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Parks Canada
Agency

L'Agence Parcs
Canada

HIGHWAY 93 SOUTH
BANFF – WINDERMERE HIGHWAY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)

KOOTENAY NATIONAL PARK, BRITISH COLUMBIA

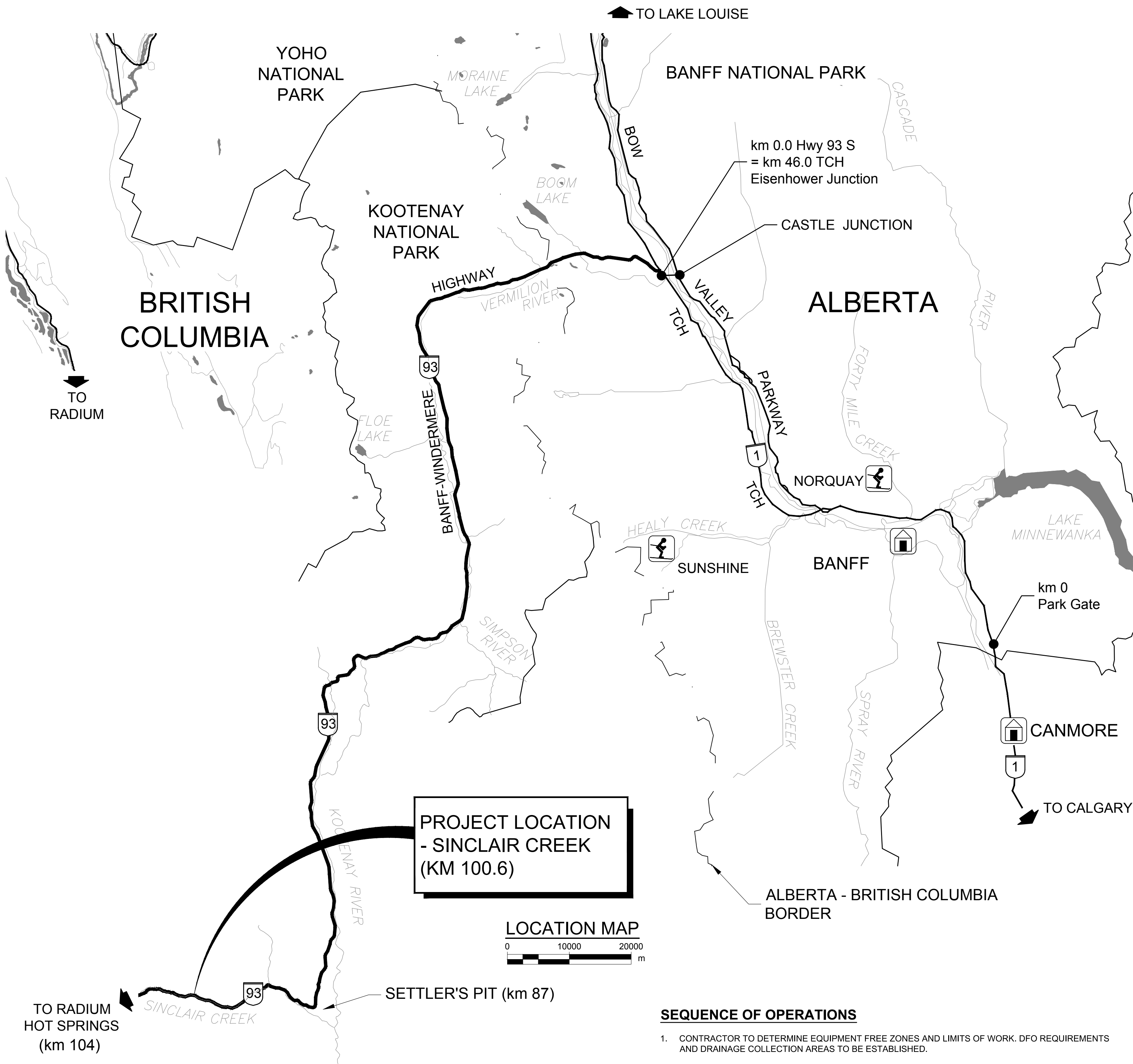
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NOT FOR CONSTRUCTION

PROJECT NO. 1079-01

MAR 2018

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S102	DEMOLITION DETAILS EXISTING END TREATMENT
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SEQUENCE OF OPERATIONS

- CONTRACTOR TO DETERMINE EQUIPMENT FREE ZONES AND LIMITS OF WORK. DFO REQUIREMENTS AND DRAINAGE COLLECTION AREAS TO BE ESTABLISHED.
- CONTRACTOR TO SUBMIT AN ENVIRONMENTAL PROTECTION PLAN (EPP), CHANNEL EXCAVATION PLAN, TEMPORARY CHANNEL DIVERSION AND DAMMING PLAN FOR APPROVAL BY THE DEPARTMENTAL REPRESENTATIVE. REFER TO SHEETS S103 AND S104 FOR THE TENTATIVE LOCATION OF THE CHANNEL DIVERSION PIPES AND EXTENT OF CHANNEL EXCAVATION.
- CONTRACTOR TO SUBMIT TRAFFIC ACCOMMODATION PLAN AND INSTALL TEMPORARY BARRIERS AND FENCES AS REQUIRED TO CREATE A SAFE WORKING AREA.
- DEWATERING THE SOIL IN ADVANCE OF THE EXCAVATION MAY BE NECESSARY FOR EXCAVATION STABILITY AND SEEPAGE CONTROL.
- INSTALL GEOTEXTILE FILTERS, BARRIERS AND SEDIMENT TRAPS ALONG WORK AREAS AS REQUIRED.
- REMOVAL OF EXISTING CULVERT, PORTION OF HEAD WALLS AND FILL MATERIAL TO BE COMPLETED IN THE DRY, WORKING FROM THE DOWNSTREAM END BACK. SUMPS AND FILTERS SHALL BE KEPT AHEAD OF THE WORK TO INTERCEPT AND TRAP DRAINAGE AND SILT.
- ALL REMOVED ACP FROM THE PARKING LOT AND ALL MATERIALS RESULTING FROM DEMOLITION AND REMOVAL OF THE EXISTING STEEL PIPE ARCH CULVERT TO BE HAULED AND DISPOSED OUTSIDE OF PARK AT CONTRACTOR'S EXPENSE.
- INSTALL NEW CULVERT IN THE DRY IN COMPLIANCE WITH ENVIRONMENTAL ASSESSMENT RESTRICTIONS.
- COMPLETE REROUTING CHANNEL FLOW INTO NEW CULVERT. SEDIMENT TRAPS AND BARRIERS TO BE PLACED TO CAPTURE SILT AND DELETERIOUS MATERIALS AND TO DIRECT FLOW INTO NEW CULVERT.
- CONTRACTOR TO MINIMIZE DISTURBANCE TO ALL NATURAL FEATURES AT BOTH UPSTREAM AND DOWNSTREAM OF THE CHANNEL.

GENERAL NOTES

- ALL DIMENSIONS SHOWN ON SHEETS S101 & S103 ARE IN METRES. ALL OTHER SHEETS ARE DIMENSIONED IN MILLIMETERS.
- ALL DIMENSIONS AND DETAILS SHOWN ON THESE DRAWINGS PERTINENT TO NEW CONSTRUCTION AND EXISTING STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.
- CULVERT FLOWS MUST BE MAINTAINED THROUGHOUT THE PROJECT. WATER NEEDS TO BE CONTROLLED WITH COFFERDAMS, PUMPS, AND PIPING AS APPROPRIATE. ENSURE THAT ALL ENVIRONMENTAL REQUIREMENTS ARE MET.
- DESIGN SPECIFICATION: CAN/CSA S6-14
- DESIGN LOADS:
 - SELFWEIGHT OF THE PRECAST BOX UNITS
 - VERTICAL EARTH PRESSURE DUE TO FILL HEIGHT (MAX FILL HEIGHT ABOVE THE BOX SECTION= 3.0m)
 - LATERAL EARTH PRESSURE FROM BACKFILL ON THE SIDES OF THE BOX UNITS
 - COMPACTION SURCHARGE: 12 KPa
 - LIVE LOAD: BCL 625 TRUCKS PLUS DYNAMIC LOAD ALLOWANCE (AS PER CLAUSE 3.8.4.5 OF S6-14). THE PRESSURE DISTRIBUTION ON THE BOX UNITS DUT TO LIVE LOAD SHALL BE AS PER CLAUSE 7.8.5.3.3 OF S6-14.
 - EARTHQUAKE LOADS AS PER CLAUSE 7.8.4.4 OF S6-14.
- FACTORED SOIL BEARING CAPACITY AT CULVERT INSTALLATION ELEVATION IS 150 kPa (ULS).
- THE CONTRACTOR SHALL DESIGN THE CONCRETE CULVERT WITH LIFE EXPECTANCY OF 75 YEARS AND SUBMIT THE DESIGN DRAWINGS DULY SIGNED AND STAMPED BY THE PROFESSIONAL ENGINEER REGISTERED OR LICENSED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA TO PARKS CANADA AGENCY FOR APPROVAL BEFORE ANY WORK IS STARTED.

