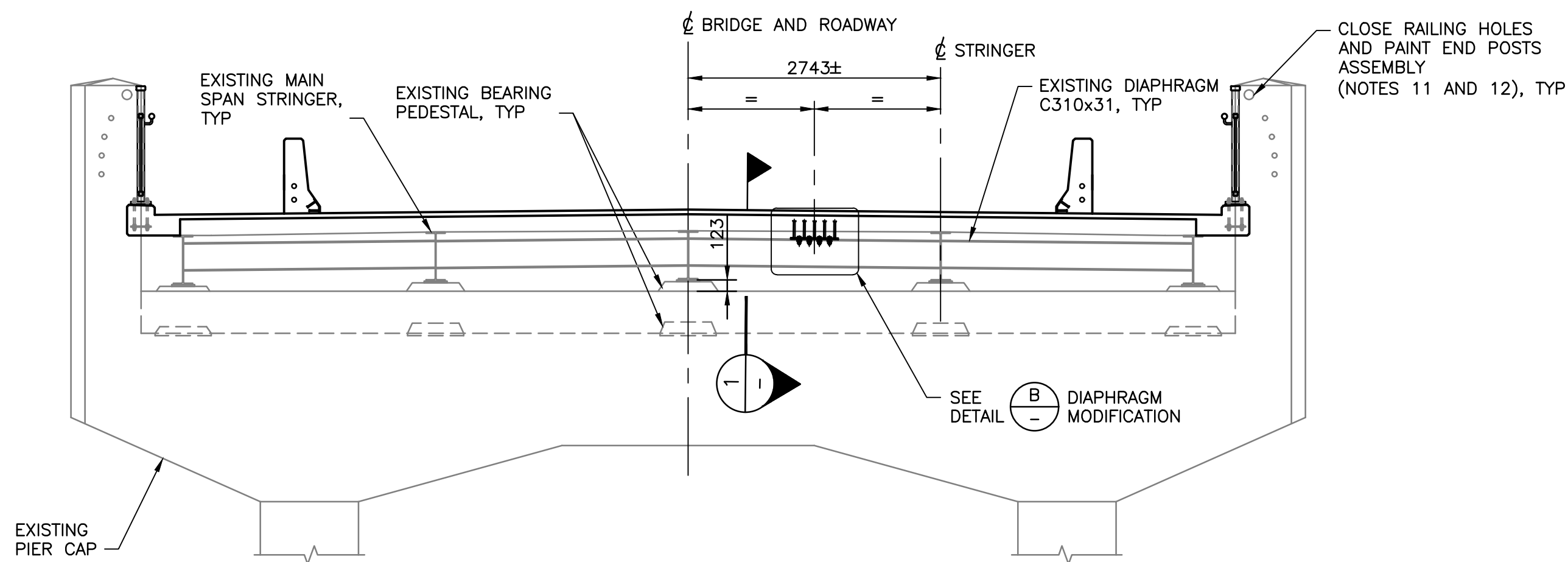


PIER PLAN

1:50

(NORTH PIER SHOWN - SOUTH PIER SIMILAR
DECK AND APPROACH SPAN GIRDERS NOT SHOWN FOR CLARITY)

DIAPHRAGM MODIFICATION
AT PIER SHOWN,
ABUTMENT SIMILAR.



PIER ELEVATION FINAL CONDITION

1:50

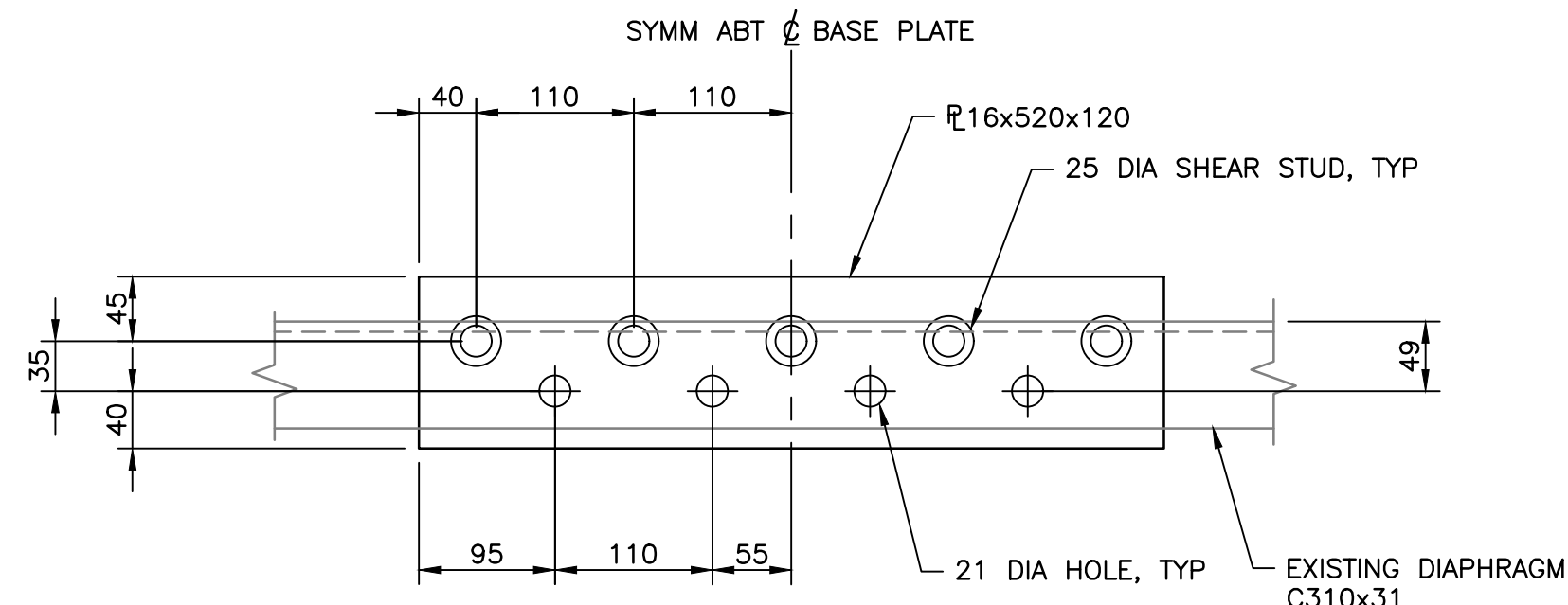
(NORTH PIER - LOOKING NORTH)

DIAPHRAGM MODIFICATION
AT PIER SHOWN,
ABUTMENT SIMILAR.

NOTES:

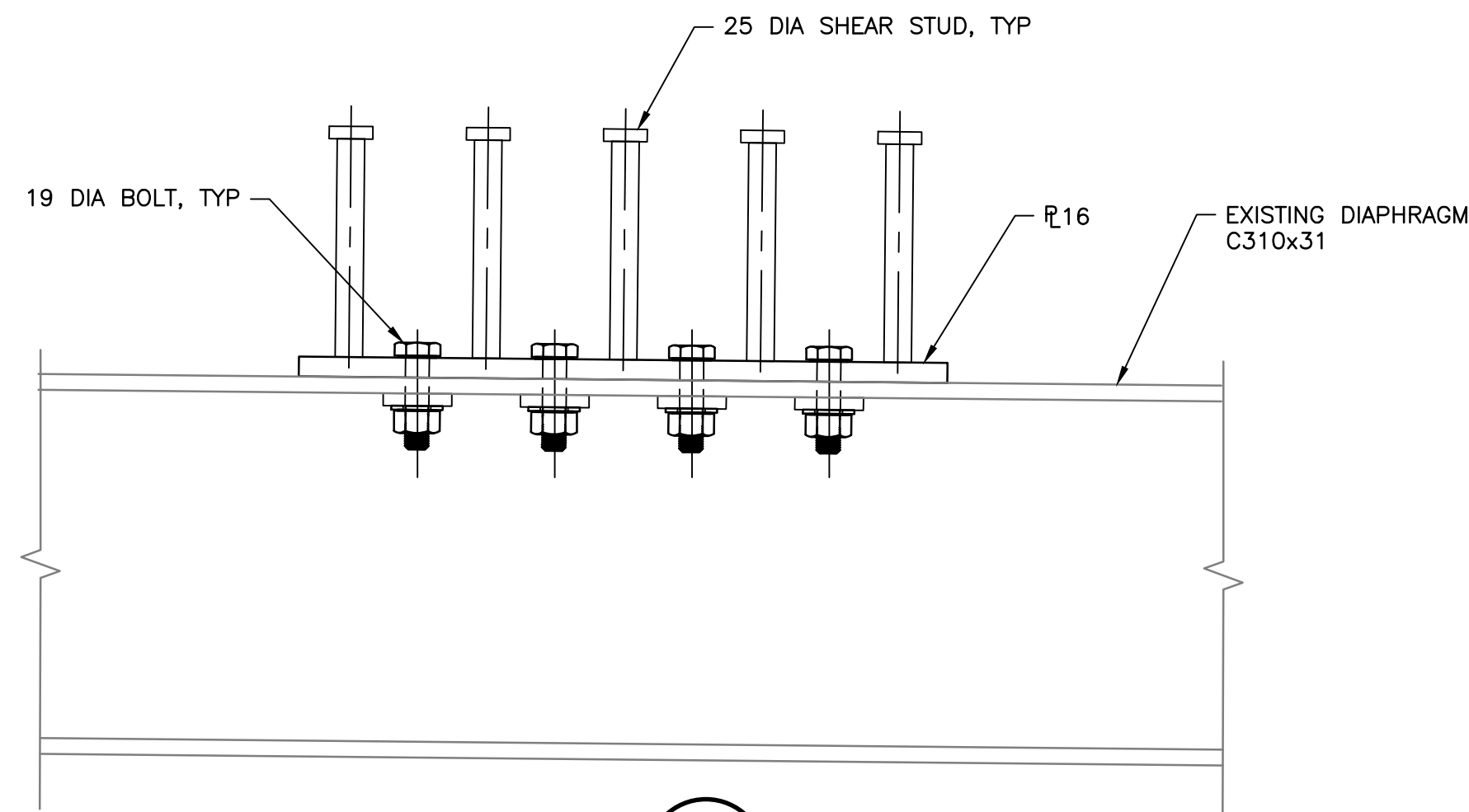
1. NEW STEEL: CAN/CSA G40.21 GRADE 350W.
2. STUDS: CSA W59 ANNEX H, TYPE B.
3. BOLTS: ASTM F3125, GRADE A325.
4. WELDING: CAN/CSA W59.
5. GALVANIZE ALL STEEL WORK AFTER FABRICATION IN ACCORDANCE WITH ASTM A123/123M.
6. BOLT THREADS SHALL BE EXCLUDED FORM SHEAR PLANE.
7. USE TURN-OF-NUT METHOD FOR TIGHTENING THE BOLTS.
8. THE FAYING SURFACE AT T/O CHANNEL FLANGE SHALL BE ZINC METALLIZED IN ACCORDANCE WITH ASTM B833. SURFACE SHALL BE BLAST CLEANED BEFORE APPLICATION. THICKNESS OF ZINC METALLIZING SHALL NOT EXCEED 16 mil.
9. FIELD WELDING IS NOT PERMITTED.
10. PLACE DIAPHRAGM MODIFICATION BEFORE PLACING NEW DECK JOINT.
11. FILL HOLES OF REMOVED RAILING PIPES IN PIER PYLONS WITH CONCRETE REPAIR MORTAR. SEAL PERIMETER OF INFILL WITH SIKAFLEX 15LM SEALING COMPOUND OF APPROVED EQUIVALENT.
12. CLAN STEEL RAILING ANCHOR ASSEMBLY IN PIER PYLON AND APPLY TWO COATS OF ZINC-RICH PAINT. PAINT COLOUR TO MATCH COLOUR OF PIER CONCRETE.

LOCATION	No. DIAPHRAGM MODIFICATION ASSEMBLIES
APPROACH SPAN - NORTH ABUTMENT	1
APPROACH SPAN - NORTH PIER	N/A
MAIN SPAN - NORTH PIER	1
MAIN SPAN - SOUTH PIER	1
APPROACH SPAN - SOUTH PIER	N/A
APPROACH SPAN - SOUTH ABUTMENT	1



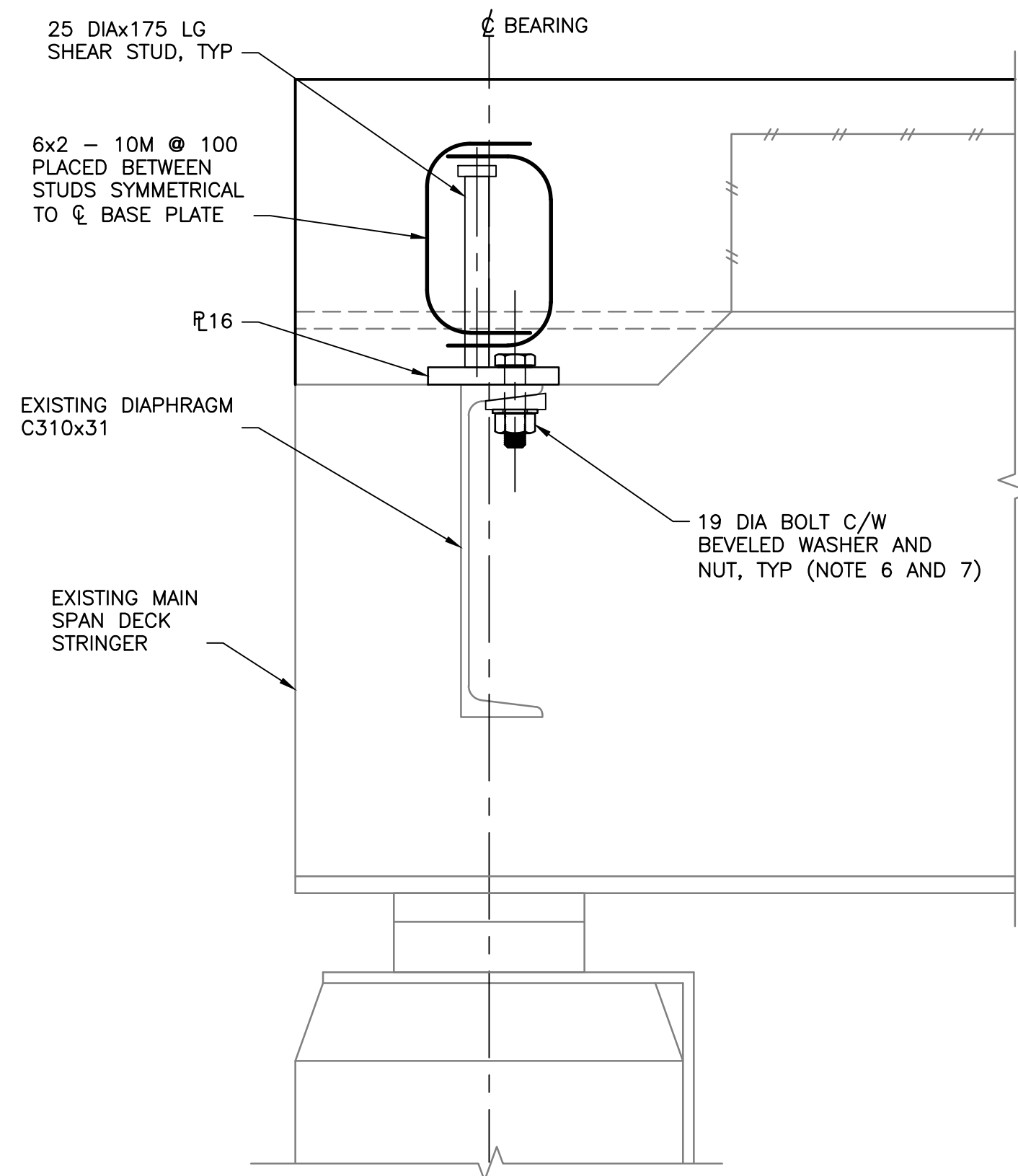
DETAIL A BASE PLATE

1:5



DETAIL B

1:5

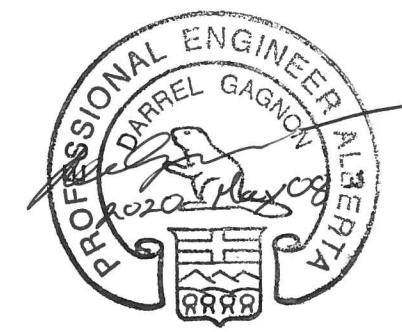


SECTION 1

1:5

(DECK JOINT, DECK REINFORCEMNT, AND APPROACH SPAN GIRDER NOT SHOWN)

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BANFF NATIONAL PARK, ALBERTA**
**KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE**

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PWGC, Architectural and Engineering Resources Manager/
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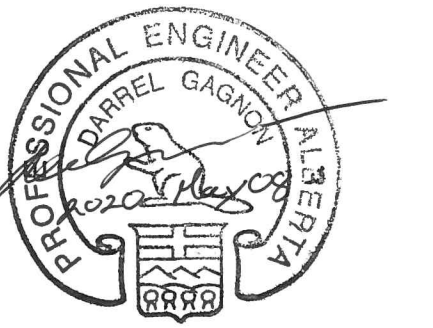
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Drawing title/Titre du dessin

**DECK DIAPHRAGM AND
PIER PYLON MODIFICATIONS**

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565-11	005 OF	0

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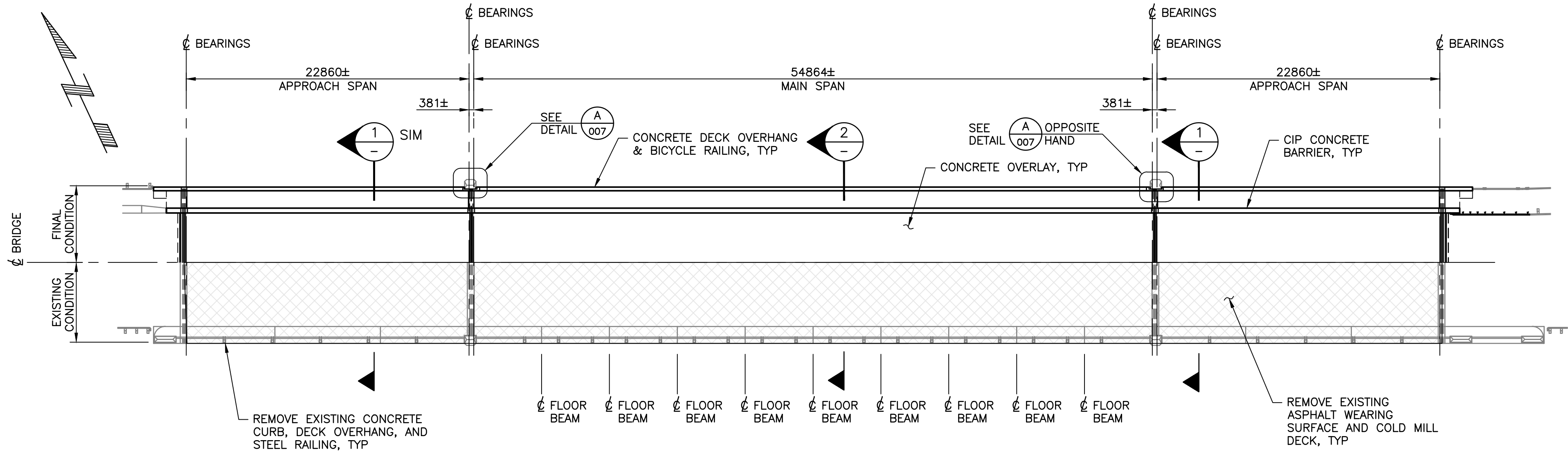
PWGC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

Client/client
PCA

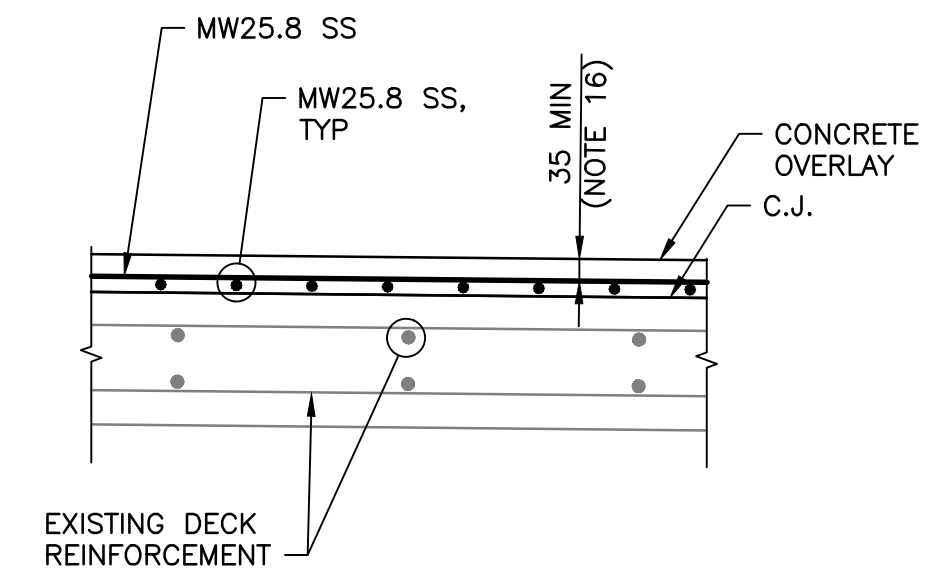
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**CONCRETE DECK
MODIFICATIONS
SHEET 1**

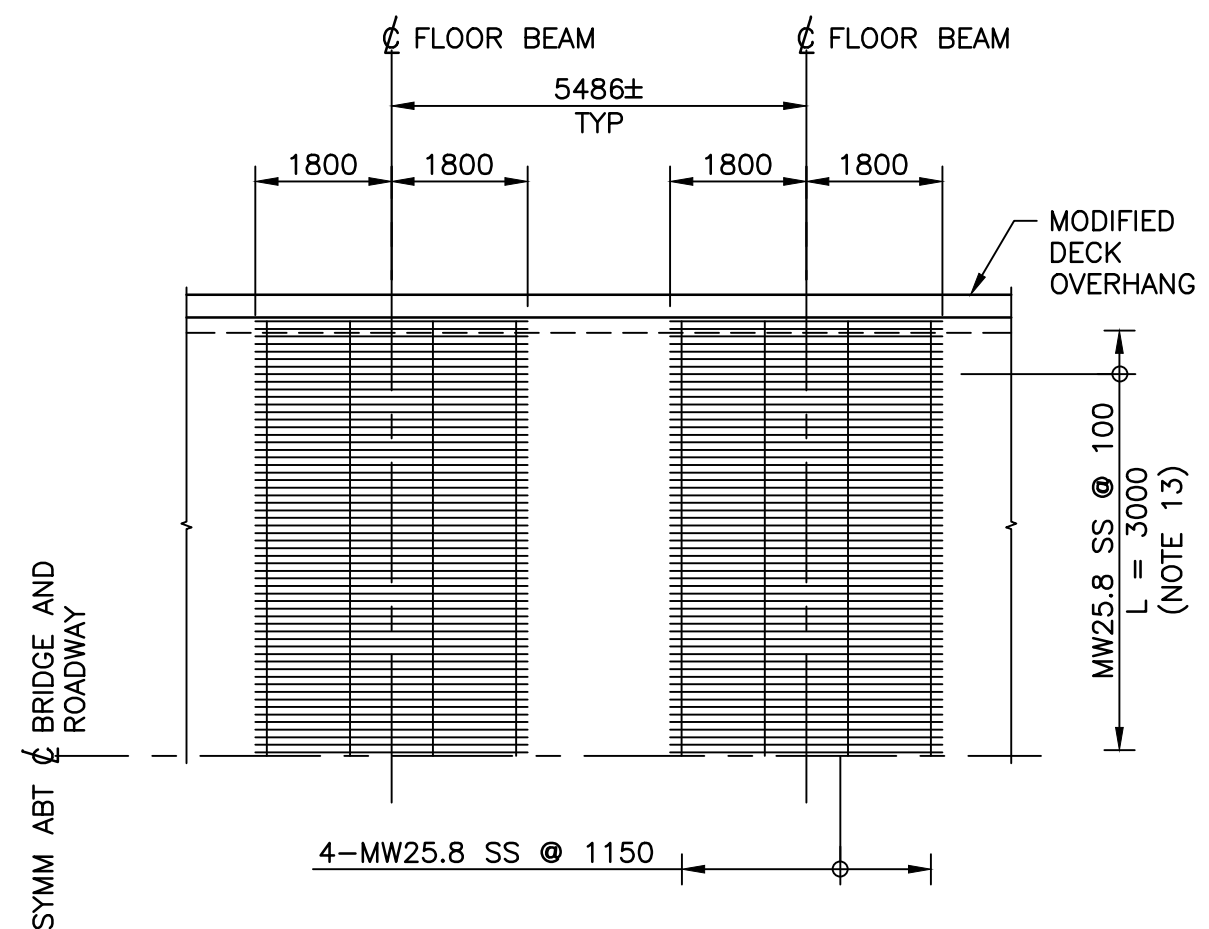
Project No./No. du projet	Sheet/Feuille no.	Revision no./ La Révision no.
565-11	006 OF	0



