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BRIDGE REHABILITATION

YOHO NATIONAL PARK, BRITISH COLUMBIA

KM 107.2 TRANS-CANADA HIGHWAY

OTTERTAIL RIVER BRIDGE

DRAWING LIST:

- 1077-01-001 COVER SHEET, DRAWING LIST AND LOCATION MAP
- 1077-01-002 GENERAL ARRANGEMENT EXISTING CONDITION
- 1077-01-003 GENERAL ARRANGEMENT FINAL CONDITION
- 1077-01-004 ABUTMENT AND RETURN WALL MODIFICATIONS
- 1077-01-005 PIER MODIFICATIONS
- 1077-01-006 BEARING DETAILS
- 1077-01-007 DECK MODIFICATIONS
- 1077-01-008 DECK JOINT REPLACEMENT
- 1077-01-009 CAST-IN-PLACE BARRIER LAYOUT AND REINFORCEMENT
- 1077-01-010 BICYCLE RAILING
- 1077-01-011 PRECAST TRANSITION BARRIER
- 1077-01-012 PRECAST DRAINAGE BARRIER AND SPILLWAY DETAILS

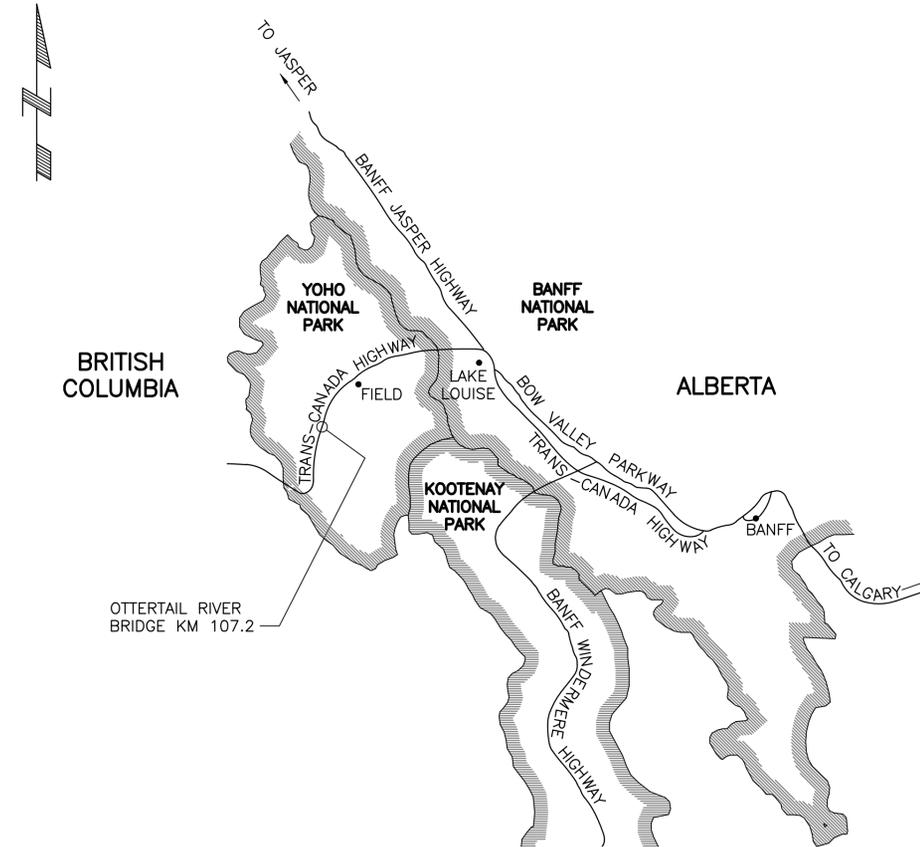
REFERENCE DRAWINGS

1956 ORIGINAL DESIGN, OTTERTAIL RIVER BRIDGE, YOHO NATIONAL PARK B.C. M.12.9, DEPARTMENT OF PUBLIC WORKS CANADA.

- 1 OF 6 PLAN & ELEVATION
- 2 OF 6 ABUTMENTS NORTH & SOUTH
- 3 OF 6 ABUTMENTS REINFORCING
- 4 OF 6 PIERS NORTH & SOUTH
- 5C OF 6 DECK PRESTRESSED CONCRETE ALTERNATIVE 'C'
- 6 OF 6 STANDARD HANDRAIL DETAIL

2008 DECK JOINT REPLACEMENT, OTTERTAIL RIVER BRIDGE ON HWY 1 NEAR FIELD, YOHO NATIONAL PARK, MOST ENGINEERING LTD.

- S1-704 DECK JOINT REPLACEMENT - SHEET 1
- S2-704 DECK JOINT REPLACEMENT - SHEET 2



LOCATION MAP

N.T.S.

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Project title/Titre du projet
**BRIDGE REHABILITATION
YOHO NATIONAL PARK, BRITISH COLUMBIA**

**KM 107.2 TRANS-CANADA HIGHWAY
OTTERTAIL RIVER BRIDGE**

Approved by/Approuvé par
DAWO

Designed by/Concepté par
CHID

Drawn by/Dessiné par
JAET

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
**COVER SHEET
DRAWING LIST AND
LOCATION MAP**

Project No./No. du projet 1077-01	Sheet/Fauille 001 OF	Revision no./ La Révision no. 0
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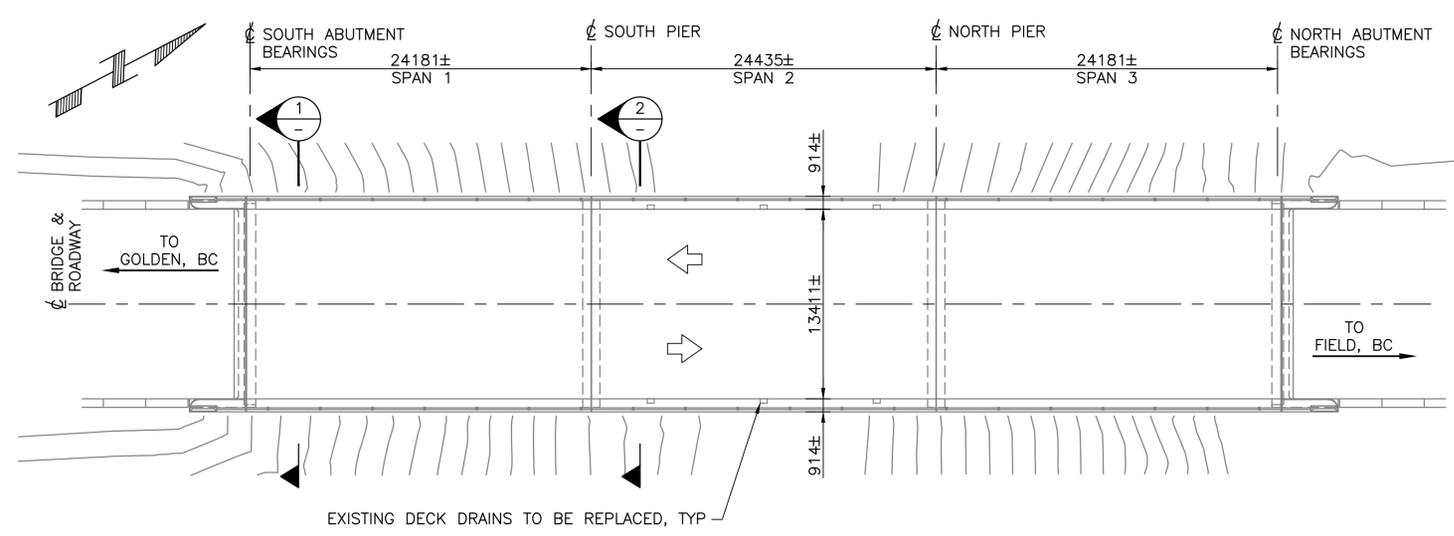
PWGC, Architectural and Engineering Resources Manager/
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Client/client
PCA

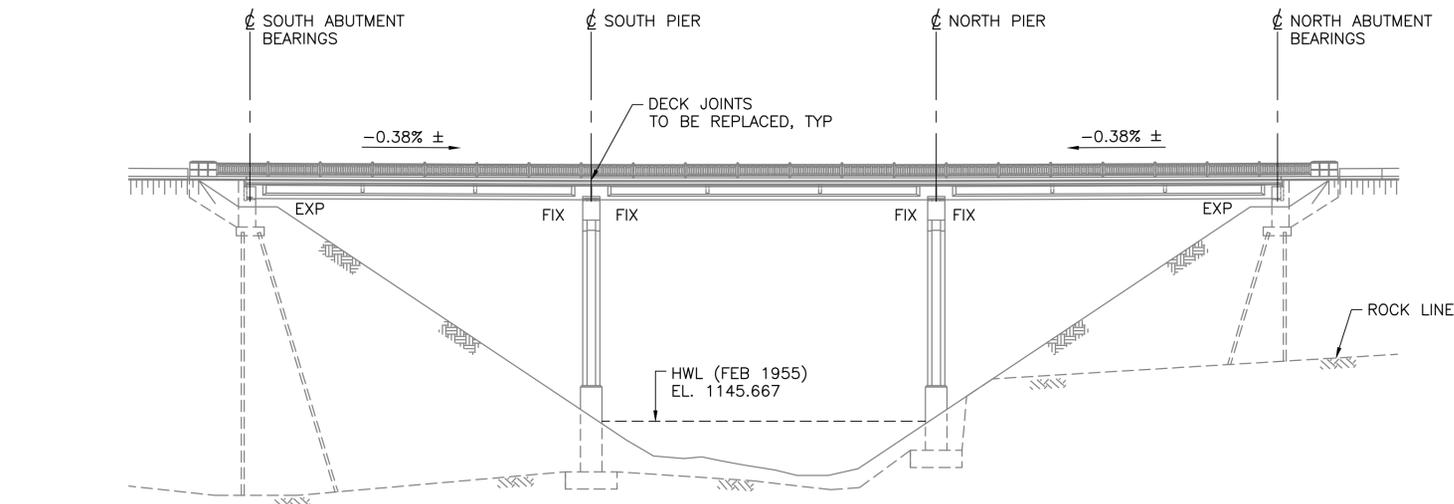
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GENERAL ARRANGEMENT
EXISTING CONDITION

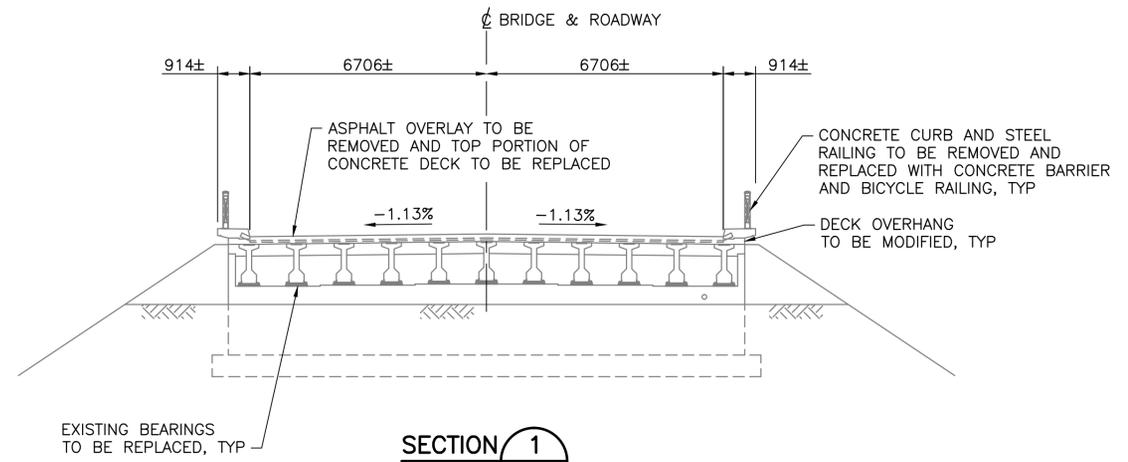
Project No./No. du projet 1077-01	Sheet/Fauille 002 OF	Revision no./ La Révision no. 0
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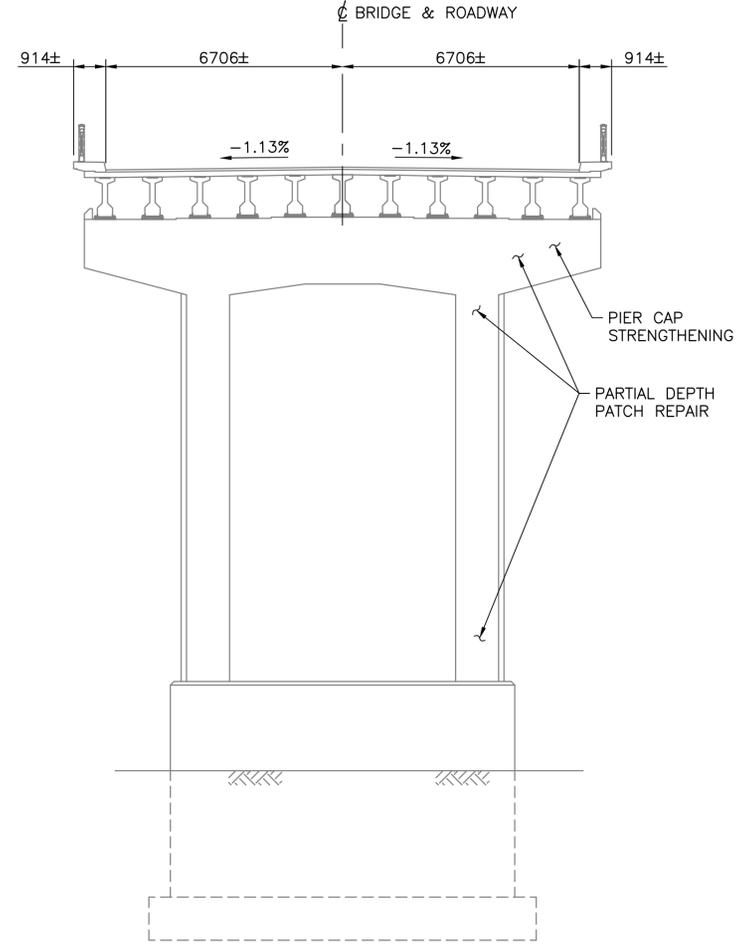
PLAN
1:250