MATERIALS AND FABRICATION

- ALL CAST-IN-PLACE AND PRECAST CONCRETE UNITS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 45 MPa AT 28 DAYS WITH MINIMUM AIR CONTENT OF 6%.
- ALL REINFORCING BARS AND BARS NOTED AS DOWELS SHALL BE DEFORMED REINFORCEMENT CONFORMING TO CAN/CSA G30.18-09 (2014), GRADE 400 UNLESS NOTED OTHERWISE.
- WELDED WIRE REINFORCEMENT (WWR) SHALL BE MADE OF DEFORMED WIRES AND CONFORM TO ASTM A1064/A1064M.
- MINIMUM CLEAR CONCRETE COVER TO REINFORCING STEEL SHALL BE AS FOLLOWS:

• PRECAST CONCRETE UNITS	40 mm
• CAST-IN-PLACE CONCRETE EXPOSED TO EARTH	70 mm
• CONCRETE CAST DIRECTLY AGAINST EARTH	100 mm
- ALL LAPS FOR REINFORCING STEEL FOR SPLICES SHALL BE AS FOLLOWS:

BAR SIZE	LAP LENGTH (mm)
10M	400
15M	600
20M	700
25M	1100
- A REINFORCING STEEL SCHEDULE, AND PLAN SHOWING LAYOUT OF THE PRECAST UNITS SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO PARKS CANADA AGENCY FOR REVIEW AND APPROVAL.
- THE PRECAST UNITS SHALL CONFORM TO THE FABRICATION REQUIREMENTS OF ASTM C1433M-16B.
- JOINTS FOR PRECAST UNITS SHALL BE TONGUE AND GROOVE TYPE CONFORMING TO THE REQUIREMENTS OF SECTION 9 OF ASTM C1433M-16B.

INSTALLATION AND BACKFILLING

- PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE ERECTED AND LAID IN PLACE AS PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS. SECTIONS SHALL BE LAID WITH THE GROOVE END OF EACH SECTION UP-GRADE. PLACEMENT OF THE BOX SECTIONS SHALL START AT THE DOWNSTREAM END AND PROCEED UPSTREAM.
- THE JOINT OPENINGS BETWEEN ADJACENT PRECAST SECTIONS SHALL NOT EXCEED 10 mm. THE SECTIONS SHALL BE DRAWN TOGETHER WITH A MINIMUM OF FOUR MECHANICAL CONNECTORS PER JOINT. AFTER INSTALLATION, CONNECTORS SHALL BE REMOVED.
- THE JOINTS SHALL BE SEALED WITH CONTINUOUS FLEXIBLE WATER TIGHT BUTYL RUBBER SEALANT CONFORMING TO THE REQUIREMENTS OF ASTM C990-09. ALL JOINTS SHALL BE TRIMMED CLEAN ON THE INSIDE AFTER SEALING.
- A 600 mm WIDE POLYOLEFIN BACKED EXTERIOR JOINT WRAP CONFORMING TO THE REQUIREMENTS OF ASTM C990-09 SHALL BE PLACED ON TOP AND SIDES OF EACH PRECAST UNIT CENTERED OVER THE JOINT.
- LIFTING HOLES SHALL BE FILLED WITH CONCRETE PLUGS OR WITH AN APPROVED NON-SHRINKABLE GROUT.
- DOWEL REINFORCING BARS TO BE INSTALLED WITH A MINIMUM EMBEDMENT OF 150 mm INTO EXISTING CONCRETE HEAD WALLS AND PRECAST END UNIT. THE SPACING OF THE DOWELS SHALL BE AS SHOWN ON SHEETS S107 AND S108.
- CONTRACTOR IS FULLY RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, ETC., DURING CONSTRUCTION OPERATIONS.
- EXCAVATION SHALL BE DONE TO LINES AND GRADES SHOWN ON THE DRAWINGS TO ALLOW FOR PLACEMENT AND COMPACTION OF ALL BEDDING AND BACKFILL MATERIALS. ADDITIONAL SUB-CUT MAY BE REQUIRED FOR THE REMOVAL AND REPLACEMENT OF THE SOFT MATERIALS ENCOUNTERED DIRECTLY BELOW THE CULVERT FOUNDATION WITH COMPACTED GRANULAR FILL AS PER THE DIRECTION OF THE GEOTECHNICAL ENGINEER. PLEASE REFER TO GEOTECHNICAL REPORT TITLED "GEOTECHNICAL INVESTIGATION FOR TWO CULVERT REPLACEMENTS (KILOMETRES 95.6 AND 100.6) ALONG HIGHWAY 93S IN KOOTENAY NATIONAL PARK, BC" FOR PREPARATION OF SUBGRADE AND ADDITIONAL SUBCUT.
- STRUCTURAL BACKFILL SHALL CONSIST OF APPROVED GRANULAR MATERIAL. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN AN UNFROZEN CONDITION. MEET THE SPECIFIED GRADATION, CONTAIN NO ROCKS EXCEEDING 50 mm IN DIAMETER AND SHALL BE FREE OF LARGE OR FROZEN LUMPS, WOOD, OR OTHER UNSUITABLE MATERIAL. BACKFILLING IS NOT ALLOWED ON FROZEN SUBSTRATE OR WHEN AIR TEMPERATURE IS BELOW 0°C.
- THE STRUCTURAL FILLS SHALL BE PLACED IN MAXIMUM LIFTS OF 150 mm AND COMPACTED TO A 98% OF STANDARD PROCTOR DENSITY WITH OPTIMUM MOISTURE CONTENT TO BE WITHIN ± 1%.
- BACKFILL SHALL BE PLACED IN SIMULTANEOUS EQUAL LIFTS ON BOTH SIDES OF CULVERT.
- TOP OF BACKFILL ELEVATION SHALL BE WITHIN 150 mm ON BOTH SIDES OF CULVERT AT ALL TIMES.
- CONTRACTOR SHALL SUBMIT SURFACE DRAINAGE SCHEME (DITCHING, SUMPS AND PUMPS) FOR MANAGING SURFACE RUNOFF AND DRAINAGE DURING CONSTRUCTION TO THE DEPARTMENTAL REPRESENTATIVE FOR REVIEW AND APPROVAL AT LEAST TWO WEEKS PRIOR TO COMMENCEMENT OF CONSTRUCTION WORK.
- PRE-APPROVED GRANULAR MATERIALS SHALL MEET THE BC MOTI GRADATION SPECIFICATIONS FOR CRUSHED BASE COURSE AGGREGATES.
- GEOTEXTILE FILTER FABRIC SHOWN SHALL MEET THE FOLLOWING REQUIREMENTS:

WOVEN GEOTEXTILE FILTER FABRIC SPECIFICATIONS AND PHYSICAL PROPERTIES		NON-WOVEN GEOTEXTILE FILTER FABRIC SPECIFICATIONS AND PHYSICAL PROPERTIES	
GRAB STRENGTH	1275 N	GRAB STRENGTH	CLASS 250
ELONGATION (FAILURE)	15%	ELONGATION (FAILURE)	900 N
PUNCTURE STRENGTH	275 N	PUNCTURE STRENGTH	50%
TRAPEZOIDAL TEAR	475 N	TRAPEZOIDAL TEAR	550 N
MINIMUM FABRIC LAP TO BE 1000mm		MINIMUM FABRIC LAP TO BE 1000mm	

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NOTES:
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

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0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision

A
B

Detail number
Sheet number
A Numéro de détail
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in millimetres
Dimensions linéaires
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Consultant's Name
Nom de l'expert-conseil

Eng. Stamp
Sceau de l'ingénieur

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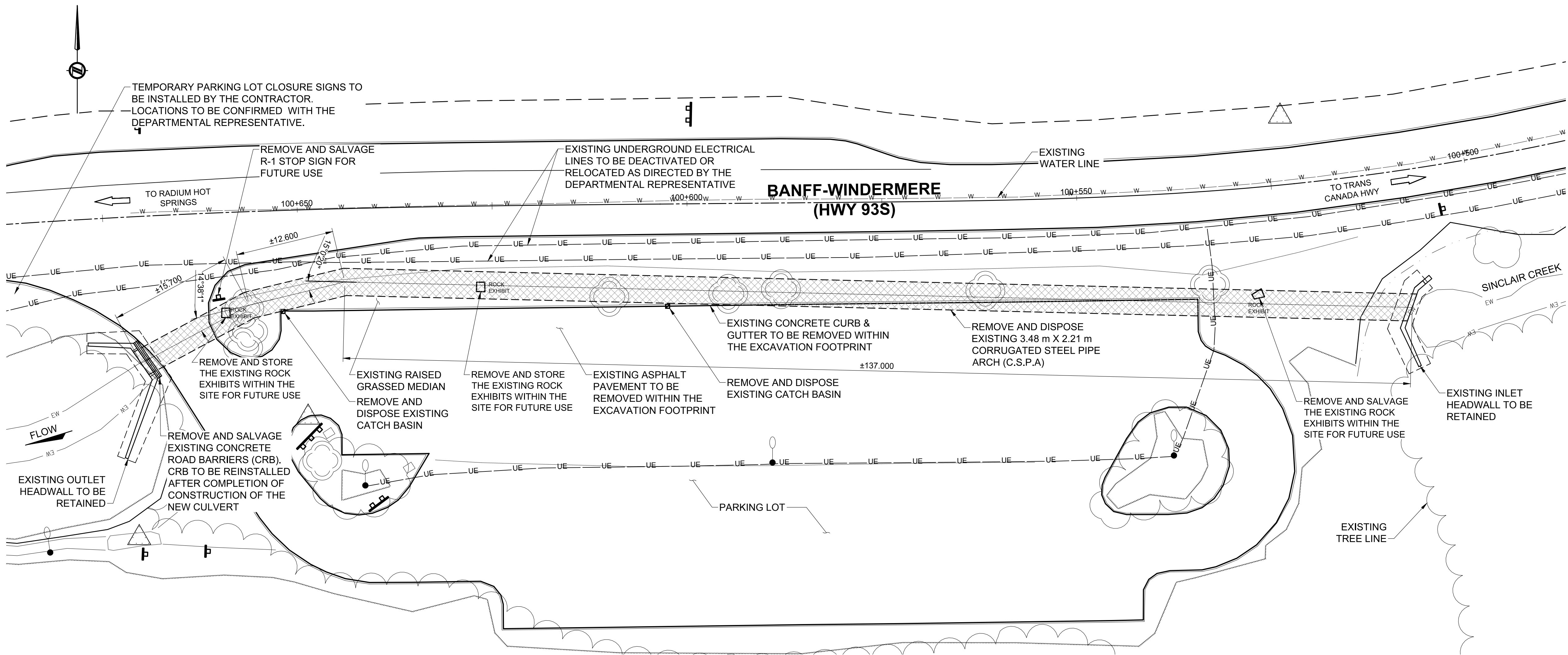
Project title/Titre du projet