PLAN
1:250



DETAIL A REINFORCEMENT
1:10
(SEE ADDITIONAL DETAIL IN PARTIAL MAIN SPAN DECK
PLAN AT FLOORBEAMS - REINFORCEMENT DETAIL)



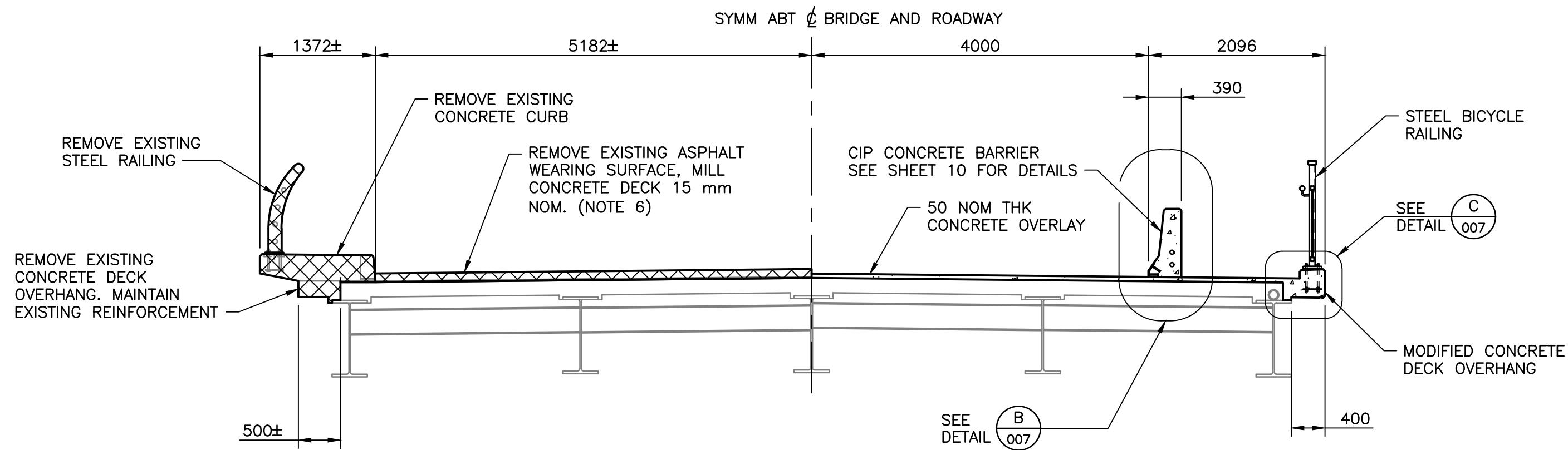
**PARTIAL MAIN SPAN DECK PLAN AT
FLOOR BEAMS - REINFORCEMENT**
1:100
(TYPICAL AT ALL FLOOR BEAM LOCATIONS)

LEGEND:

- REMOVALS

NOTES:

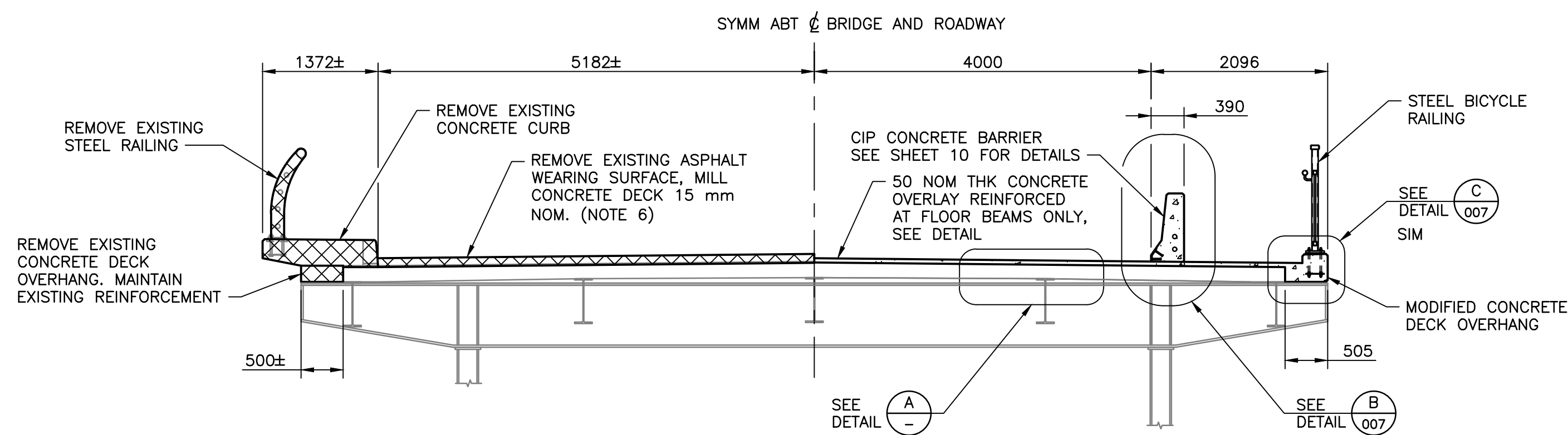
- CONCRETE: 45 MPa at 28 DAYS MINIMUM.
- CHAMFER EXPOSED EDGE 20.
- STEEL: CAN/CSA G40.21M GRADE 350W, GALVANIZE AFTER FABRICATION.
- REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W. STAINLESS STEEL WIRE REINFORCEMENT (MARKED MW): ASTM A1022 TYPE 316LN, GRADE 75.
- MINIMUM COVER: 50 mm UNO.
- USE COVER METER TO CHECK ACTUAL CONCRETE COVER BEFORE MILLING. DO NOT MILL CLOSER THAN 10 mm TO TOP LAYER REINFORCEMENT.
- MINIMUM LAP: 10M - 350 UNO. 15M - 600 UNO. LAP SLICES NOT SHOWN. STAGGER LAP SPLICES BY 1.3 TIMES THE LAP LENGTH.
- CONSTRUCTION JOINTS TO BE CLEAN, FREE OF LAITANCE AND ROUGHENED TO AN AMPLITUDE OF 5mm.
- REBAR SHALL BE WILLIAMS GRADE 75 ALL-THREADED REBAR OR APPROVED EQUIVALENT. BARS AND ACCESSORIES TO BE GALVANIZED.
- REMOVE EXISTING WICK DRAIN PIPES, ROUGHEN HOLE SURFACE AND CLOSE HOLES WITH CONCRETE REPAIR MORTAR.
- MAINTAIN EXISTING REINFORCEMENT. FILL HOLES WITH CEMENTITIOUS GROUT AFTER PLACING BARS. PLACE LOCK NUT AT CONSTRUCTION JOINT IF REQUIRED TO SECURE BAR POSITION.
- PROVIDE SPECIFIED COVER TO BARRIER SURFACE.
- SECURE REBAR WIRE ASSEMBLY ON TOP OF CONSTRUCTION JOINT USING STAINLESS STEEL M6 CONCRETE SCREW ANCHORS OR APPROVED EQUIVALENT.
- PARTIAL DEPTH REPAIR AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE IN ACCORDANCE WITH SPECIFICATIONS.
- NUTS TO BE SNUG TIGHT.
- SPECIFIED CONCRETE COVER REFERS TO LONGITUDINAL REBAR WIRES (MW25.8 SS @ 100).



EXISTING CONDITION

FINAL CONDITION

SECTION 1 APPROACH SPAN
1:50

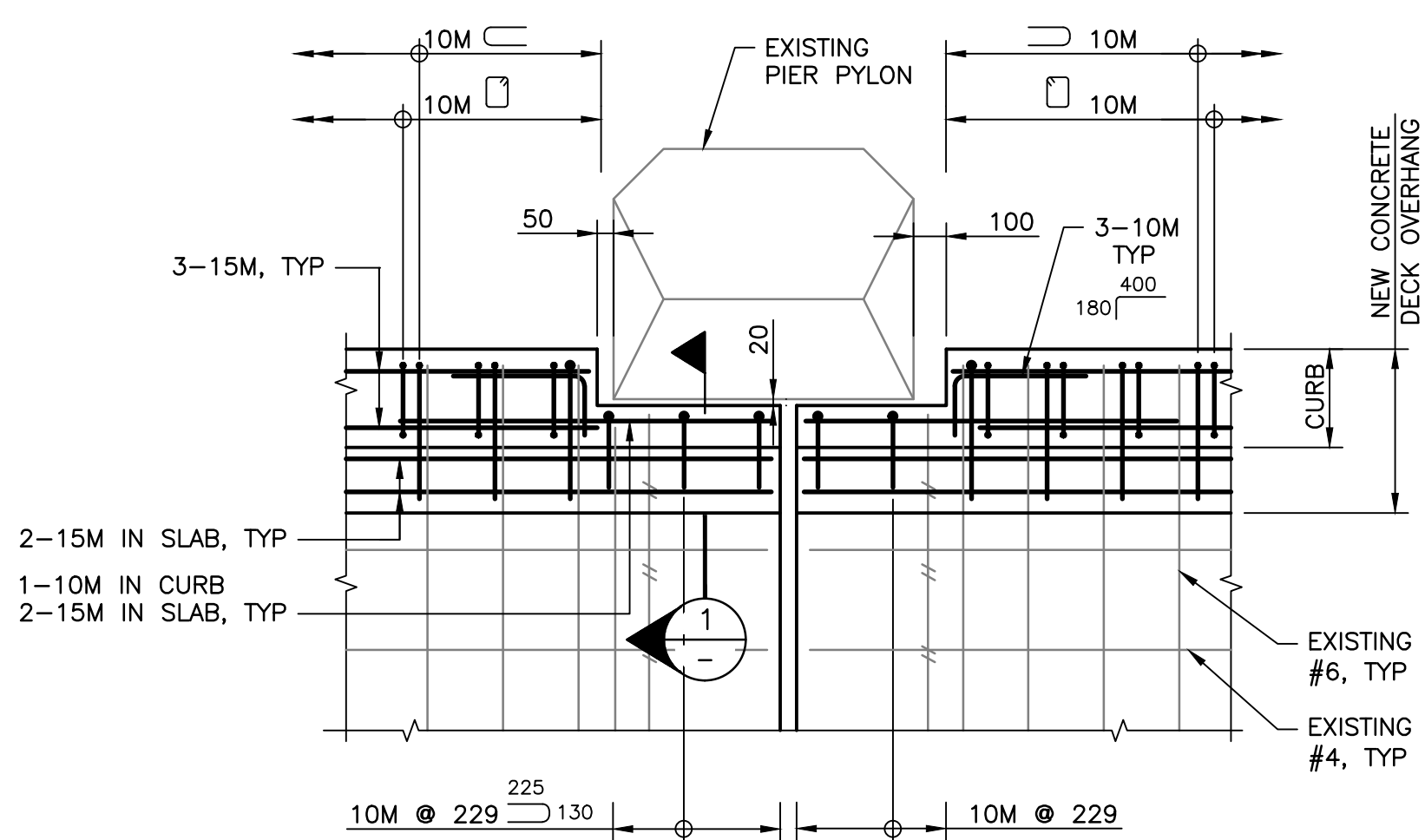


EXISTING CONDITION

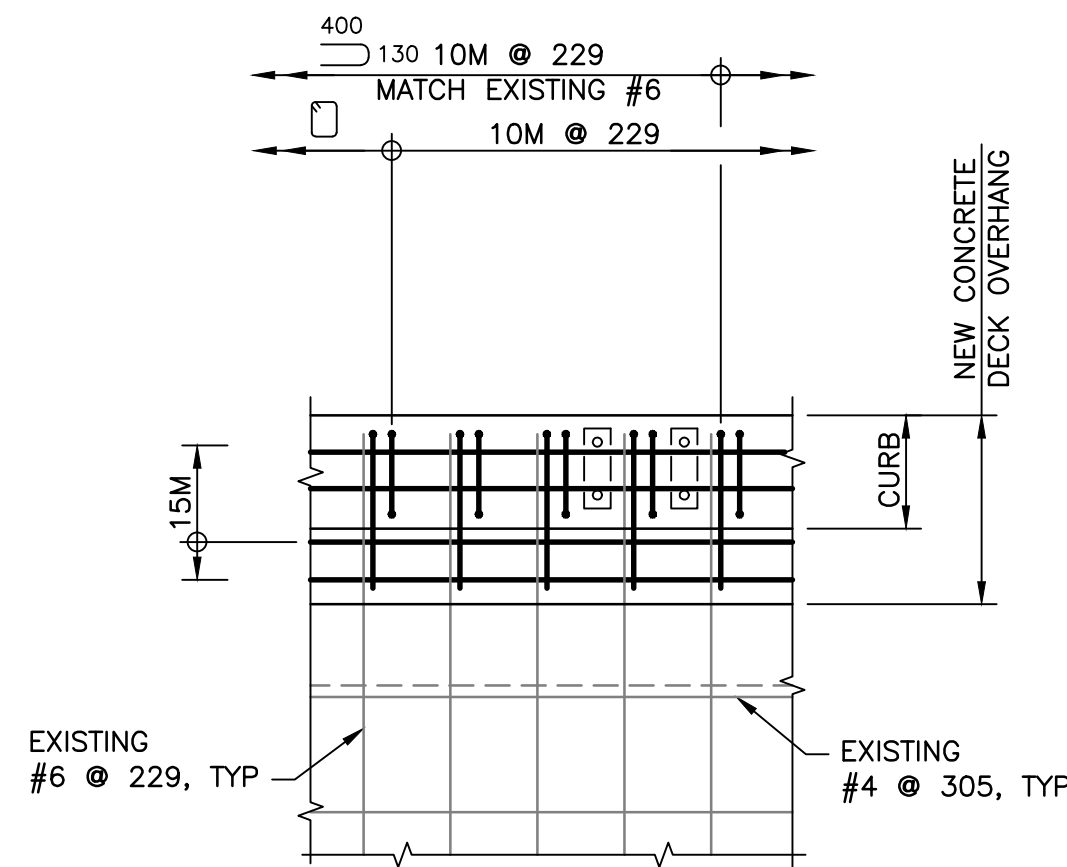
FINAL CONDITION

SECTION 2 MAIN SPAN
1:50

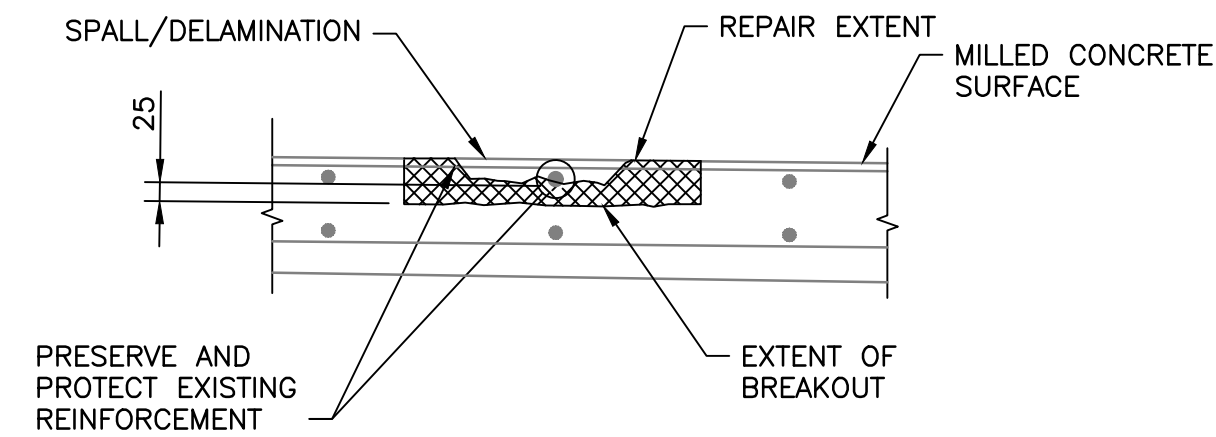
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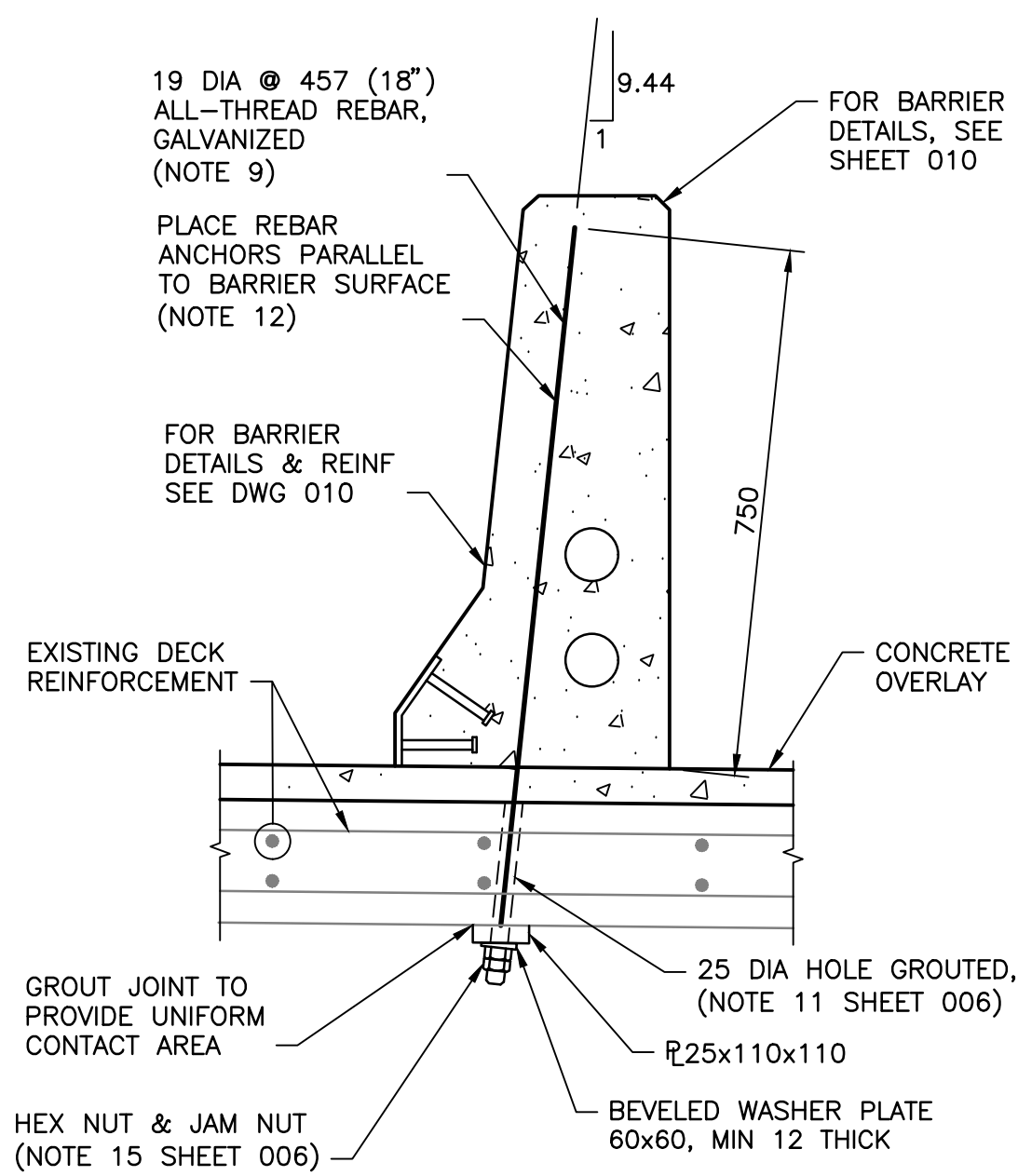
DETAIL A
1:20
NOTE: DECK JOINT BLOCK OUT REINFORCEMENT NOT SHOWN, SEE SHEET 008 AND SHEET 009 FOR DECK JOINT REINFORCEMENT



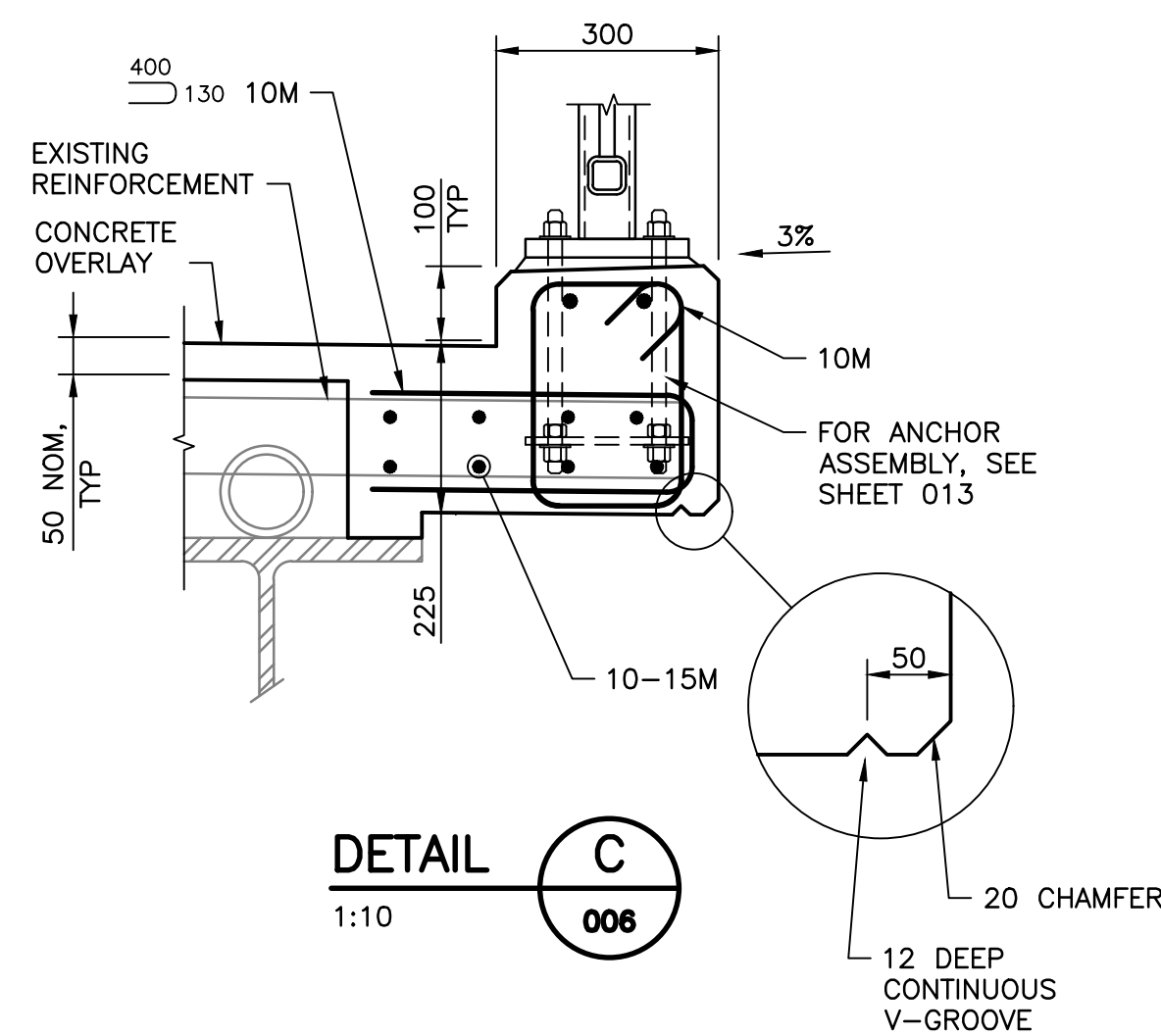
CURB REINFORCEMENT PLAN
1:20



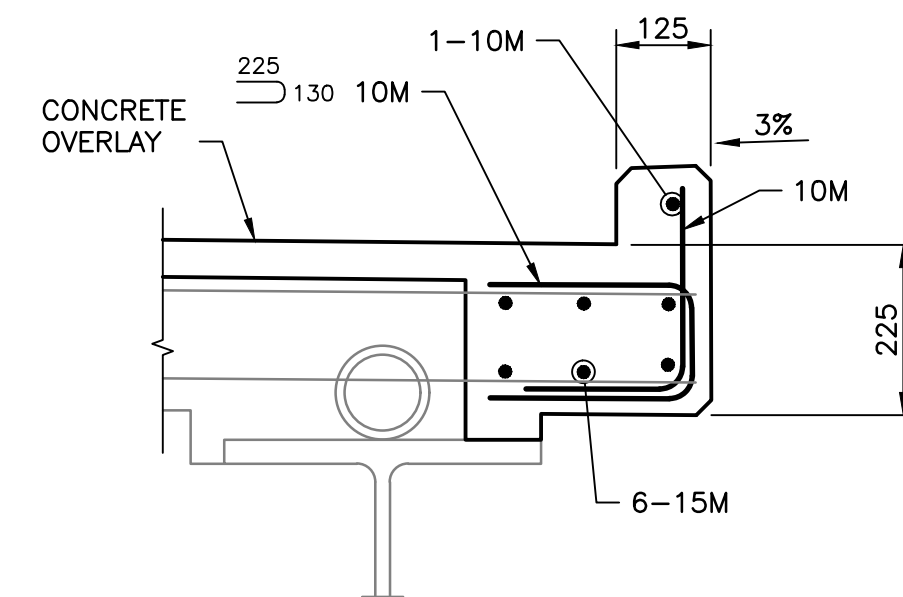
PARTIAL DEPTH DECK CONCRETE REPAIR DETAIL
NTS
(NOTE 14)



DETAIL B
1:10



DETAIL C
1:10

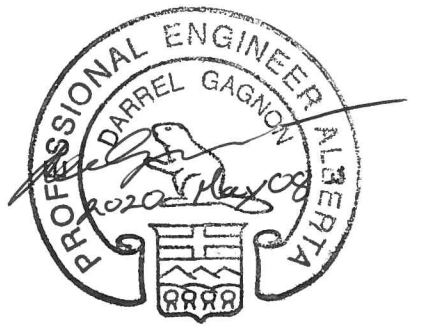


SECTION 1
1:10

NOTES:

- WORK WITH NOTES ON SHEET 006.