ELEVATION
1:250



SECTION 1
1:100



SECTION 2
1:100

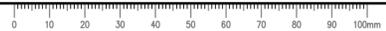
SCOPE OF WORK:

1. REMOVAL AND DISPOSAL OF EXISTING BRIDGE RAILINGS, CONCRETE CURBS, DECK DRAINS, DECK OVERHANGS, ASPHALT WEARING SURFACE, DECK JOINTS, AND BEARINGS IN THREE STAGES.
2. COLD MILLING OF CONCRETE DECK.
3. PARTIAL DEPTH CONCRETE DECK REPAIRS WHEN AUTHORIZED BY DEPARTMENTAL REPRESENTATIVE.
4. SUPPLY, FABRICATION AND INSTALLATION OF NEW ELASTOMERIC BEARINGS.
5. SUPPLY AND CONSTRUCTION OF NEW CONCRETE DECK OVERHANGS AND CONCRETE OVERLAY.
6. SUPPLY, FABRICATION AND INSTALLATION OF NEW DECK DRAINS.
7. MODIFICATION OF ABUTMENT BACKWALL AND RETURN WALL.
8. SUPPLY, FABRICATION, INSTALLATION AND POST-TENSIONING OF HIGH STRENGTH BARS AT PIER CAP.
9. SUPPLY, FABRICATION AND INSTALLATION OF NEW DECK JOINTS.
10. SUPPLY AND CONSTRUCTION OF NEW CAST-IN-PLACE BARRIERS.
11. SUPPLY, FABRICATION AND INSTALLATION OF NEW PRECAST TRANSITION AND DRAINAGE BARRIERS.
12. SUPPLY, FABRICATION AND INSTALLATION OF NEW BICYCLE RAILINGS.
13. PARTIAL DEPTH CONCRETE REPAIRS AT PIERS AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE.
14. MODIFICATION OF APPROACH ROADWAY.
15. APPLICATION OF LANE MARKINGS ON NEW FINISHED ROAD SURFACE.
16. SUPPLY AND CONSTRUCTION OF DRAINAGE SPILLWAYS AT EMBANKMENTS.

NOTES:

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

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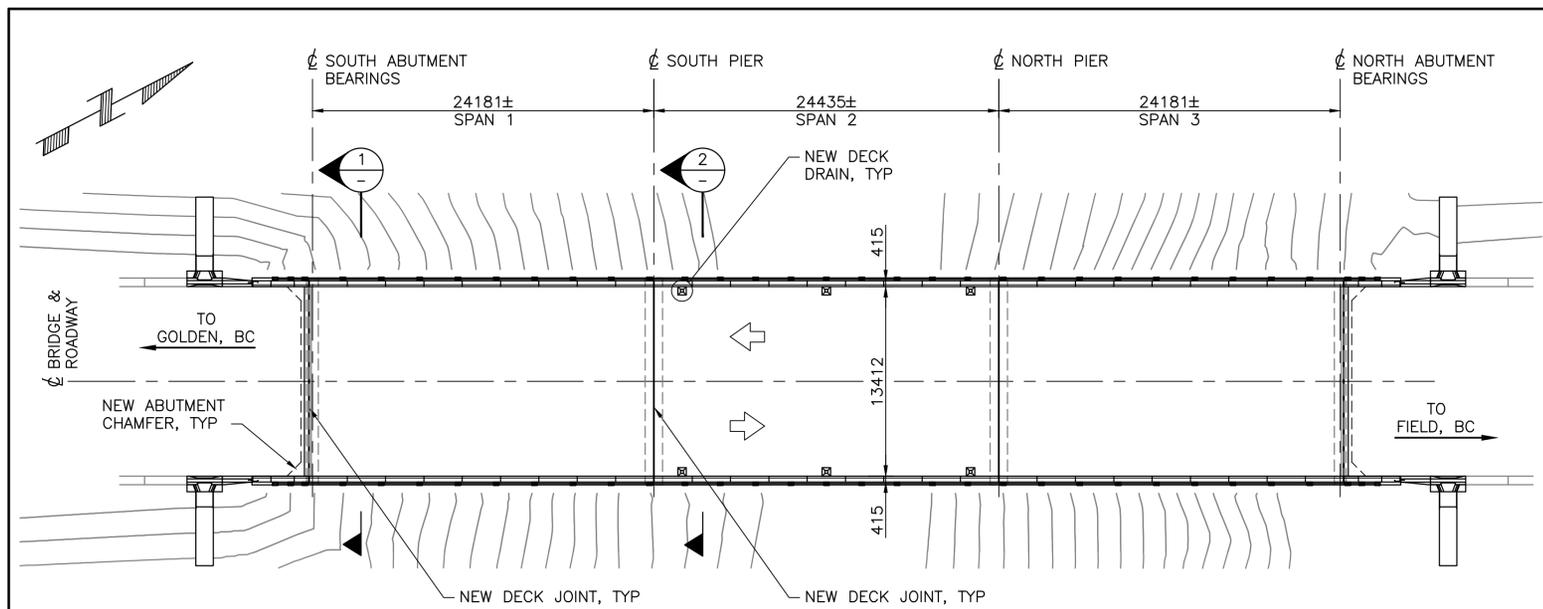
PWGSC, Architectural and Engineering Resources Manager/
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PCA

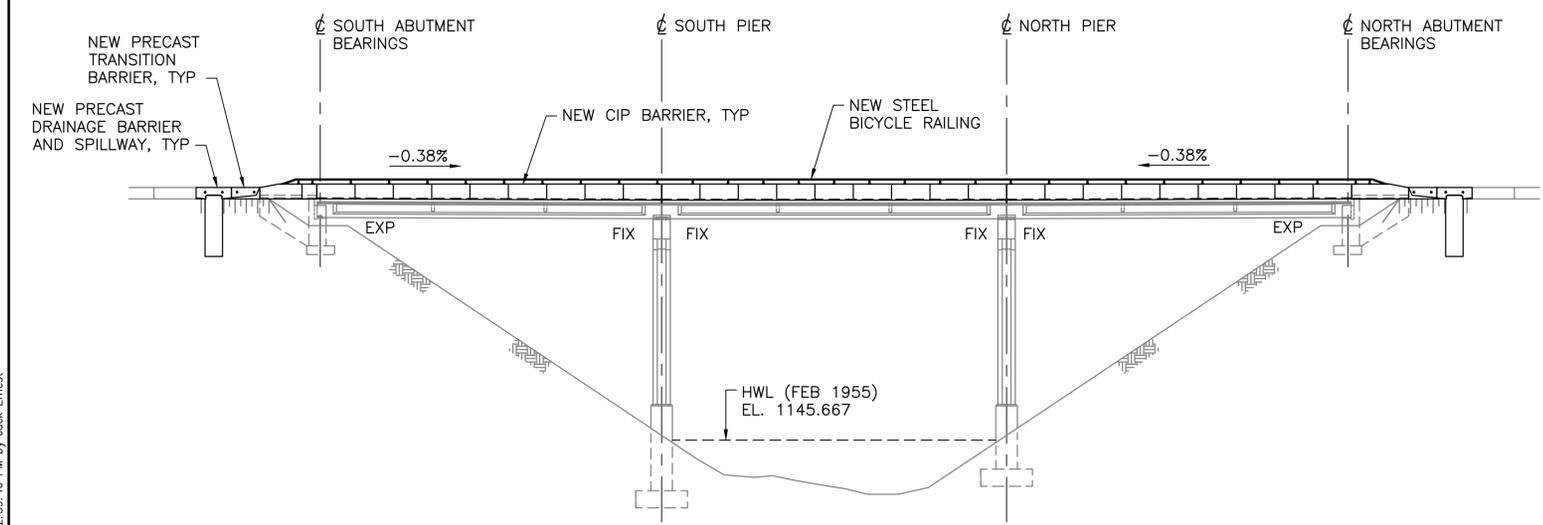
Drawing title/Titre du dessin

GENERAL ARRANGEMENT
FINAL CONDITION

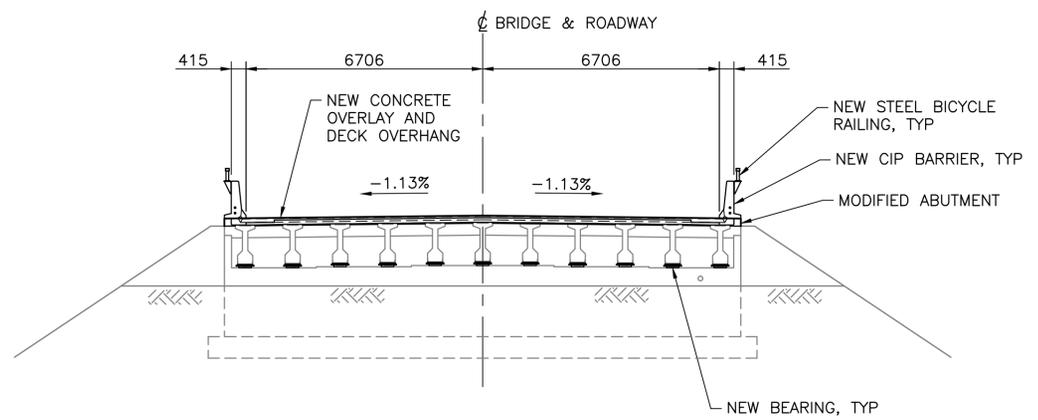
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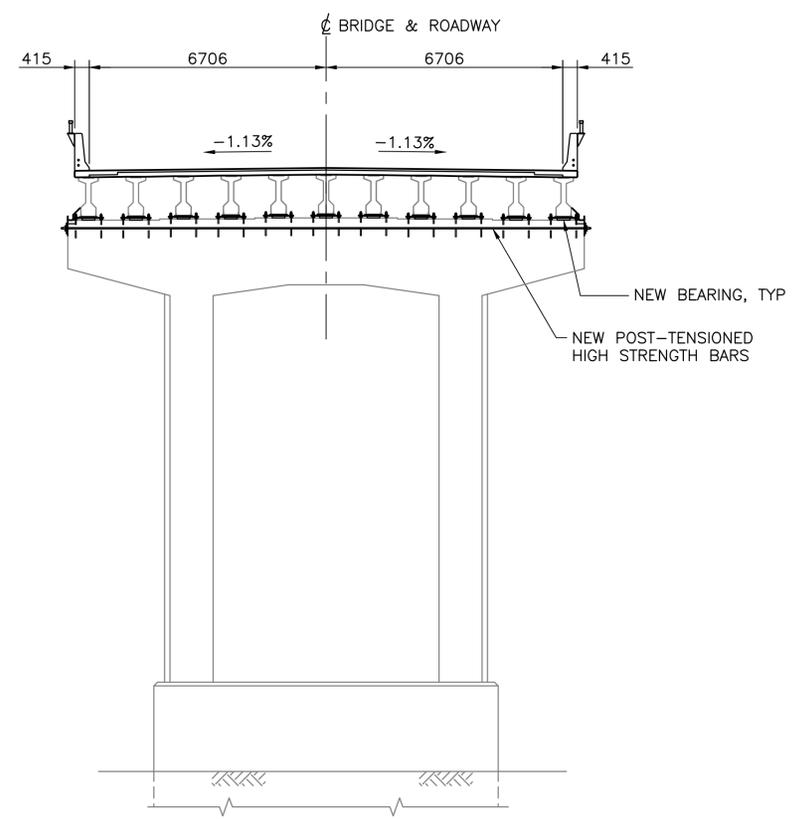
PLAN
1:250



ELEVATION
1:250



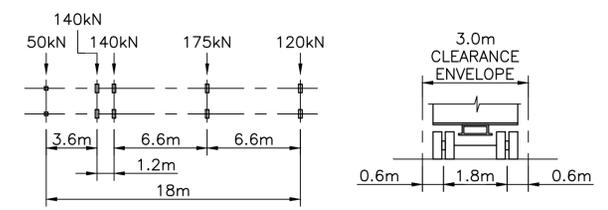
SECTION 1
1:100



SECTION 2
1:100

DESIGN DATA:

- DESIGN STANDARDS: CAN/CSA S6-14
- DESIGN LIFE: 35 YEARS
- DESIGN LOADS:
 - UNIT MATERIAL WEIGHTS
 - REINFORCED CONCRETE: 24.0 kN/m³
 - PRESTRESSED CONCRETE: 24.5 kN/m³
 - STEEL: 77.0 kN/m³
 - LIVE LOADS
 - BCL-625 TRUCK AND LANE LOADING
 - DYNAMIC LOAD ALLOWANCE PER S6-14



3.3 SEISMIC DESIGN PARAMETERS

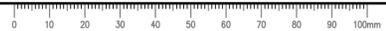
- SITE CLASS B
- LIFELINE BRIDGE
- REGULAR BRIDGE
- SEISMIC PERFORMANCE CATEGORY 2
- SITE-SPECIFIC SPECTRAL ACCELERATION FOR A RETURN PERIOD OF 2475 YEARS AND FUNDAMENTAL PERIOD OF THE BRIDGE S(0.79) = 0.086