**HIGHWAY 93 SOUTH
BANFF – WINDERMERE HWY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin

LOCATION MAP & GENERAL NOTES

Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
Designed by/Conçeut par SM	Reviewed by/Revisé par BS	Scale/Echelle AS SHOWN
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Date		Date
Project No./Nº du projet 1079-01	Asset No./Nº du bien -	Sheet No./ Nºde la feuille S100
Drawing Set No./Nº de série du dessin 60547362-C6		



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**HIGHWAY 93 SOUTH
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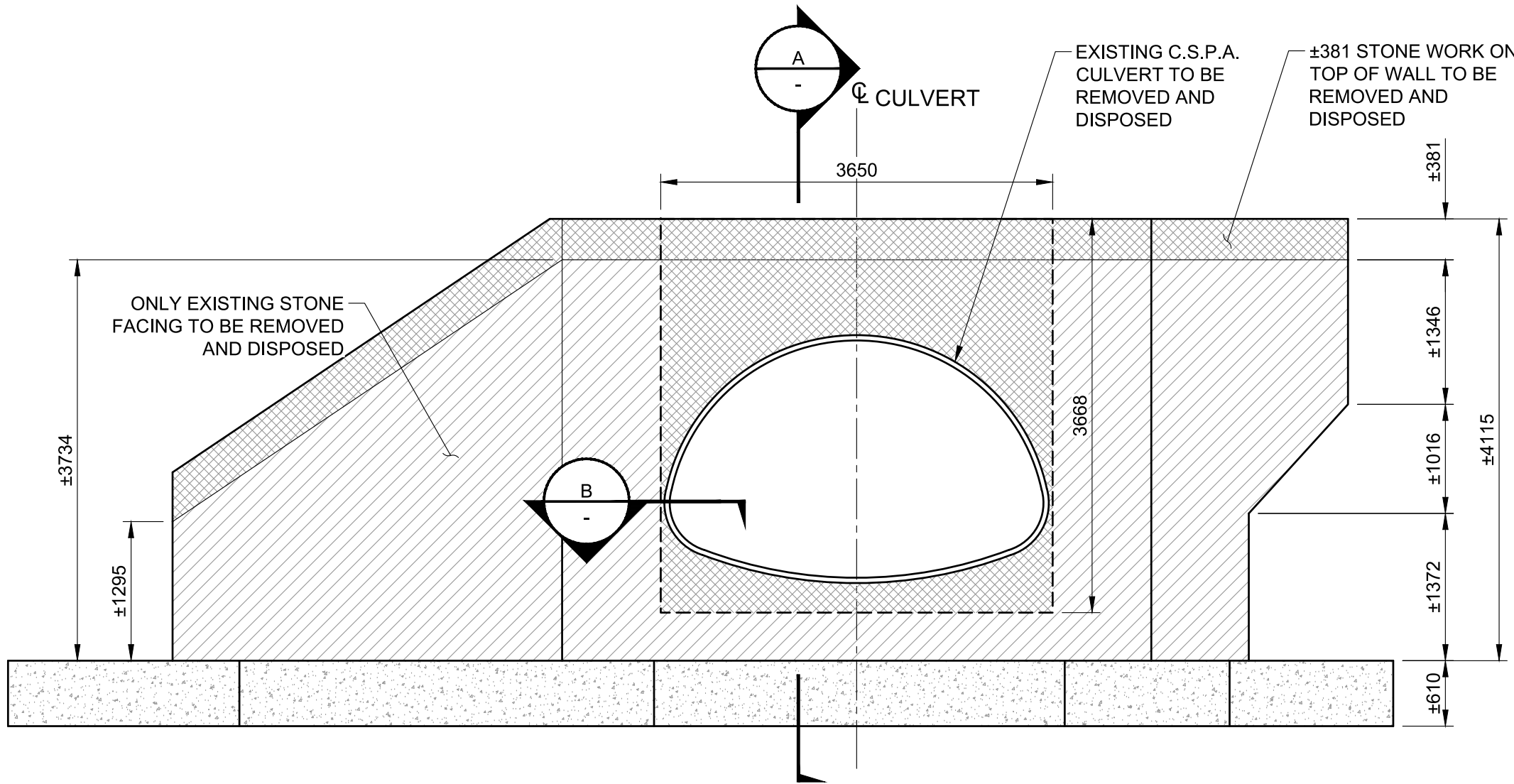
Drawing title/Titre du dessin

**DEMOLITION DETAILS
EXISTING END TREATMENT**

Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
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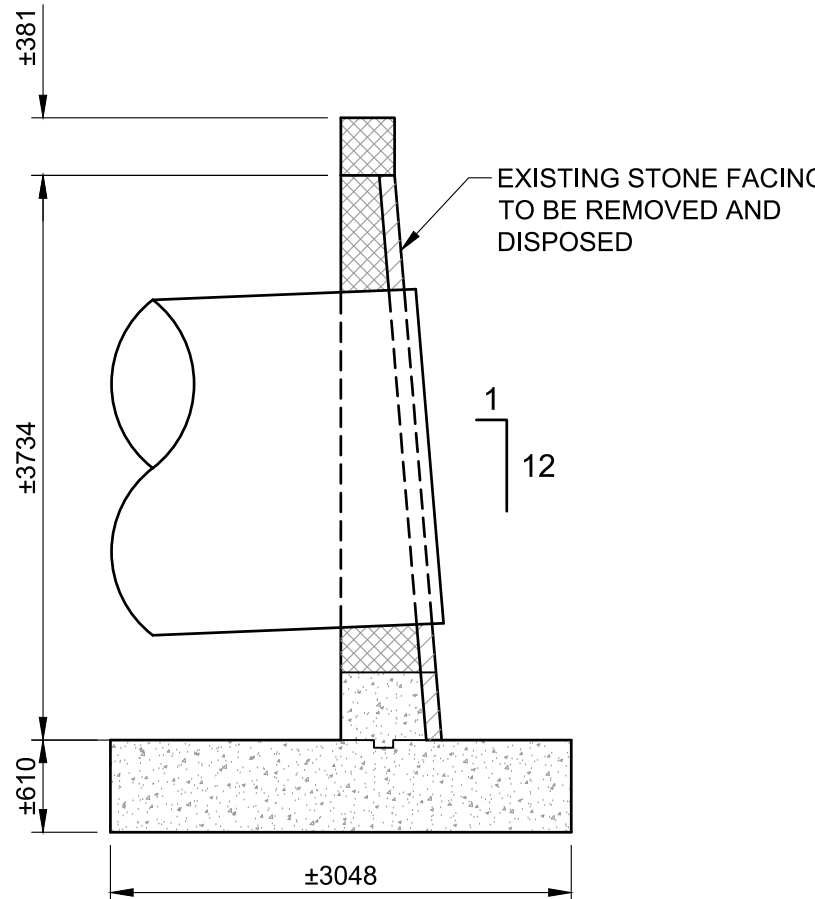
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Date	Date

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Drawing Set No./Nº de série du dessin 60547362-C6		