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Revision/	Description/Description	Date/Date
0	ISSUED FOR CONSTRUCTION	20/05/08

Client/client	Parks Canada Agency	L'Agence Parcs Canada
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COWI

Project title/Titre du projet
BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA

KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE

Approved by/Approuvé par
DPG

Designed by/Concept par
TWB

Drawn by/Dessiné par
MACM

PWGSC Project Manager/Administrateur de Projets TFSGC

PWGSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TFSGC

Client/client
PCA

Drawing title/Titre du dessin

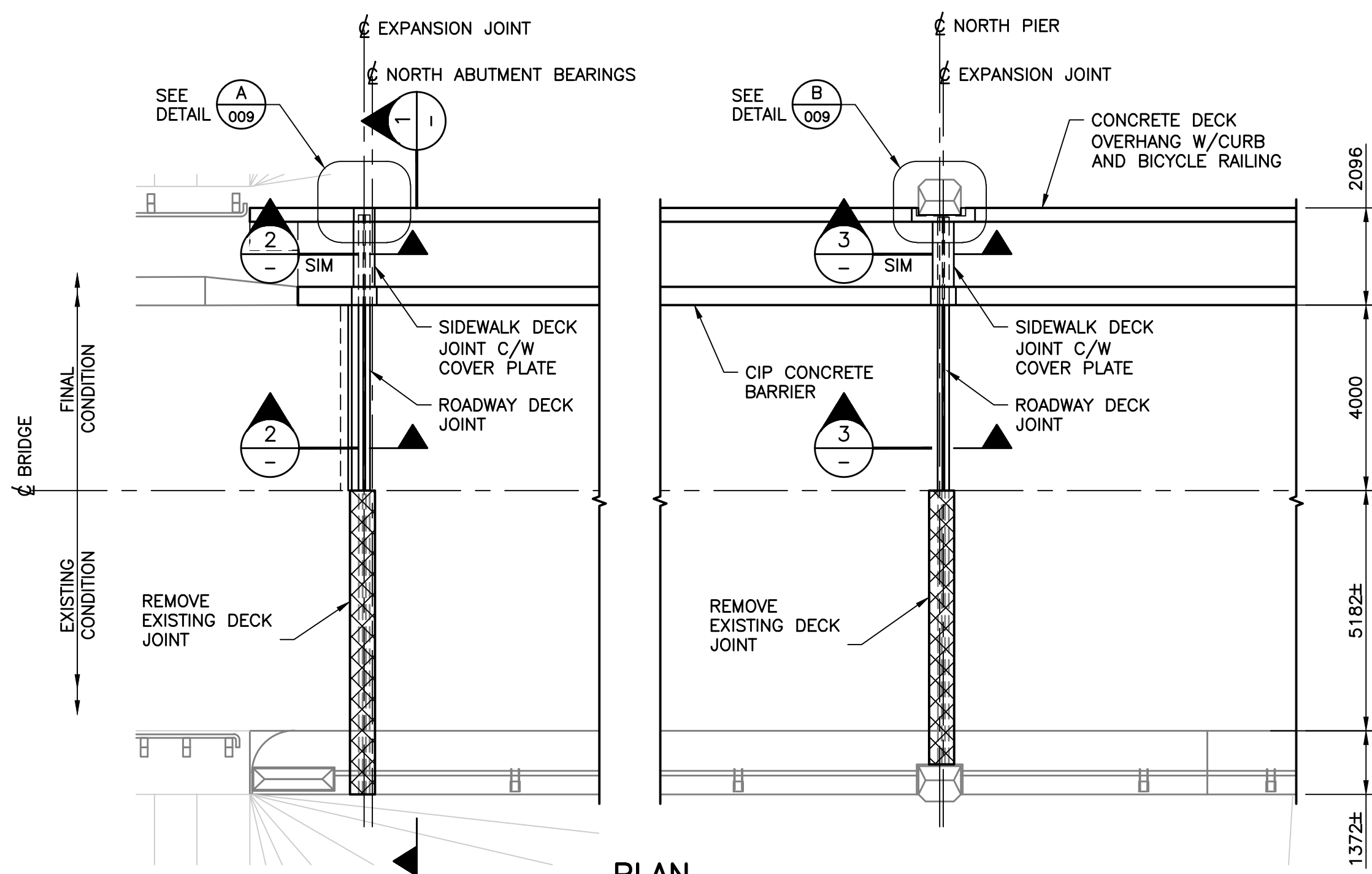
CONCRETE DECK
MODIFICATIONS
SHEET 2

Project No./No. du projet	Sheet/Feuille	Revision no./La Révision no.
565-11	007 OF	0



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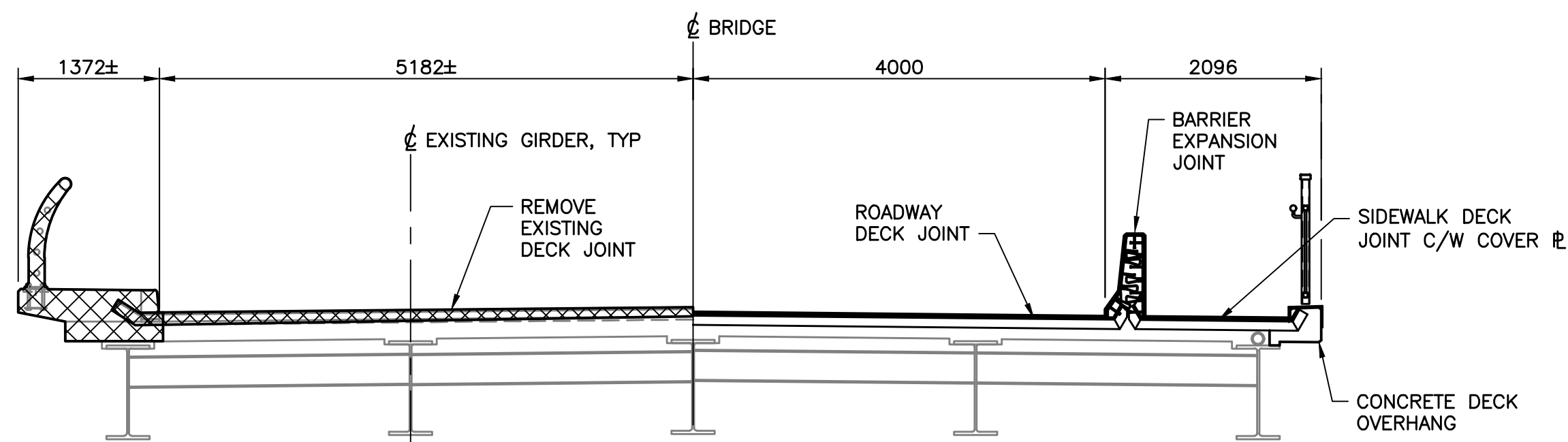
PWGSC - A1 - 841X594



PLAN

1:100

(NORTH ABUTMENT AND NORTH PIER SHOWN - SOUTH ABUTMENT AND SOUTH PIER SIMILAR)

