

# Appendix A – Drawings

1945.043-03 001 Cover Sheet, Drawing List and Location Plans

1945.043-03 002 Site Plan

1945.043-03 003 Footings

1945.043-03 004 Railing System

1945.043-03 005 Existing Railing Connections

1945.043-03 006 Railing at Bridge Crossing

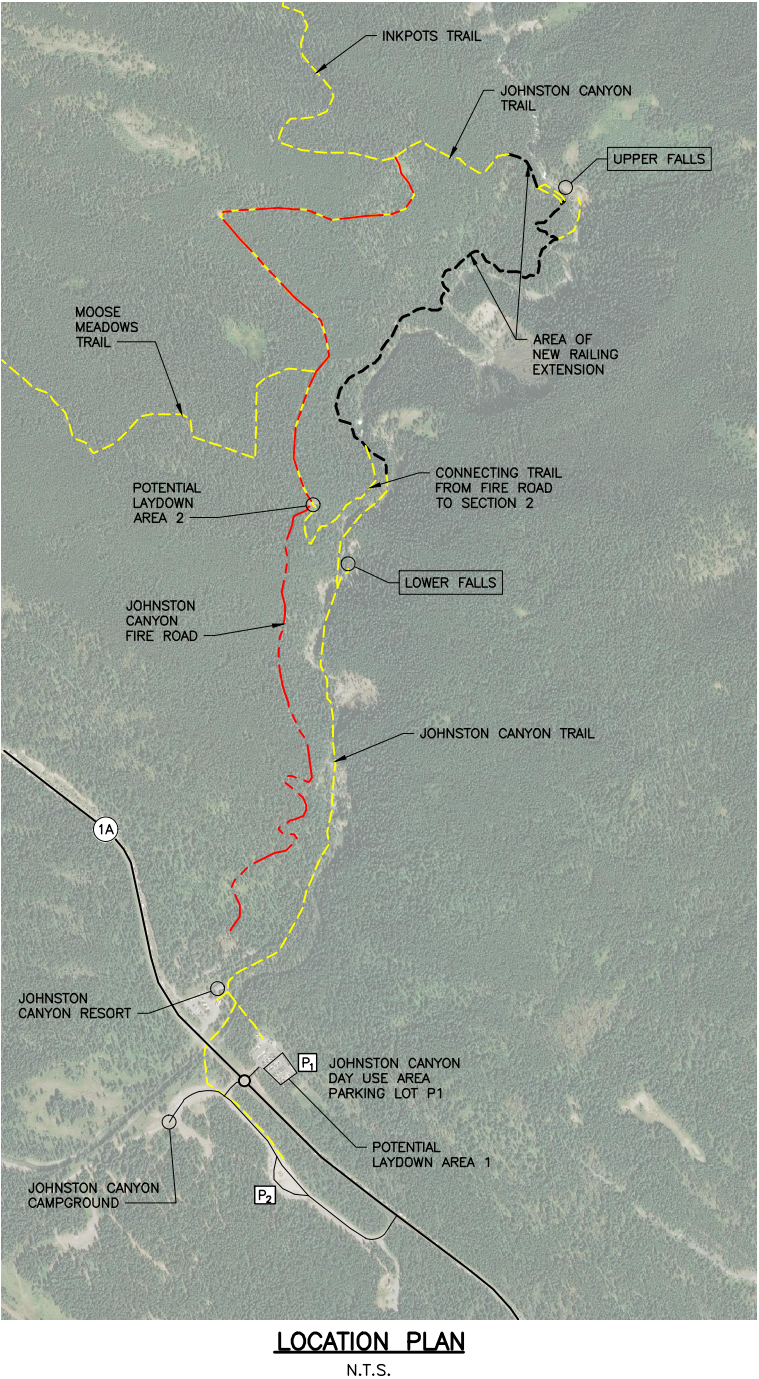
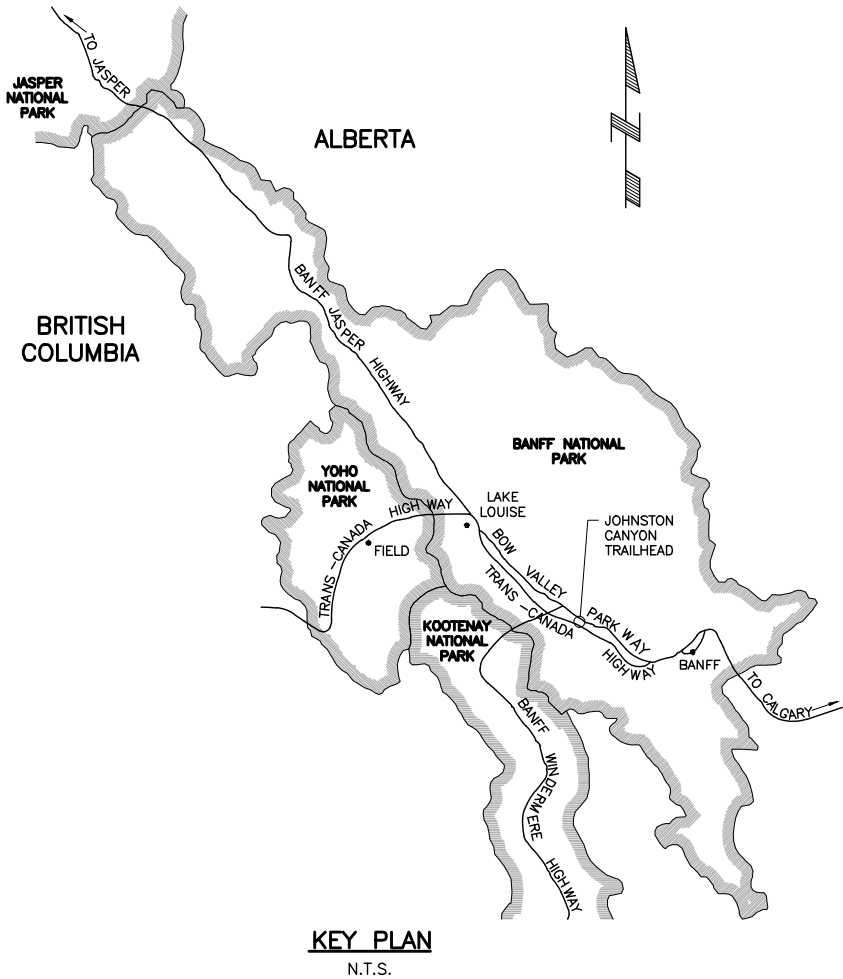
# BANFF NATIONAL PARK, ALBERTA

# JOHNSTON CANYON TRAIL

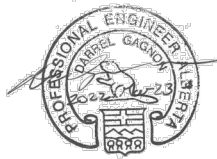
# RAILING EXTENSION

DRAWING LIST:

- 1945.043-03-001 COVER SHEET, DRAWING LIST AND LOCATION PLANS
- 1945.043-03-002 SITE PLAN
- 1945.043-03-003 FOOTINGS
- 1945.043-03-004 RAILING SYSTEM
- 1945.043-03-005 EXISTING RAILING CONNECTIONS
- 1945.043-03-006 RAILING AT BRIDGE CROSSING



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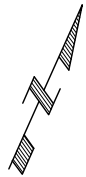
Project title/Titre du projet
BANFF NATIONAL PARK, ALBERTA
JOHNSTON CANYON TRAIL RAILING EXTENSION

Approved by/Approuvé par
DPG
Designed by/Concept par
MIWG
Drawn by/Dessiné par
MICH
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 PLANS

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1945.043-03	001 OF 006	A





- THE WORK INCLUDES THE EXTENSION OF THE EXISTING RAILING ALONG THE TRAIL TO PROVIDE A CONTINUOUS BARRIER ALONG THE CANYON SIDE, WHILE SATISFYING THE FOLLOWING REQUIREMENTS:
1. FRONT FACE OF NEW RAILING TO OVERHANG THE EXISTING TRAIL TO MINIMIZE ANY TRIP HAZARD BETWEEN THE EXISTING ASPHALT WALKING SURFACE AND THE NEW RAILING. CONTRACTOR TO MINIMIZE AMOUNT OF EDGE PATCHING OF THE ASPHALT WALKING SURFACE AND TRAIL RECONSTRUCTION.
  2. MAINTAIN MAXIMUM POSSIBLE TRAIL WIDTH, WHILE ELIMINATING DAMAGE/IRREGULAR TRAIL EDGE.
  3. MAINTAIN A MINIMUM TRAIL WIDTH OF 1.5m, IF 1.5m WIDTH CAN NOT BE ACHIEVED, THE DEPARTMENTAL REPRESENTATIVE TO DETERMINE NEED FOR TRAIL WIDENING WITH COLD MIX ASPHALT.
  4. POSTS SHALL NOT BE PLACED DIRECTLY ADJACENT TO TREE TRUNKS AND WILL BE OFF SET 1m TO EITHER SIDE OF THE TREE.



**NOTES:**

CONTRACTOR TO REMOVE EXISTING CURB SECTIONS ON THE CANYON SIDE OF THE TRAIL AND REPLACE WITH NEW RAILING, WHERE THERE ARE TWO LAYERS OF TIMBERS THE LOWER LAYER IS TO REMAIN.

EXISTING CURBED AREA (LENGTH ~33m)

NEW RAILING SECTION 2 (LENGTH 331m)

NEW RAILING SECTION 3 (LENGTH 82m)

NEW RAILING SECTION 4 (LENGTH 23m)

NEW RAILING SECTION 5 (LENGTH 140m)

EXISTING STAIRS (LENGTH ~10m)

EXISTING RAILING

NEW RAILING SECTION 7 (LENGTH 138m)

NEW RAILING SECTION 6 (LENGTH 145m)

EXISTING BRIDGE



**NOTES:**

CONTRACTOR TO CONSTRUCT NEW REMOVABLE RAILING TO SPAN THE EXISTING BRIDGE CROSSING ON CANYON SIDE ONLY, SEE SHEET 006

**NOTES:**

CONTRACTOR TO CONSTRUCT RAILING SO THE BOTTOM RAIL IS PARALLEL AND IMMEDIATELY ADJACENT TO THE TIMBER CURB. THE RAILING WILL BE ELEVATED ABOVE THE BOARDWALK WHILE MAINTAINING THE 100 mm MAXIMUM GAP. THE TOP RAIL WILL BE CONSTRUCTED TO BE 1070 ABOVE THE WALKING SURFACE. BOARDWALK IS RESTING ON THE GROUND. EXISTING BOARDWALK SECTIONS TO BE STRAIGHTENED SO THAT CURBS ARE ALIGNED.



EXISTING BOARDWALK (LENGTH ~8m)

**NOTES:**

CONTRACTOR TO REPAIR COMPONENTS OF EXISTING RAILING THAT WAS DAMAGED ON CATWALK 6, AS PER SPECIFICATION.



REPAIR EXISTING RAILING ON CATWALK 6 (DAMAGED LENGTH ~6m)

NEW RAILING SECTION 1 (LENGTH 87m)

EXISTING CATWALK 6

CONNECTING TRAIL FROM JOHNSTON CANYON FIRE ROAD

**PLAN**

1:1000

**SCOPE OF WORK:**

1. USE OF HELICOPTER
2. TREE REMOVAL
3. SUPPLY AND INSTALLATION OF NEW CONCRETE FOOTINGS
4. SUPPLY, FABRICATION, AND INSTALLATION OF NEW RAILING
5. SUPPLY, AND PLACEMENT OF COLD PATCH ASPHALT
6. REPAIR EXISTING RAILING ON CATWALK 6
7. DECOMPACTION OF SOIL
8. RESTORATION, SEEDING AND NON-NATIVE VEGETATION CONTROL



**NOTES:**

CONTRACTOR TO REMOVE AND REPLACE 10m OF EXISTING RAILING WITH NEW RAILING. SEE SHEET 005. TERMINATION AT EXPOSED BEDROCK TO BE FIELD FIT TO PROVIDE 100mm MAXIMUM GAP.

NEW RAILING SECTION 8 (LENGTH 118m + 10m)

**NOTES:**

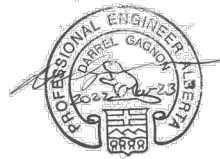
CONTRACTOR TO CONSTRUCT THE RAILING TO OVERHANG THE STAIRS TO MINIMIZE ANY HORIZONTAL GAP BETWEEN THE STAIRS AND RAILING, TYP



EXISTING RAILING

TO CATWALK 7

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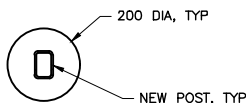
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Project title/Titre du projet  
**BANFF NATIONAL PARK, ALBERTA**  
**JOHNSTON CANYON TRAIL RAILING EXTENSION**

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1945.043-03	<b>002</b> OF 006	<b>A</b>