3.4 TEMPERATURE DATA

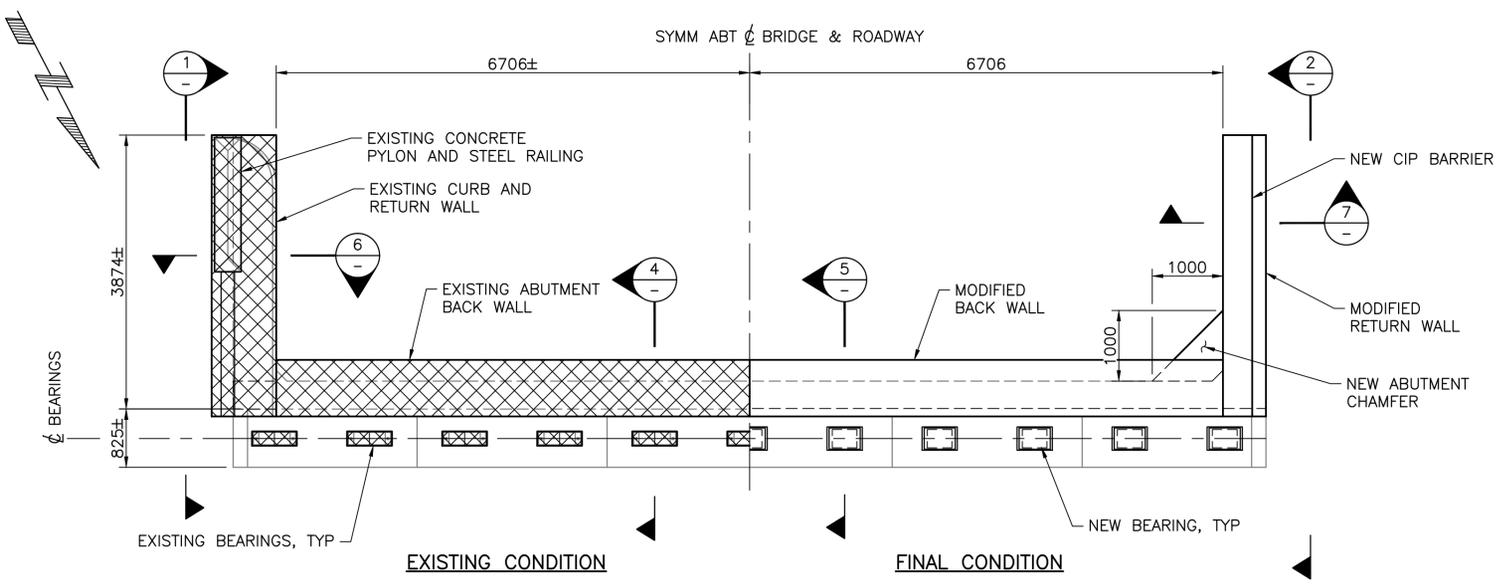
- EFFECTIVE CONSTRUCTION TEMPERATURE: 15°C
- MAXIMUM MEAN DAILY TEMPERATURE: 28°C
- MINIMUM MEAN DAILY TEMPERATURE: -36°C
- ANNUAL MEAN RELATIVE HUMIDITY: 60%

3.5 HOURLY MEAN WIND PRESSURE (50 YEARS): 520 Pa

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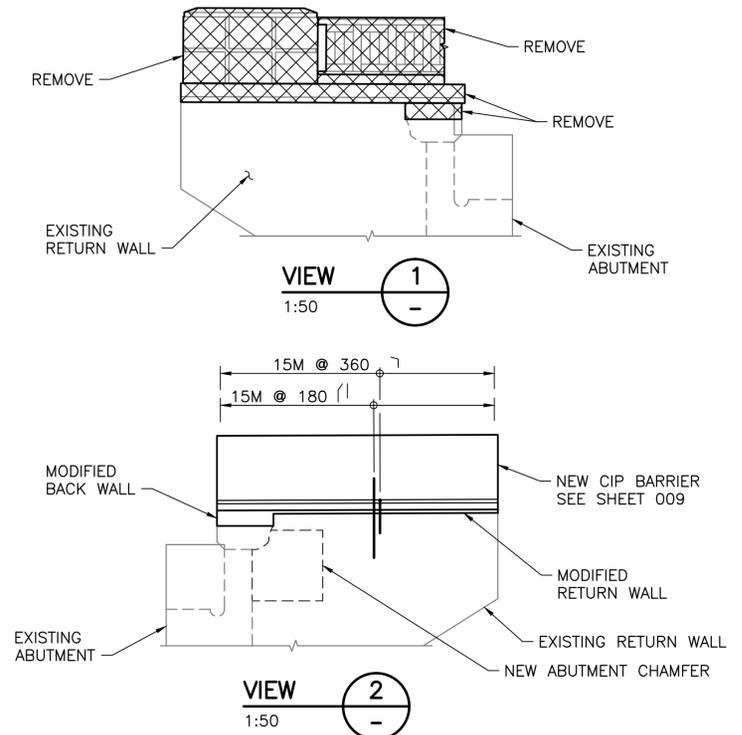


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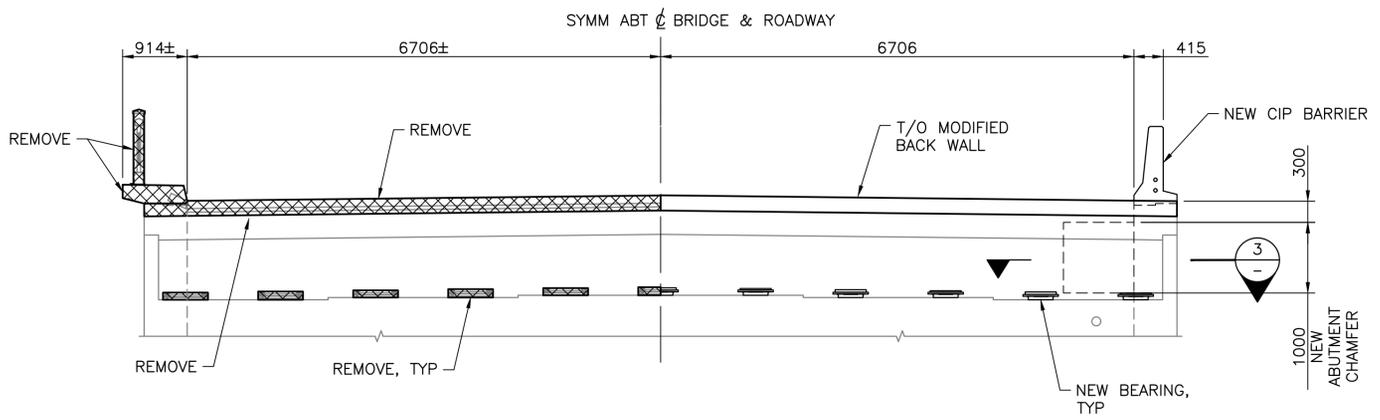


ABUTMENT PLAN

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

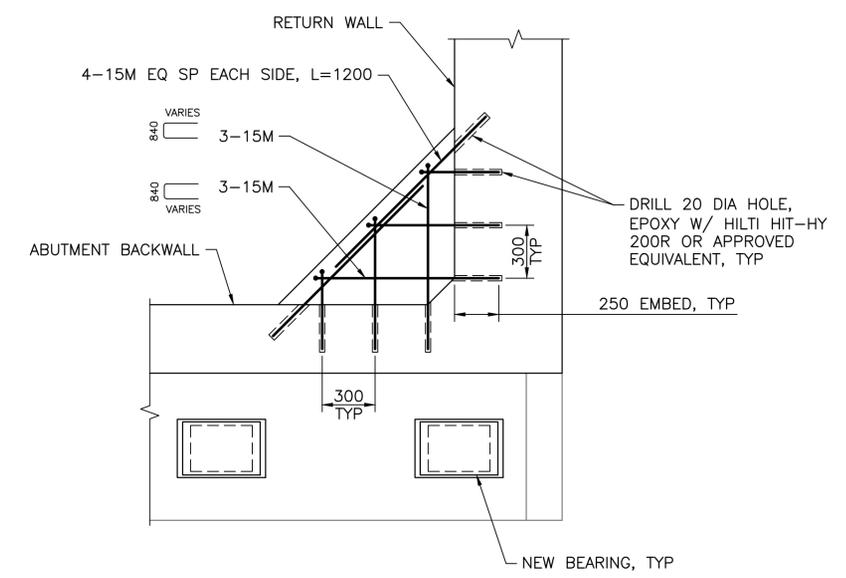


(ONLY BARRIER ANCHORAGE REINFORCEMENT SHOWN FOR CLARITY)

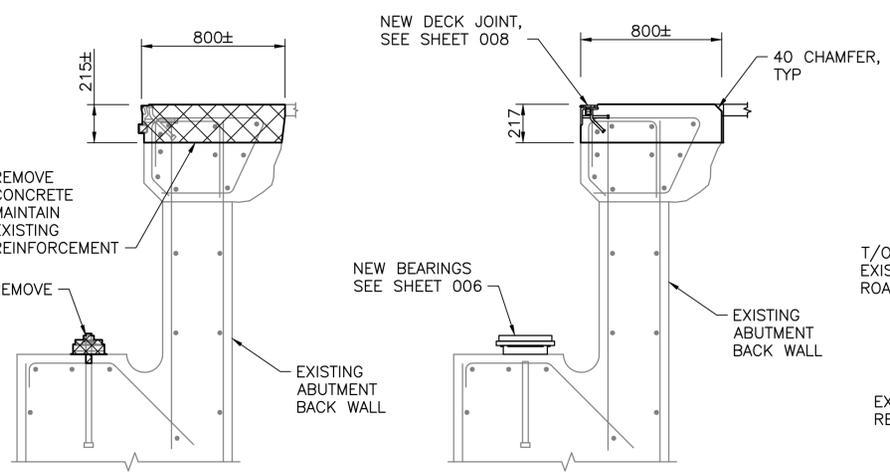


ABUTMENT ELEVATION

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

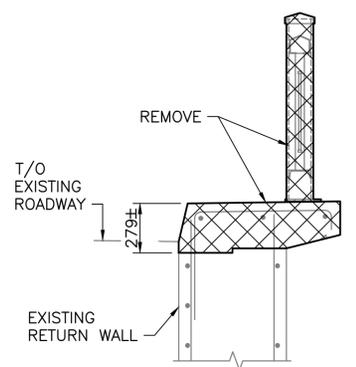


SECTION 3
1:20
(ONLY NEW ABUTMENT CHAMFER REINFORCEMENT SHOWN FOR CLARITY)

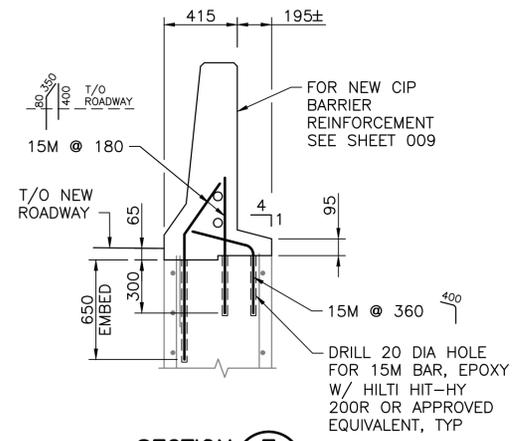


SECTION 4
1:20

SECTION 5
1:20



SECTION 6
1:20



SECTION 7
1:20

LEGEND:

REMOVE

NOTES:

1. ABUTMENT MODIFICATION TO OCCUR IN THREE STAGES IN ACCORDANCE WITH SPECIFICATIONS.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPa AT 28 DAYS.
3. REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
4. SAWCUT 25 DEPTH ALONG EDGE OF CONCRETE REMOVALS.
5. CHAMFER EXPOSED EDGES 20 UNO.
6. MINIMUM COVER: 50 FOR BARRIERS, 70 FOR ALL OTHER.
7. MINIMUM LAP: 500 UNO. LAP SPLICES NOT SHOWN.
8. SEE SHEET 005 FOR PARTIAL DEPTH CONCRETE PATCH REPAIR DETAIL.
9. TOP OF RETURN WALL TO BE CAST WITH BARRIER.