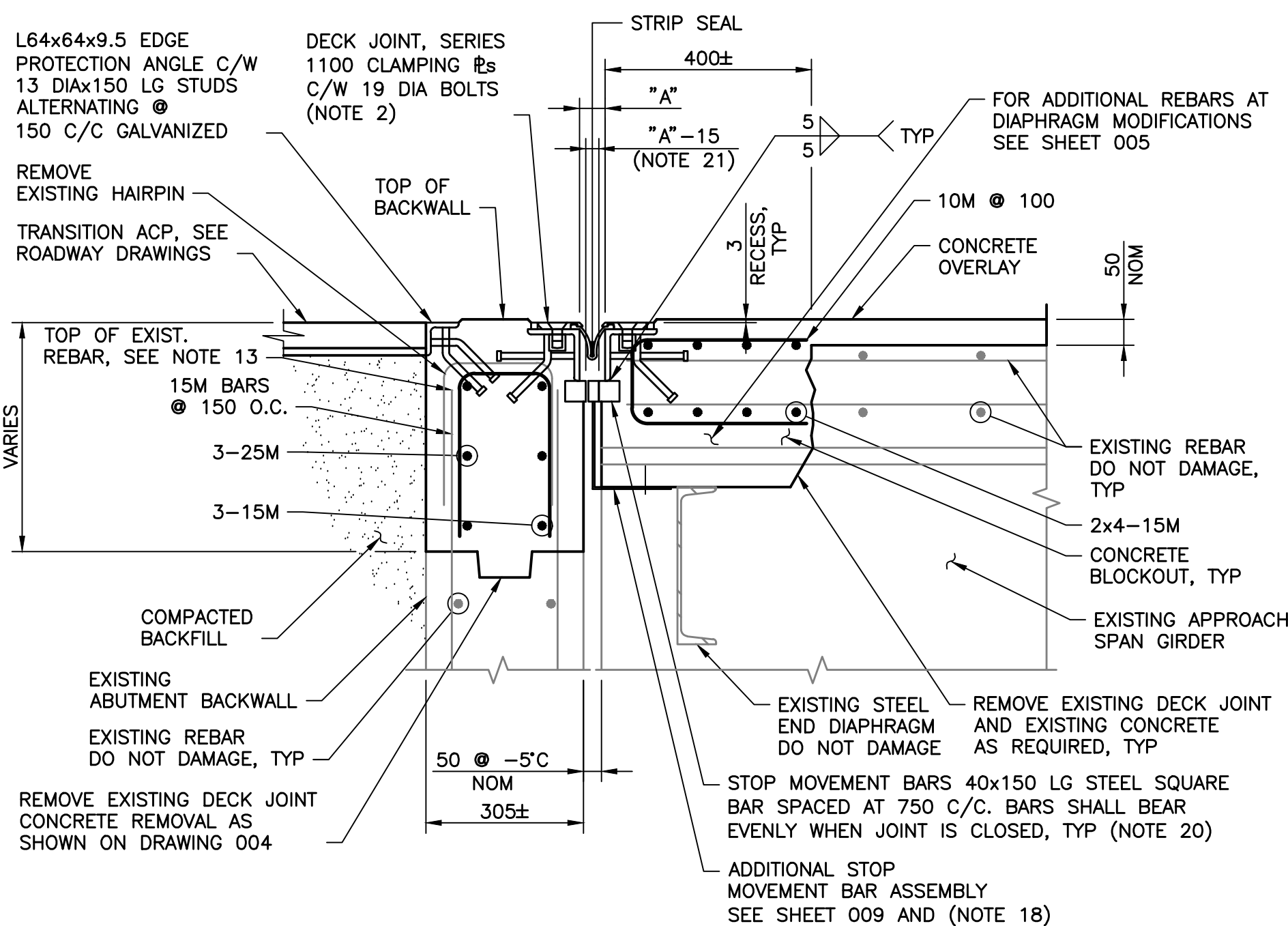


EXISTING CONDITION

FINAL CONDITION

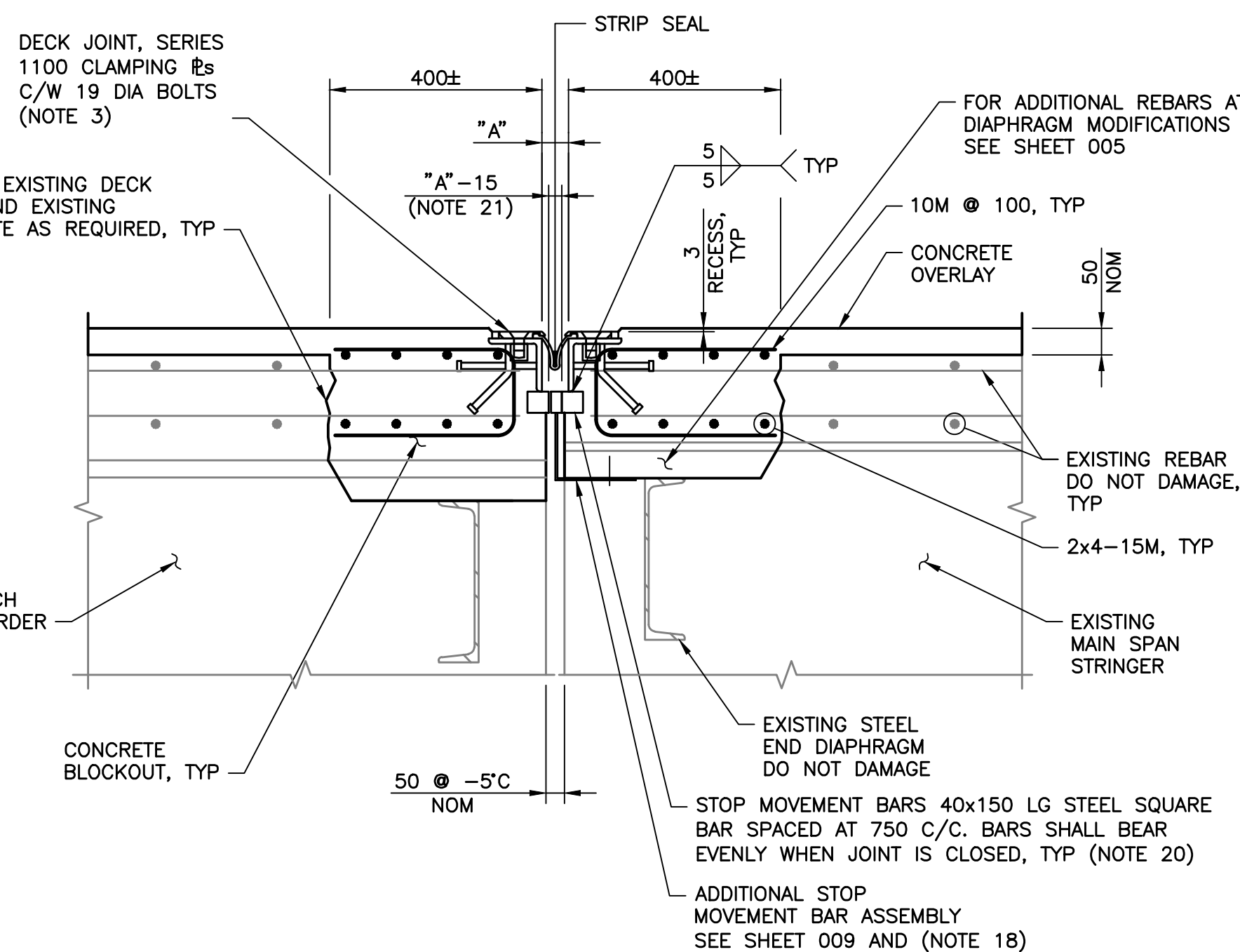
SECTION 1

1:50



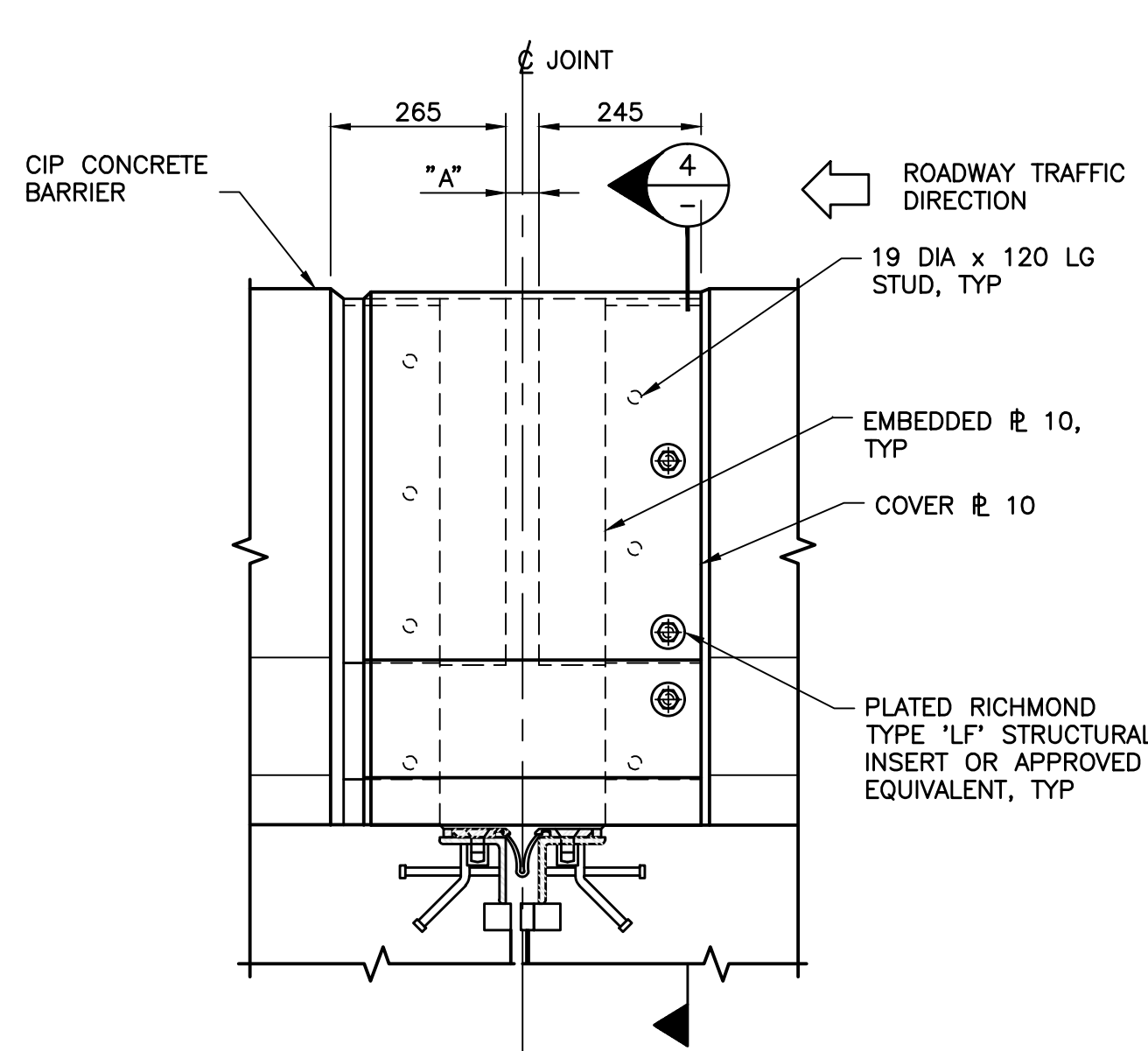
SECTION 2

1:10



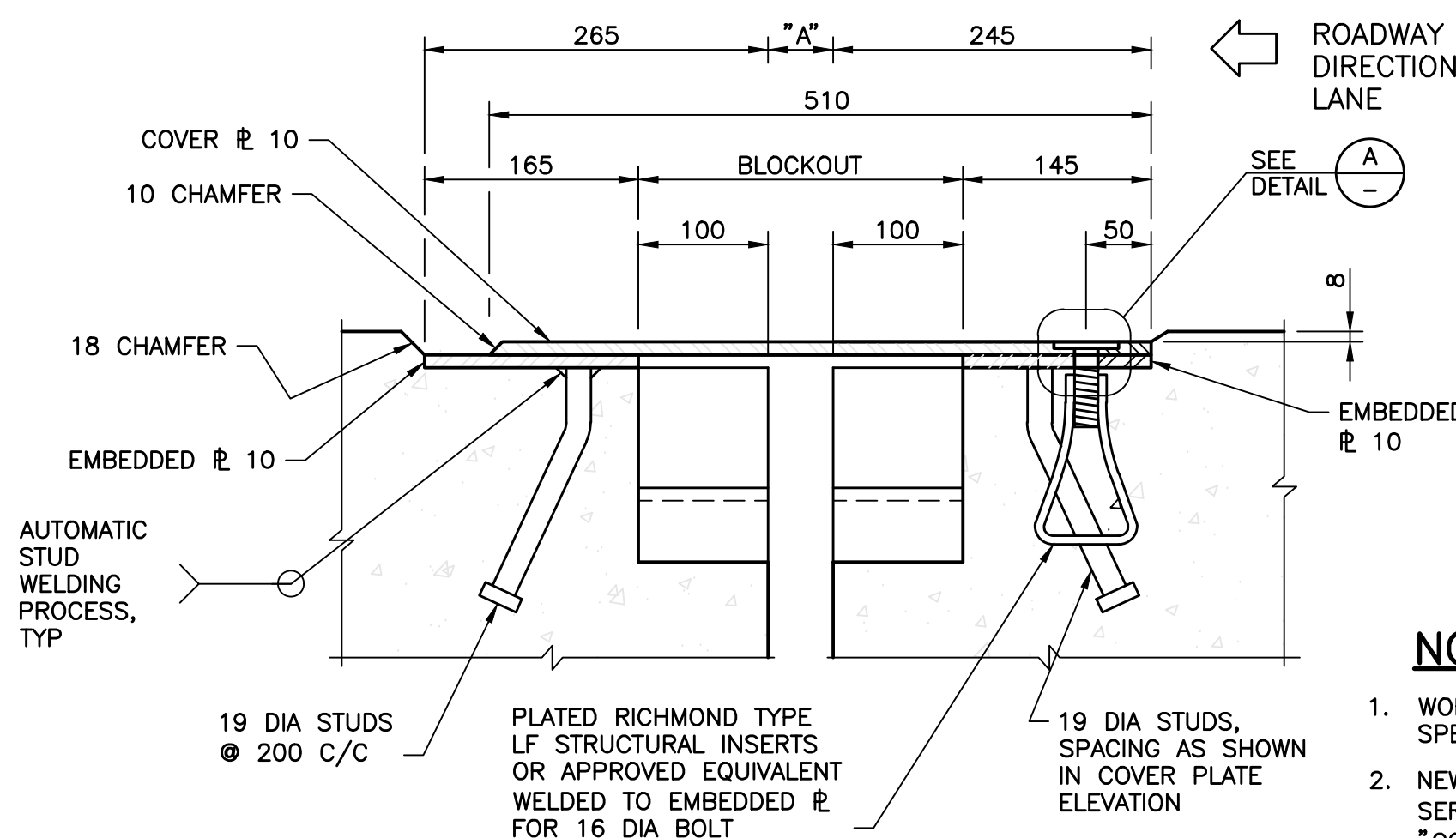
SECTION 3

1:10



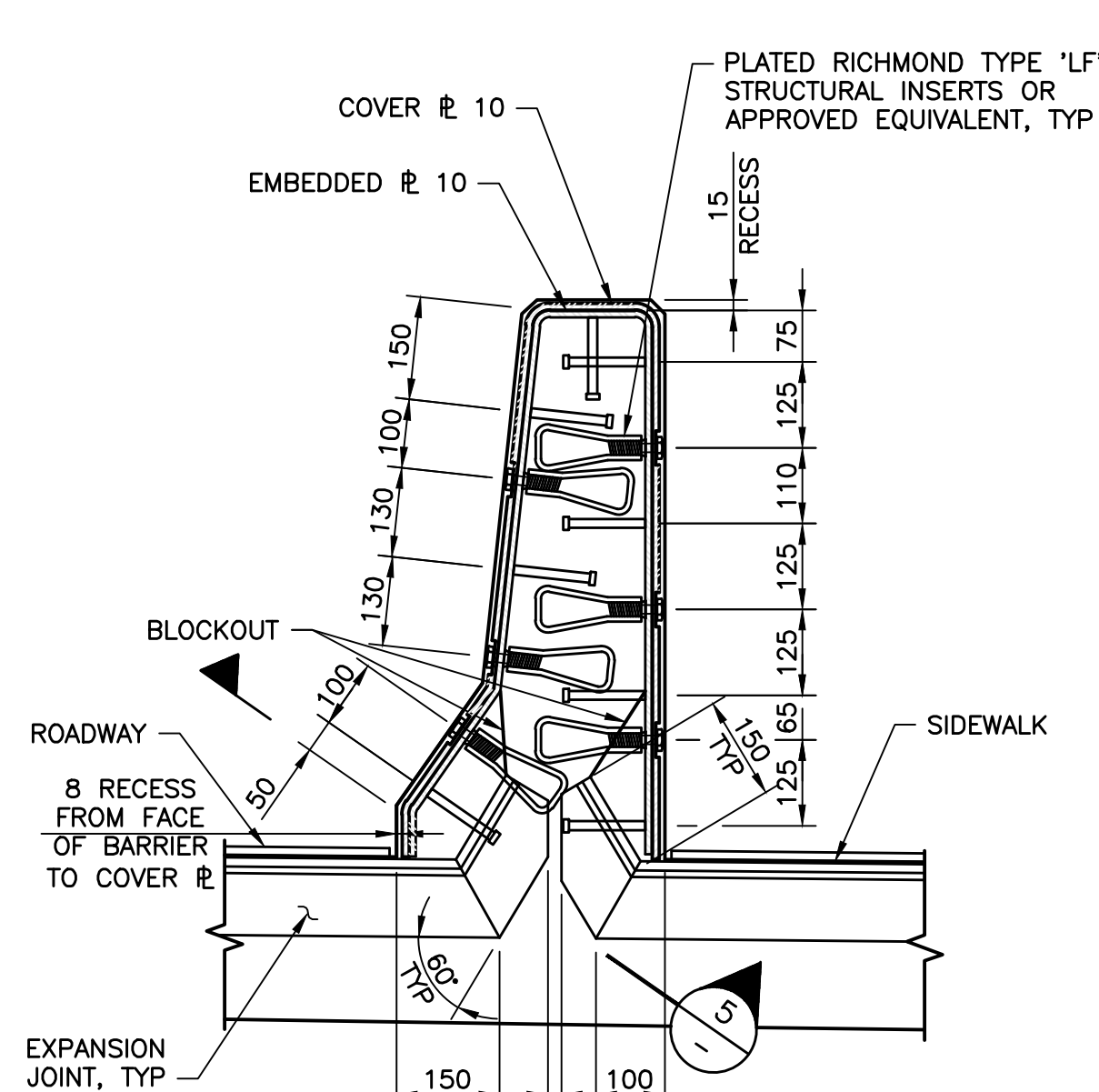
BARRIER EXPANSION JOINT COVER PLATE - ELEVATION

1:10



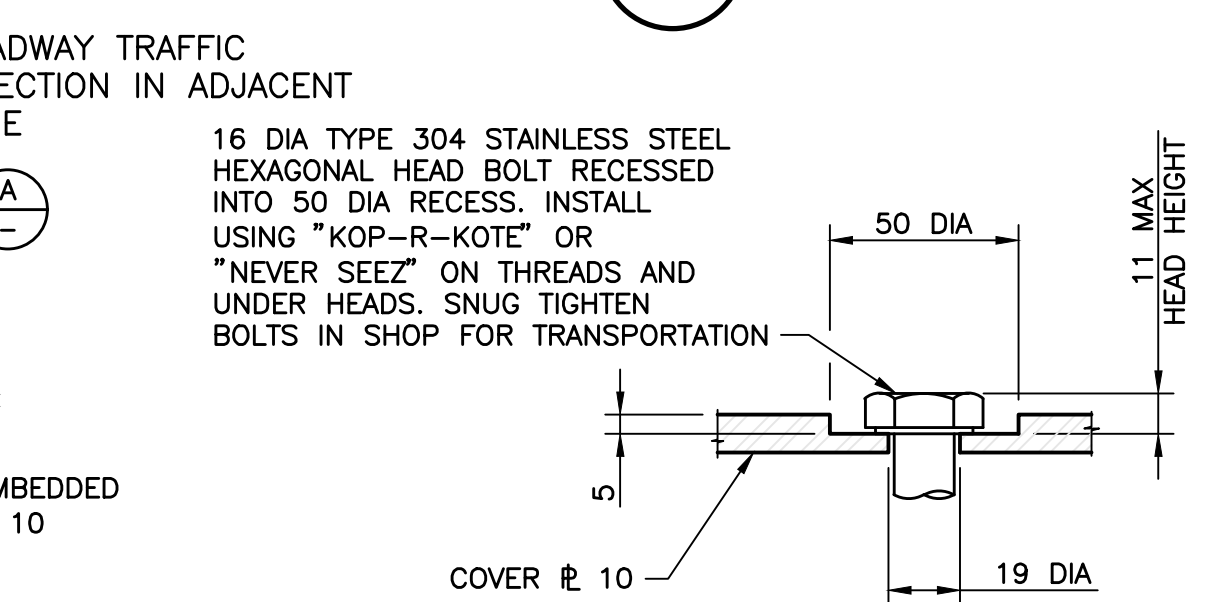
SECTION 5

1:5



SECTION 4

1:10



DETAIL A

1:2

NOTES:

- WORK TO BE COMPLETED IN TWO STAGES IN ACCORDANCE WITH SPECIFICATIONS.
- NEW ROADWAY AND SIDEWALK DECK JOINTS AT ABUTMENTS "GOODFLEX SERIES 1100 BY GOODCO Z-TECH" C/W JOINT NEOPRENE SEAL "GOODCO FL-75" OR APPROVED EQUIVALENT INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.
- NEW ROADWAY AND SIDEWALK DECK JOINTS AT PIERS "GOODFLEX SERIES 1100 BY GOODCO Z-TECH" C/W JOINT NEOPRENE SEAL "GOODCO FL-125" OR APPROVED EQUIVALENT INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.
- COVER PLATE FOR SIDEWALK DECK JOINTS "WABO SAFETYFLEX BY WATSON BOWMAN ACME CORP." OR APPROVED EQUIVALENT INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS. - AT PIERS AND ABUTMENTS : "WABO SAFETYFLEX SFP-1000"
- NEW STEEL: CSA G40.21M GRADE 300W, GALVANIZE AFTER FABRICATION.
- STUDS: CAN/CSA W59 ANNEX H, TYPE B, GALVANIZE AFTER FABRICATION.
- WELDING: CAN/CSA W59.
- HOT DIP GALVANIZE TO ASTM A123/123M.
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45MPa AT 28 DAY
- REINFORCING STEEL: CAN/CSA G30.18 GRADE 400W
- MINIMUM COVER: 50 UNO.
- MINIMUM LAP: 10M: 325mm
15M: 600mm
USE REBAR COUPLERS FOR TRANSVERSE BARS AS REQUIRED AT STAGE 1/STAGE 2 CONSTRUCTION JOINT. REBAR COUPLERS IN ACCORDANCE WITH CSA/CAN S6-14, SECTION 8.4.4.4.
- TRIM TOP OF VERTICAL BARS IF REQUIRED TO MAINTAIN CONCRETE COVER.
- CONSTRUCTION JOINTS TO BE CLEAN, FREE OF LAITANCE AND ROUGHENED TO AN AMPLITUDE OF 5mm.
- INSTALLATION GAP "A" IN ACCORDANCE WITH TABLE.
- PROVIDE 5mm GAP TO T/O CURB.
- CHAMFER EDGES OF CURB COVER PLATES 5mm.
- ADDITIONAL STOP MOVEMENT BAR ASSEMBLIES TO BE PLACED IN AREAS BETWEEN GIRDERS/STRINGERS ONLY. BARS SHALL BEAR EVENLY ON JOINT SQUARE BARS.
- CONCRETE SCREW ANCHOR TO BE FULLY REMOVABLE.
- PROVIDE 5mm RECESS OF DECK CONCRETE FASCIA IN REFERENCE TO STOP MOVEMENT BARS.
- JOINT GAP FOR STOP MOVEMENT BARS 40x150: "A"-15mm.

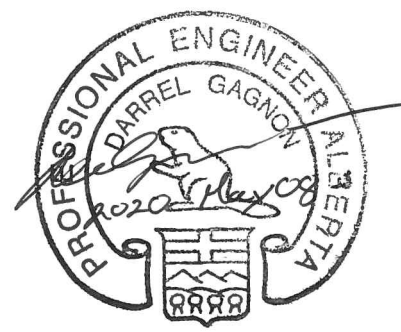
GAP SETTING TABLE DIMENSION "A"

TEMPERATURE (°C)	-15	-10	-5	0	5	10	15	20	25
JOINT GAP "A" AT ABUTMENT	62	60	59	58	56	55	53	52	51
JOINT GAP "A" AT PIER	65	64	62	60	59	57	55	54	52

LEGEND:

REMOVALS

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Revision/Revision	Description/Description	Date/Date
Client/client	Parks Canada Agency	L'Agence Parcs Canada

COWI

Project title/Titre du projet
BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA

KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE

Approved by/Approuvé par
DPG

Designed by/Conçu par
TWB

Drawn by/Dessiné par
LT

PWGSC Project Manager/Administrateur de Projets TPSPG

PWGSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSPG

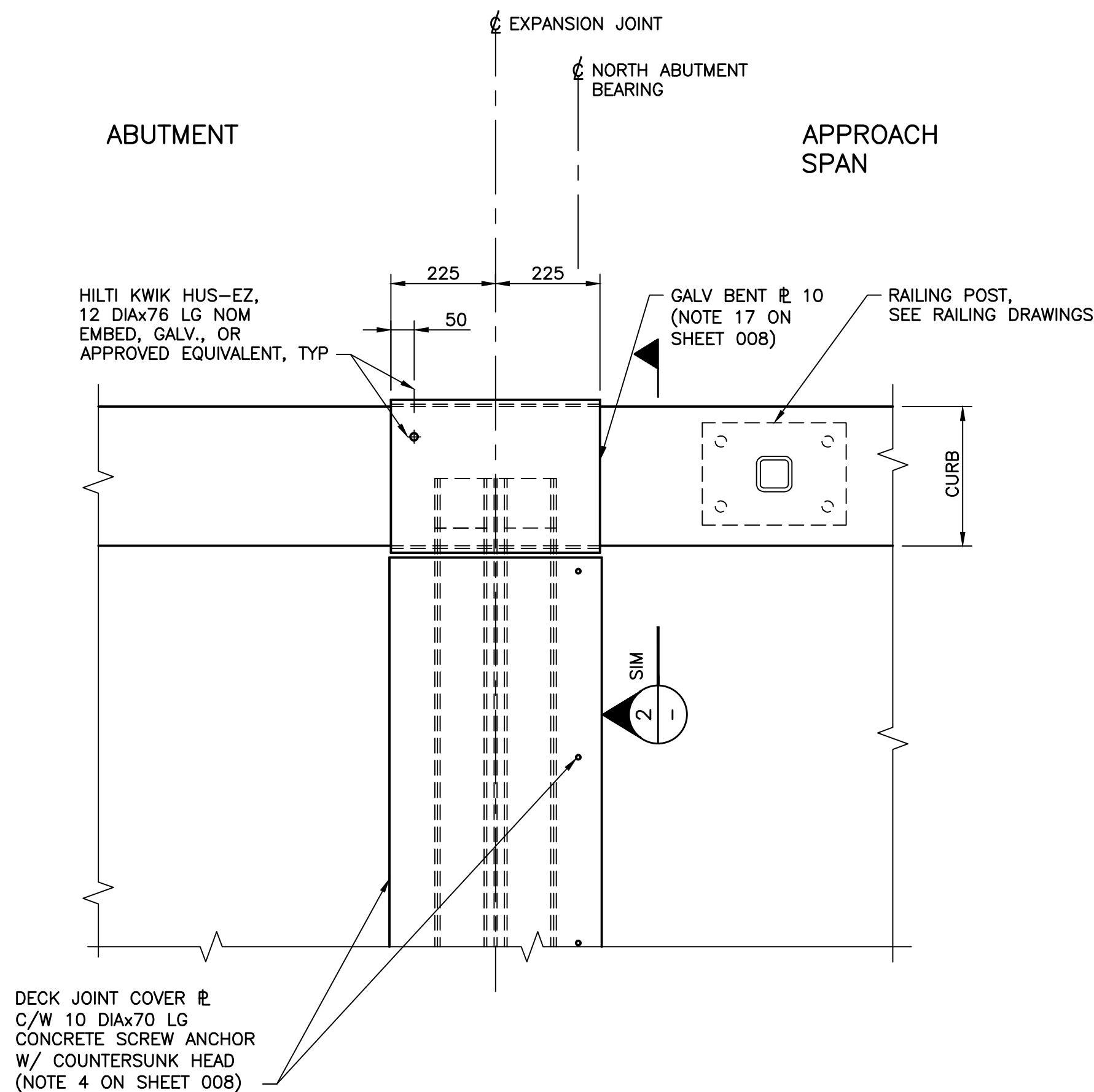
Client/client
PCA

Drawing title/Titre du dessin

DECK JOINT MODIFICATION
SHEET 1

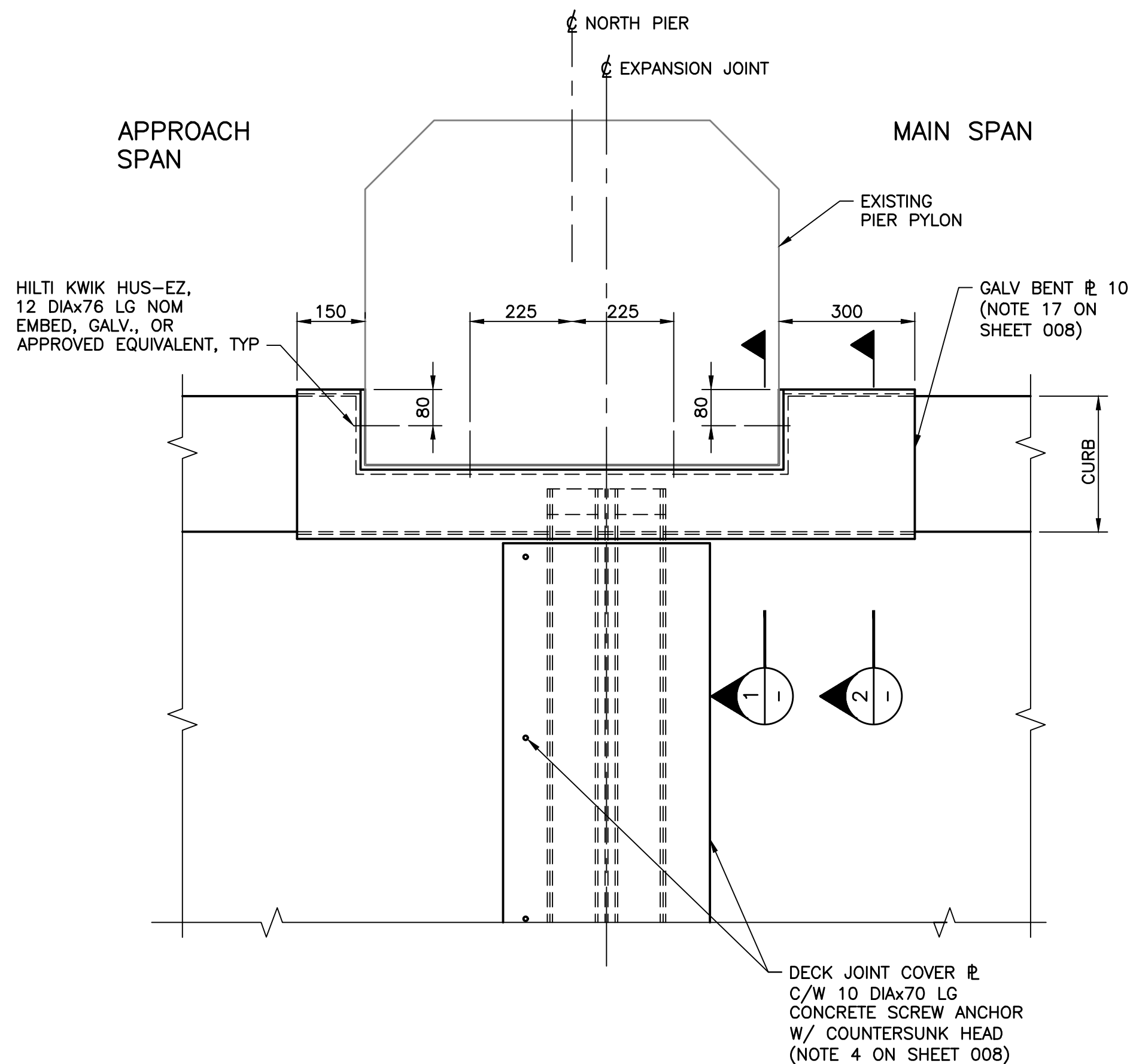
Project No./No. du projet	Sheet/Feuille	Revision no./La Révision no.
565-11	008 OF	0

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DETAIL A
1:10
008

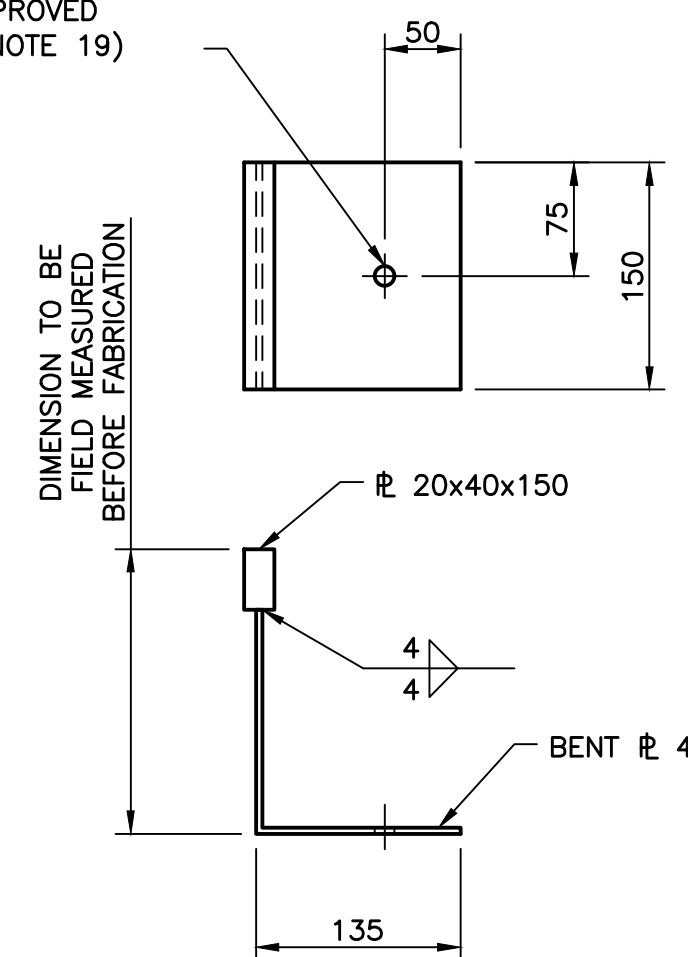
(NORTH SIDEWALK OF NORTH ABUTMENT SHOWN. OTHER SIDEWALK ABUTMENT JOINTS SIMILAR)



DETAIL B
1:10
008

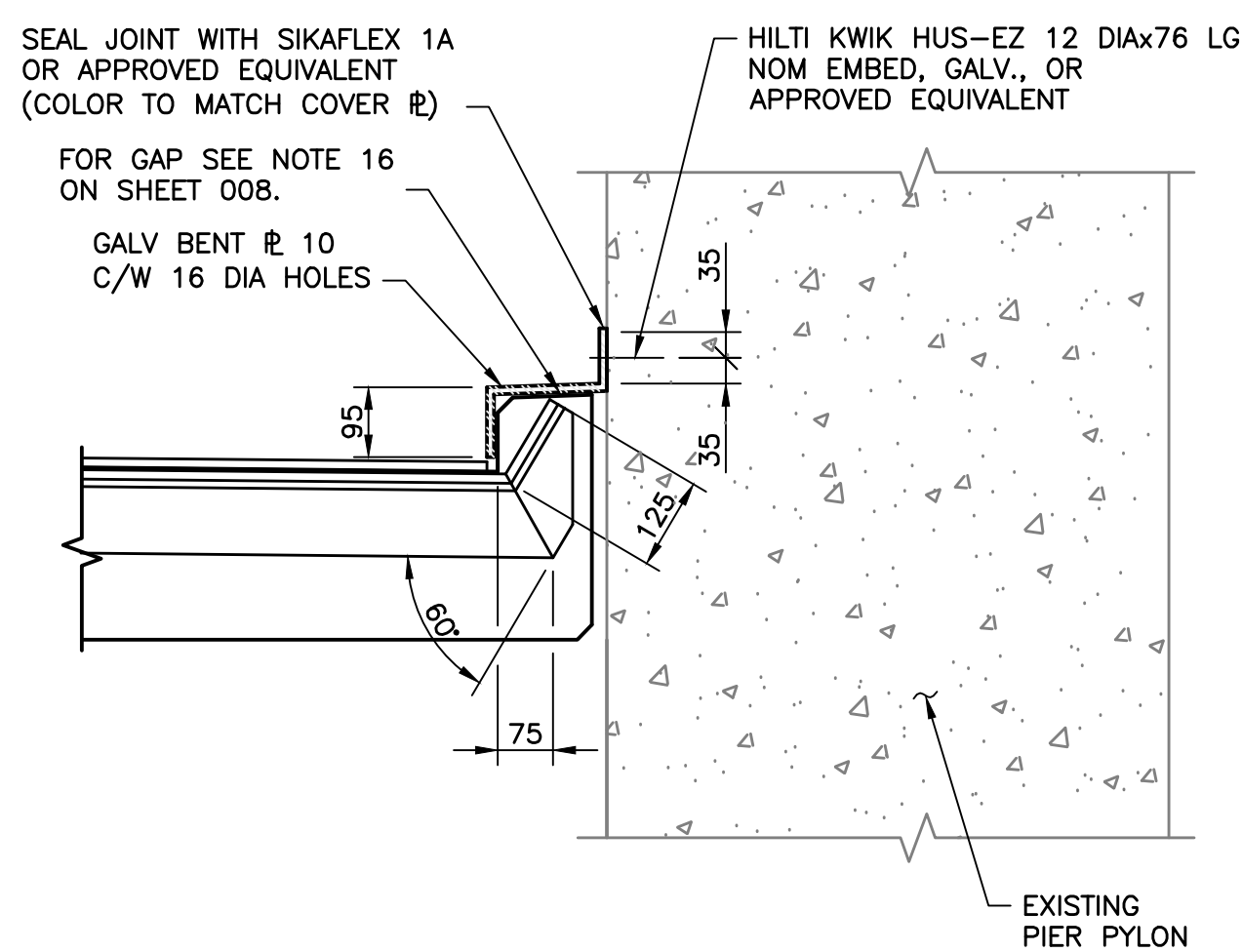
(NORTH SIDEWALK OF NORTH PIER SHOWN. OTHER SIDEWALK PIER JOINTS SIMILAR)

13 DIA HOLE FOR HILTI KWIK HUS-EZ 10 DIAx41 LG NOM EMBED, GALV., OR APPROVED EQUIVALENT (NOTE 19)

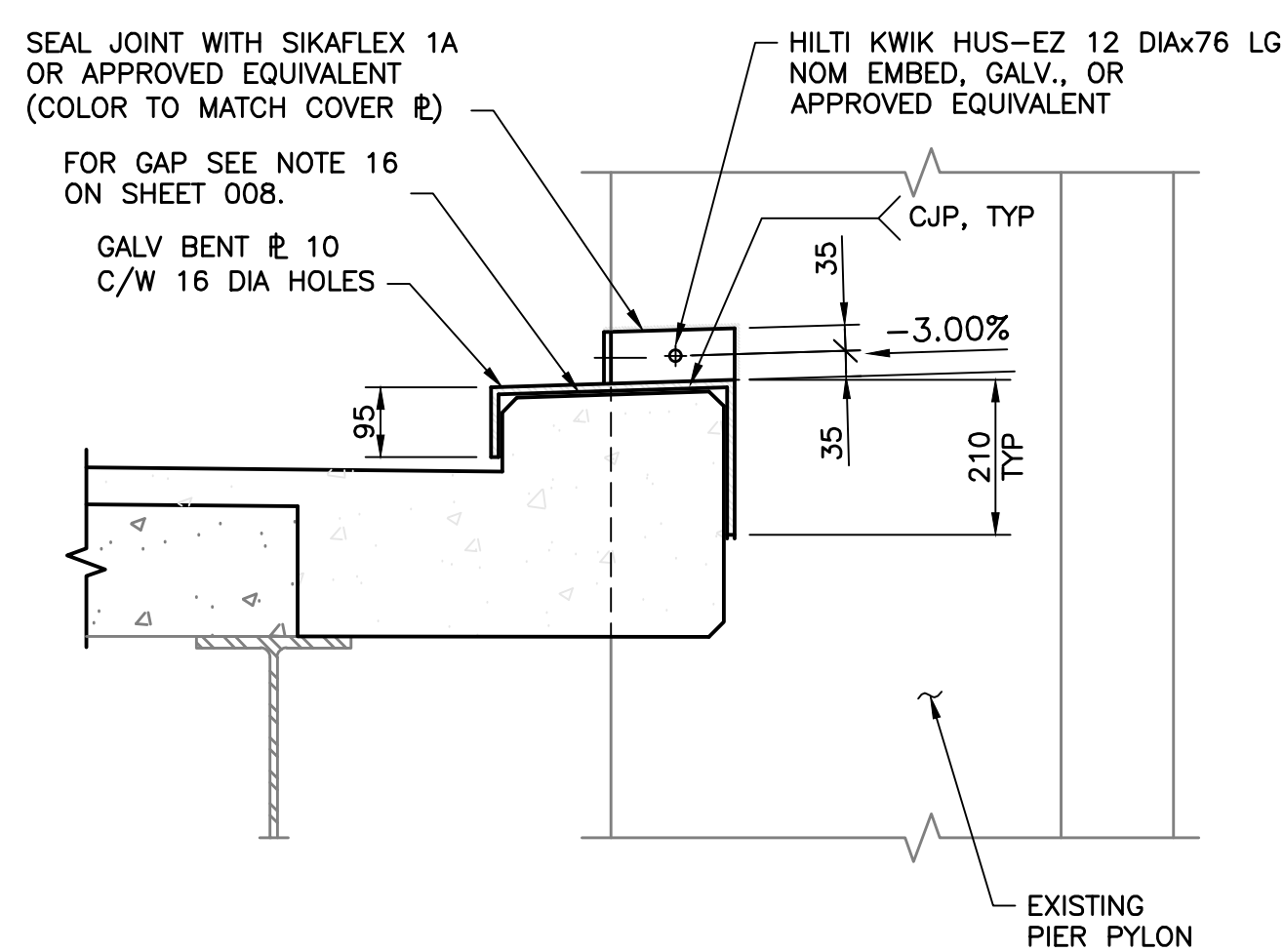


STOP MOVEMENT BAR ASSEMBLY

1:5



SECTION 1
1:10
-

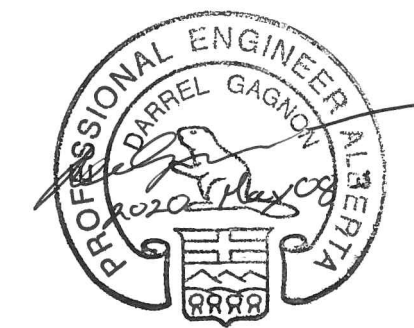


SECTION 2
1:10
-

NOTES:

- FOR NOTES, SEE SHEET 008.