TYPE 1



TYPE 2



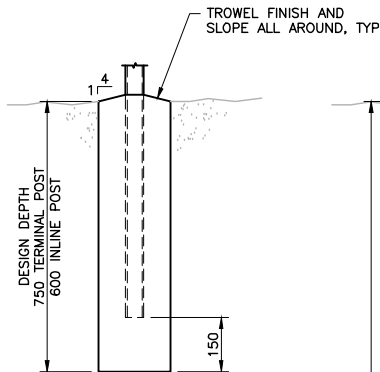
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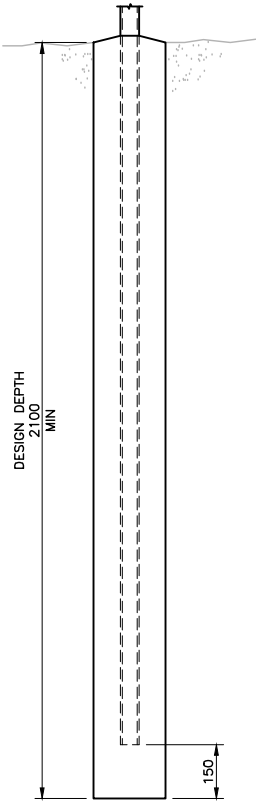
TYPE 4

FOOTING — PLAN

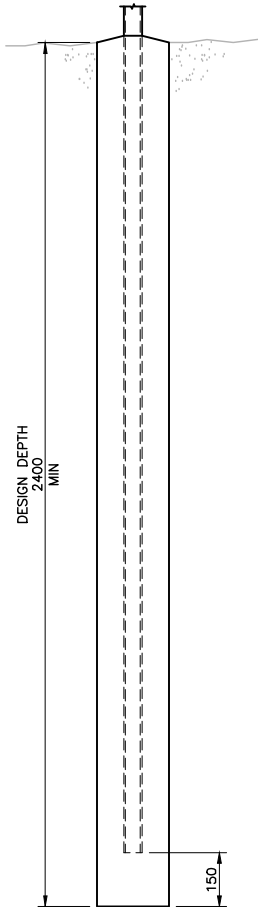
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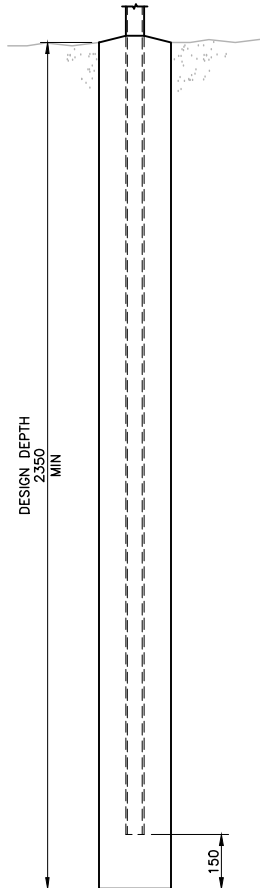
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TYPE 2



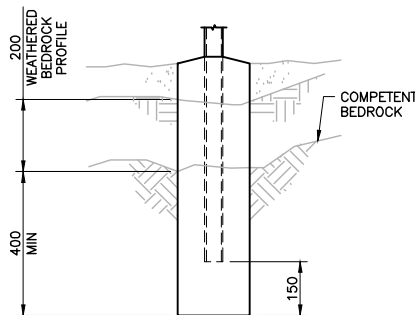
TYPE 3



TYPE 4

FOOTING — ELEVATION

1:10



BEDROCK EMBEDMENT

(SEE NOTES 5, 6, 7)

TYPE 1 — FLAT GROUND.  
(WHEN GRADE CONDITIONS IN TYPE 2 AND TYPE 3 ARE NOT PRESENT)

TYPE 2 — LOOSE SOIL OVER DENSE MATERIAL AND THE DIFFERENCE IN ELEVATION IS MORE THAN 600 BETWEEN THE WALKING SURFACE AND THE ADJACENT SURFACE, OR THE ADJACENT SURFACE WITHIN 1200 OF THE WALKING SURFACE HAS A SLOPE OF MORE THAN 1V:2H.

TYPE 3 — LOOSE SOILS TO THE DESIGN DEPTH AND THE DIFFERENCE IN ELEVATION IS MORE THAN 600 BETWEEN THE WALKING SURFACE AND THE ADJACENT SURFACE OR THE ADJACENT SURFACE WITHIN 1200 OF THE WALKING SURFACE HAS A SLOPE OF MORE THAN 1V:2H.

TYPE 4 — FOOTINGS FOR BRIDGE RAIL, SEE SHEET 006.

NOTES:

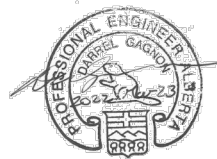
- FOOTING TYPE 1 DESIGNED TO REQUIREMENTS FOR TYPE D — CHAIN LINK FENCE (SP741—05.01) AS PER THE BC STANDARD SPECIFICATIONS — SECTION 741 — FENCE CONSTRUCTION.
- FOOTING TYPE 2, 3 & 4 DESIGNED TO REQUIREMENTS OF GUARDS IN NATIONAL BUILDING CODE OF CANADA 2015.
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE: 25 MPa AT 28 DAYS
- POSTS TO BE CENTERED IN CONCRETE FOOTING AND MINIMUM CONCRETE COVER 50 U.N.O.
- THE TOP 200 OF THE BEDROCK PROFILE IS CONSIDERED PART OF THE WEATHERING PROFILE AND IS NOT CONSIDERED AS BEDROCK DRILLING FOR PAYMENT PURPOSES.
- WHEN COMPETENT BEDROCK IS ENCOUNTERED, THE FOUNDATION MUST BE EMBEDDED 400 INTO COMPETENT BEDROCK OR TO THE FULL DESIGN DEPTH, WHICH EVER IS LESSER
- BEDROCK EMBEDMENT OF FOOTING WILL APPLY TO ALL FOOTING TYPES WHEN BEDROCK IS ENCOUNTERED BEFORE DESIGN DEPTH.
- COBBLES AND BOULDERS SHOULD BE EXPECTED IN BOTH LOOSE AND DENSE SOILS THROUGHOUT THE PROJECT AREA.
- FOOTINGS AND POSTS TO HAVE A VERTICAL TOLERANCE OF  $\pm 5$  mm FROM VERTICAL AS WELL AS ON A POST-TO-POST BASIS.
- ALL UNITS ARE mm UNLESS NOTED OTHERWISE.