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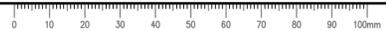
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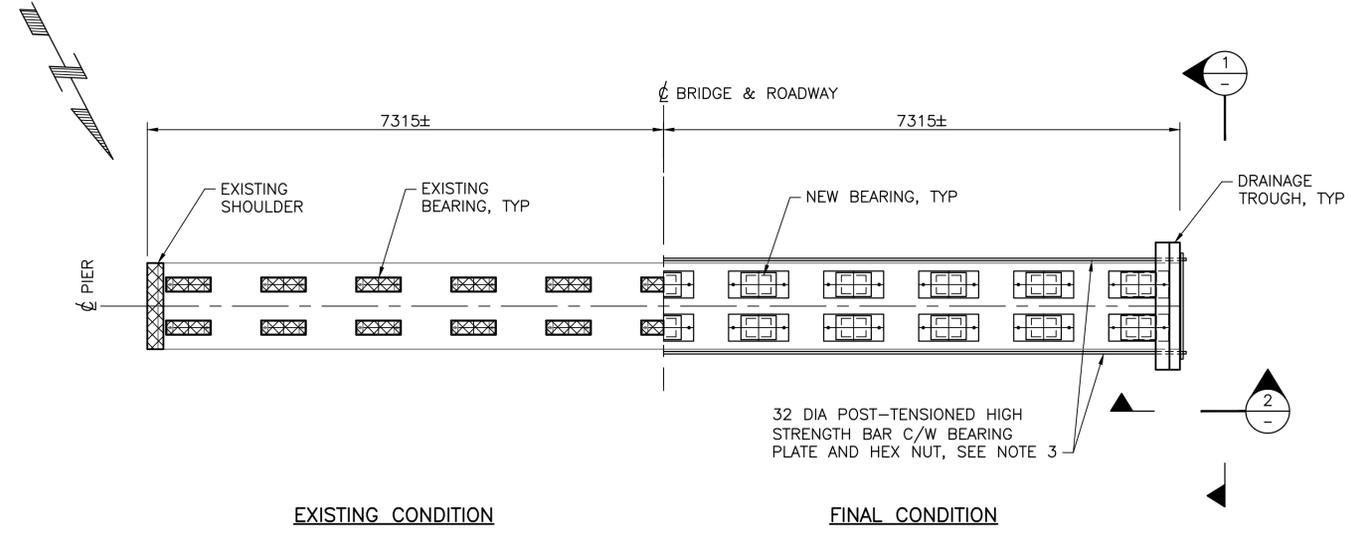
ABUTMENT AND RETURN WALL
MODIFICATIONS

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1077-01	004 OF	0

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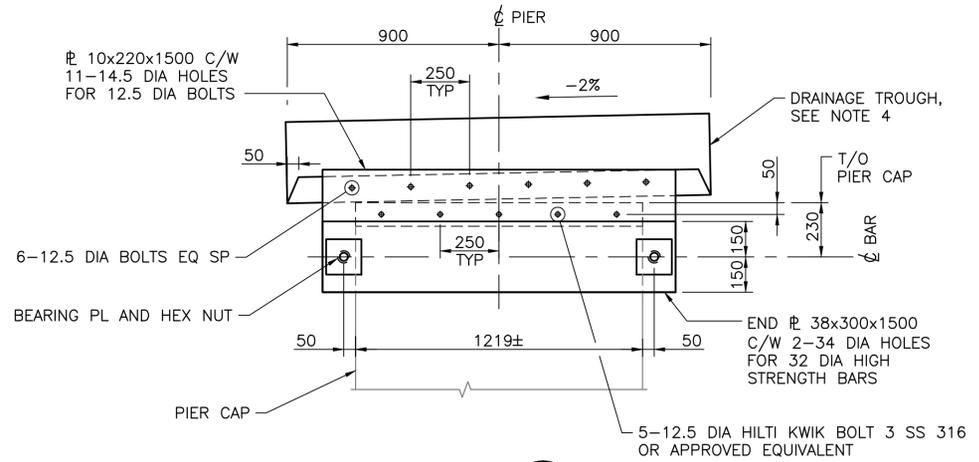


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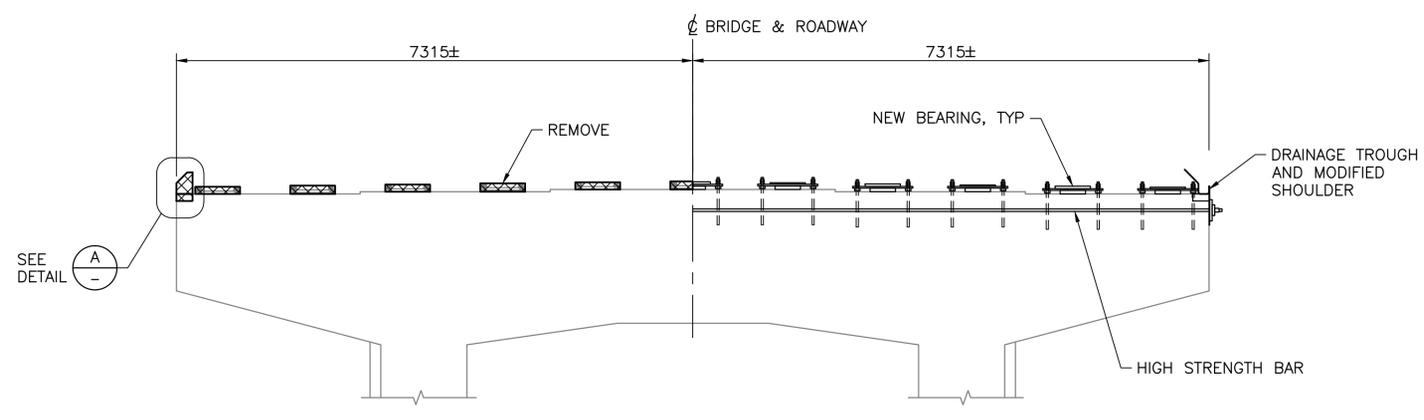


EXISTING CONDITION FINAL CONDITION

PIER PLAN
1:50

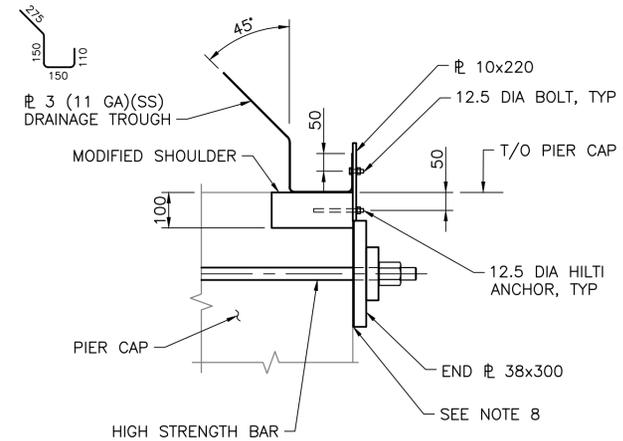


VIEW 1
1:15

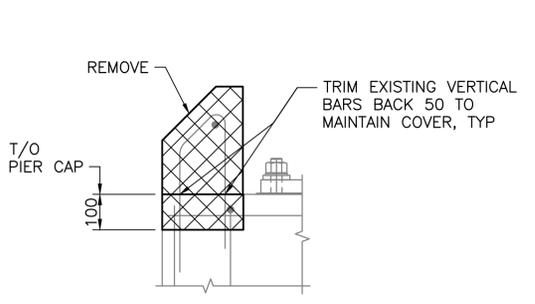


EXISTING CONDITION FINAL CONDITION

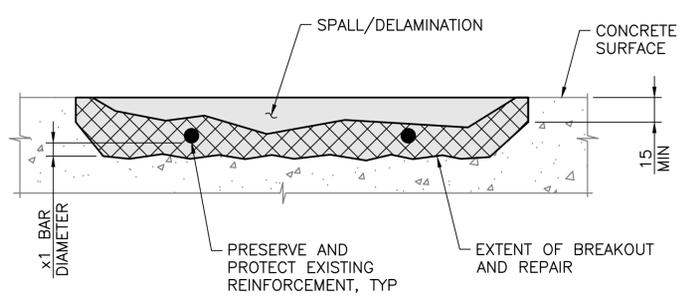
PIER ELEVATION
1:50



VIEW 2
1:10



DETAIL A
1:10



PARTIAL DEPTH CONCRETE PATCH REPAIR DETAIL
NTS

LEGEND:
[Cross-hatched box] - REMOVALS

NOTES:

- PIER MODIFICATIONS TO OCCUR IN THREE STAGES, IN ACCORDANCE WITH SPECIFICATIONS.
- PARTIAL DEPTH CONCRETE PATCH REPAIRS AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE IN ACCORDANCE WITH SPECIFICATIONS.
- POST-TENSIONED HIGH STRENGTH BAR: WILLIAMS 150 KSI (F_{pu}=1037 MPa), ASTM A722-07, HOT DIPPED GALVANIZED.
- MAX JACKING FORCE OF 500 kN PER BAR TO ACHIEVE MIN TARGET INSTALLATION TENSION OF 450 kN PER BAR. TENSION IN ACCORDANCE WITH SPECIFICATIONS.
- INSTALL DRAINAGE TROUGH ON 2% SLOPE.
- STEEL:
STEEL MARKED SS: ASTM A240 GRADE 316
OTHER: CAN/CSA-G40.21 GRADE 300W, GALVANIZED AFTER FABRICATION.
- BOLTS: ASTM F593 GRADE 316.
- ALL WELDING SHALL CONFORM TO CSA W59.
- END PLATE BEARING SURFACE PREPARATION: IN ACCORDANCE WITH SPECIFICATIONS.

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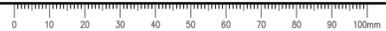
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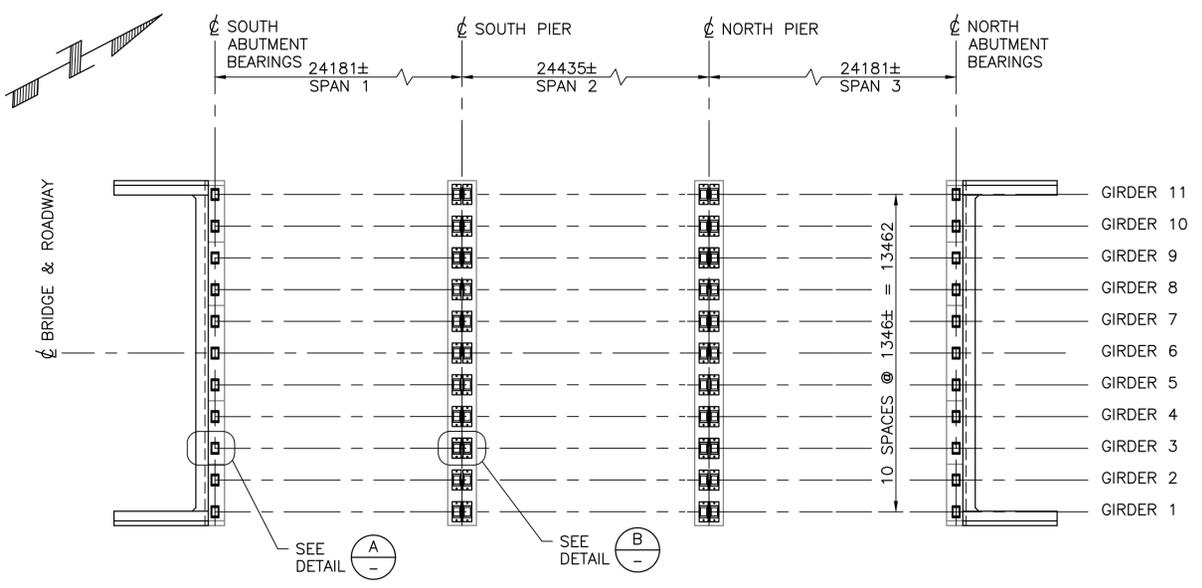
PIER MODIFICATIONS

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1077-01	005 OF	0

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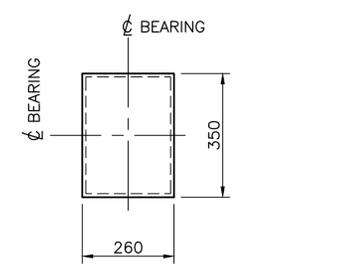
PLAN
1:150

GIRDER	1	2	3	4	5	6	7	8	9	10	11
SHIM PLATE THICKNESS	20	36	20	36	20	33	20	36	20	36	20

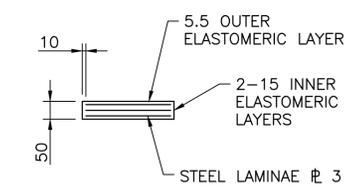
LOAD CASE	BEARING REACTION (kN)				ROTATION (rad)
	SLS		ULS		
PERMANENT VERTICAL LOAD	180	210	165	280	0.007
TOTAL VERTICAL LOAD	180	425	165	650	0.009

LOCATION	BEARING MOVEMENT (mm)		
	SLS	SEISMIC	
ABUTMENTS	+6, -15	37	24
PIERS	0	0	0

NOTE: POSITIVE/NEGATIVE LONGITUDINAL MOVEMENT CORRESPONDS TO BRIDGE EXPANSION/CONTRACTION RESPECTIVELY. REPORTED SEISMIC BEARING MOVEMENTS ARE DUE TO COMBINED ORTHOGONAL FORCES.