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Revision/	Description/Description	Date/Date

Client/client		
	Parks Canada Agency	L'Agence Parcs Canada

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Project title/Titre du projet
**BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA**

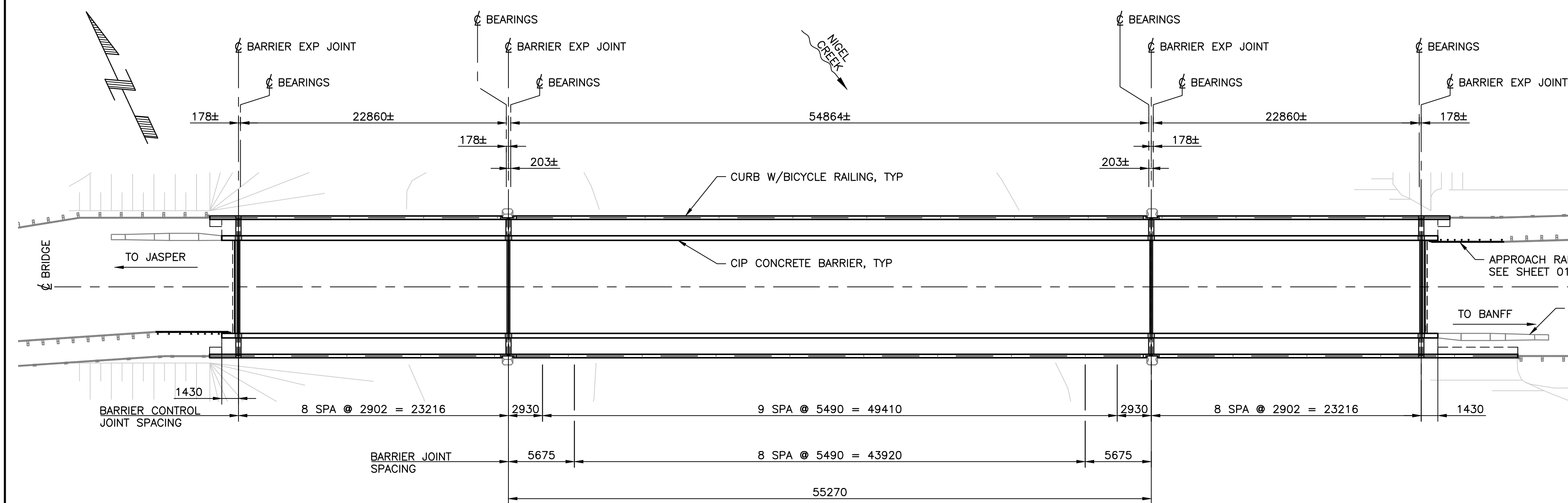
**KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE**

Approved by/Approuvé par DPG
Designed by/Concept par TWB
Drawn by/Dessiné par LT
PWGSC Project Manager/Administrateur de Projets TPSCG
PWGSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie, TPSCG
Client/client PCA
Drawing title/Titre du dessin

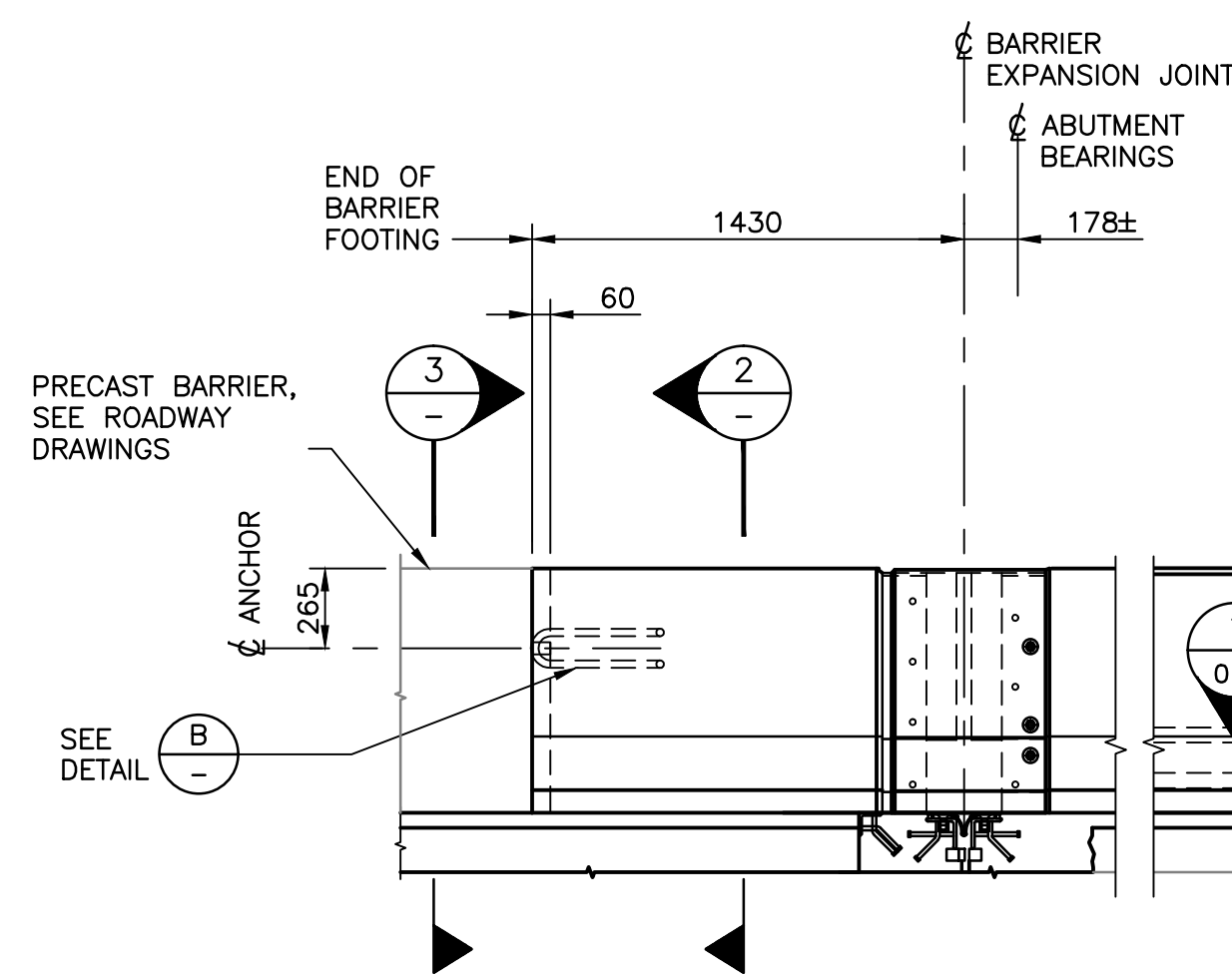
DECK JOINT MODIFICATION SHEET 2

Project No./No. du projet 565-11	Sheet/Feuille 009 OF	Revision no./ La Révision no. 0
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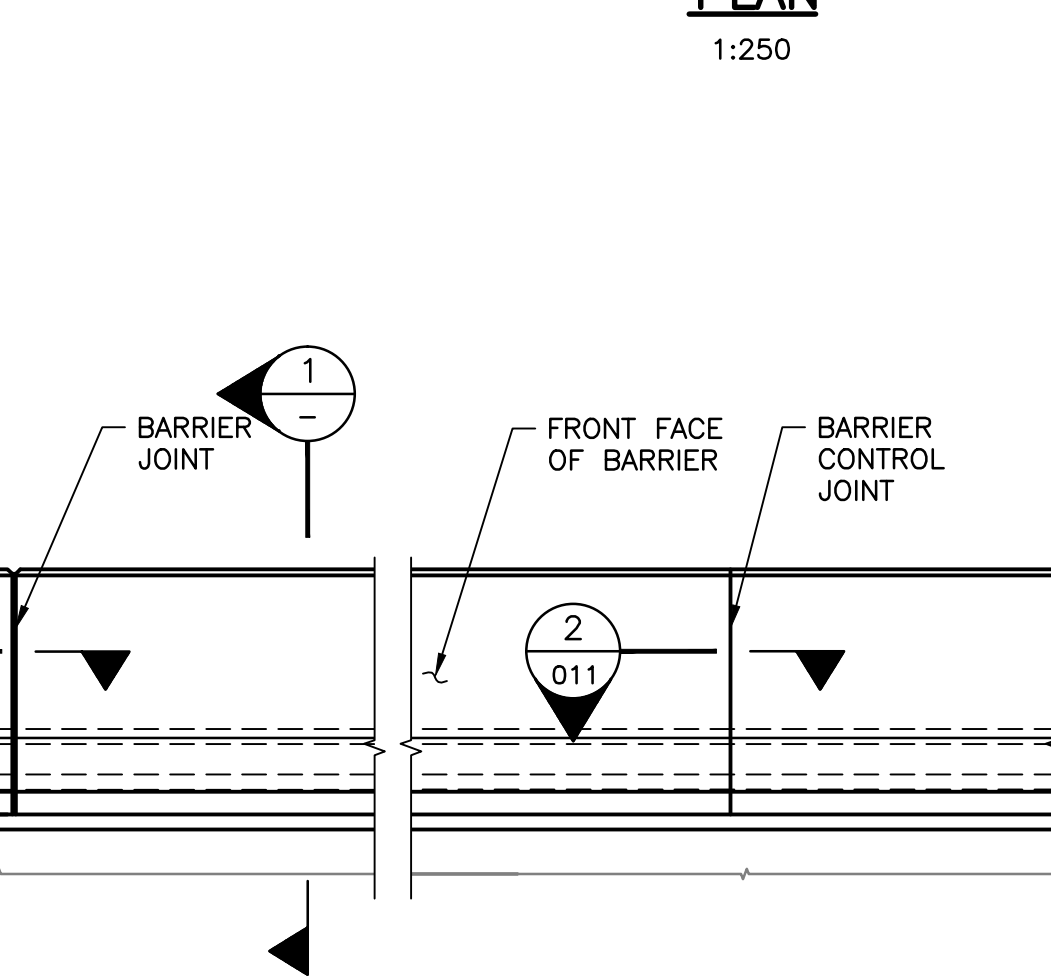
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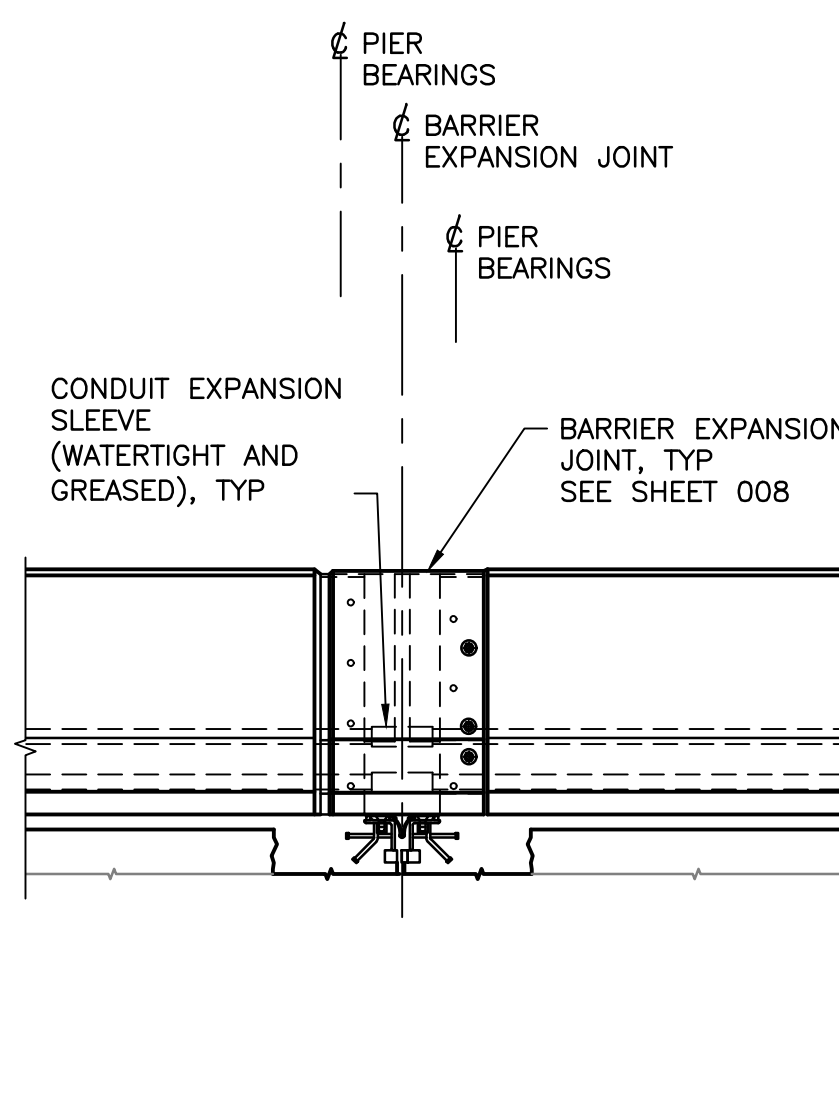
PLAN
1:250



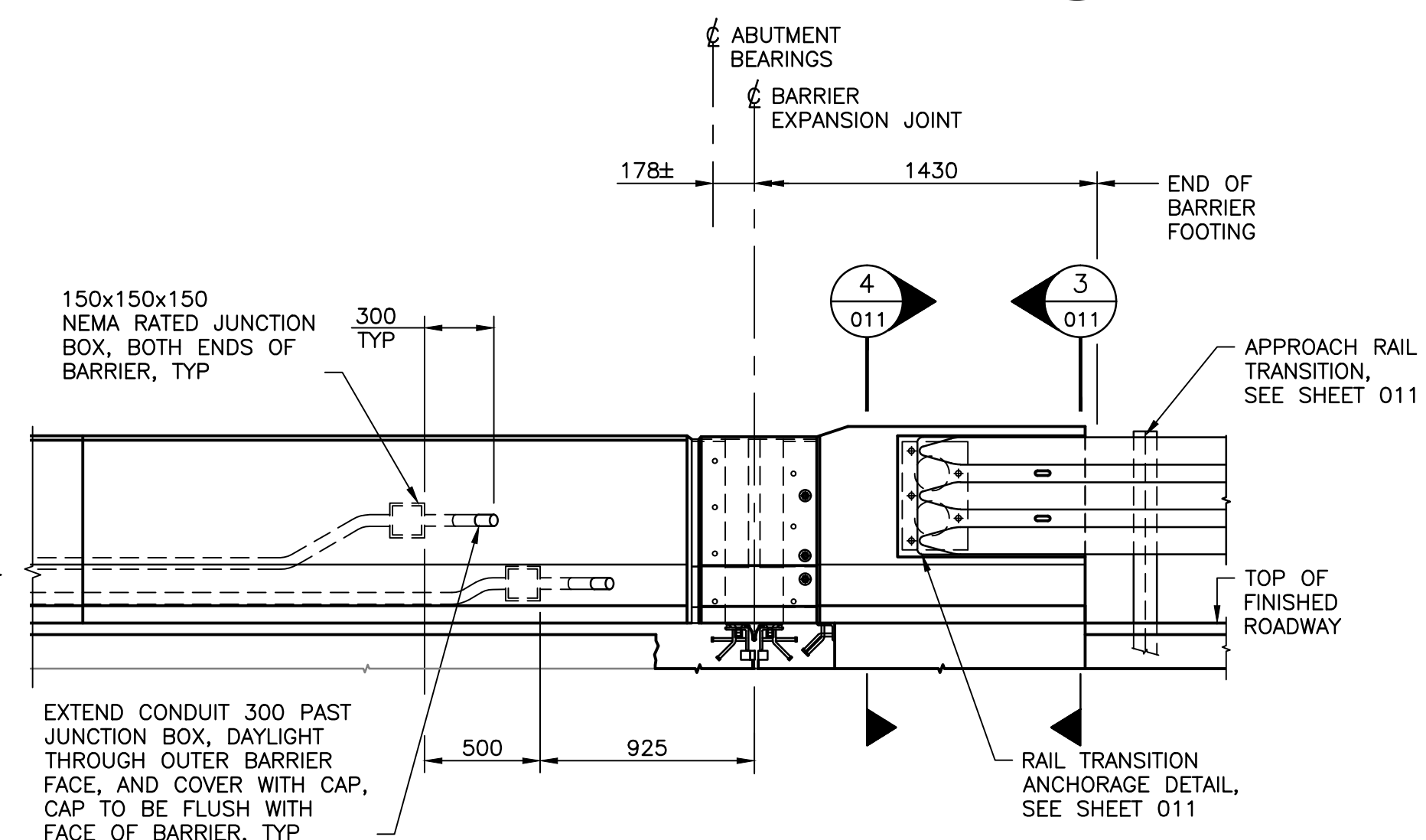
ELEVATION – BARRIER AT BRIDGE ENDS
1:25
(NORTH BARRIER SHOWN, SOUTH BARRIER SIMILAR)



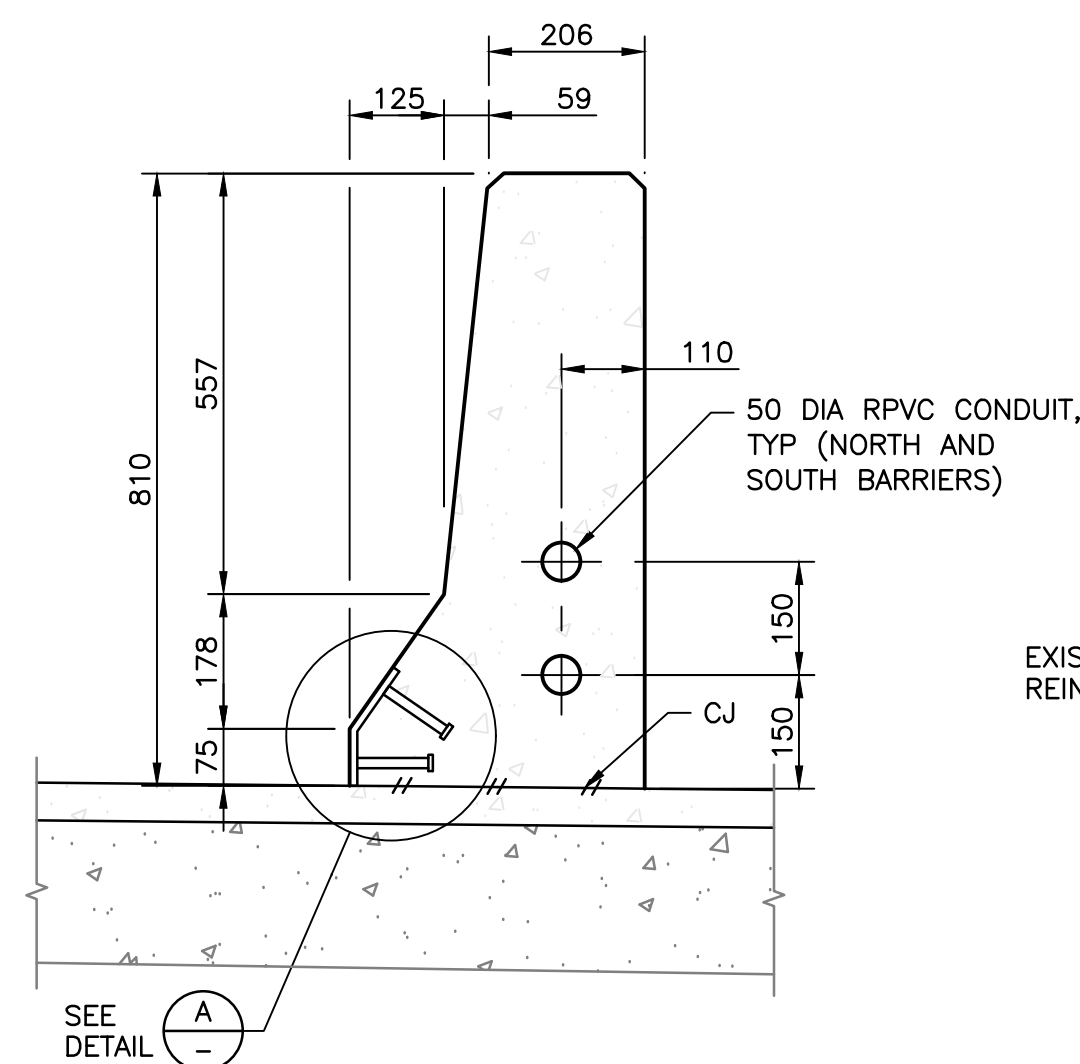
ELEVATION – TYPICAL BARRIER
1:25



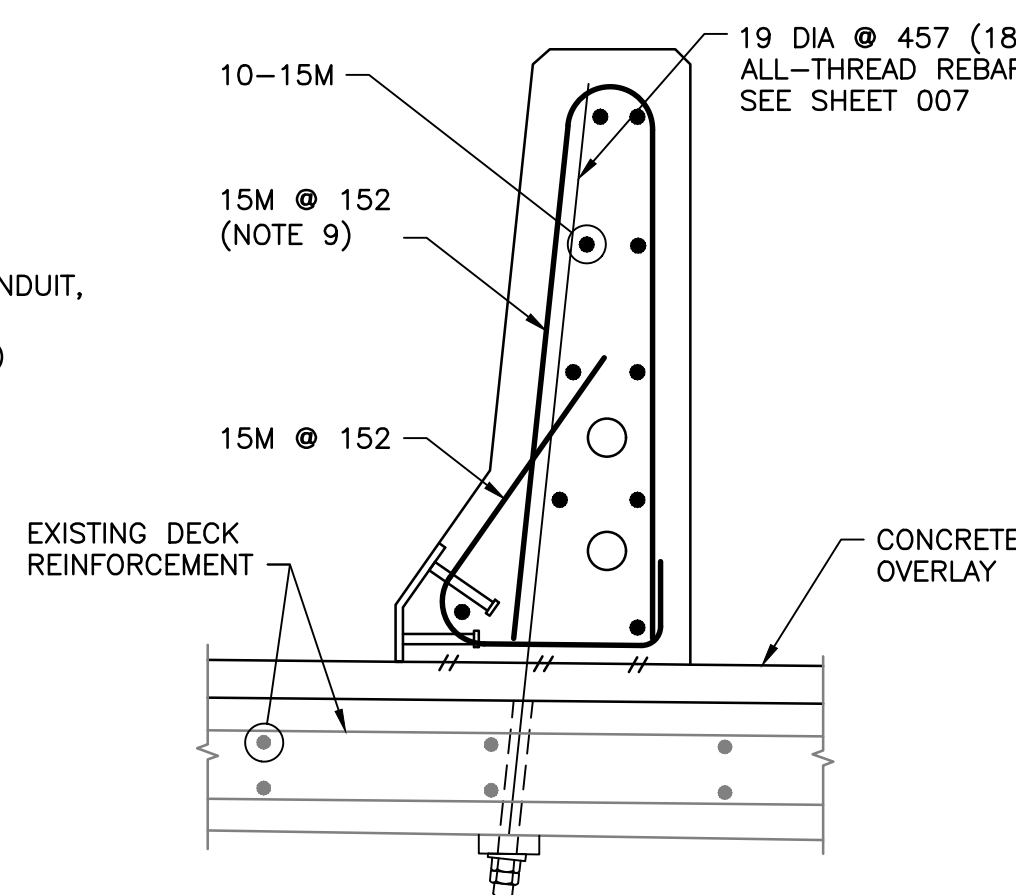
ELEVATION – BARRIER AT PIER
1:25



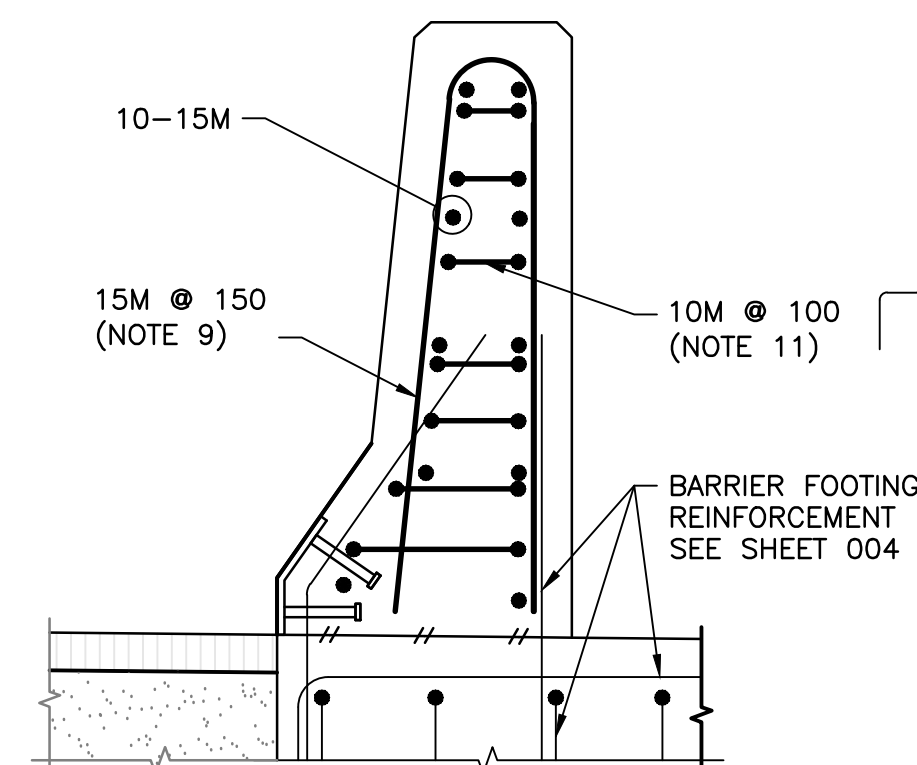
ELEVATION – BARRIER AT BRIDGE ENDS
1:25
(NORTH BARRIER SHOWN, SOUTH BARRIER SIMILAR)