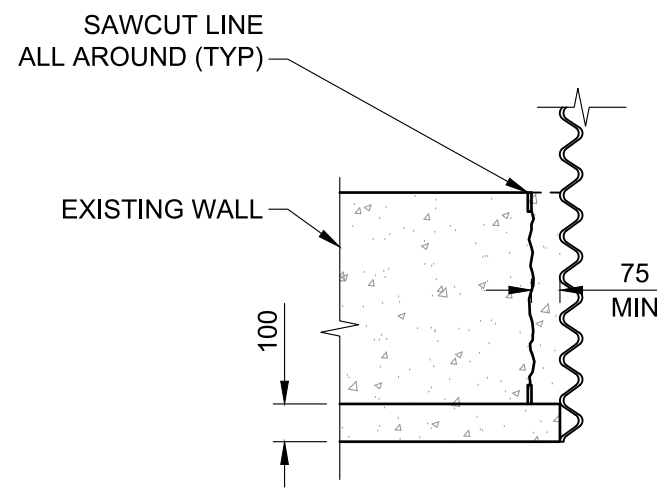
INLET - ELEVATION

Scale 1:50



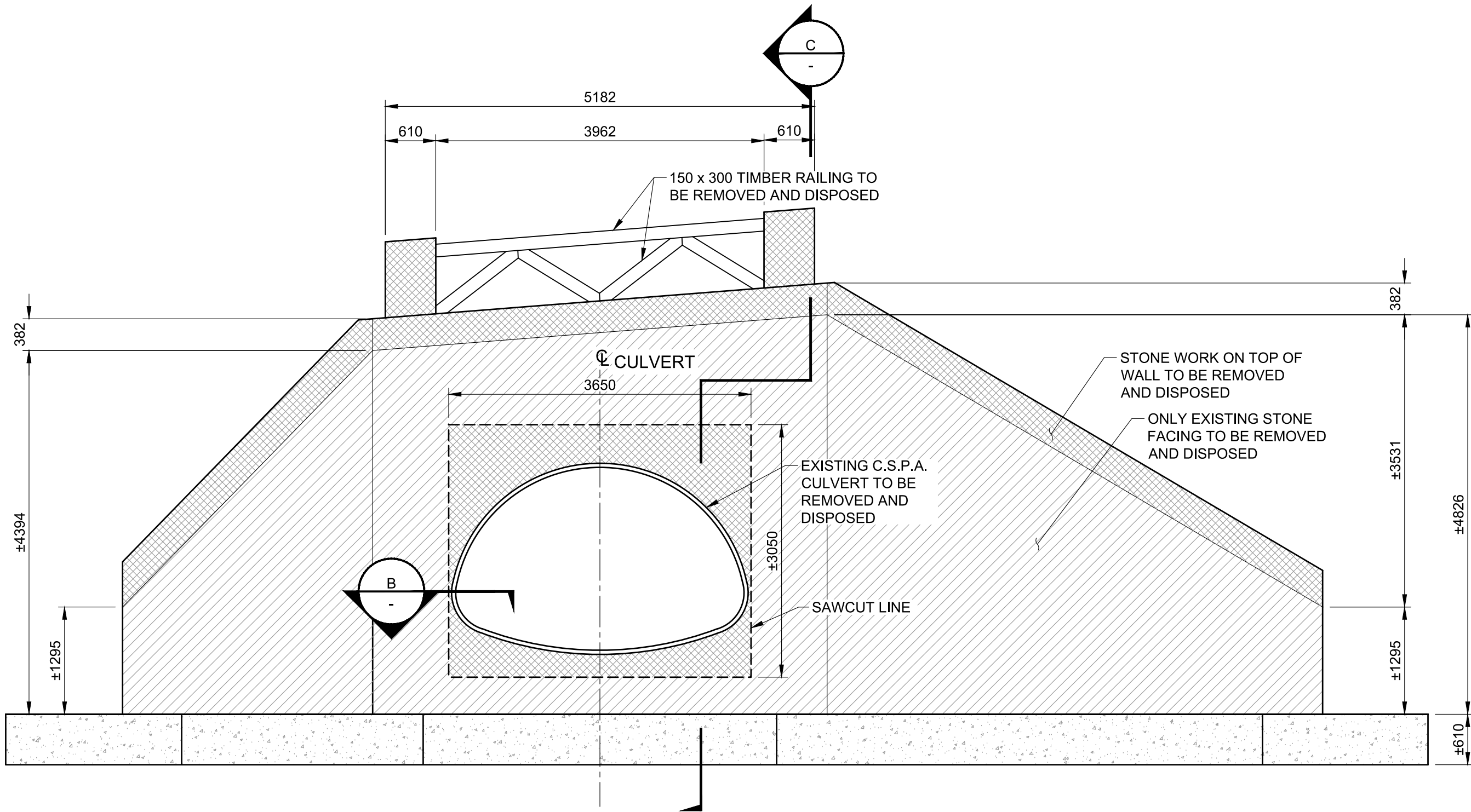
A SECTION

Scale 1:50



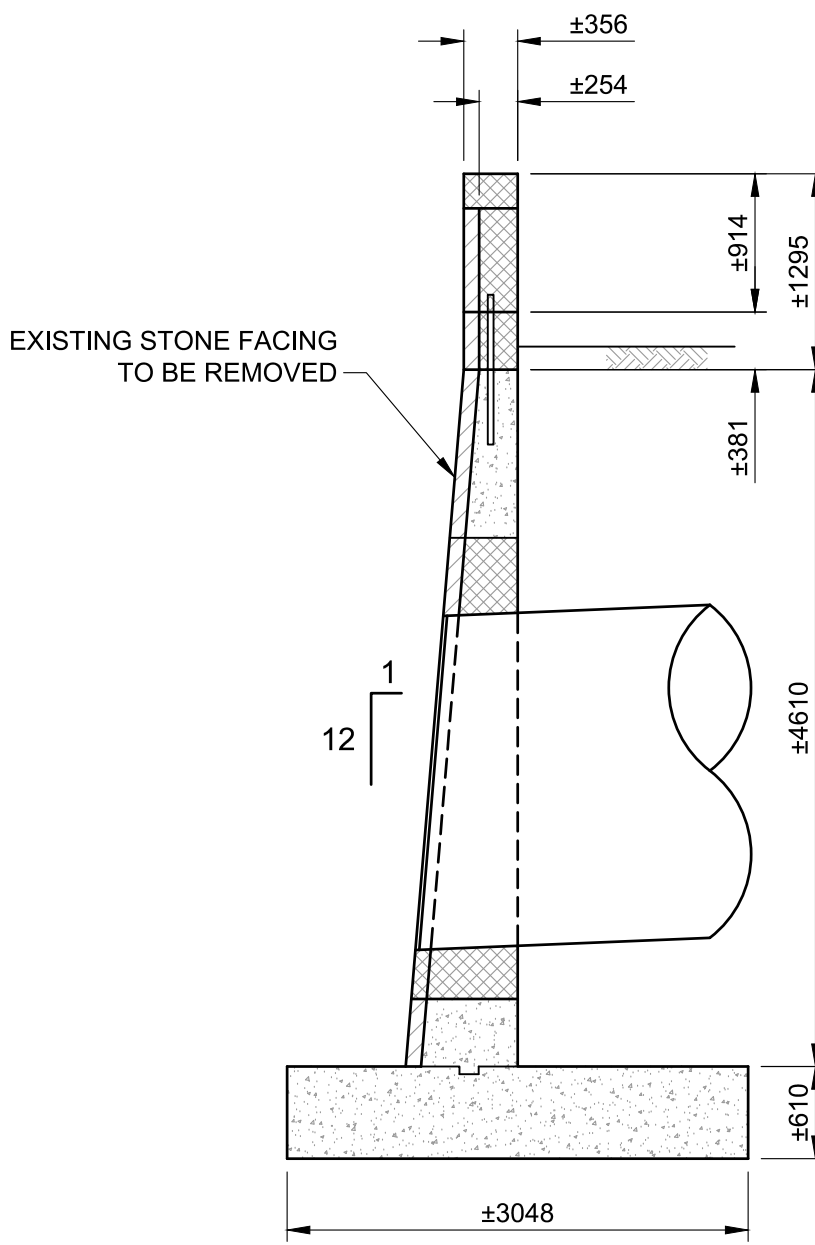
B SECTION

Scale 1:20



OUTLET - ELEVATION

Scale 1:50



C SECTION

Scale 1:50

LEGEND:

- DENOTES EXISTING CONCRETE AREA
- DENOTES DEMOLITION AREA
- DENOTES FACING DEMOLITION AREA

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Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
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A circular professional seal for a British Columbia Professional Engineer. The outer ring contains the text "PROFESSIONAL" at the top and "ENGINEER" at the bottom. Inside the ring, it says "PROVINCE OF" at the top, "S. K. KUNDAL" in the center, and "BRITISH COLUMBIA" at the bottom. A handwritten signature "S. K. Kundal" is written across the seal, and the number "32396" is printed below the signature.