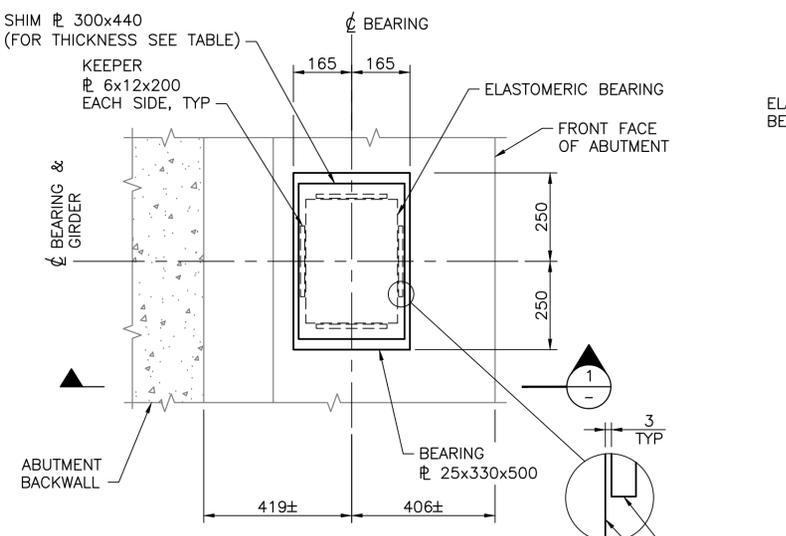


PLAN

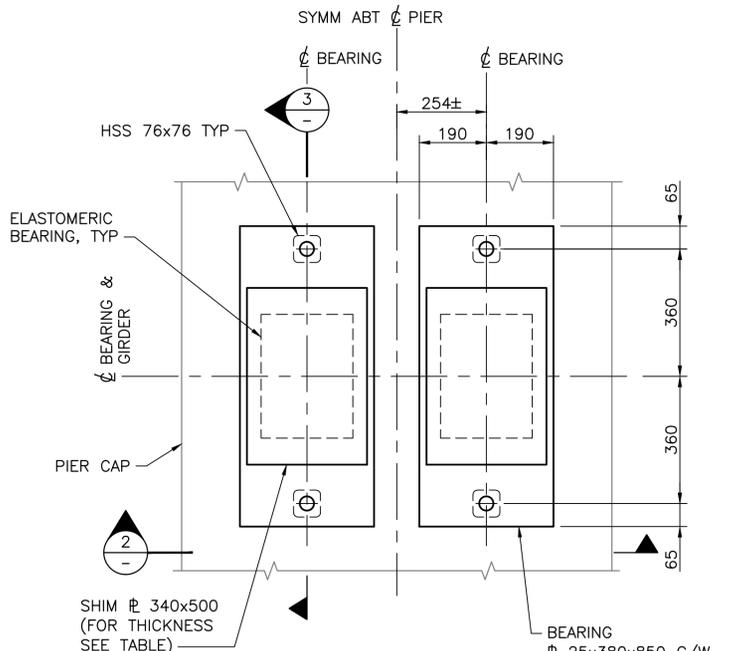


ELEVATION

ELASTOMERIC BEARING
1:10

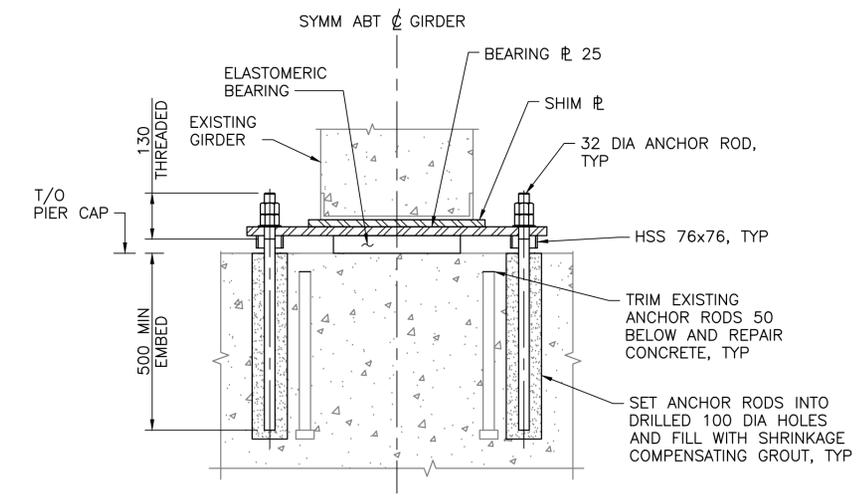


DETAIL A
1:10

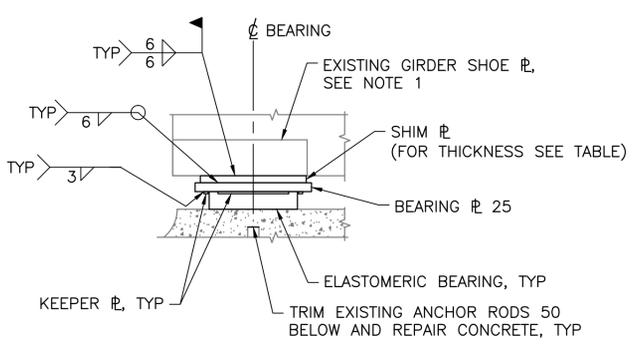


DETAIL B
1:10

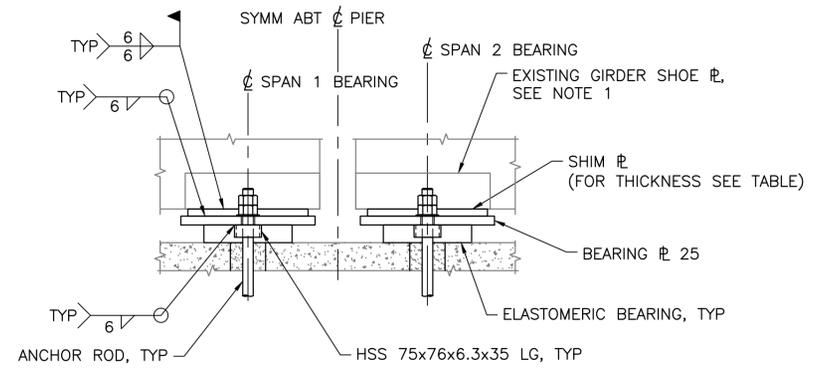
(BEARINGS AT SOUTH PIER SHOWN, NORTH PIER SIMILAR)



SECTION 3
1:10



SECTION 1
1:10



SECTION 2
1:10

NOTES:

- REMOVE WELD BETWEEN EXISTING STEEL UPPER BEARING PLATE AND GIRDER SHOE PLATE. WELD NEW SHIM PLATE AND RECONDITION AND METALLIZE GIRDER STEEL SHOE PLATE IN ACCORDANCE WITH SPECIFICATIONS.
- STEEL:
 - HSS: CAN/CSA-G40.21 GRADE 350W CLASS C, GALVANIZE AFTER FABRICATION.
 - OTHER: CAN/CSA-G40.21 GRADE 300W, GALVANIZE AFTER FABRICATION.
- ANCHOR RODS: ASTM F1554 GRADE 105 (FY=724 MPa), GALVANIZE AFTER FABRICATION.
- ELASTOMER: VIRGIN NATURAL RUBBER (POLYISOPRENE), 55+/- DUROMETER, IN ACCORDANCE WITH TABLE 11.5 OF CAN/CSA S6-14.
- STEEL LAMINAE: CAN/CSA-G40.21 GRADE 230W
- WELDING TO CAN/CSA W59.
- MINIMUM COMPRESSIVE STRENGTH OF SHRINKAGE COMPENSATING GROUT: 45 MPa AT 28 DAYS.

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Drawn by/Dessiné par: JAET

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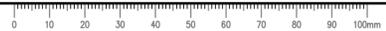
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Project title/Titre du projet
**BRIDGE REHABILITATION
YOHO NATIONAL PARK, BRITISH COLUMBIA**

**KM 107.2 TRANS-CANADA HIGHWAY
OTTERTAIL RIVER BRIDGE**

Approved by/Approuvé par
DAWO

Designed by/Concepté par
CHID

Drawn by/Dessiné par
JAET

PWGC Project Manager/Administrateur de Projets TPSSC

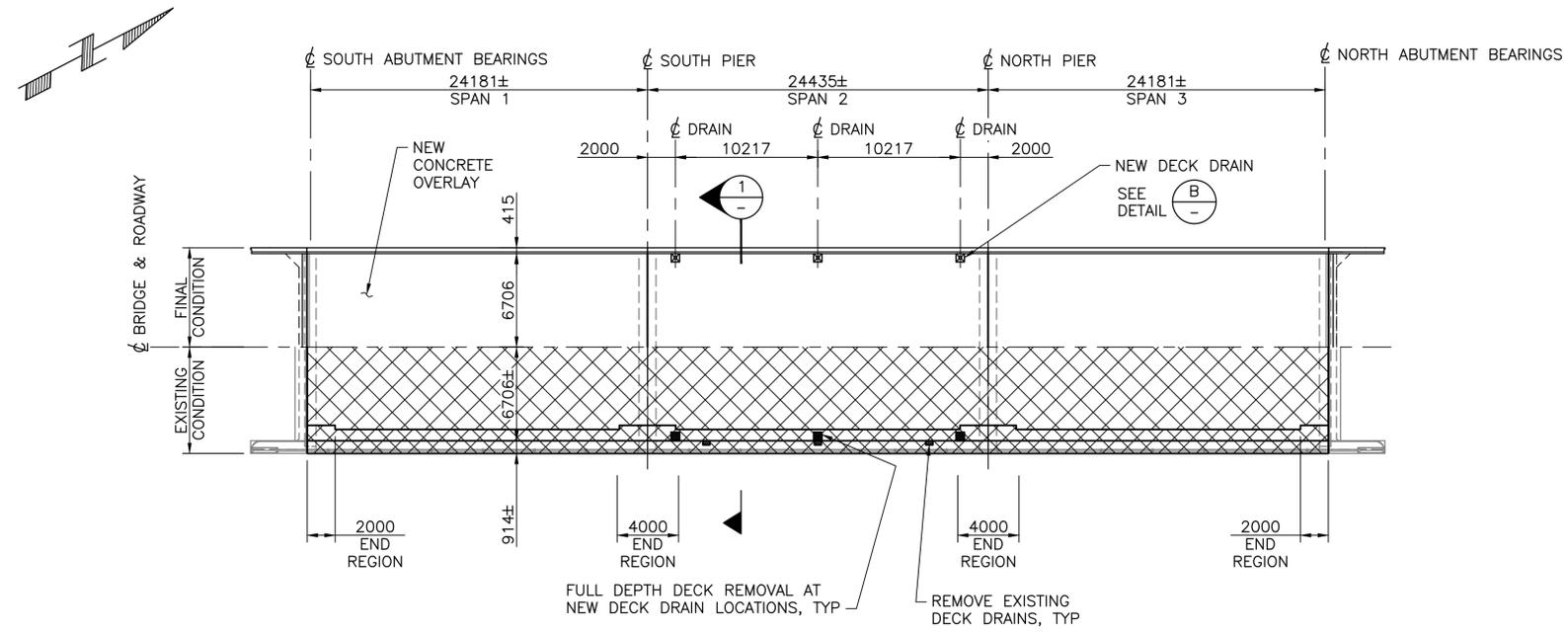
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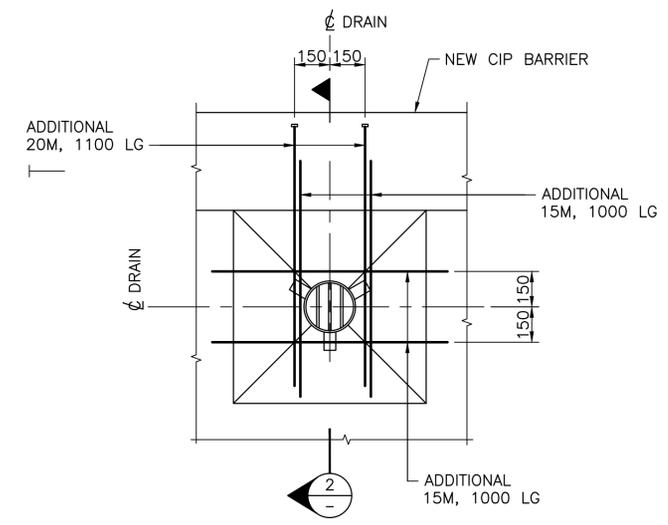
Drawing title/Titre du dessin

DECK MODIFICATIONS

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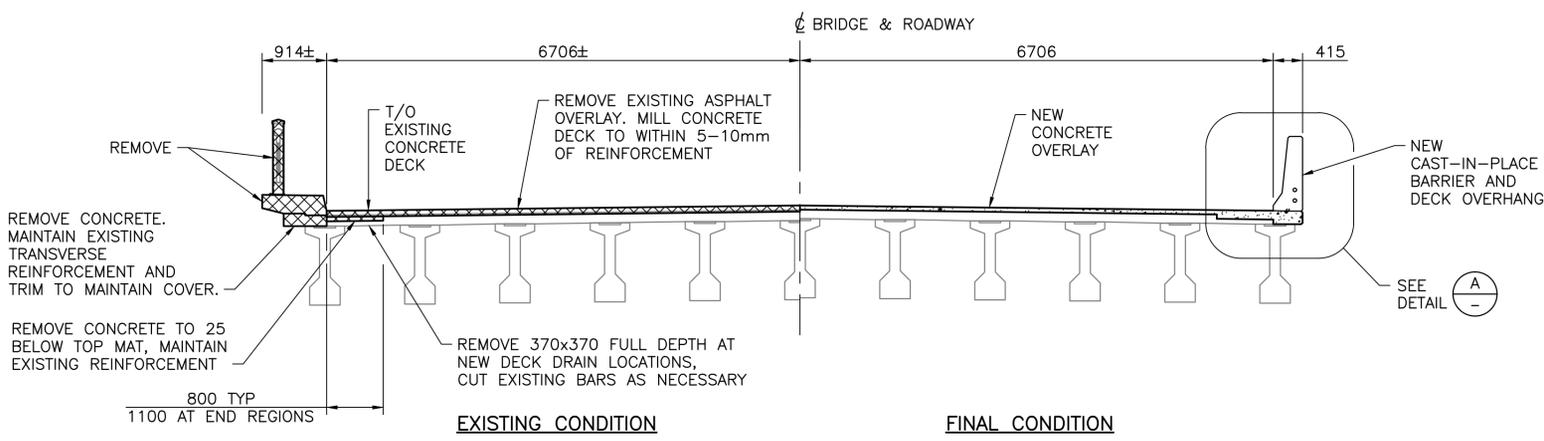


PLAN
1:250

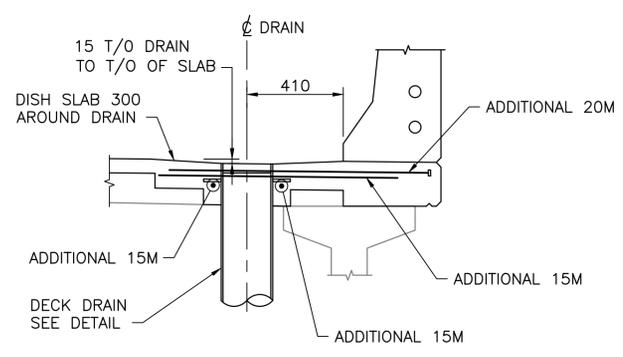


DETAIL B
1:15

(EXISTING AND TYPICAL NEW DECK REINFORCING NOT SHOWN FOR CLARITY)