LEGEND:

- SOIL
- WEATHERED BEDROCK
- COMPETENT BEDROCK

SECTION	APPROX. CHAINAGES		ANTICIPATED FOOTING TYPE	ANTICIPATED GROUND CONDITIONS
1	CH000	TO CH010	TYPE 2	APPROXIMATELY 1 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH010	TO CH070	TYPE 1	LOOSE SOILS TO DESIGN DEPTH
	CH070	TO CH087	TYPE 2	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK
2	CH000	TO CH020	TYPE 2	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK
	CH020	TO CH060	TYPE 1	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK
	CH060	TO CH145	TYPE 1	LOOSE SOILS TO DESIGN DEPTH
	CH145	TO CH180	TYPE 3	LOOSE SOILS TO DESIGN DEPTH
3	CH180	TO CH331	TYPE 2	APPROXIMATELY 1 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH000	TO CH035	TYPE 2	APPROXIMATELY 1 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH035	TO CH070	TYPE 1	LOOSE SOILS TO DESIGN DEPTH
4	CH070	TO CH082	TYPE 1	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH000	TO CH023	TYPE 1	APPROXIMATELY 0.5 TO 0.6 m OF LOOSE SOIL OVER DENSE MATERIAL OR BEDROCK
5	CH000	TO CH015	TYPE 1	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH015	TO CH060	TYPE 2	APPROXIMATELY 1 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH060	TO CH080	TYPE 1	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH080	TO CH113	TYPE 2	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH113	TO CH118	TYPE 4	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH118	TO CH140	TYPE 2	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
6	CH000	TO CH075	TYPE 1	APPROXIMATELY 0.5 m OF LOOSE SOIL OVER DENSE MATERIAL
	CH075	TO CH085	TYPE 2	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK
	CH085	TO CH145	TYPE 1	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK
7	CH000	TO CH065	TYPE 1	UP TO 0.6 m OF LOOSE SOIL ABOVE BEDROCK
	CH065	TO CH085	TYPE 2	UP TO 0.3 m OF LOOSE SOIL ABOVE BEDROCK
	CH085	TO CH125	TYPE 1	UP TO 0.6 m OF LOOSE SOIL ABOVE BEDROCK
	CH125	TO CH138	TYPE 2	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK
	CH000	TO CH010		UTILIZE EXISTING FOOTINGS
8	CH010	TO CH128	TYPE 1	UP TO 0.5 m OF LOOSE SOIL ABOVE BEDROCK

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JOHNSTON CANYON TRAIL  
RAILING EXTENSION

Approved by/Approuvé par

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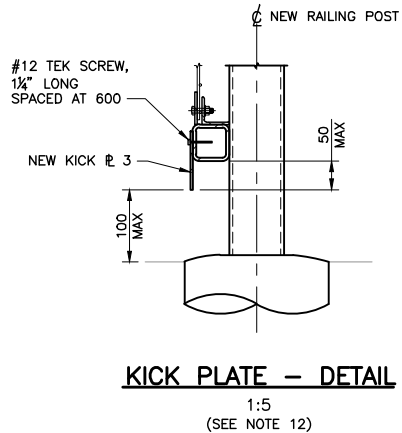
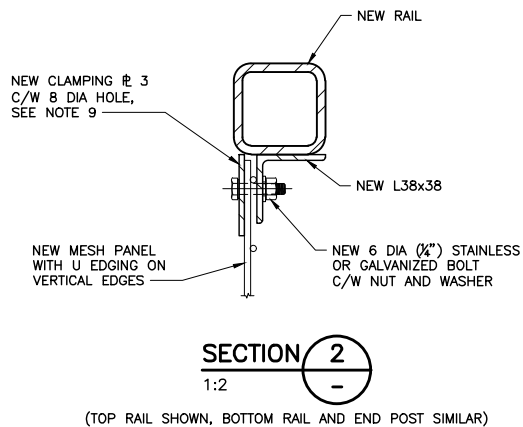
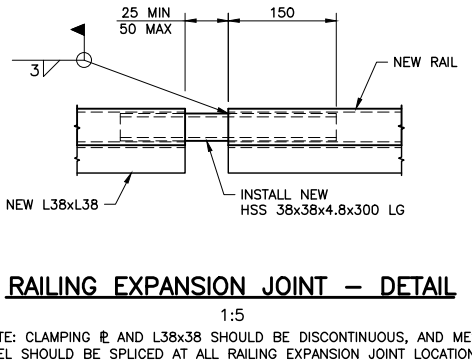
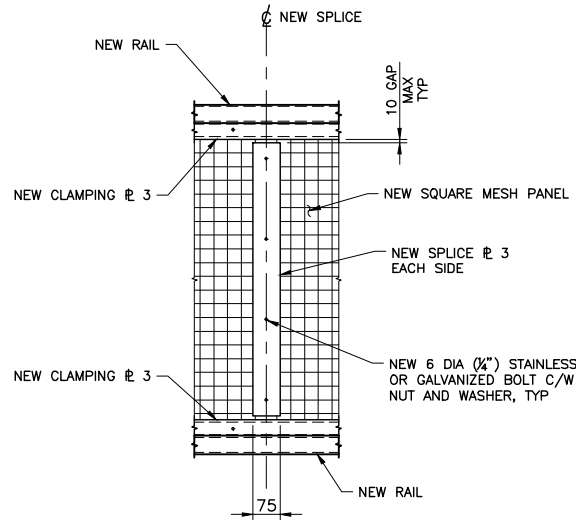
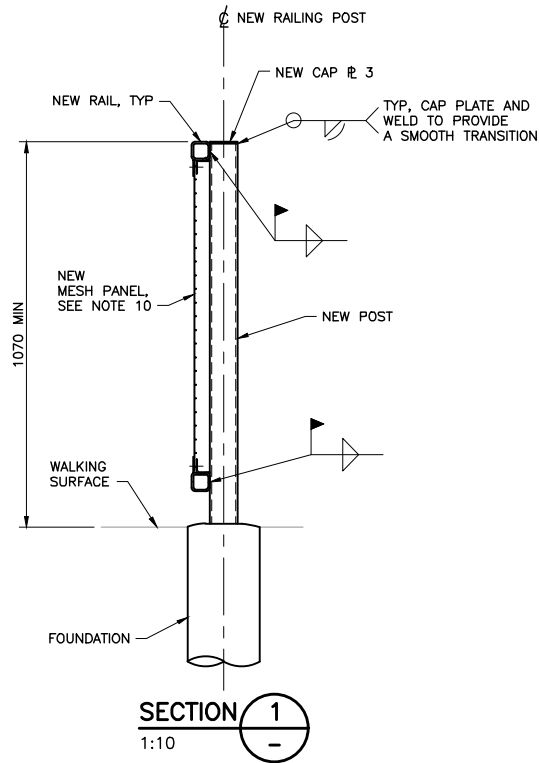
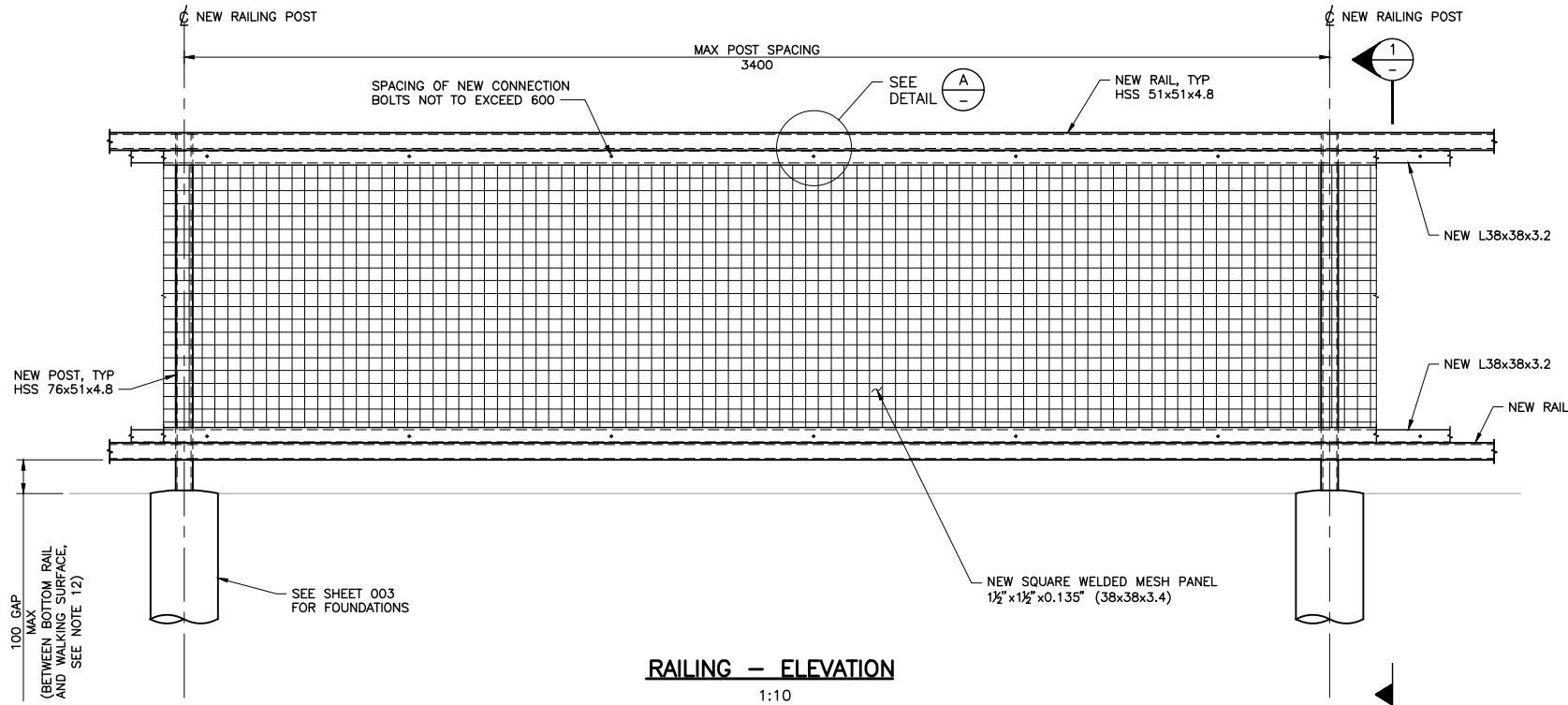
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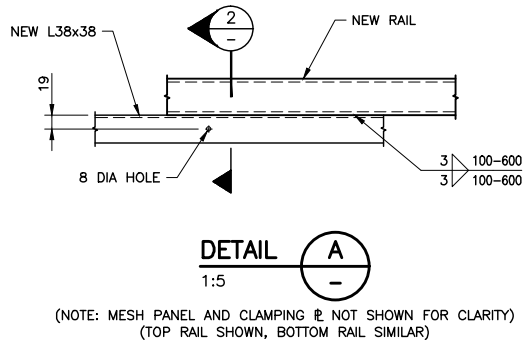
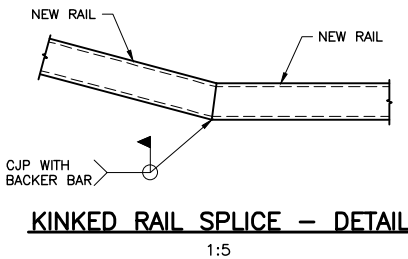
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FOOTINGS