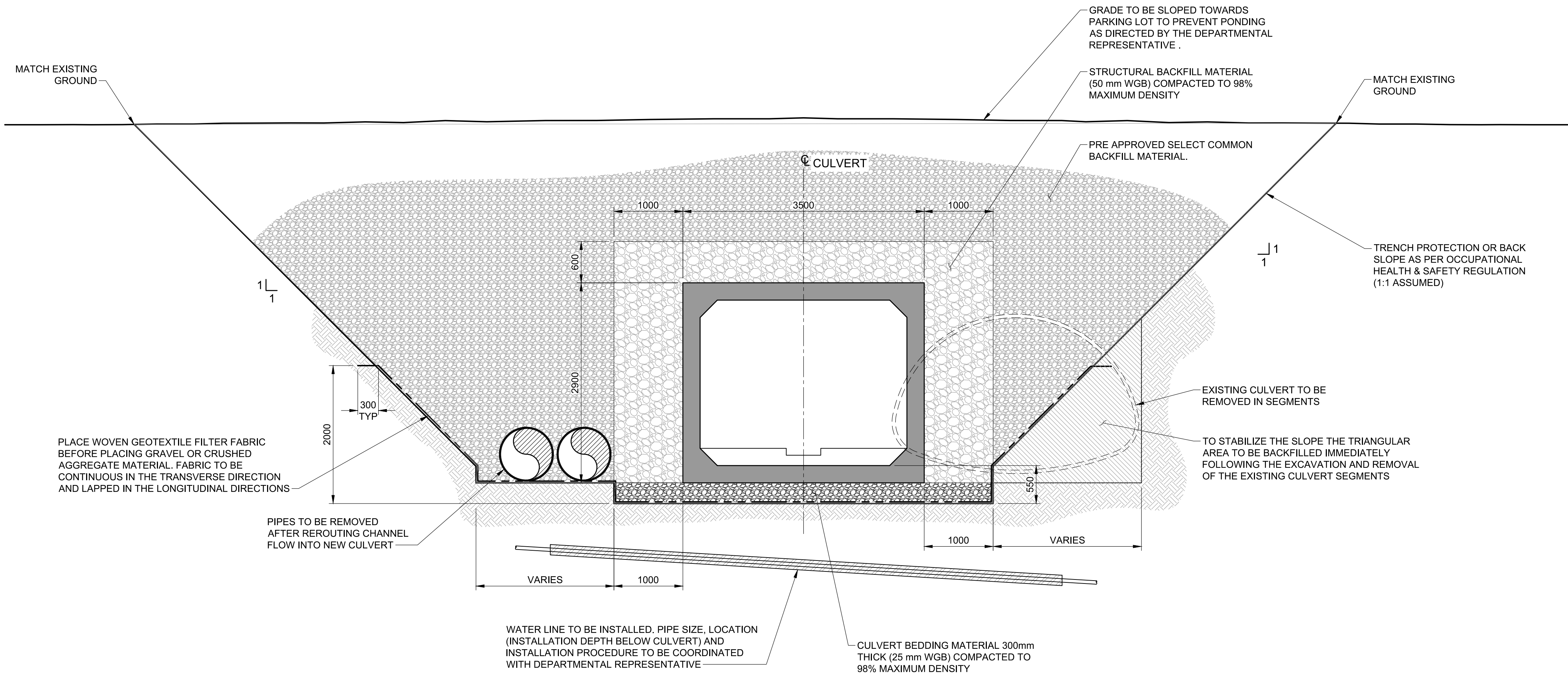
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NEW CULVERT LAYOUT

Client Acceptance/Acceptation du client	Approved by/Approuvé par
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Drawing Set No./N° de série du dessin	S103
60547362-C6	



A | BACKFILL SECTION
S103 | Scale 1:40

GENERAL NOTE

1. FOR CULVERT INSTALLATION, BACKFILLING AND COMPACTION REQUIREMENTS REFER TO SHEET S100.

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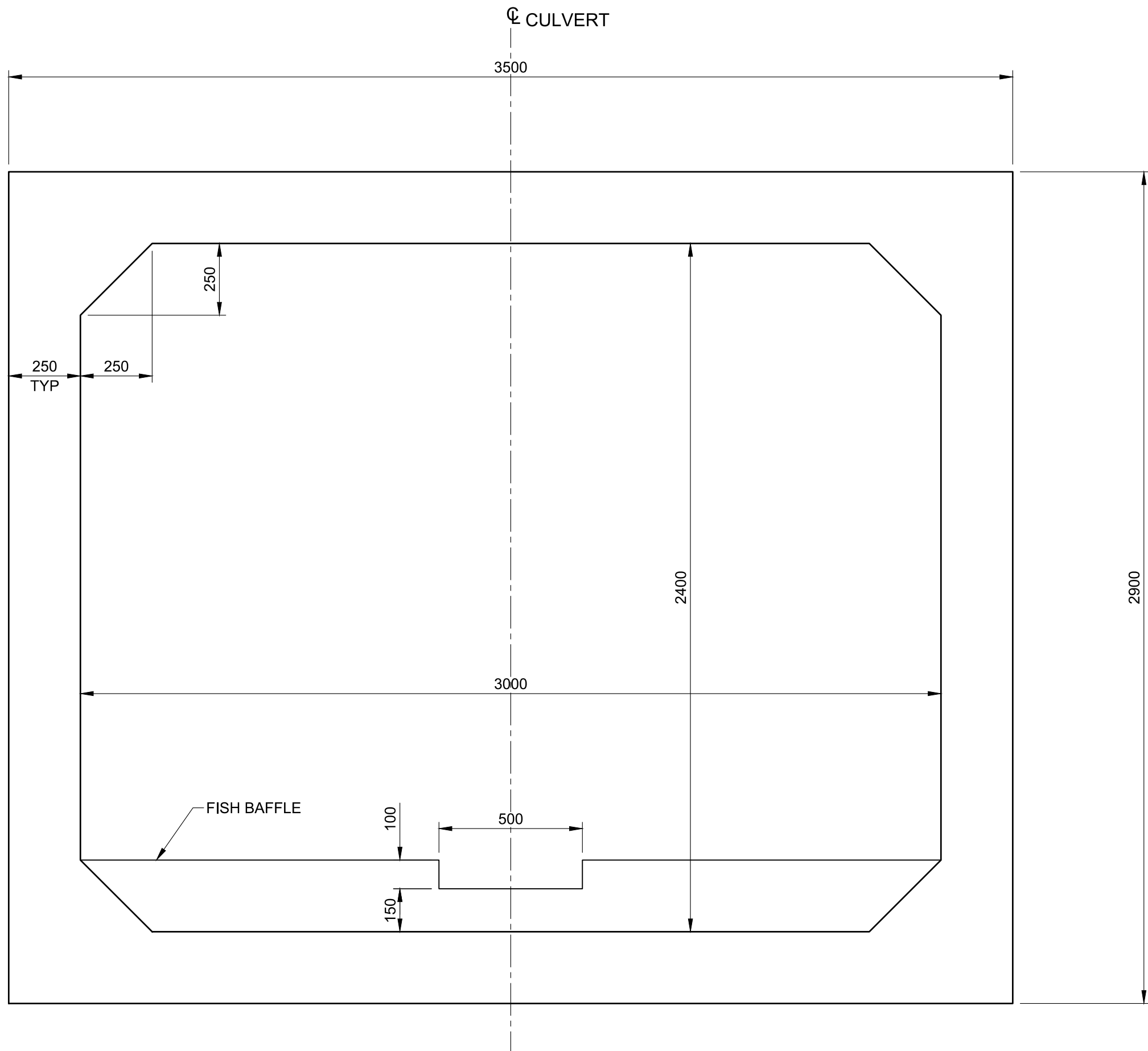
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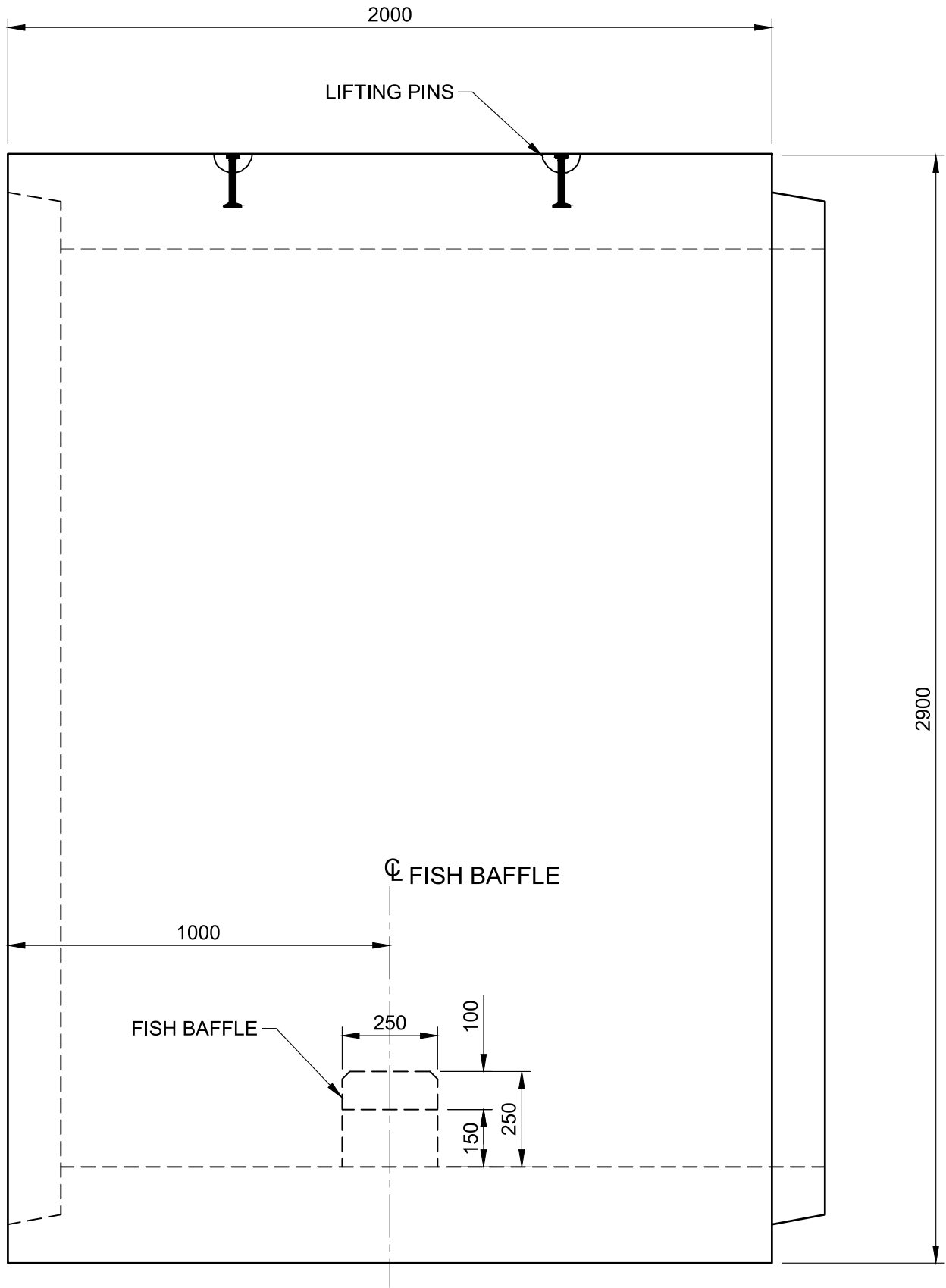
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CULVERT BACKFILL DETAILS