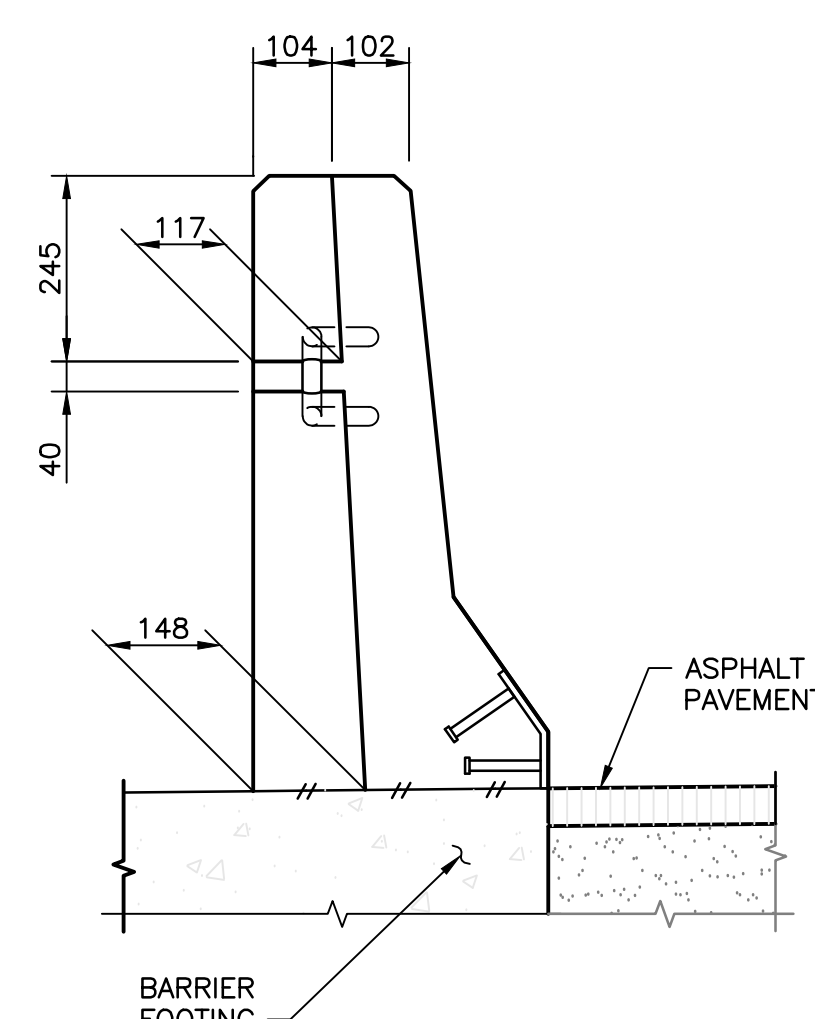
SECTION 1 TYPICAL BARRIER
1:10



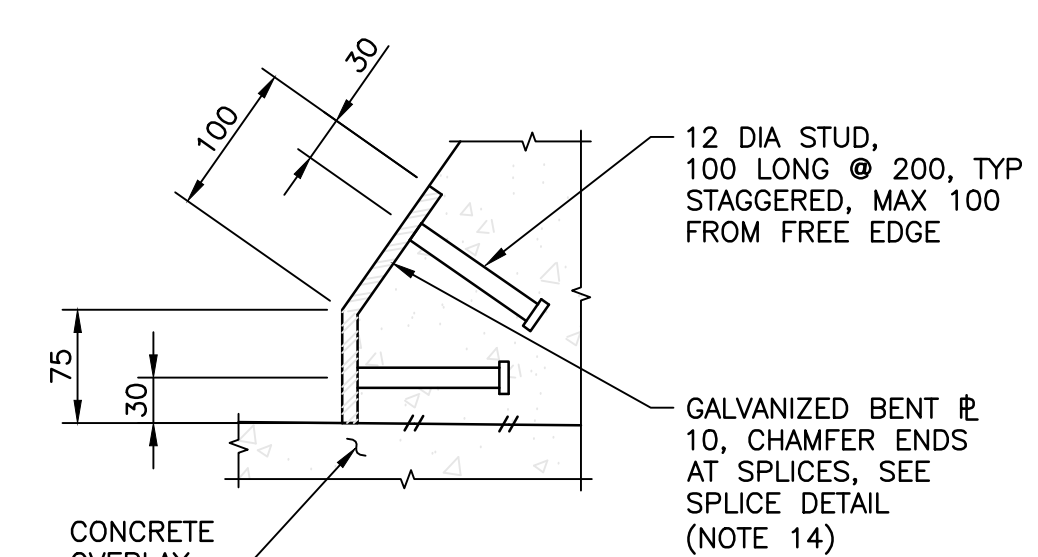
SECTION 1 REINFORCEMENT
1:10



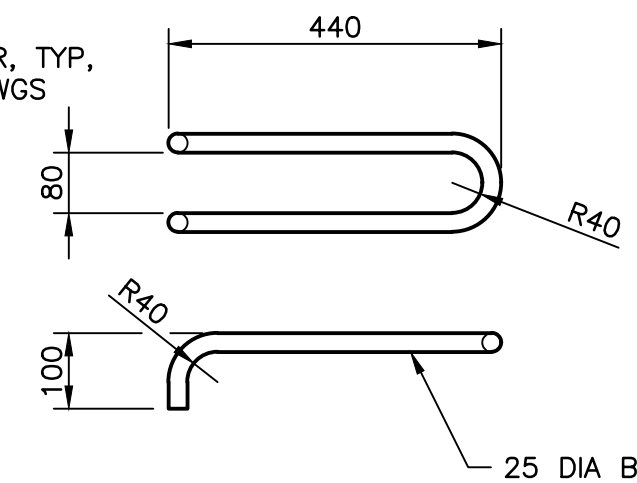
SECTION 2 REINFORCEMENT
1:10



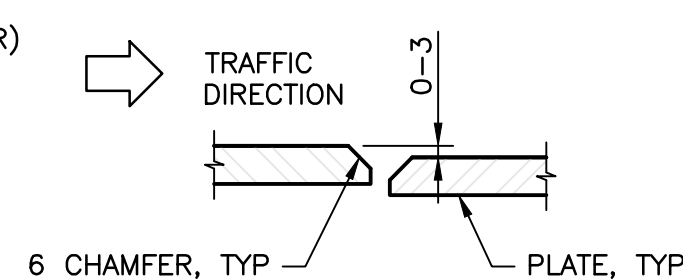
VIEW 3 OUTLINE
1:10



DETAIL A
1:5



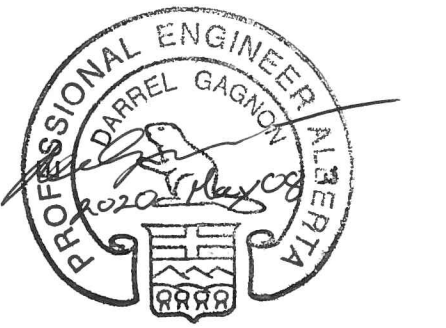
DETAIL B
1:10



NOTES:

- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPa AT 28 DAYS.
- CHAMFER EXPOSED EDGES 20.
- REINFORCING STEEL: CAN/CSA G.30.18M GRADE 400W.
- MINIMUM COVER: 50 UNO.
- MINIMUM LAP:
15M – 600 UNO.
- STEEL: CAN/CSA G40.21M GRADE 300W, GALVANIZE AFTER FABRICATION.
- STUDS: CSA W59 ANNEX H, TYPE B, GALVANIZE AFTER FABRICATION.
- HOT DIP GALVANIZE TO ASTM A123/A123M.
- PROVIDE REDUCED BEND DIAMETER OF 81 (MEASURED ON THE INSIDE OF THE BAR) AND PLACE BAR ON SKEW TO SATISFY COVER REQUIREMENTS.
- DISCONTINUE LONGITUDINAL REINFORCEMENT AT BARRIER JOINTS. PROVIDE 50mm CONCRETE COVER TO THE REBAR ENDS.
- PLACE HAIRPINS 10M @ 100 HORIZONTALLY AT BARRIER ENDS.
- REPLACE BARRIER REINFORCEMENT CUT FOR JUNCTION BOX WITH ADDITIONAL EQUIVALENT BARS ADJACENT TO THE BOX.
- CONDUIT ELBOWS NOT TO EXCEED 22.5 DEGREES. ENDS OF CONDUITS SHALL TERMINATE IN RADIAL SWEEPS OR 22.5 DEGREE ELBOWS.
- PLOW GUARD PLATES TO BE DISCONTINUED AND SPLICED AT ALL BARRIER JOINTS.

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Revision/	Description/Description	Date/Date

Client/client
Parks Canada Agency
L'Agence Parcs Canada

COWI

Project title/Titre du projet
BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA

KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE

Approved by/Approuvé par
DPG

Designed by/Conçu par
TWS

Drawn by/Dessiné par
JAET/ILT

PWOSC Project Manager/Administrateur de Projets TPSCG

PWOSC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

Client/client
PCA

Drawing title/Titre du dessin

CAST-IN-PLACE BARRIER
LAYOUT AND REINFORCEMENT
SHEET 1

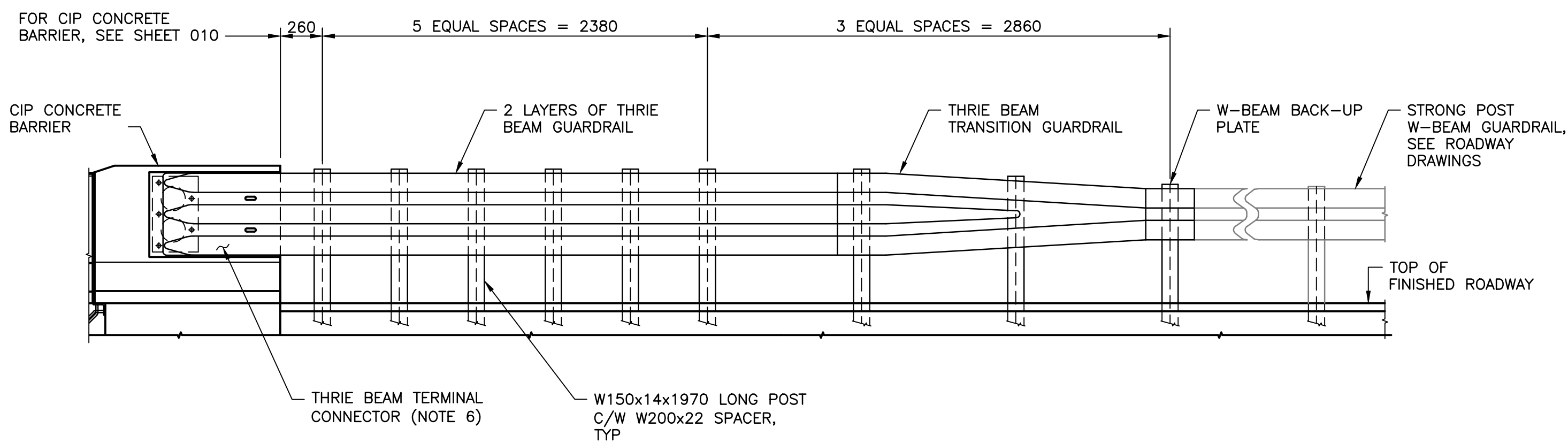
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projet
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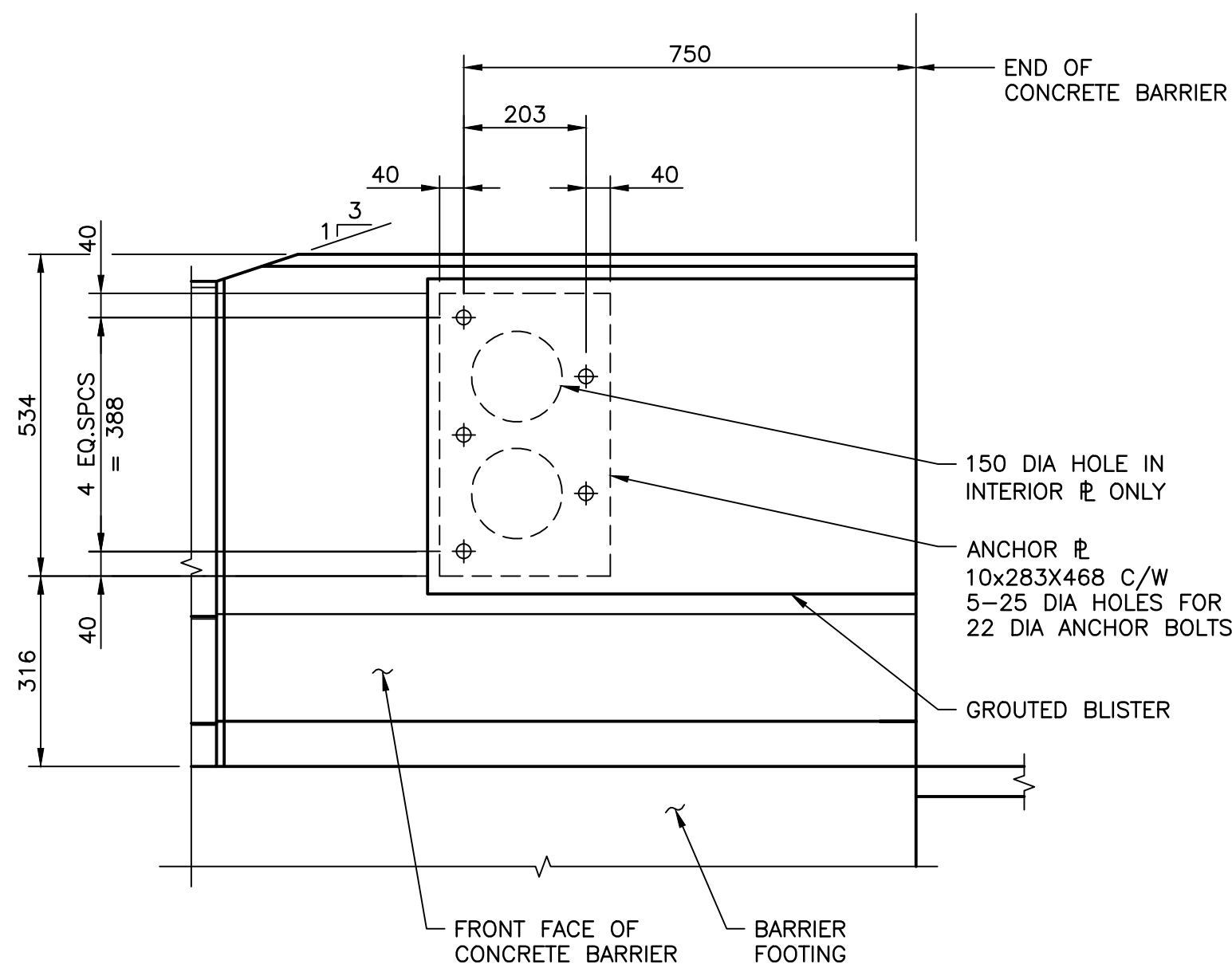
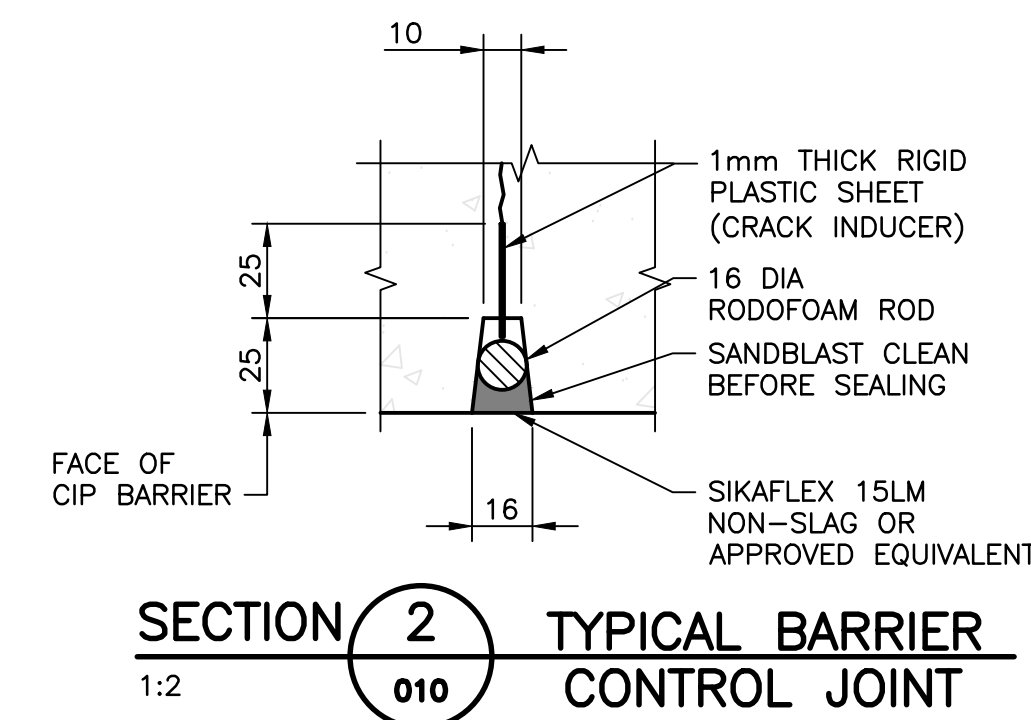
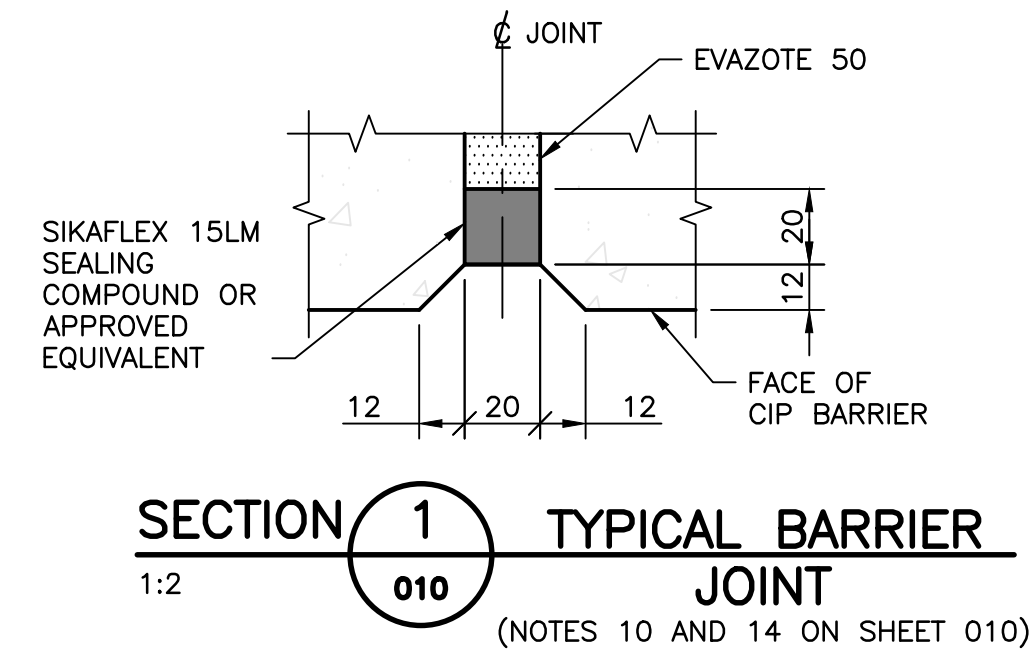
Revision no./
La Révision
no.
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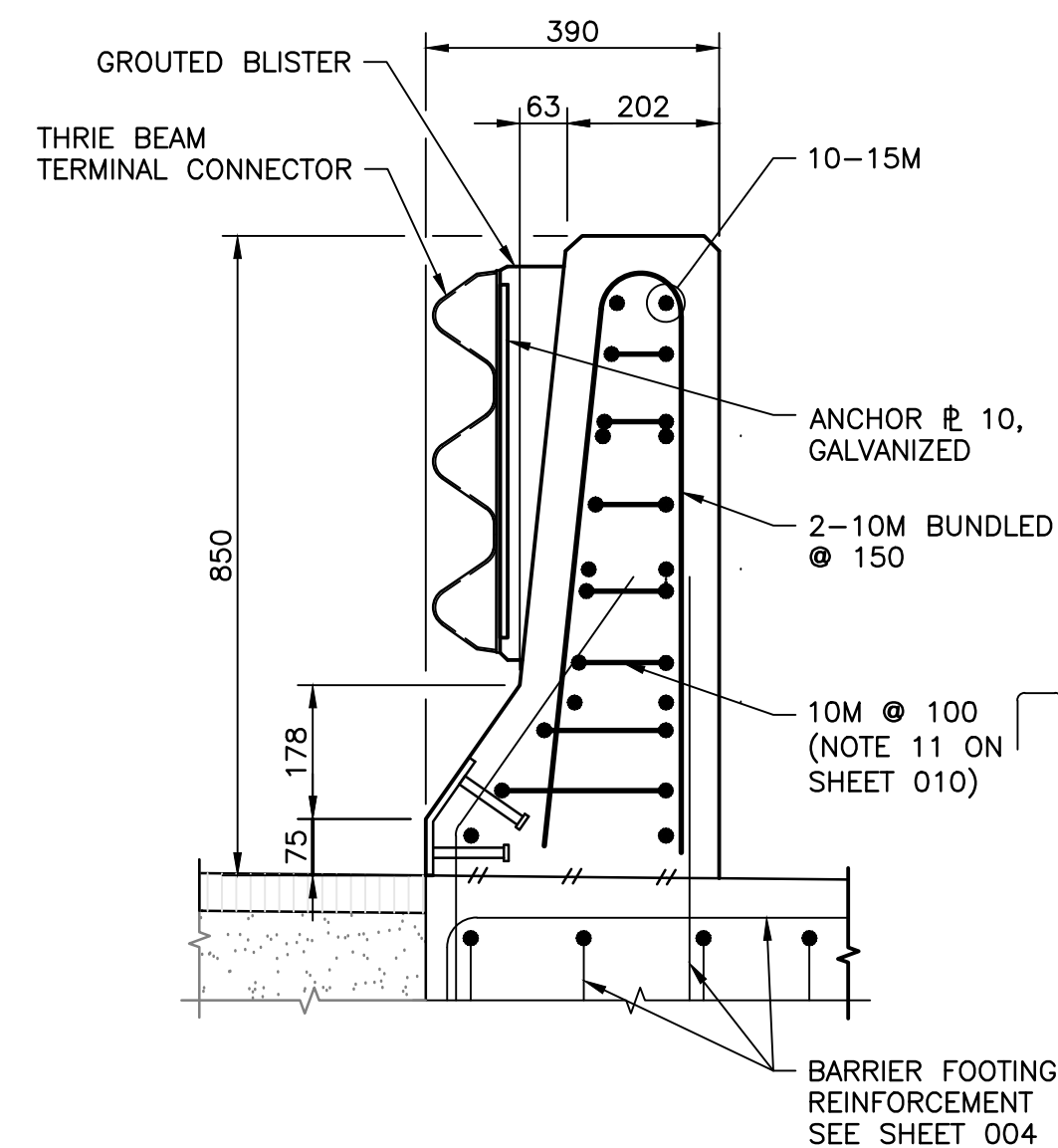
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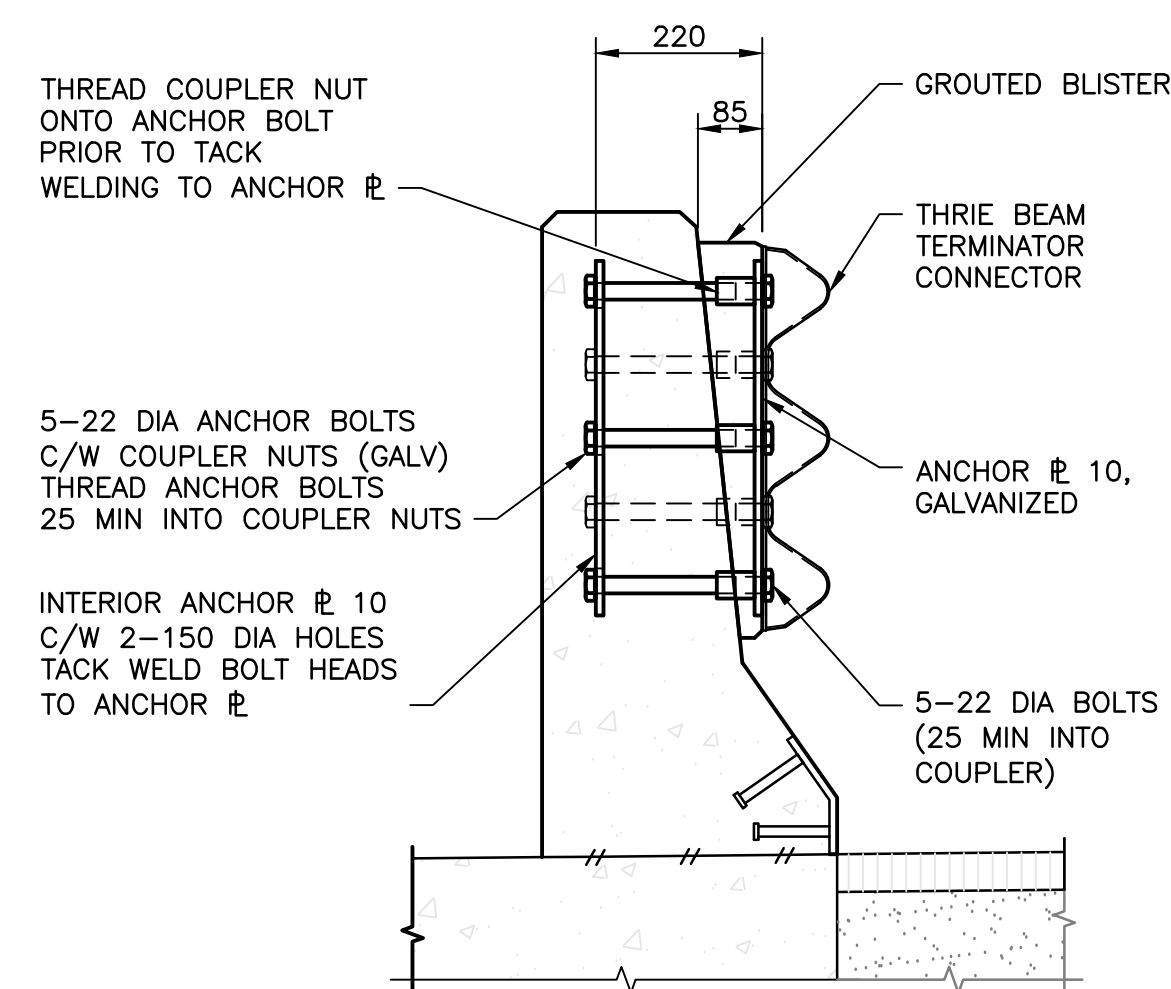
ELEVATION — APPROACH RAIL TRANSITION
1:25