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1945.043-03	003 OF 006	A



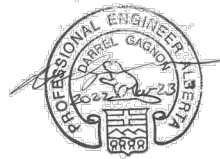
PANEL SPLICE DETAIL  
1:10



NOTES:

1. POSTS AND RAILS DESIGNED TO REQUIREMENTS OF GUARDS IN NATIONAL BUILDING CODE OF CANADA 2015.
2. WELDING TO CAN/CSA W59
3. NEW HSS: G40.21M GRADE 350W CLASS C
4. NEW PLATE AND ANGLE: G40.21M GRADE 350W
5. NEW MESH PANEL: ASTM A1064/A1064M-18A, PLAIN WIRE, GRADE 65. TO MATCH EXISTING RAILING MESH PANELS.
6. POWDER COAT ALL NEW COMPONENTS, EXCLUDING FASTENERS.
7. FASTEN WITH 1/2" DIA A307 GALVANIZED OR EQUIVALENT STAINLESS STEEL BOLTS WITH SUITABLE WASHERS.
8. FIELD TOUCH COATINGS AT FIELD WELD LOCATIONS OF NEW AND EXISTING COMPONENTS AS PER SPECIFICATIONS.
9. MESH PANEL SHALL NOT PROTRUDE BEYOND FACE OF RAILS AND NEW CLAMPING PLATE TO BE FLUSH WITH FRONT FACE OF NEW RAIL.
10. VERTICAL WIRE ON MESH PANEL TO BE INSTALLED FACING THE TRAIL TO REDUCE CLIMB-ABILITY.
11. EXPANSION JOINT FOR TOP AND BOTTOM RAIL MINIMUM EVERY 12 m, FOR CONTINUOUS STRAIGHT SECTIONS.
12. KICK PLATE DETAIL TO ONLY BE USED IF 100 MAX GAP BETWEEN WALKING SURFACE AND BOTTOM RAIL CAN NOT BE SATISFIED DUE TO EXISTING GROUND ELEVATIONS WITH APPROVAL FROM DEPARTMENTAL REPRESENTATIVE. CONTRACTOR TO AVOID THE USE OF KICK PLATES WHERE POSSIBLE.
13. RAILINGS TO HAVE A VERTICAL AND HORIZONTAL TOLERANCE OF ±5 ON A POST-TO-POST BASIS.
14. RAILING TO BE FIELD FIT TO EXISTING GROUND CONDITIONS.
15. ALL UNITS ARE mm UNLESS NOTED OTHERWISE.