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Drawing Set No./Nº de série du dessin 60547362-C6		S104



PRECAST CULVERT - TYPICAL SECTION
Scale 1:15



PRECAST CULVERT - TYPICAL ELEVATION
Scale 1:15

GENERAL NOTES

1. FOR CONCRETE AND REINFORCING STEEL NOTES REFER TO SHEET S100.
2. FOR MATERIALS AND FABRICATION SEE NOTES ON SHEET S100.
3. CONTRACTOR MAY PROPOSE A DIFFERENT SEGMENT LENGTH FOR THE PRECAST BOX SECTIONS AND SUBMIT THE REVISED CULVERT LAYOUT FOR APPROVAL FROM DEPARTMENTAL REPRESENTATIVE.
4. THE SPACING OF FISH BAFFLE SHALL NOT EXCEED 2000 mm BETWEEN ADJACENT PRECAST BOX SECTIONS AS PER THE MEMO TITLED "FISH PASSAGE DESIGN FOR SINCLAIR CULVERT AT PARKS GATE, KOOTENAY NATIONAL PARK, BC".

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PRECAST CULVERT DETAILS

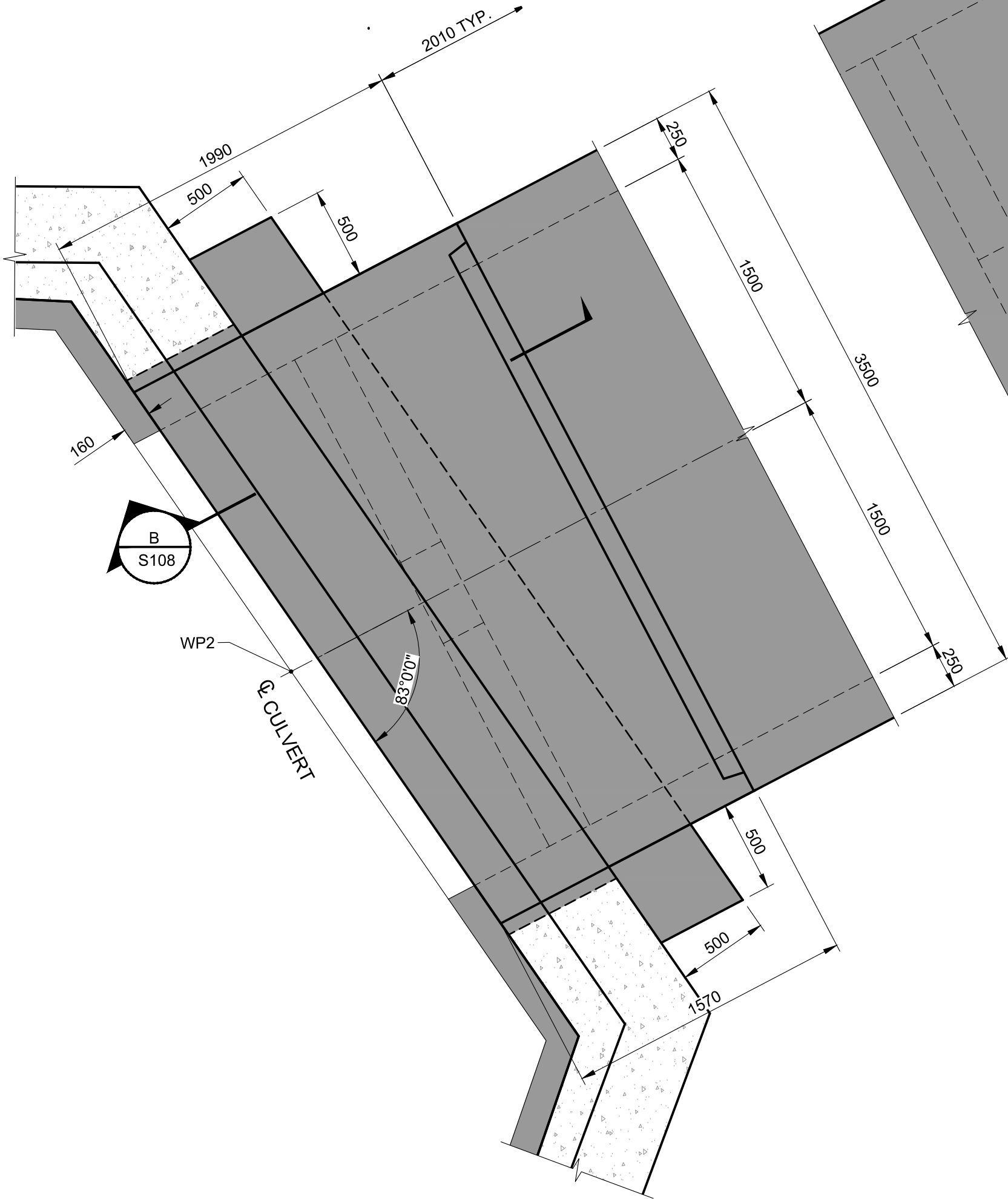
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Drawing Set No./Nº de série du dessin 60547362-C6		

LEGEND:

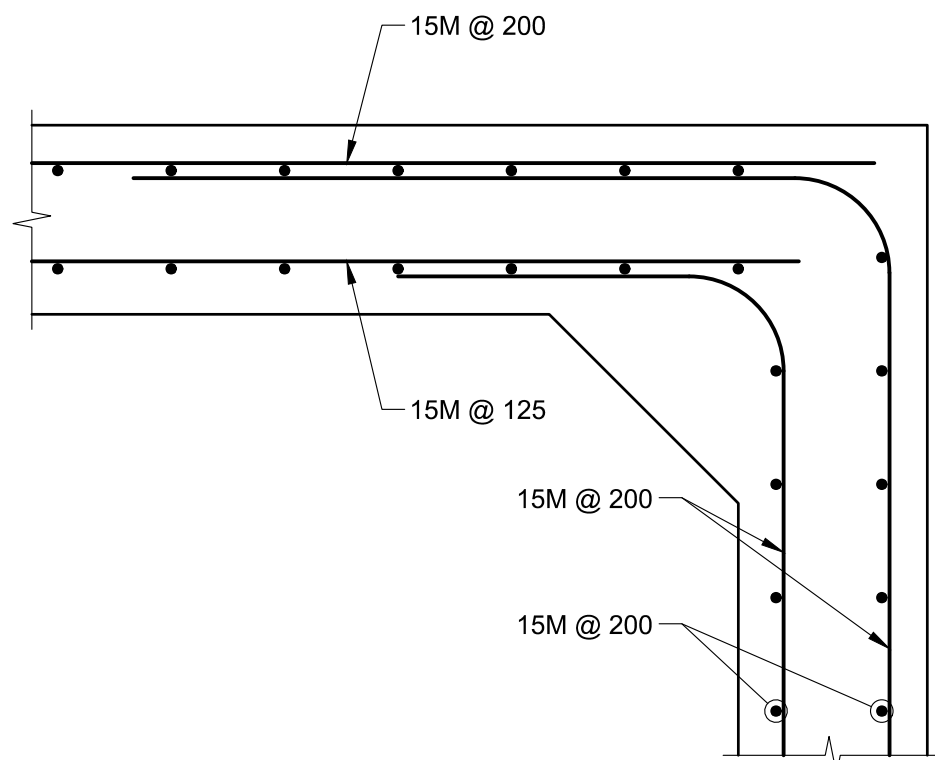
- DENOTES NEW CONSTRUCTION
CONCRETE AREA
- DENOTES EXISTING CONCRETE AREA

GENERAL NOTES

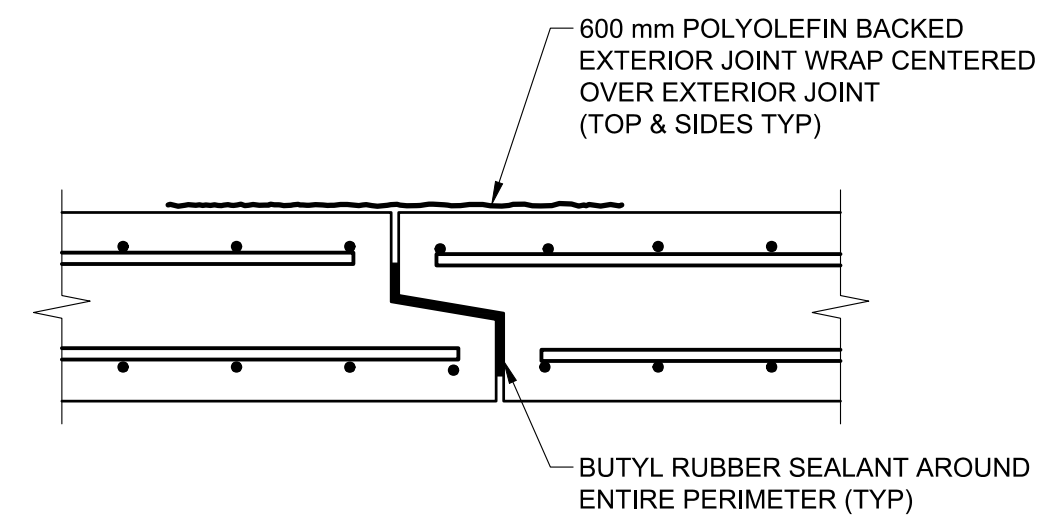
- FOR CONCRETE AND REINFORCING STEEL NOTES REFER TO SHEET S100.
- FOR MATERIALS AND FABRICATION REFER TO NOTES SHEET S100.
- CONTRACTOR MAY PROPOSE A PRECAST CONCRETE END SECTION AT INLET END INSTEAD OF A CAST-IN-PLACE SECTION. THE PRECAST SECTION WILL BE ACCEPTABLE AS LONG IT CAN BE PLACED FLUSH WITH THE FRONT FACE OF THE HEADWALL.