RAIL TRANSITION ANCHORAGE DETAIL
1:10
(NOTE: THRIE BEAM TERMINAL CONNECTOR NOT SHOWN FOR CLARITY)



SECTION 3
1:10

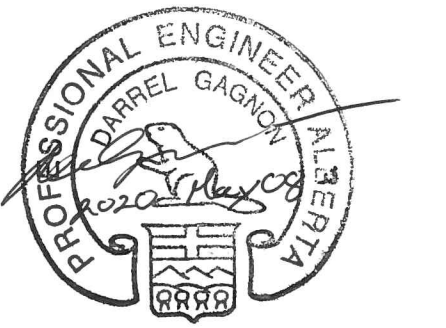


SECTION 4
1:10

NOTES:

- PLATE STEEL AND STRUCTURAL SHAPES: CSA G40.21 GRADE 350W, OR ASTM A36.
- BOLTS: ASTM A307
- W-BEAM AND THRIE BEAM GUARDRAIL (INCLUDING THRIE BEAM TERMINAL CONNECTOR AND THRIE BEAM TRANSITION SECTION): 345 MPa MINIMUM YIELD STRENGTH.
- HOT-DIP GALVANIZE AFTER FABRICATION TO ASTM A123/A123M AND ASTM F2329 UNLESS NOTED OTHERWISE.
- WELDING TO CSA W59.
- BOLTS FOR THE THRIE BEAM TERMINAL CONNECTOR SHALL BE CAST-IN-PLACE.
- ALL RAIL SECTIONS TO BE LAPPED IN THE DIRECTION OF TRAFFIC.

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BANFF NATIONAL PARK, ALBERTA**
**KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE**

Approved by/Approuvé par
DPG

Designed by/Concept par
TWB

Drawn by/Dessiné par
LT

PWGS Project Manager/Administrateur de Projets TPSCG

PWGS, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

Client/client
PCA

Drawing title/Titre du dessin

**CAST-IN-PLACE BARRIER
LAYOUT AND REINFORCEMENT
SHEET 2**

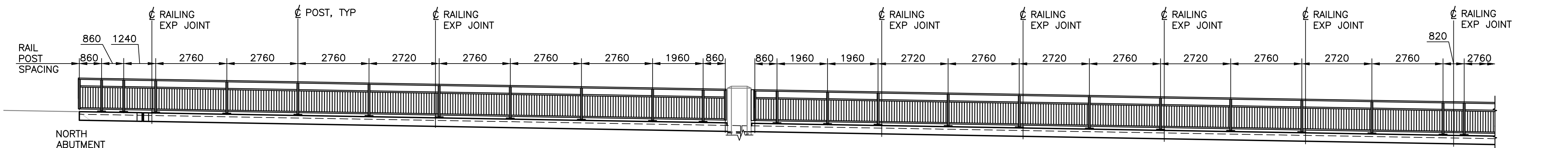
Project No./No. du projet
565-11

Sheet/Feuille
011
OF

Revision no./
La Révision
no.
0

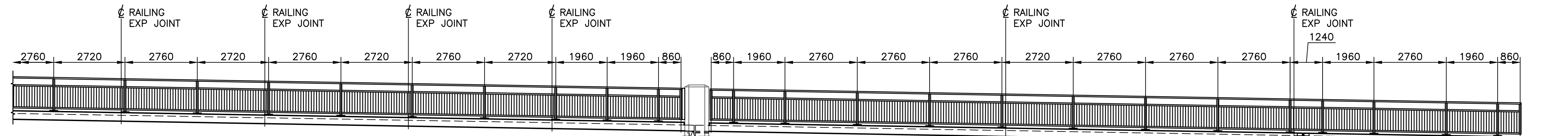


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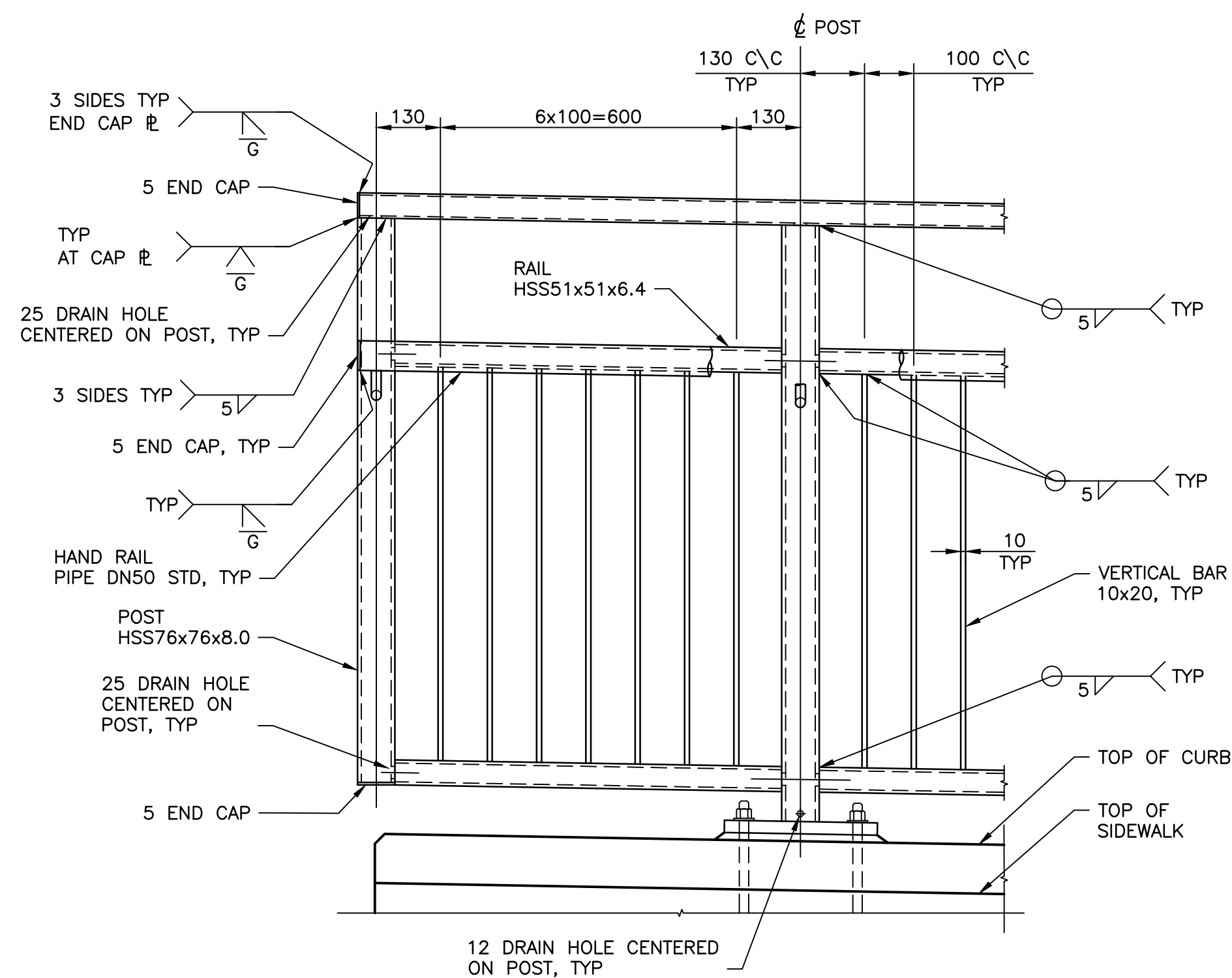
ELEVATION

1:100
(BICYCLE RAILING ON SOUTH SIDE SHOWN - BICYCLE RAILING ON NORTH SIDE SIMILAR)



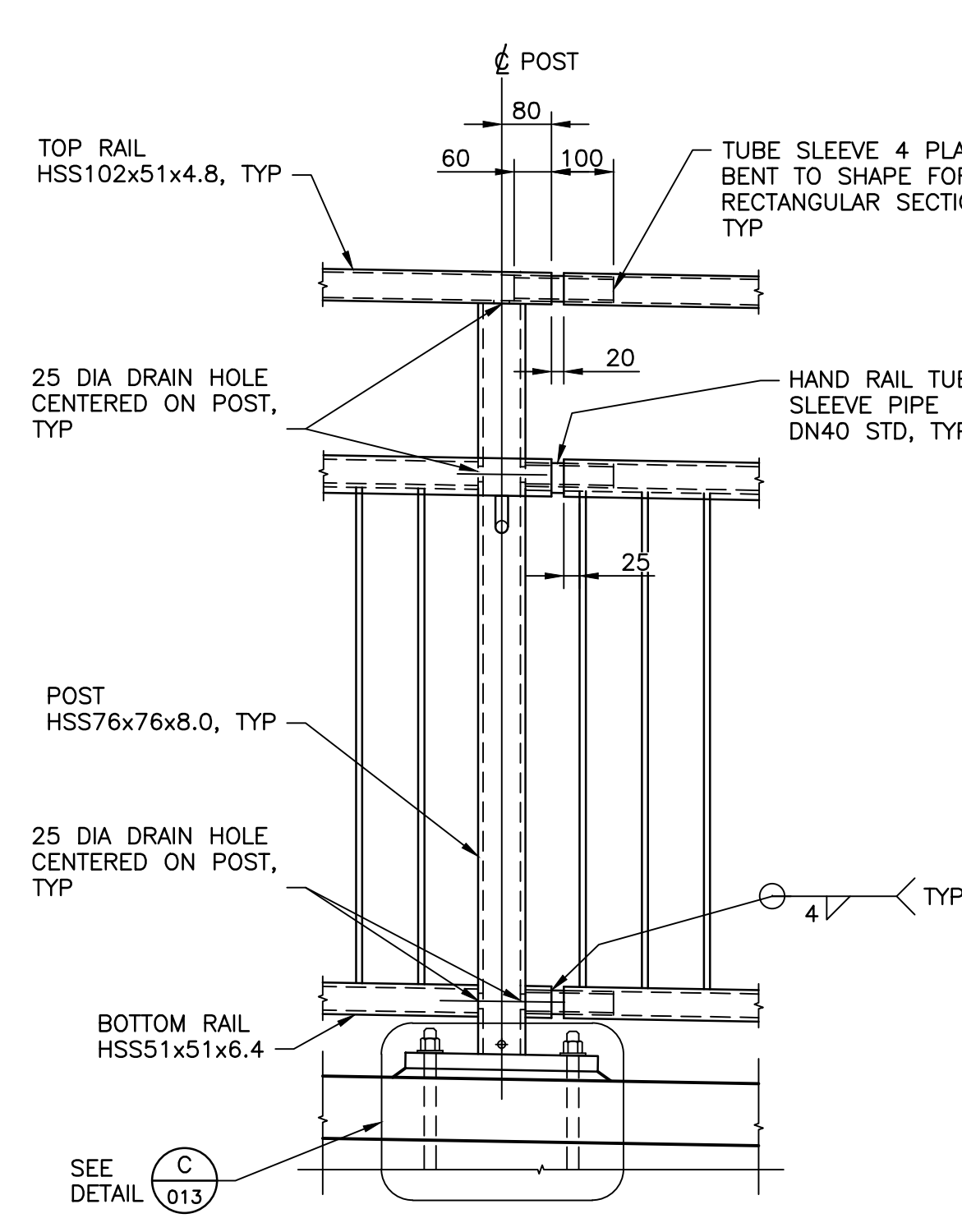
ELEVATION

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(BICYCLE RAILING ON SOUTH SIDE SHOWN - BICYCLE RAILING ON NORTH SIDE SIMILAR)



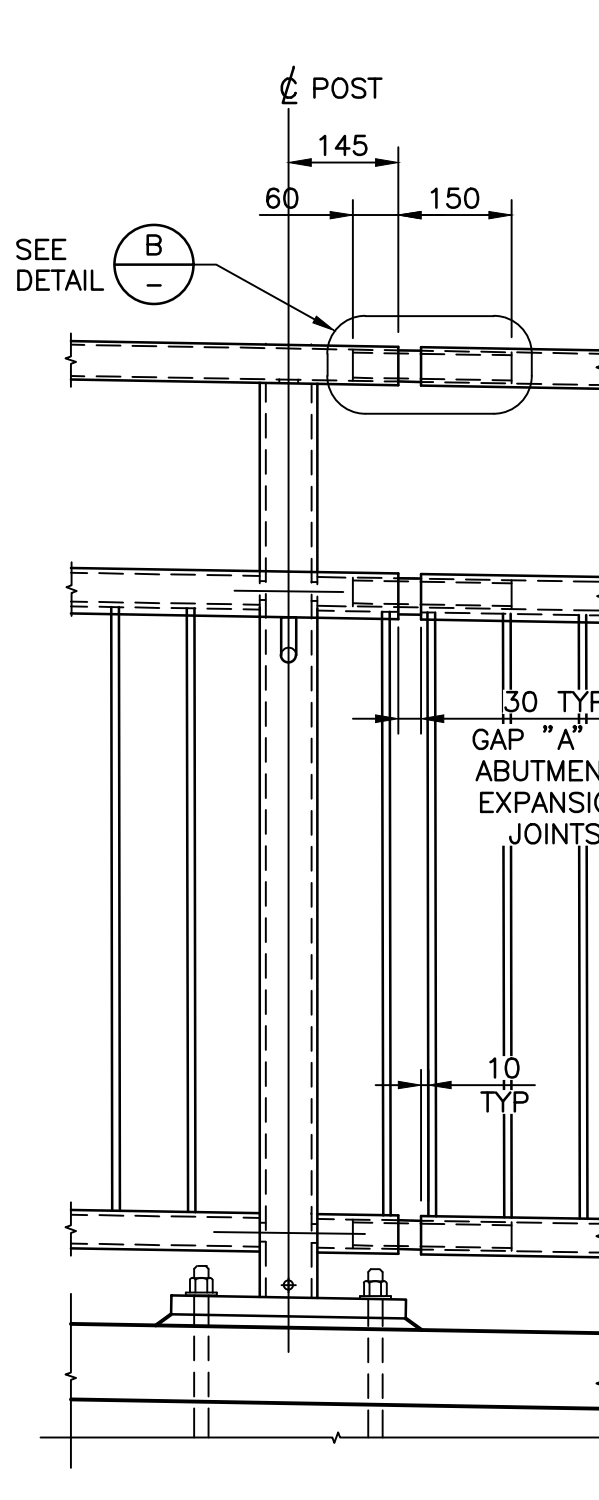
BARRIER CANTILEVER END PANEL

1:10



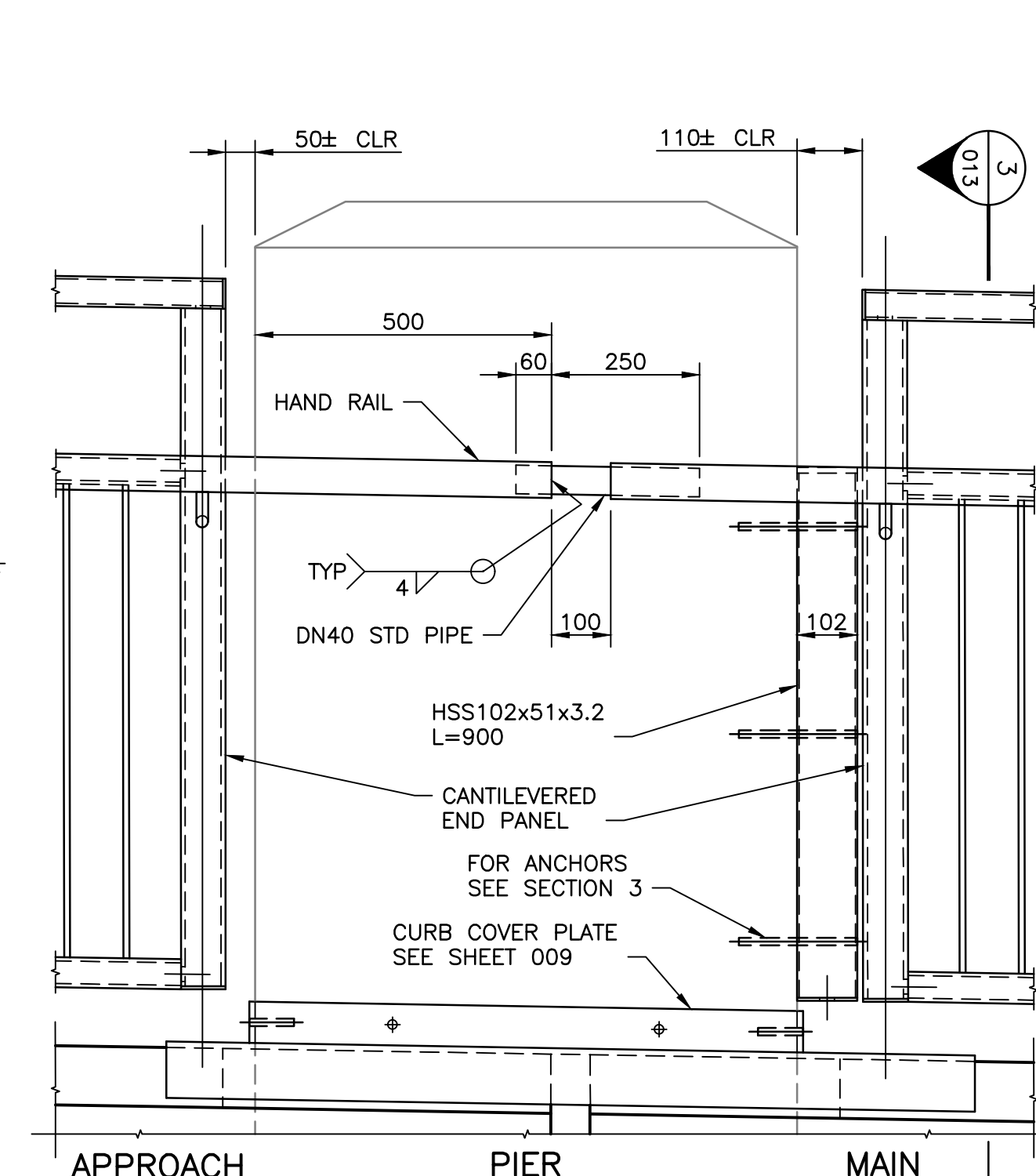
TYPICAL FIELD SPLICE

1:10



TYPICAL EXPANSION JOINT

1:10



TYPICAL DETAIL AT PIER PYLON

1:10

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. SEGMENT LENGTHS FOR RAILING ARE BASED ON ORIGINAL DESIGN DRAWINGS. CONTRACTOR TO VERIFY ACCURACY OF SUCH BY FIELD MEASUREMENTS.

FABRICATION:

1. ALL STEEL SHALL CONFORM TO CSA SPECIFICATION G40.21M GRADE 350W. HANDRAIL PIPES SHALL CONFORM TO ASTM A53, GRADE B. ANCHOR RODS SHALL CONFORM TO ASTM F1554 GRADE 10S. NUTS AND WASHERS SHALL CONFORM TO ASTM A563 AND ASTM F436 RESPECTIVELY.
2. WELDING SHALL CONFORM TO CAN/CSA W59.
3. COMPONENTS TO BE POWDER COATED SHALL BE HOT DIP GALVANIZED AFTER FABRICATION TO ASTM A123/A123M WITH SURFACE FINISH AND PREPARATION TO ASTM D7803/D7803M AND POWDER COATED IN ACCORDANCE WITH THE SPECIFICATIONS. ALL OTHER MATERIALS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123/A123M AND ASTM F2329.
4. REPAIR OF GALVANIZING SHALL BE COMPLETED AS PER ASTM A780.
5. ALL EXPOSED CUT TUBE ENDS SHALL BE GROUND SMOOTH.
6. ALL RAIL SECTIONS SHALL BE FABRICATED IN LENGTHS NOT EXCEEDING 9 m BUT WHERE POSSIBLE CONTINUOUS OVER AT LEAST 3 POSTS.
7. AT LEAST 2 POSTS ARE REQUIRED IN RAIL SECTION EITHER SIDE OF AN EXPANSION JOINT AND FIELD SPLICE.
8. ALL POSTS AND VERTICAL BARS TO BE TRUE VERTICAL.