SECTION 1
1:50



SECTION 2
1:15

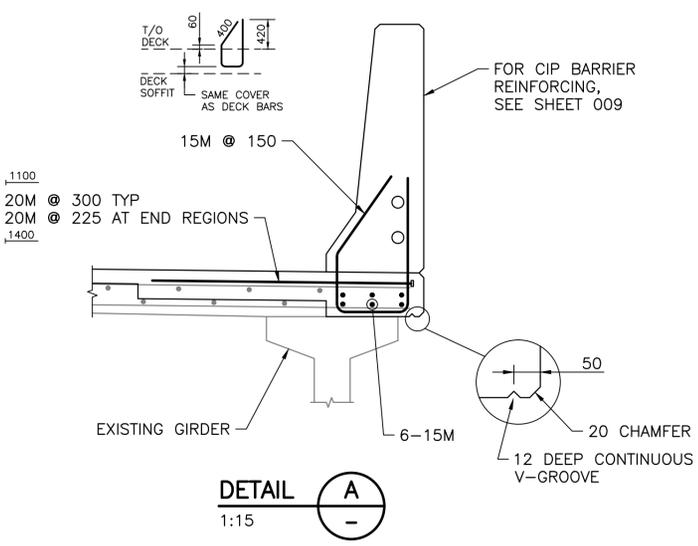
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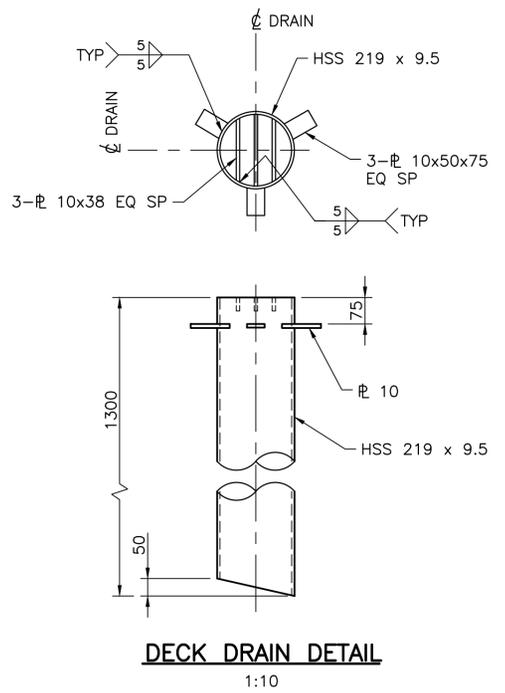
REMOVALS

NOTES:

- DECK MODIFICATIONS TO OCCUR IN THREE STAGES IN ACCORDANCE WITH SPECIFICATIONS.
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPA AT 28 DAYS.
- REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
- CHAMFER EXPOSED EDGES 20, UNO.
- MINIMUM COVER:
 - 70 TO TOP OF SLAB
 - 30 TO SOFFIT OF SLAB
 - 50 ALL OTHER
- MINIMUM LAP 500 UNO. LAP SPLICES NOT SHOWN.
- STEEL:
 - HSS: CAN/CSA-G40.21 GRADE 350W CLASS C, GALVANIZE AFTER FABRICATION
 - OTHER: CAN/CSA-G40.21 GRADE 300W, GALVANIZE AFTER FABRICATION
- WELDING TO CAN/CSA W59.

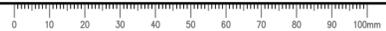


DETAIL A
1:15

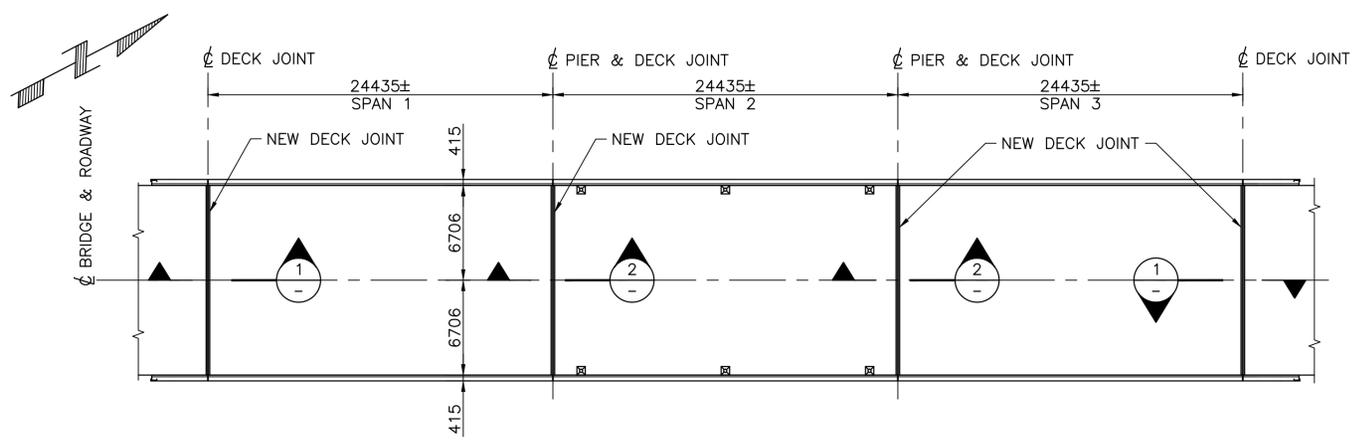


DECK DRAIN DETAIL
1:10

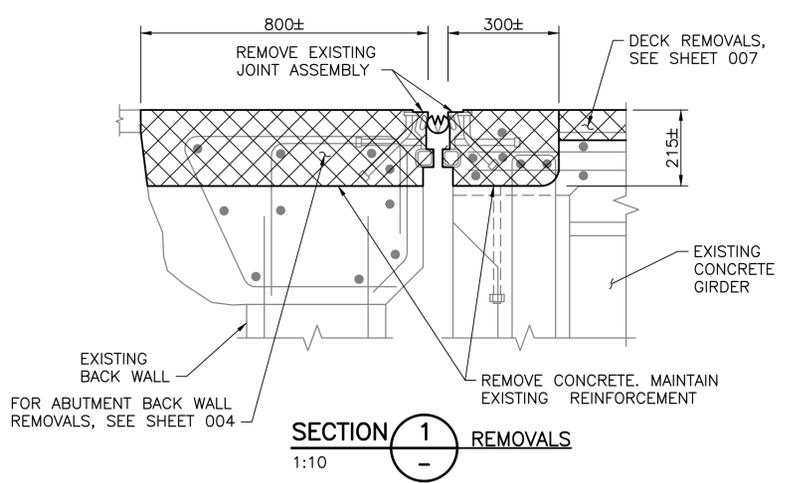
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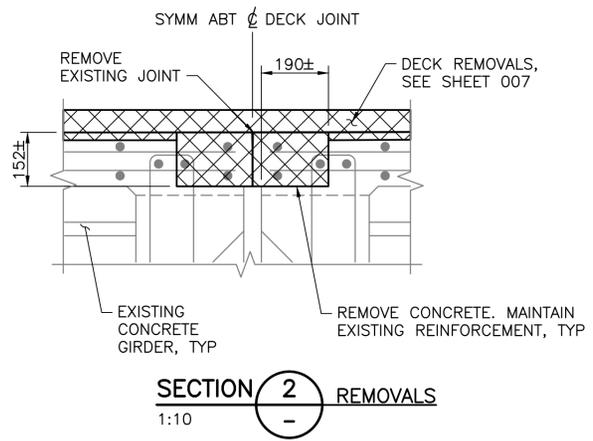
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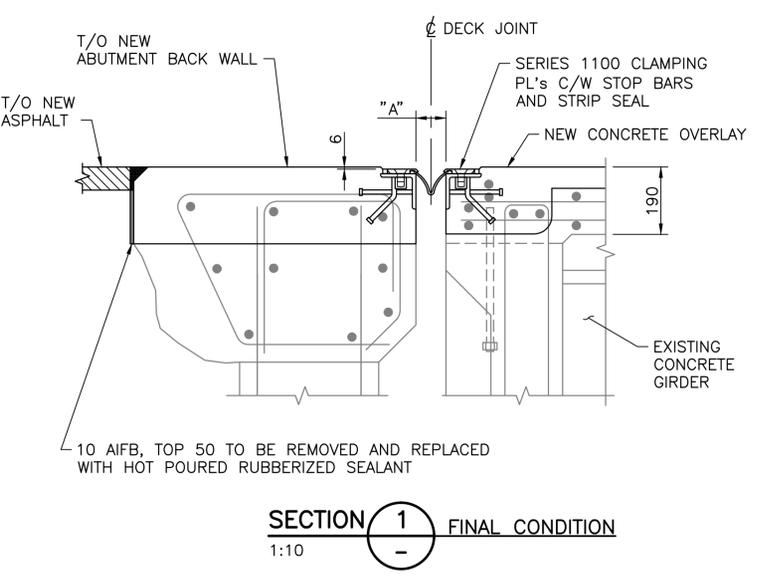
PLAN
1:250



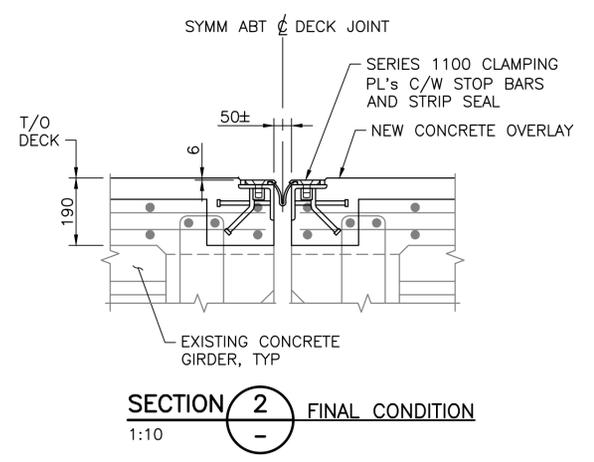
SECTION 1
1:10



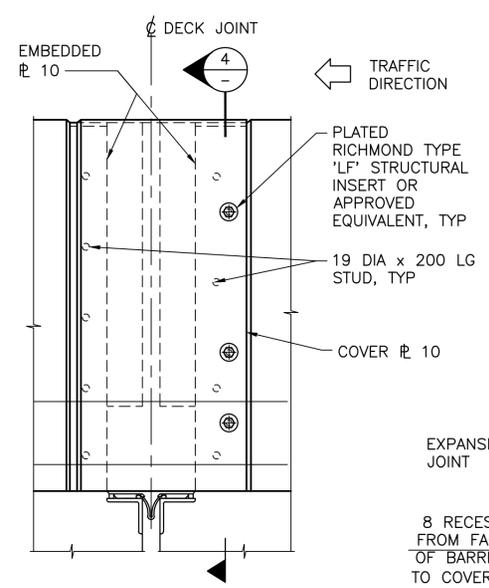
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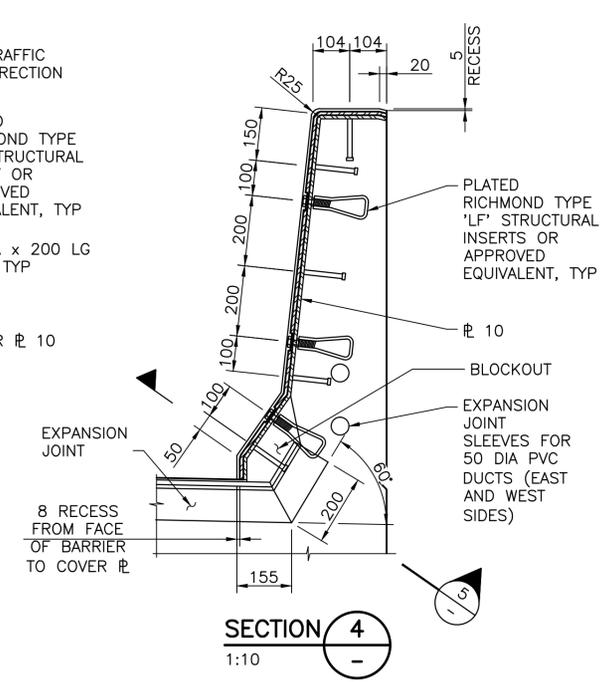
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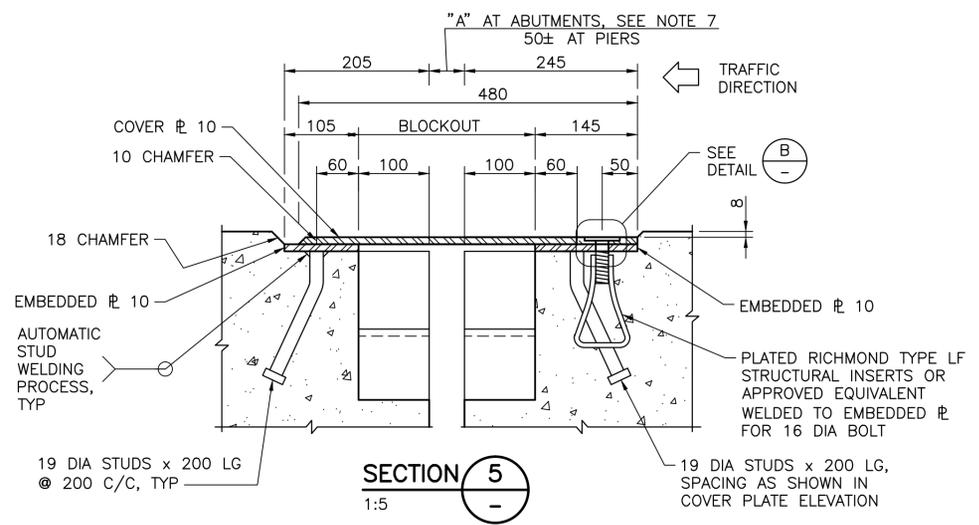
SECTION 2
1:10