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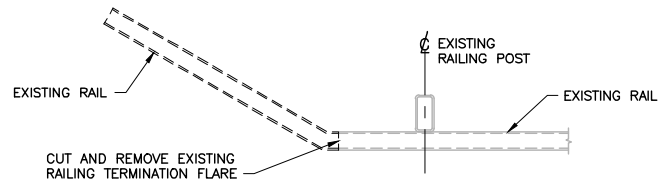
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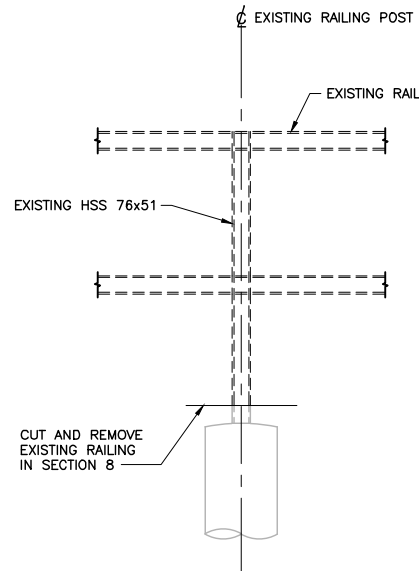
RAILING SYSTEM

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1945.043-03	004 OF 006	A



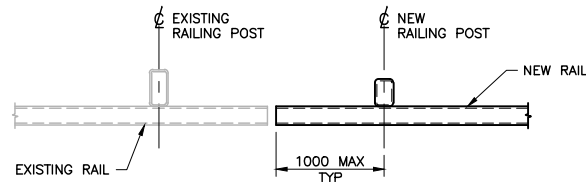
**EXISTING RAILING FLARE REMOVAL – PLAN**

1:10



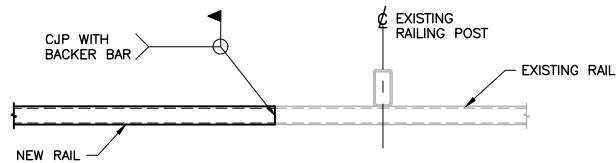
**SECTION 8 – EXISTING RAIL REMOVAL**

1:10



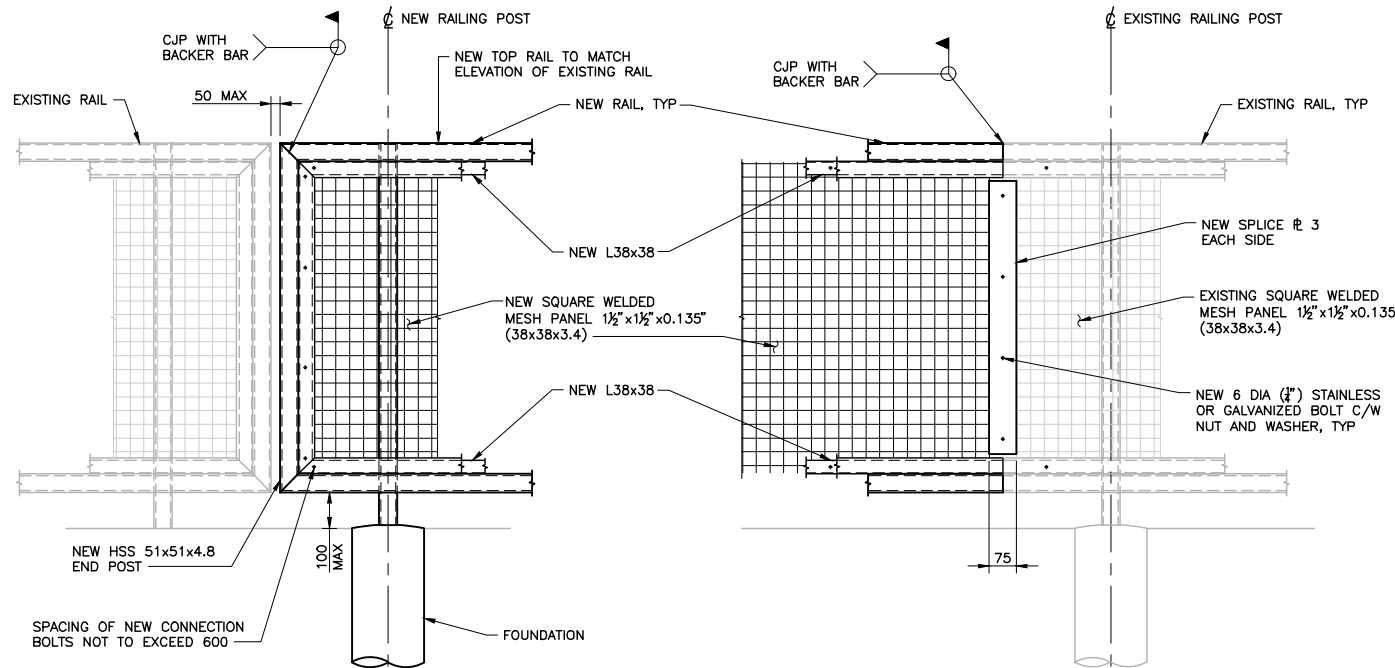
**END RAIL – PLAN**

1:10



**NEW RAIL EXTENSION – PLAN**

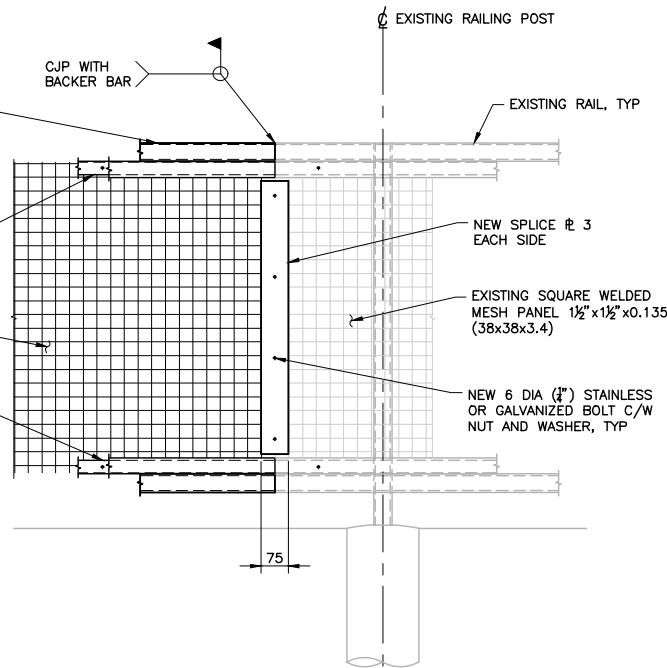
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**END RAILING – ELEVATION**