RAILING EXPANSION JOINT:

1. INSTALLATION GAP FOR ALL TYPICAL EXPANSION JOINTS TO BE 30 mm.
2. INSTALLATION GAP "A" FOR EXPANSION JOINTS AT THE ABUTMENTS IN ACCORDANCE WITH TABLE.

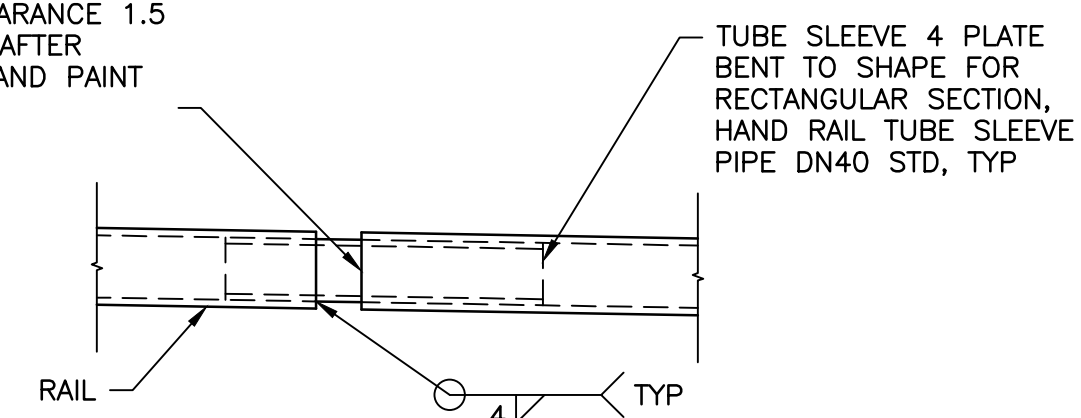
GAP SETTING TABLE - DIMENSION "A"

TEMPERATURE (°C)	-15	-10	-5	0	5	10	15	20	25
JOINT GAP "A" AT ABUTMENT	53	51	50	49	47	46	44	43	41

ERECTION:

1. ALL DIMENSIONS ARE MEASURED PARALLEL TO TOP OF CURB AND ALONG CENTERLINE OF ANCHOR ROD ASSEMBLIES.
2. LINE AND ELEVATION OF RAIL TO BE SET BY INSTRUMENT.

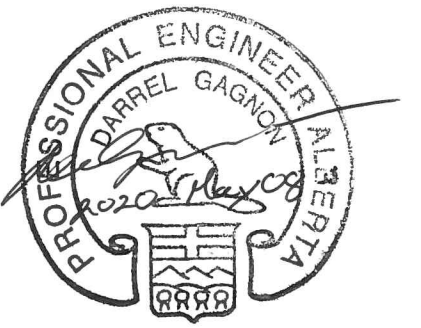
SLIDING FIT, TYP
MAXIMUM CLEARANCE 1.5
ALL AROUND AFTER
GALVANIZING AND PAINT
COATING



DETAIL B
1:5

(TYPICAL FOR ALL EXPANSION JOINT RAILS,
VERTICAL BARS NOT SHOWN FOR CLARITY)

ISSUED FOR CONSTRUCTION



DO NOT SCALE DRAWINGS

Revision/Revision	Description/Description	Date/Date
0	ISSUED FOR CONSTRUCTION	20/05/08

Client/client	Parks Canada Agency	L'Agence Parcs Canada
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COWI

Project title/Titre du projet
BRIDGE REHABILITATION
BANFF NATIONAL PARK, ALBERTA

KM 108.6 HIGHWAY 93N
NIGEL CREEK BRIDGE

Approved by/Approuvé par
DPG

Designed by/Concept par
TWS

Drawn by/Dessiné par
MACM

PWGC Project Manager/Administrateur de Projets TPSCG

PWGC, Architectural and Engineering Resources Manager/
Ressources Architectural et de Directeur d'Ingénierie, TPSCG

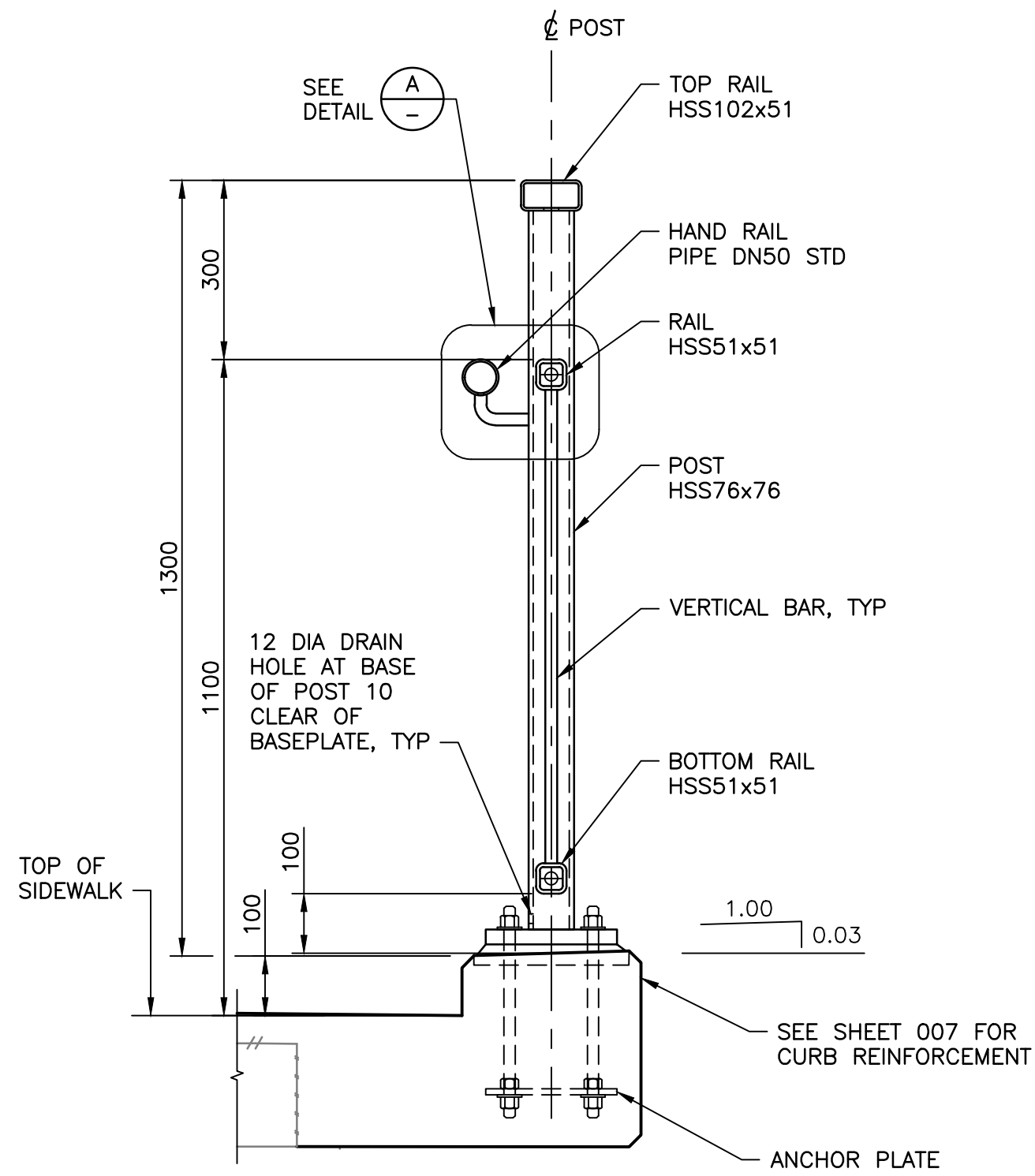
Client/client
PCA

Drawing title/Titre du dessin

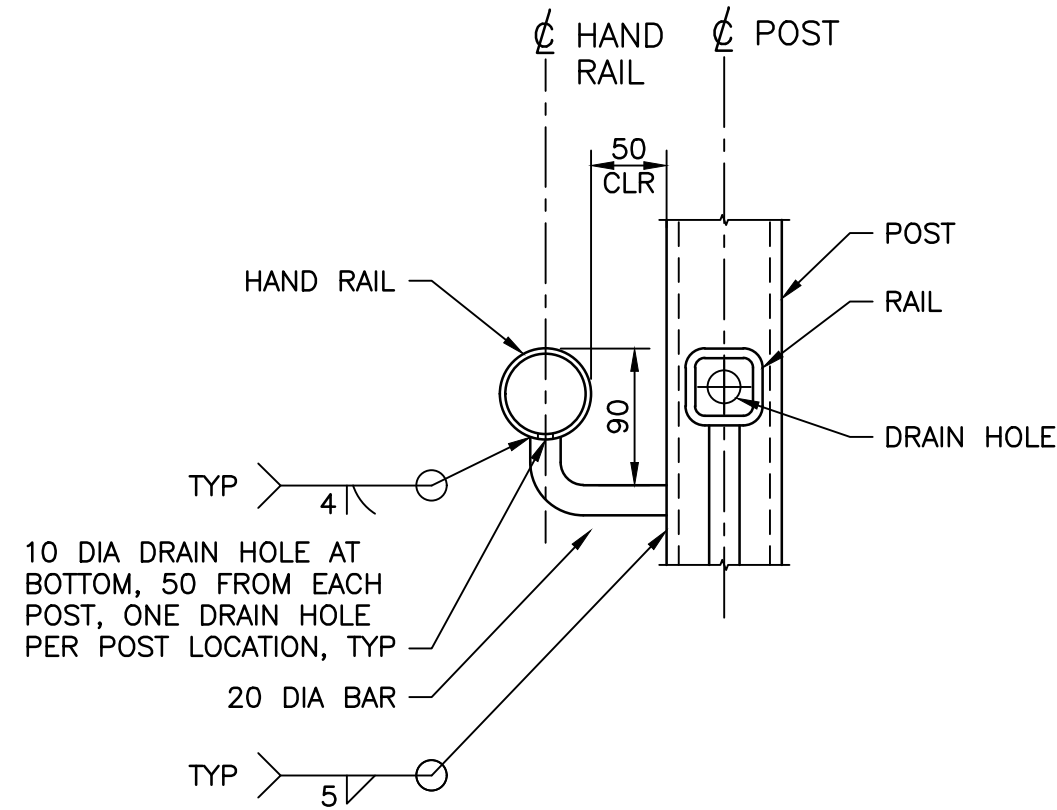
BICYCLE RAILING
SHEET 1

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565-11	012	0

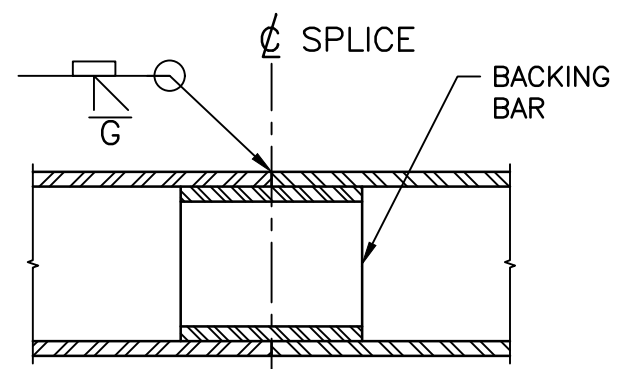
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TYPICAL SECTION
1:10

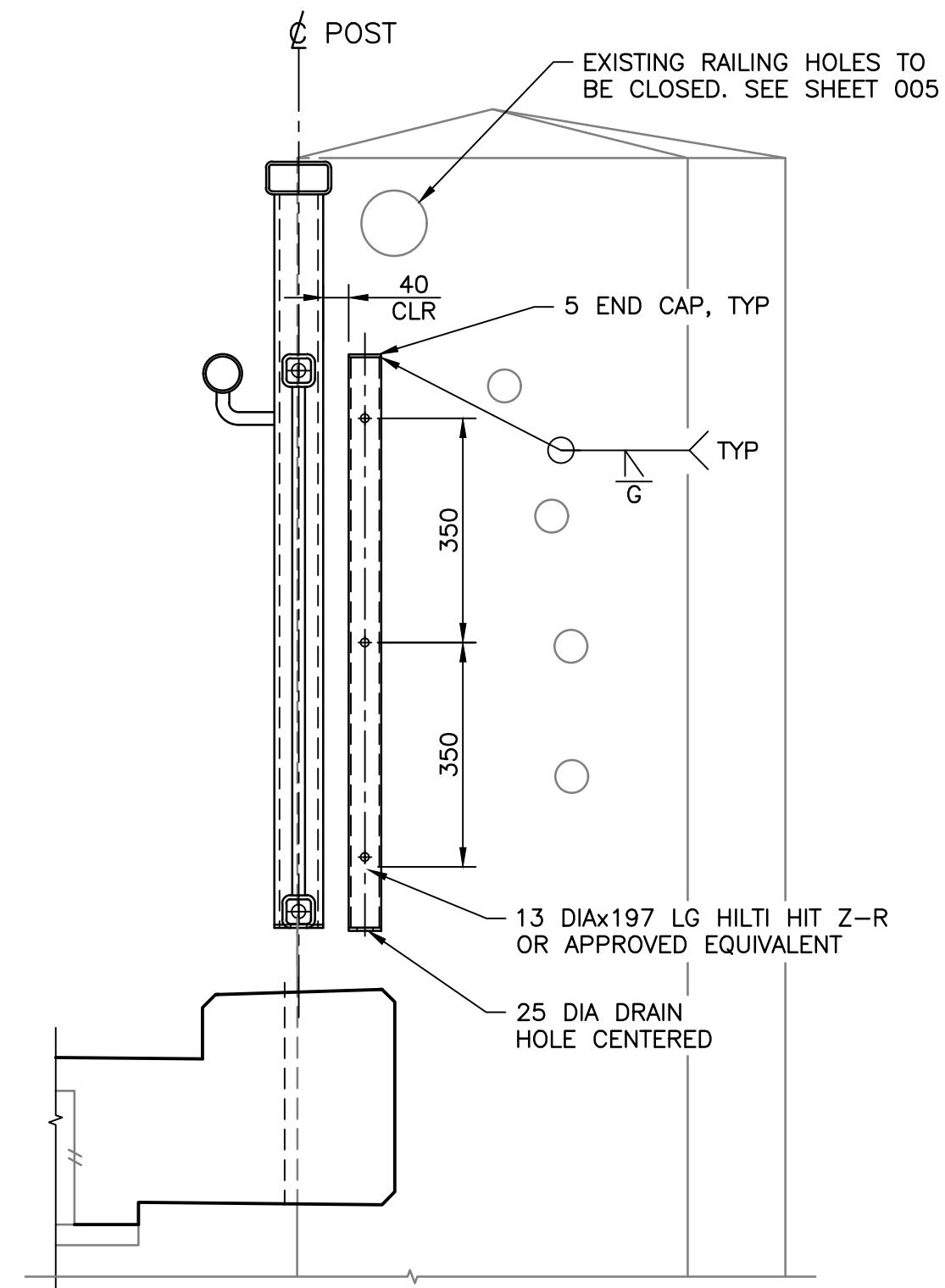


DETAIL A
1:5



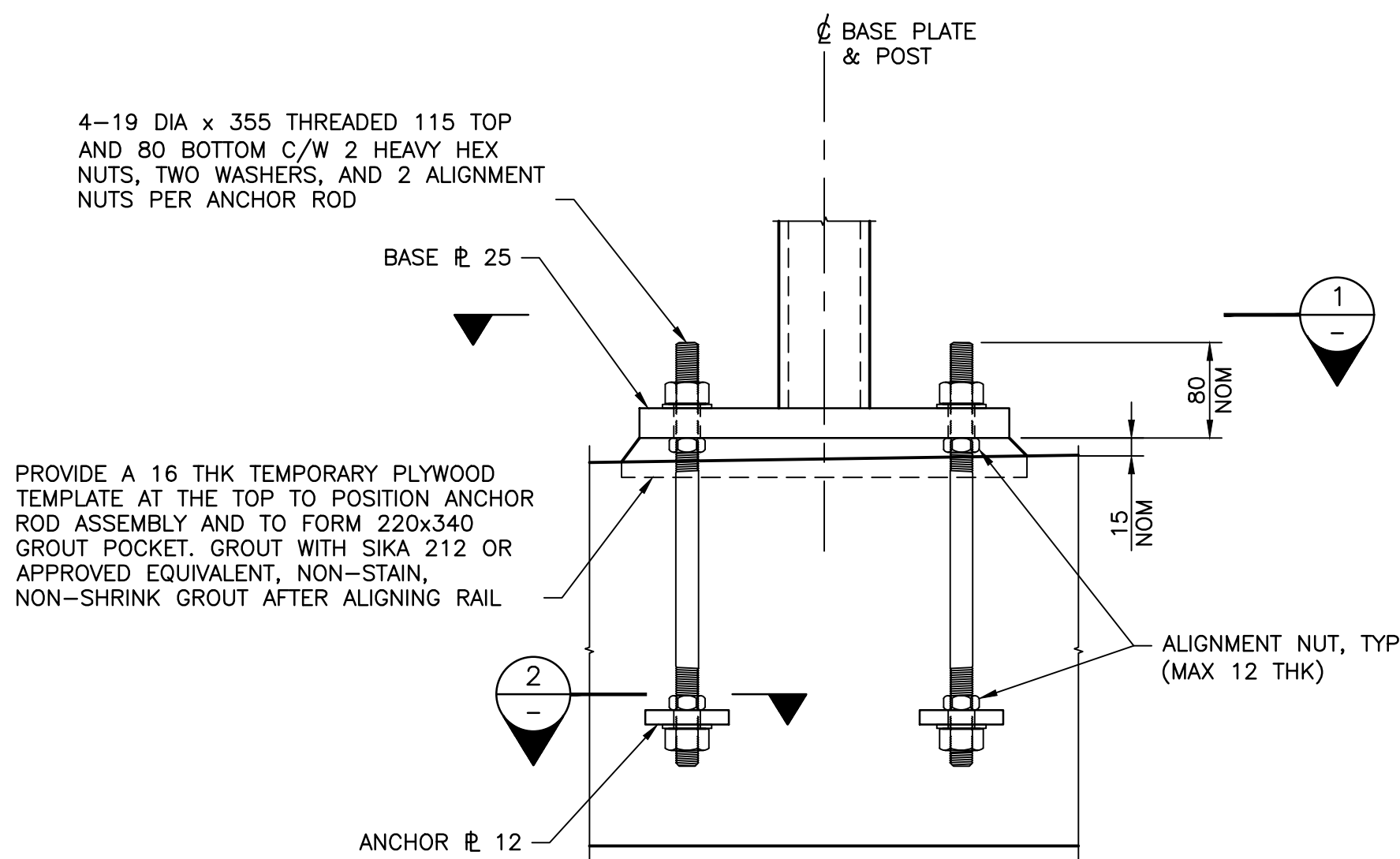
NOTE: RAIL SHOP SPLICE IF REQUIRED SHALL CONFORM TO THE DETAIL AND BE CLEAR OF JOINTS AND CONNECTIONS. NOT MORE THAN ONE SPLICE PER TUBE SECTION

RAIL SHOP SPLICE DETAIL
NTS

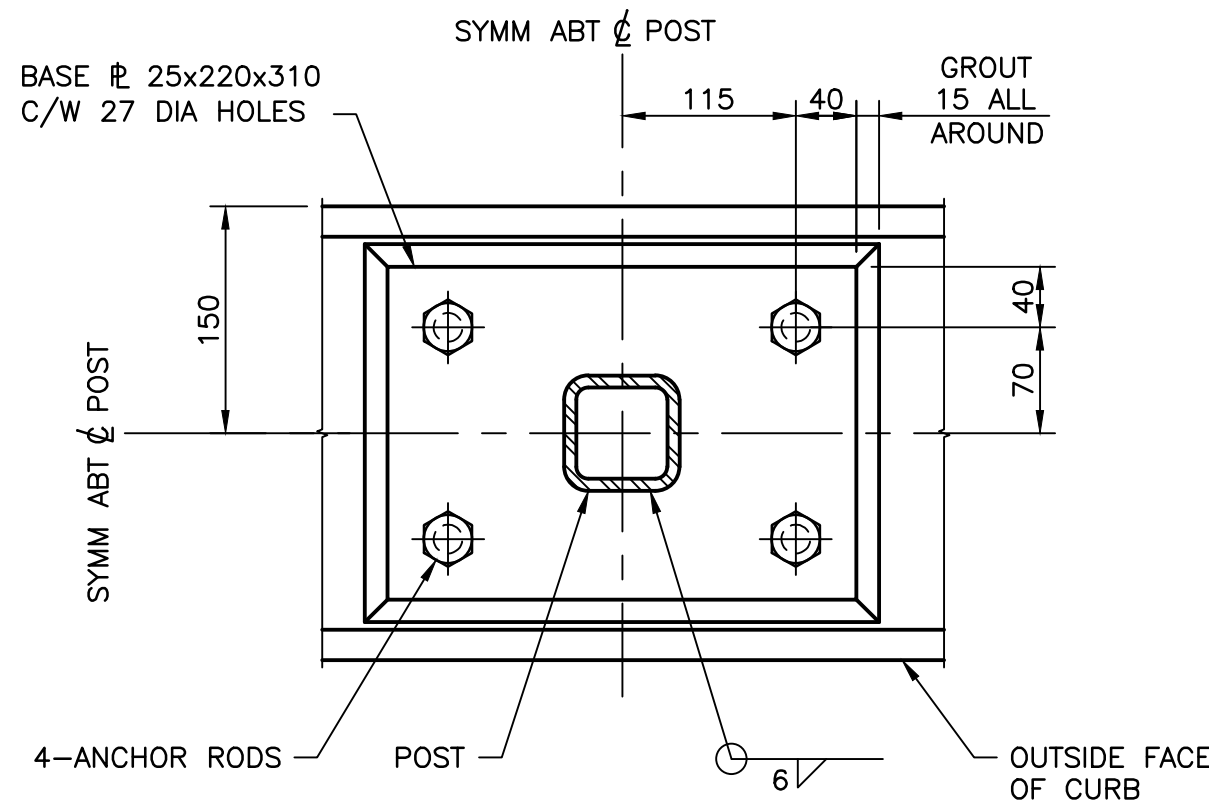


SECTION 3
1:10
012

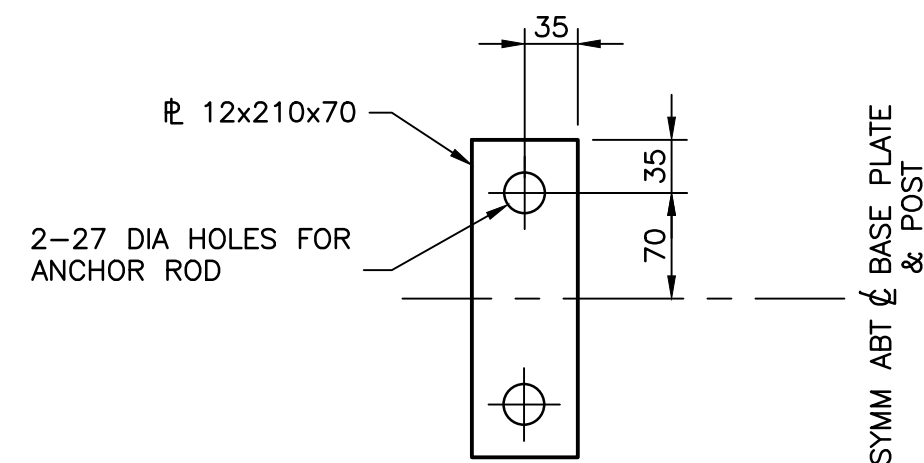
(CURB COVER PLATE NOT SHOWN)



DETAIL C
1:5
012



SECTION 1 POST BASE PLATE
1:5

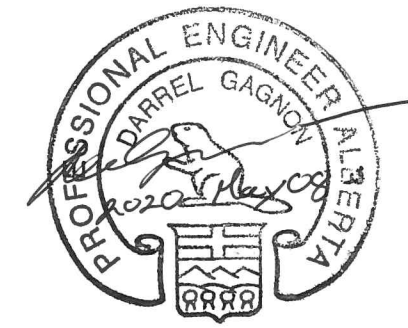


SECTION 2 ANCHOR PLATE
1:5

NOTES:

1. WORK WITH NOTES ON SHEET 012.

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DO NOT SCALE DRAWINGS

Revision/	Description/Description	Date/Date
0	ISSUED FOR CONSTRUCTION	20/05/08

Client/client	Parks Canada Agency	L'Agence Parcs Canada
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Ressources Architectural et de Directeur d'Ingénierie, TPSCG

Client/client
PCA

Drawing title/Titre du dessin

**BICYCLE RAILING
SHEET 2**

Project No./No. du projet 565-11	Sheet/Feuille 013 OF	Revision no./La Révision no. 0
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