BARRIER JOINT COVER PLATE ELEVATION
1:10



SECTION 4
1:10



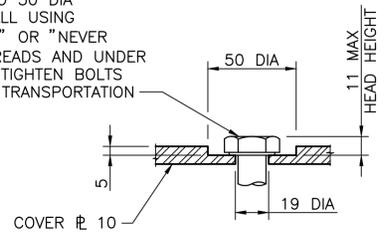
SECTION 5
1:5

NOTES:

- NEW DECK JOINTS "GOODFLEX SERIES 1100 BY GOODCO Z-TECH" AND NEW JOINT NEOPRENE SEAL "GOODCO FL-75" OR APPROVED EQUIVALENT, INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 45 MPA AT 28 DAYS.
- REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
- STEEL: CAN/CSA G40.21 GRADE 300W, GALVANIZE AFTER FABRICATION.
- STUDS: CAN/CSA W59 APPENDIX H, TYPE B, GALVANIZE AFTER FABRICATION.
- WELDING TO CAN/CSA W59.
- INSTALL GAP "A" AT ABUTMENTS IN ACCORDANCE WITH THE TABLE BELOW:

INSTALLATION TEMPERATURE	-15°C	-5°C	5°C	15°C	25°C	35°C
GAP "A" (mm)	88	85	81	78	74	70

16 DIA TYPE 304 STAINLESS STEEL HEXAGONAL HEAD BOLT RECESSED INTO 50 DIA RECESS. INSTALL USING "KOP-R-KOTE" OR "NEVER SEEZ" ON THREADS AND UNDER HEADS. SNUG TIGHTEN BOLTS IN SHOP FOR TRANSPORTATION



DETAIL B
1:2

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0	ISSUED FOR CONSTRUCTION	2017/04/13

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

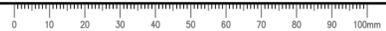
Client/client
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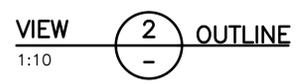
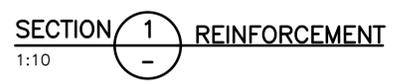
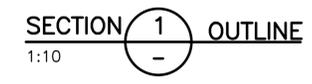
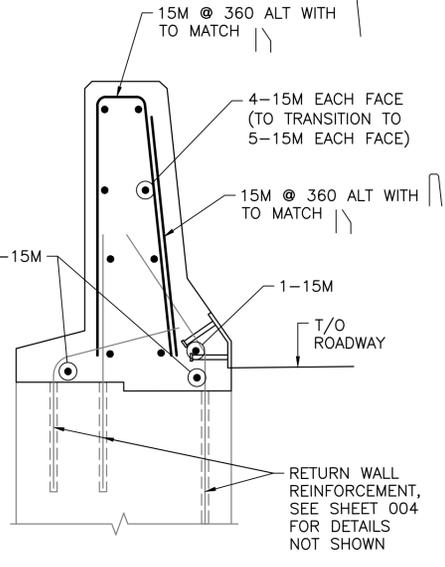
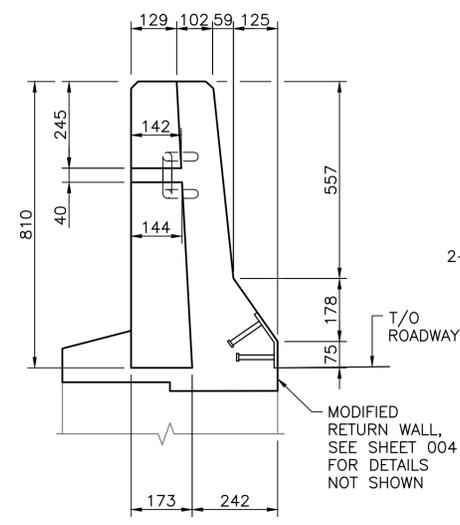
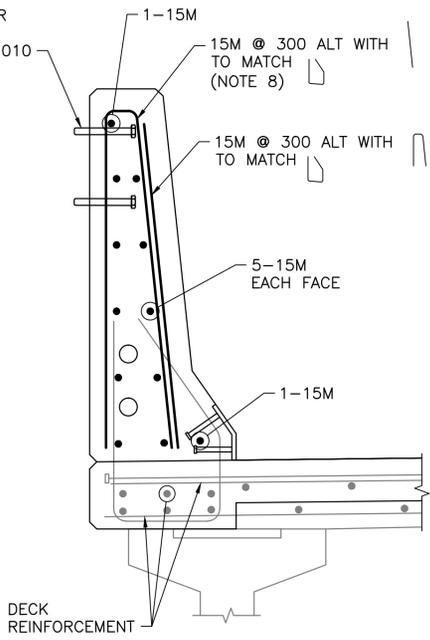
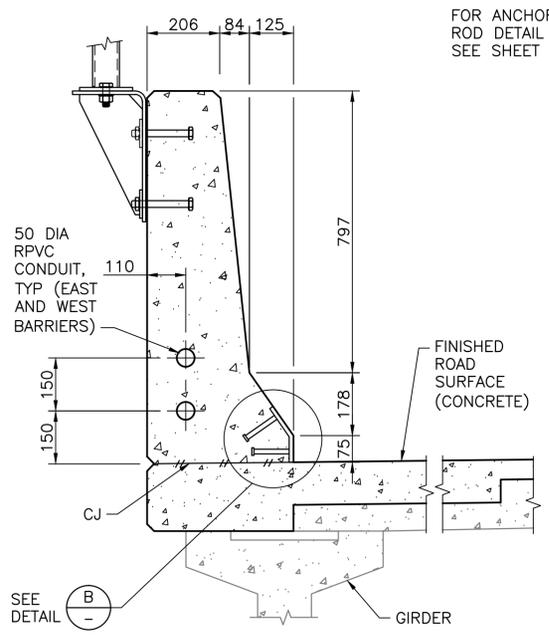
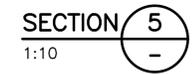
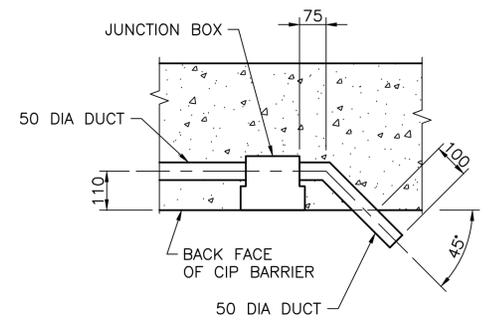
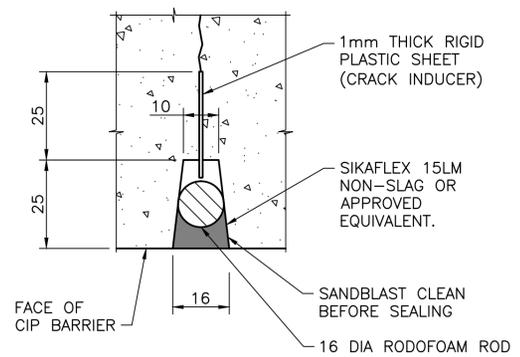
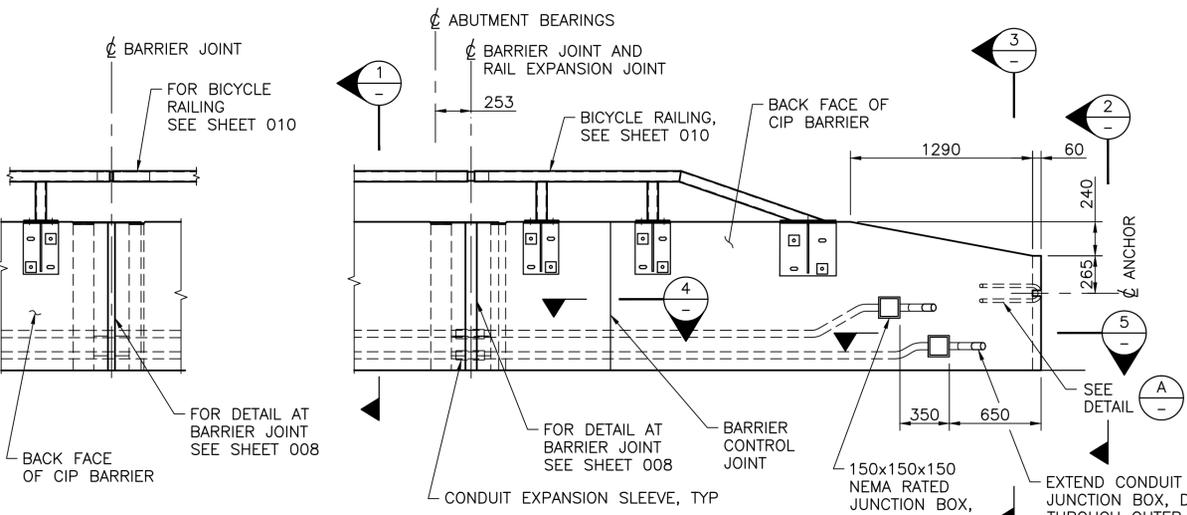
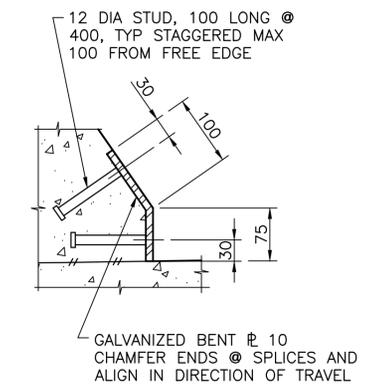
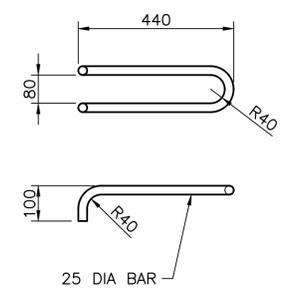
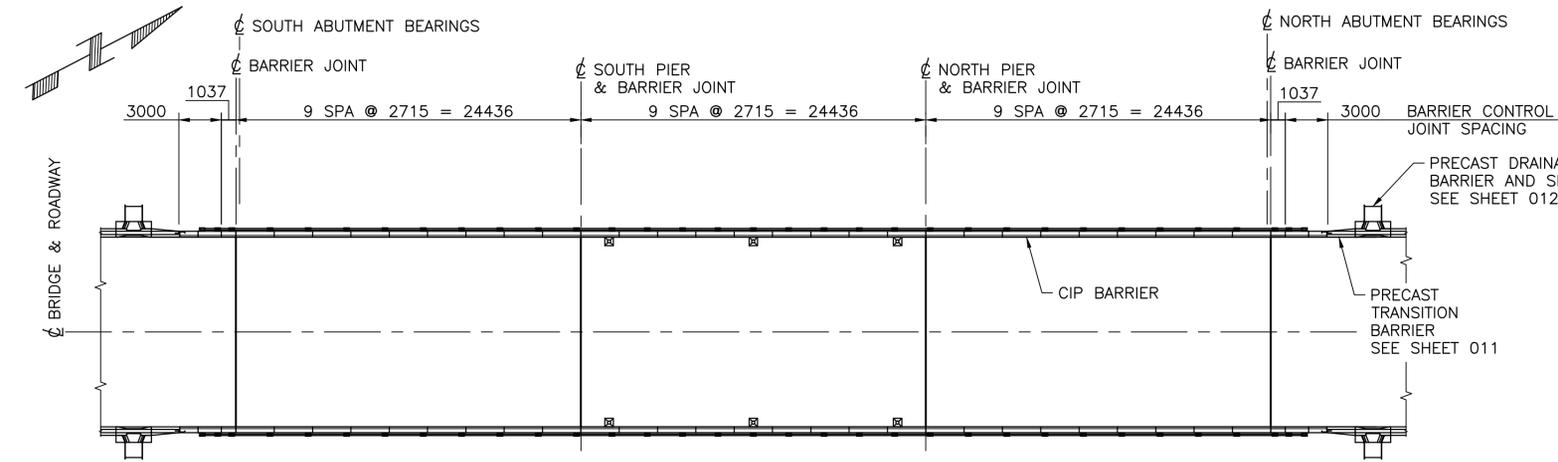
DECK JOINT REPLACEMENT

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NOTES:

- MINIMUM COMPRESSING STRENGTH OF CONCRETE: 45 MPa AT 28 DAYS.
- CHAMFER EXPOSED EDGES 20.
- REINFORCING STEEL: CAN/CSA G30.18M GRADE 400W.
- MINIMUM COVER: 50 UNO.
- MINIMUM LAP: 500 UNO.
- STEEL: CAN/CSA G40.21M GRADE 300W, GALVANIZE AFTER FABRICATION.
- STUDS: CSA W59 APPENDIX H, TYPE B, GALVANIZE AFTER FABRICATION.
- PROVIDE REDUCED BEND DIAMETER OF 81 (MEASURED ON THE INSIDE OF THE BAR) AND PLACE BAR ON SKEW TO SATISFY COVER REQUIREMENTS.
- REPLACE BARRIER REINFORCEMENT CUT FOR JUNCTION BOX WITH ADDITIONAL EQUIVALENT BARS ADJACENT TO THE BOX.
- CONDUIT ELBOWS NOT TO EXCEED 22.5 DEGREES UNLESS NOTED OTHERWISE.