1:10

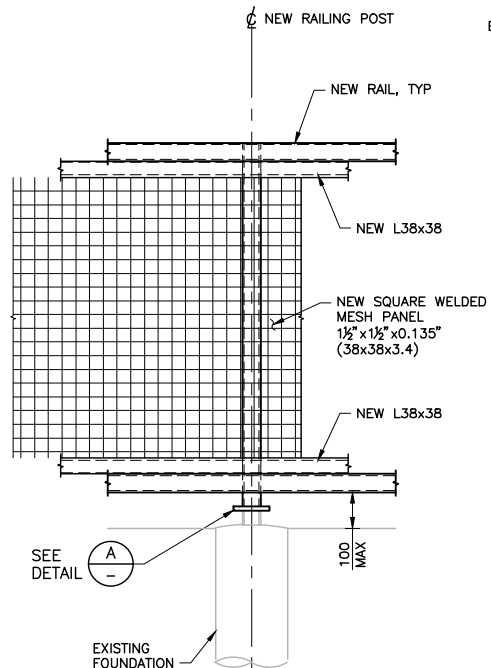
(FOR LOCATION WHEN EXISTING RAILING DOES NOT HAVE AN END FLARE AND END OF SECTION 8 WHERE THERE IS NO EXISTING RAILING)



**NEW RAIL EXTENSION – ELEVATION**

1:10

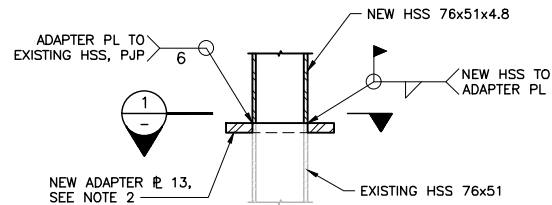
(FOR LOCATION WHEN EXISTING RAILING HAS AN END FLARE)



**SECTION 8 – NEW RAIL**

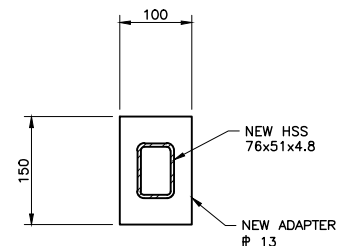
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(FOR 9.5 m OF SECTION 8 WITH EXISTING RAILING, THE EXISTING FOUNDATIONS TO BE KEPT AND NEW RAILING INSTALLED)