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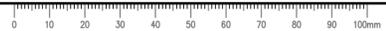
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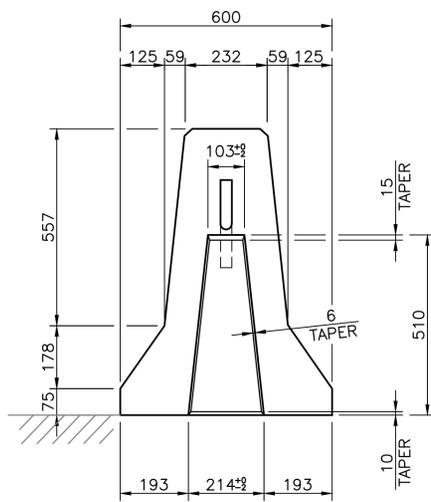
CAST-IN-PLACE BARRIER
LAYOUT AND REINFORCEMENT

Project No./No. du projet	Sheet/Fauille	Revision no./Lo Révision no.
1077-01	009 OF	0

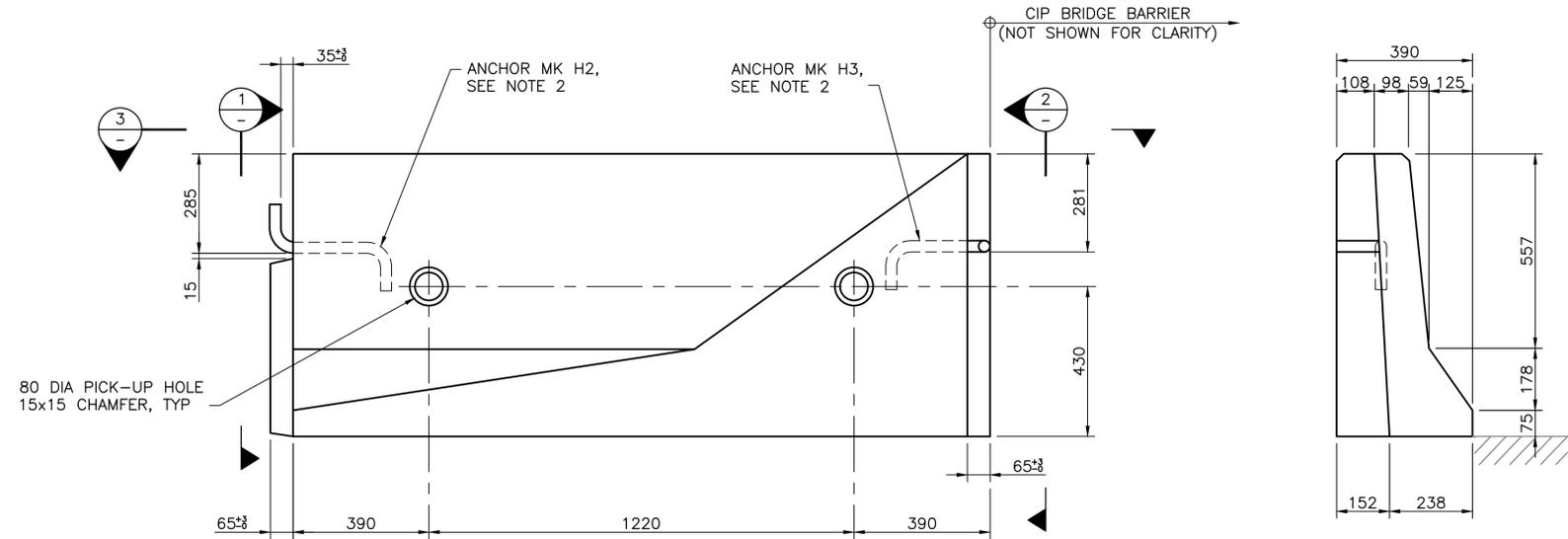
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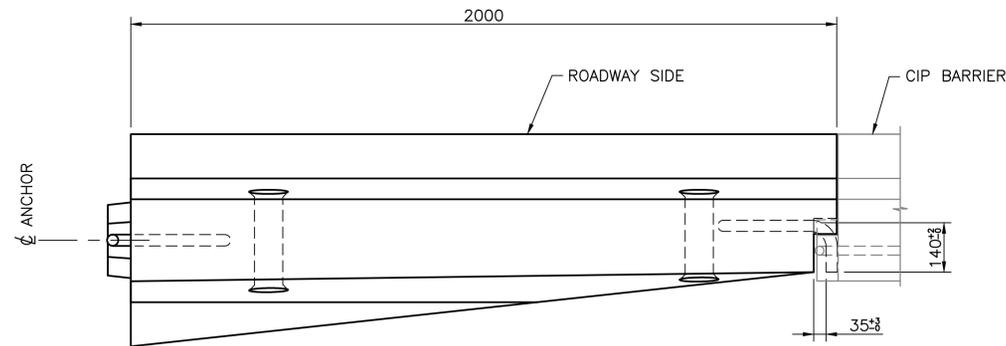


VIEW 1
1:10



BARRIER TRANSITION ELEVATION
1:10

VIEW 2
1:10



VIEW 3
1:10

NOTES:

1. SOUTH EAST AND NORTH WEST TRANSITION BARRIER SHOWN, SOUTH WEST AND NORTH EAST TRANSITION BARRIER SIMILAR BUT OPPOSITE HAND.
2. FOR MATERIAL, QUALITY OF WORK AND OTHER DETAILS OF NEW PRECAST BARRIER TRANSITION, REFER TO SECTION 941 OF BC MOT 2016 SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, WITH THE FOLLOWING EXCEPTION: SYNTHETIC FIBRE REINFORCEMENT SHALL BE ADDED TO THE PRECAST BARRIERS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

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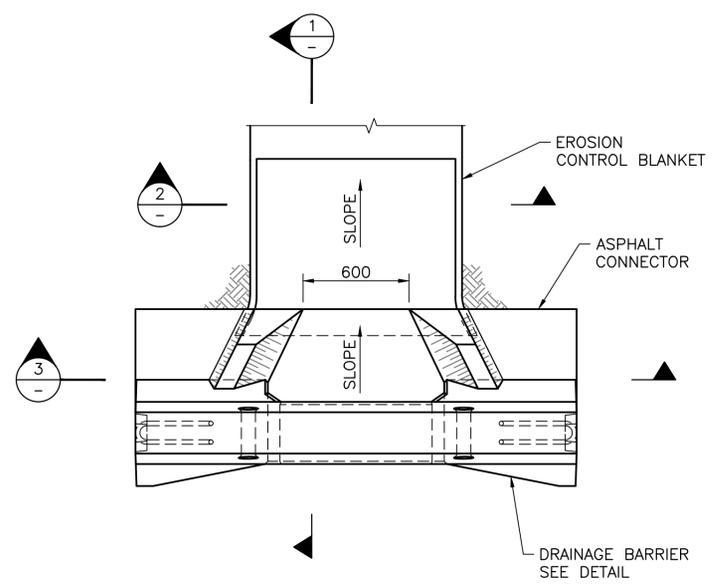
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PRECAST TRANSITION BARRIER

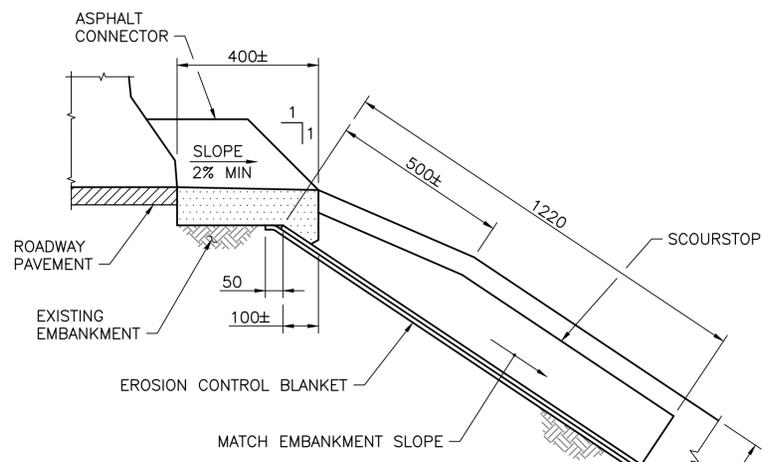
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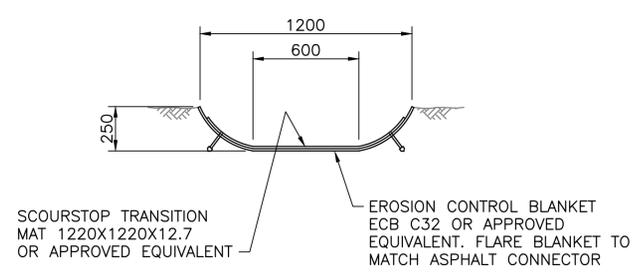
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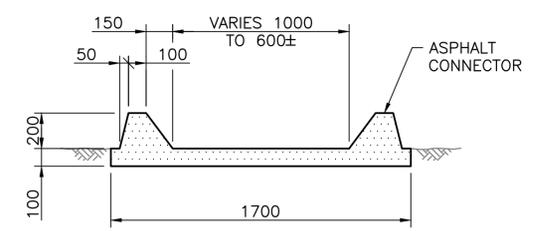
DRAINAGE BARRIER AND SPILLWAY PLAN
1:20



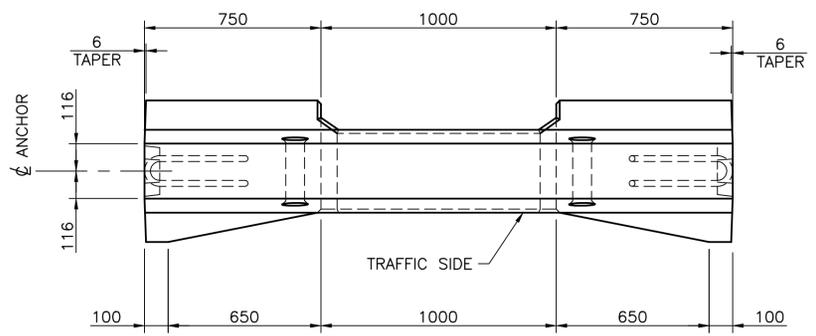
SECTION 1
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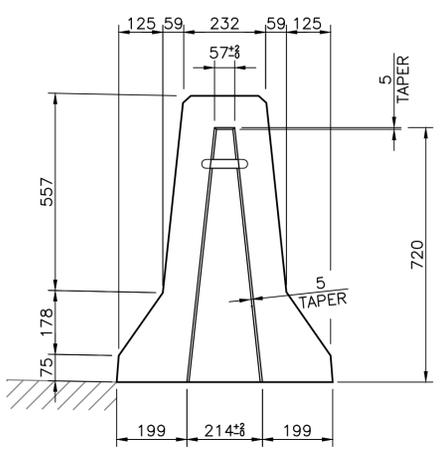
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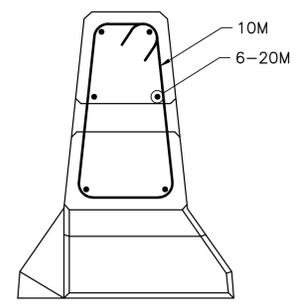
SECTION 3
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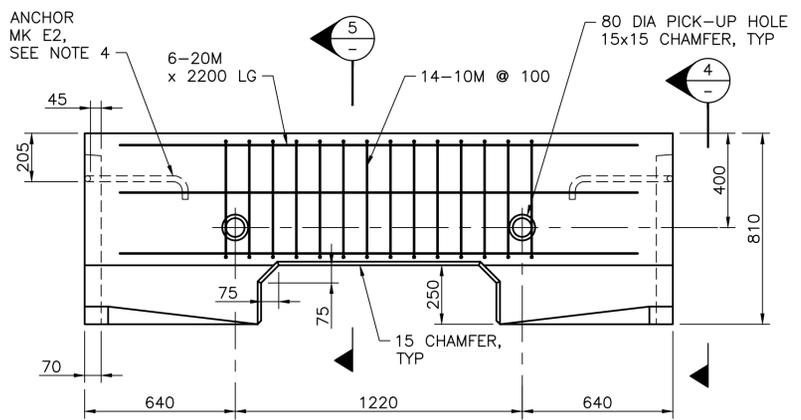
PLAN



VIEW 4
1:10



SECTION 5
1:10



DRAINAGE BARRIER DETAIL
1:15
(WIRE MESH NOT SHOWN FOR CLARITY)

NOTES:

- FIELD FIT ASPHALT CONNECTOR TO CONNECT TOP OF EMBANKMENT TO EDGE OF ROADWAY PAVEMENT.
- ANCHOR SCOURSTOP TRANSITION MAT WITH STAKES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- EXTEND EROSION CONTROL BLANKET TO BASE OF EMBANKMENT, AS DIRECTED BY DEPARTMENTAL REPRESENTATIVE, AND STAPLED IN PLACE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- FOR MATERIAL, QUALITY OF WORK AND OTHER DETAILS OF NEW PRECAST DRAINAGE BARRIER, REFER TO SECTION 941 OF BC MOT 2016 SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. MODIFIED AS NOTED IN ACCORDANCE WITH SPECIFICATIONS, WITH THE FOLLOWING EXCEPTION: SYNTHETIC FIBRE REINFORCEMENT SHALL BE ADDED TO THE PRECAST BARRIERS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

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PRECAST DRAINAGE BARRIER
AND SPILLWAY DETAILS

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