**DETAIL A**

1:5



**SECTION 1**

1:5

**NOTES:**

1. SEE NOTES ON SHEET 004.
2. ADAPTER PLATE TO BE CUT AS A DONUT AND WELDED TO EXISTING HSS 76x51.

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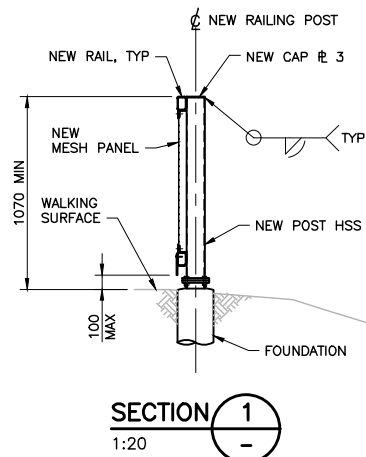
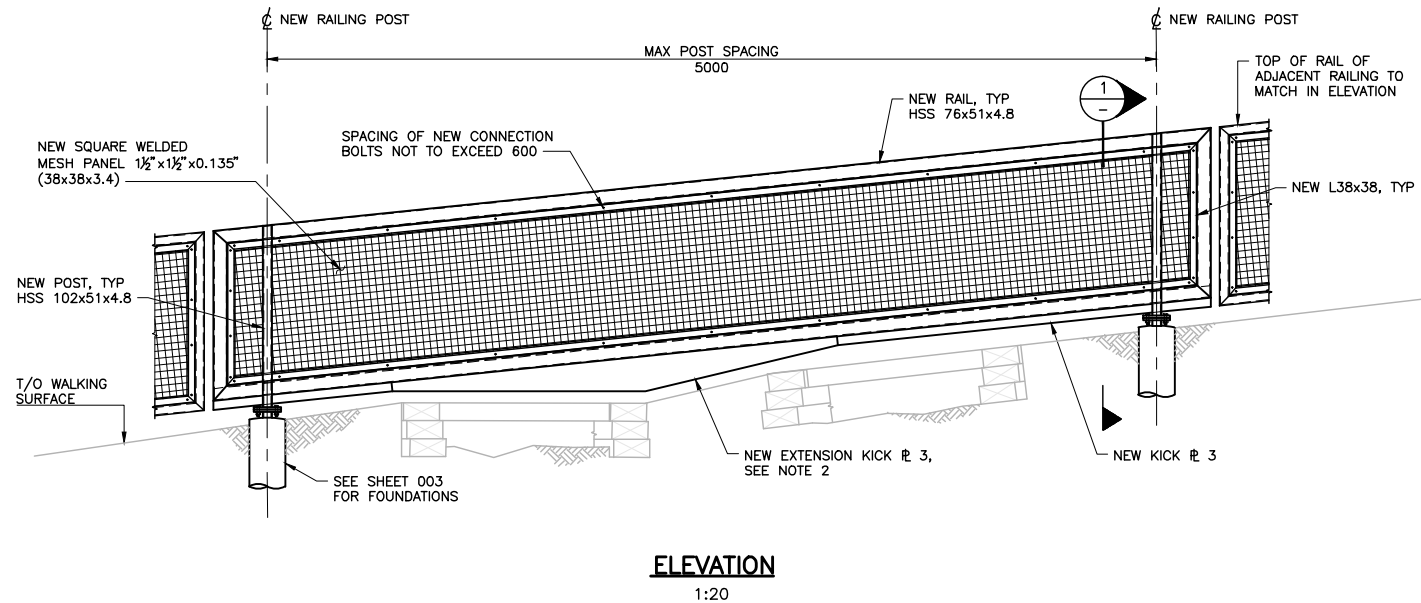
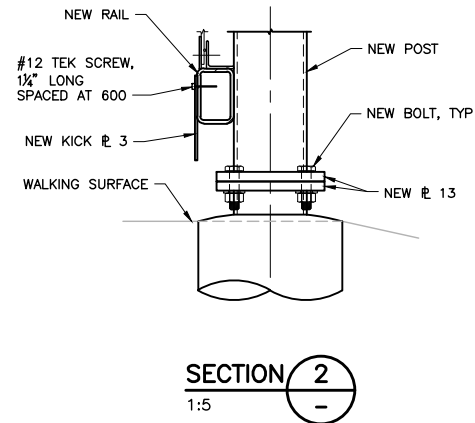
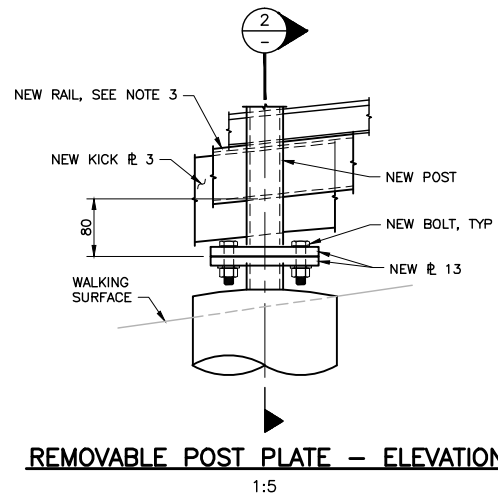
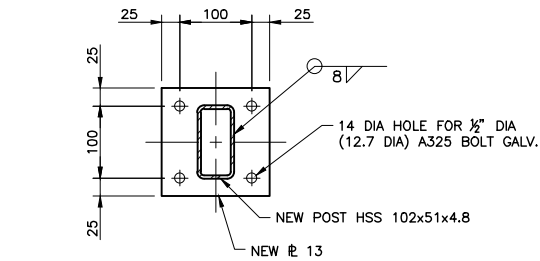
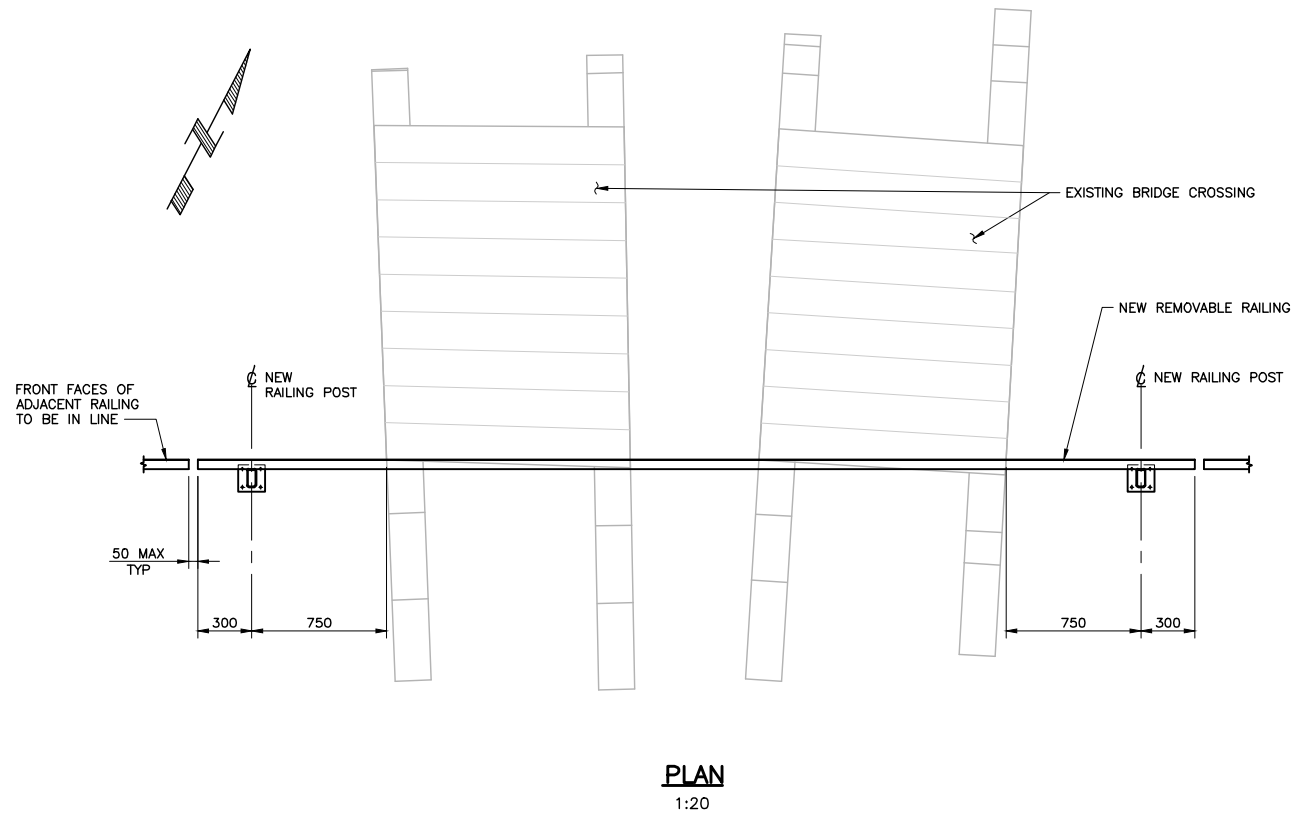
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Client/client: PCA  
Drawing title/Titre du dessin: EXISTING RAILING CONNECTIONS

Project No./No. du projet: 1945.043-03	Sheet/Feuille: 005 OF 006	Revision no./Le Révision no.: A
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#### NOTES:

1. SEE NOTES ON SHEET 004.
2. KICK PLATE CAN BE USED TO ACCOUNT FOR VARIABLE GROUND ELEVATIONS AND MAINTAIN A MAXIMUM 100 GAP ABOVE THE WALKING SURFACE. STIFFENERS MAY BE REQUIRED BASED ON DEPTH OF KICK PLATE.
3. BOTTOM RAILING TO BE POSITIONED TO ALLOW ENOUGH SPACE TO INSERT BOLTS FOR POST SPLICE PLATE.
4. RAILING TO BE FIELD FIT TO EXISTING GROUND CONDITIONS.

**ISSUED FOR TENDER  
NOT FOR CONSTRUCTION**



**DO NOT SCALE DRAWINGS**

Revision/Description	Description/Description	Date/Date
A	ISSUED FOR TENDER	22/03/23

Client/client  
 Parks Canada Agency  
 L'Agence Parcs Canada

**COWI**

Project title/Titre du projet

BANFF NATIONAL PARK, ALBERTA

**JOHNSTON CANYON TRAIL  
RAILING EXTENSION**

Approved by/Approuvé par  
DPG

Designed by/Concept par  
MIWG

Drawn by/Dessiné par  
MICH

PWGS&C Project Manager/Administrateur de Projets TPSC

PWGS&C, Architectural and Engineering Resources Manager/  
Ressources Architectural et de Directeur d'ingénierie, TPSC

Client/client  
PCA

Drawing title/Titre du dessin

**RAILING  
AT BRIDGE CROSSING**

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
1945.043-03	<b>006</b> OF 006	<b>A</b>