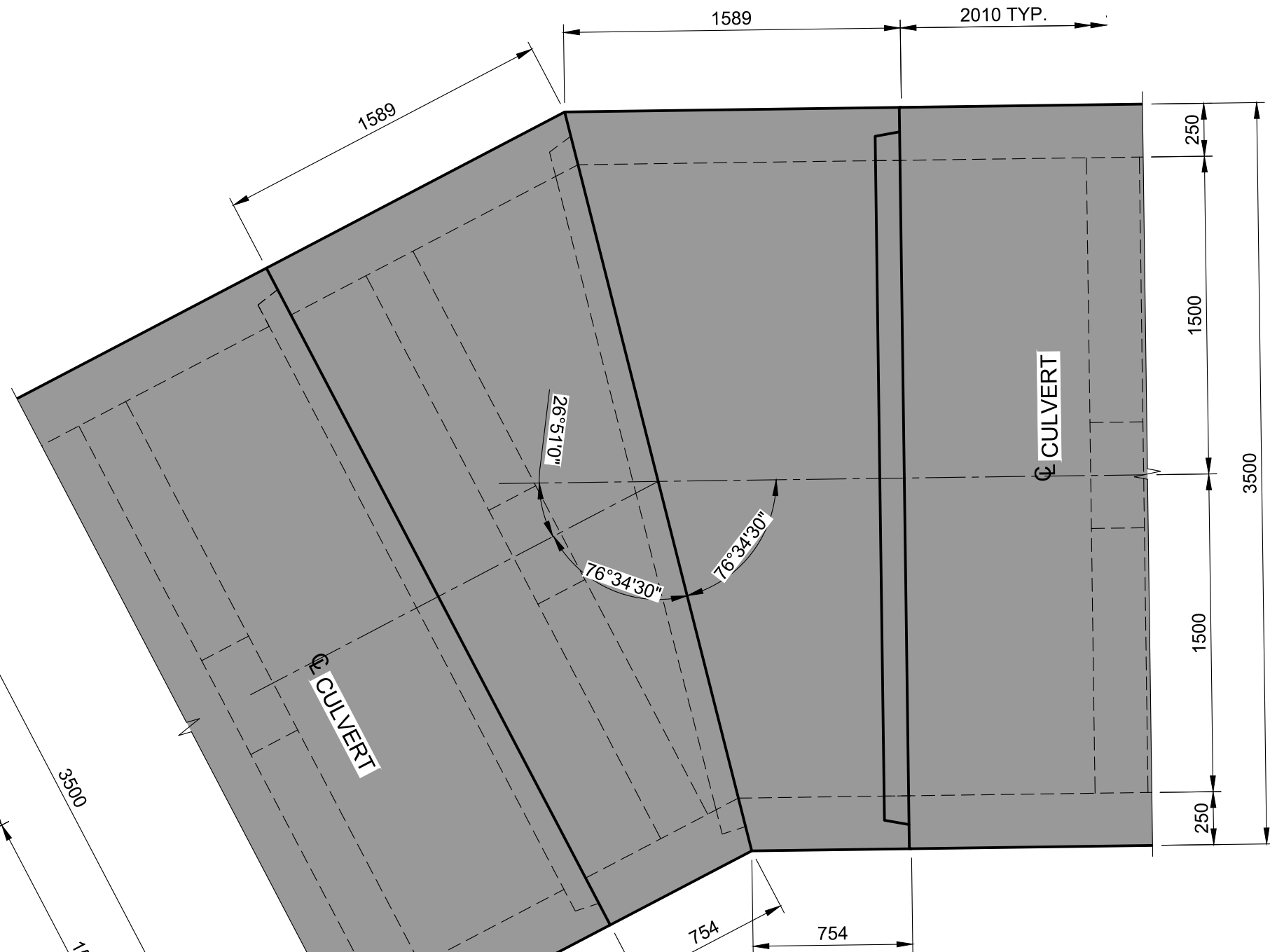
OUTLET END
1 | DETAIL
S103 Scale 1:25



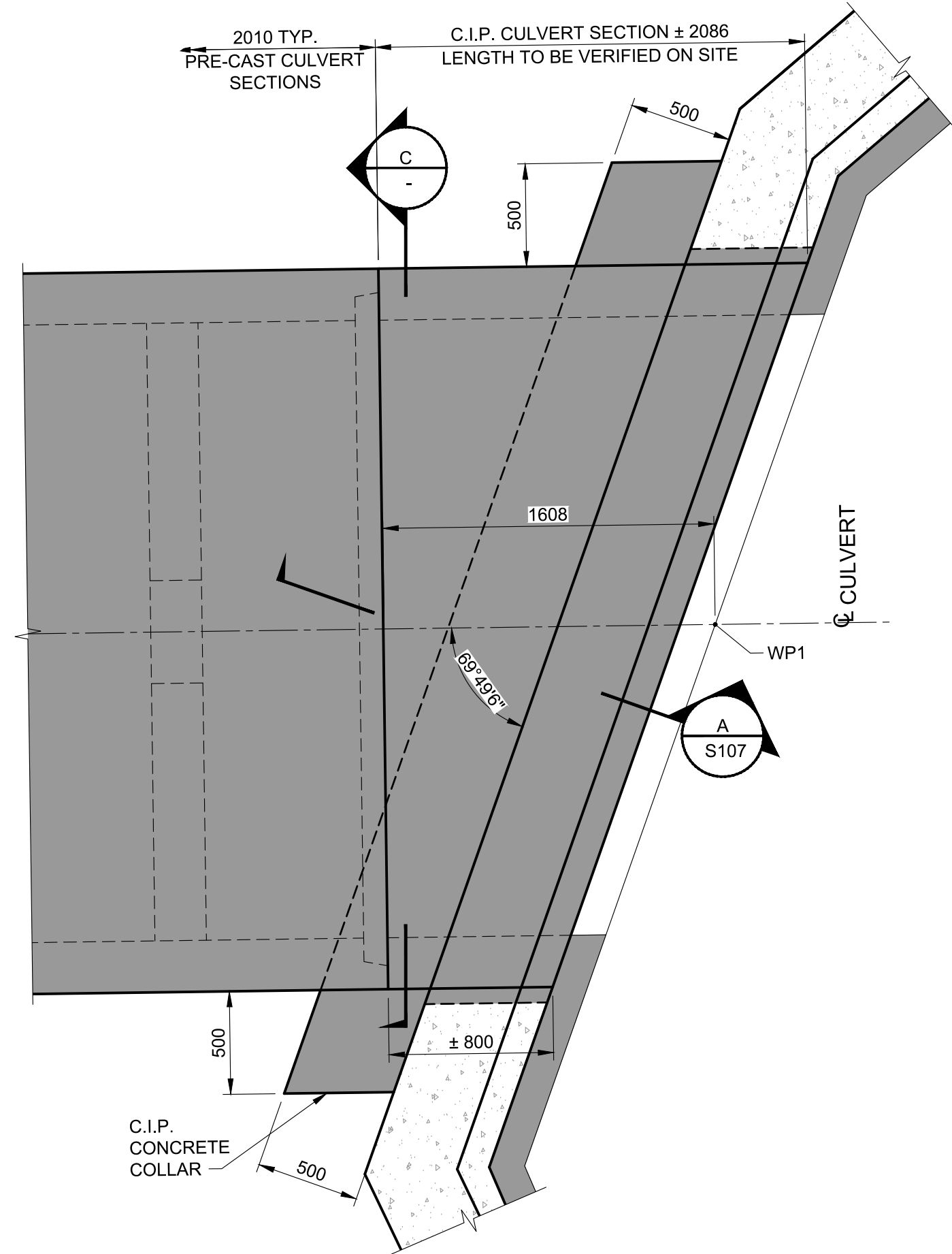
4 | DETAIL
Scale 1:10



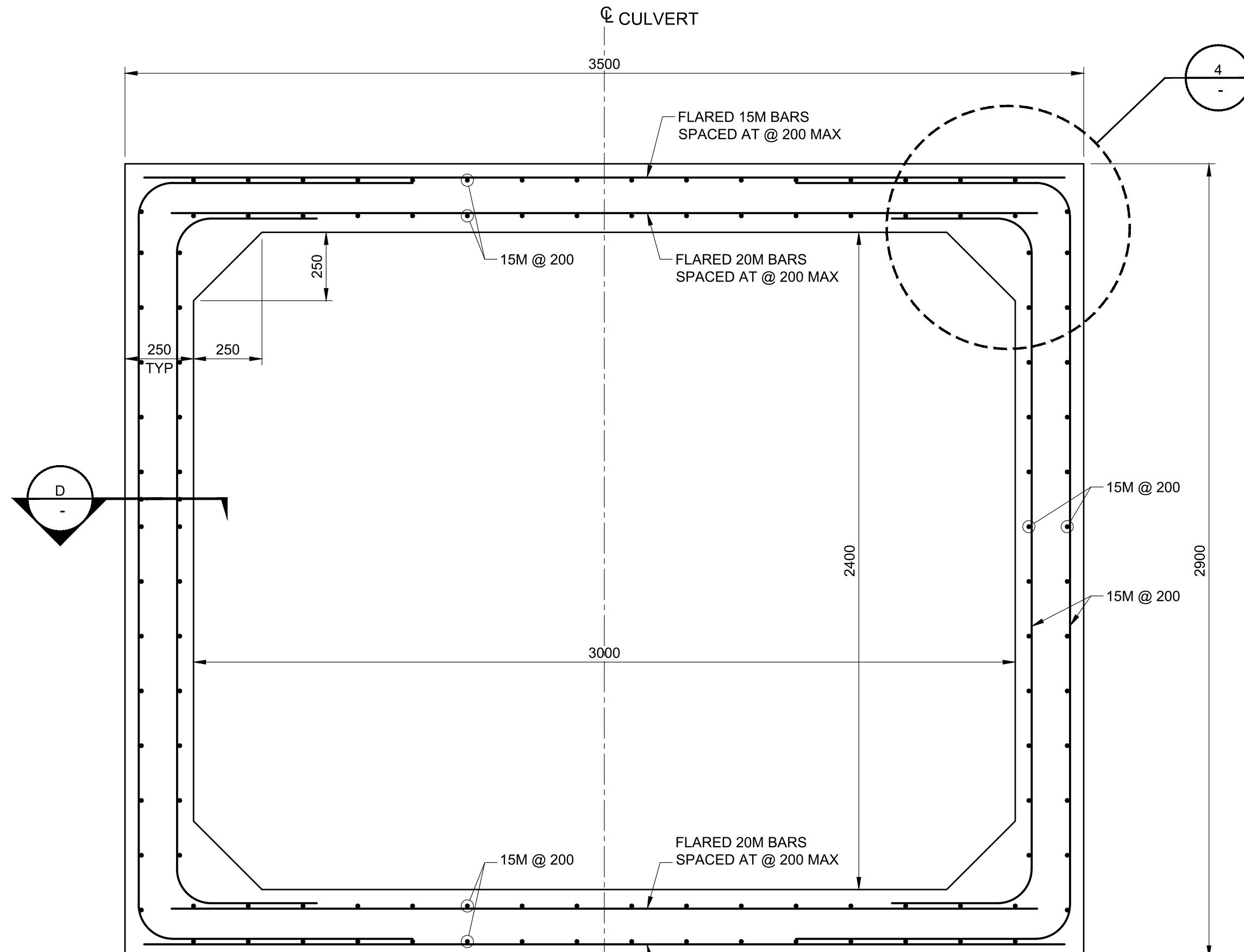
D | SECTION
Scale 1:10



AT BEND LOCATION
2 | DETAIL
S103 Scale 1:25



C.I.P. INLET END
3 | DETAIL
S103 Scale 1:25



C | CULVERT - C.I.P. SECTION AT INLET
Scale 1:15

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NOTES:
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No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	Detail number Sheet number
B	A Numéro de détail B Numéro de la feuille
Linear dimensions in millimetres	
Dimensions linéaires en millimètres	
Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
AECOM	PROFESSIONAL ENGINEER KANDAL 32396

Parks Canada
Asset Management
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Region

Parcs Canada
Gestion des biens
Région de l'Ouest et
du Nord

Canada

Project title/Titre du projet
HIGHWAY 93 SOUTH
BANFF – WINDERMERE HWY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)

Drawing title/Titre du dessin
CULVERT DETAILS

Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
Designed by/Conçeut par SM	Reviewed by/Revisé par BS	Scale/Echelle AS SHOWN
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Project No./Nº du projet 1079-01		Asset No./Nº du bien -
Drawing Set No./Nº de série du dessin 60547362-C6		Sheet No./ Nº de la feuille S106

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0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision

A
B

Detail number
Sheet number
A Numéro de détail
B Numéro de la feuille

Linear dimensions
in millimetres
Dimensions linéaires
en millimètres

Consultant's Name
Nom de l'expert-conseil

AECOM

Eng. Stamp
Sceau de l'ingénieur



Parks Canada

Asset Management
Western and
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Region

Parcs Canada

Gestion des biens
Région de l'Ouest et
du Nord

Canada

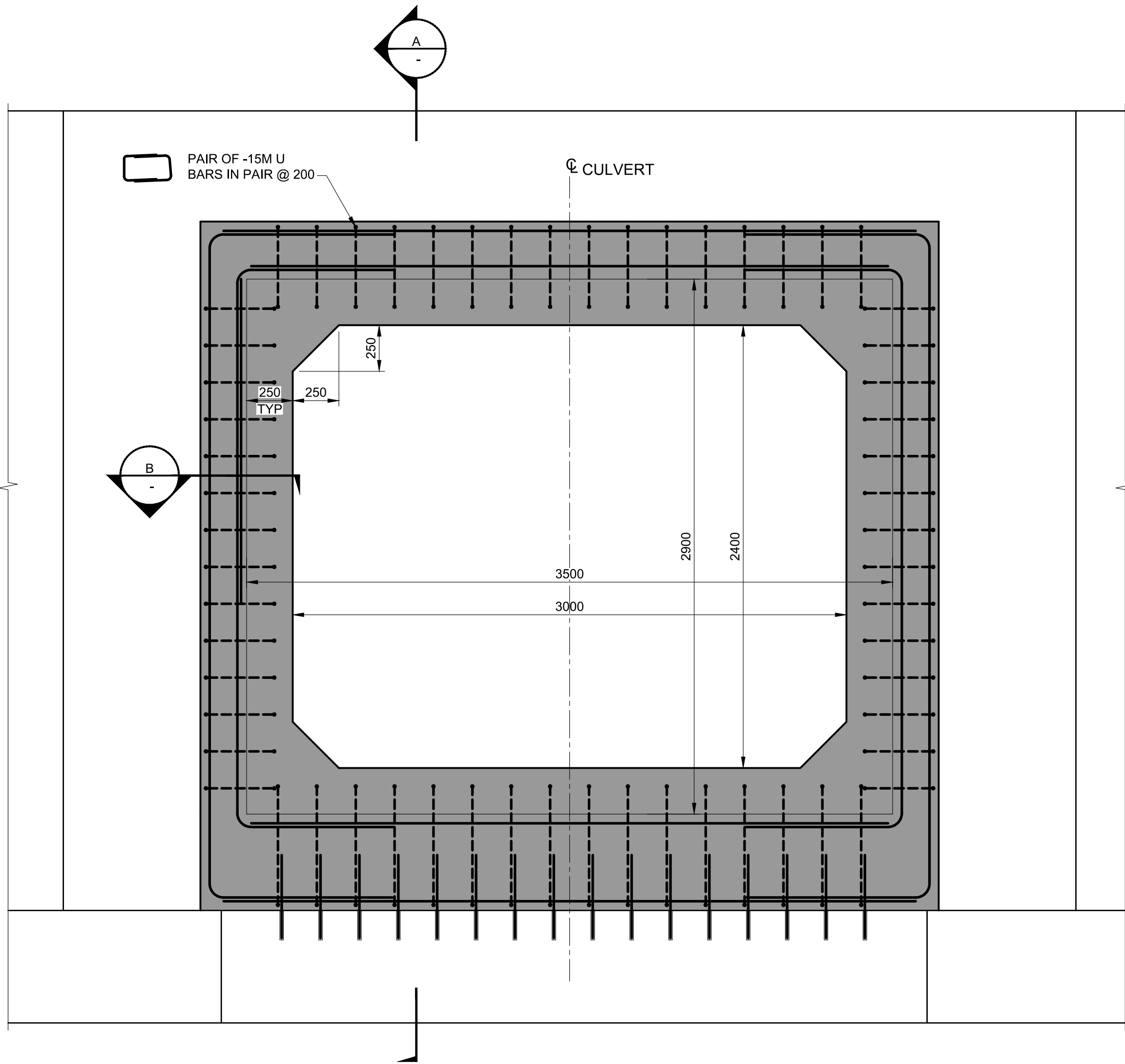
Project title/Titre du projet

**HIGHWAY 93 SOUTH
BANFF – WINDERMERE HWY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin

CULVERT INLET DETAILS

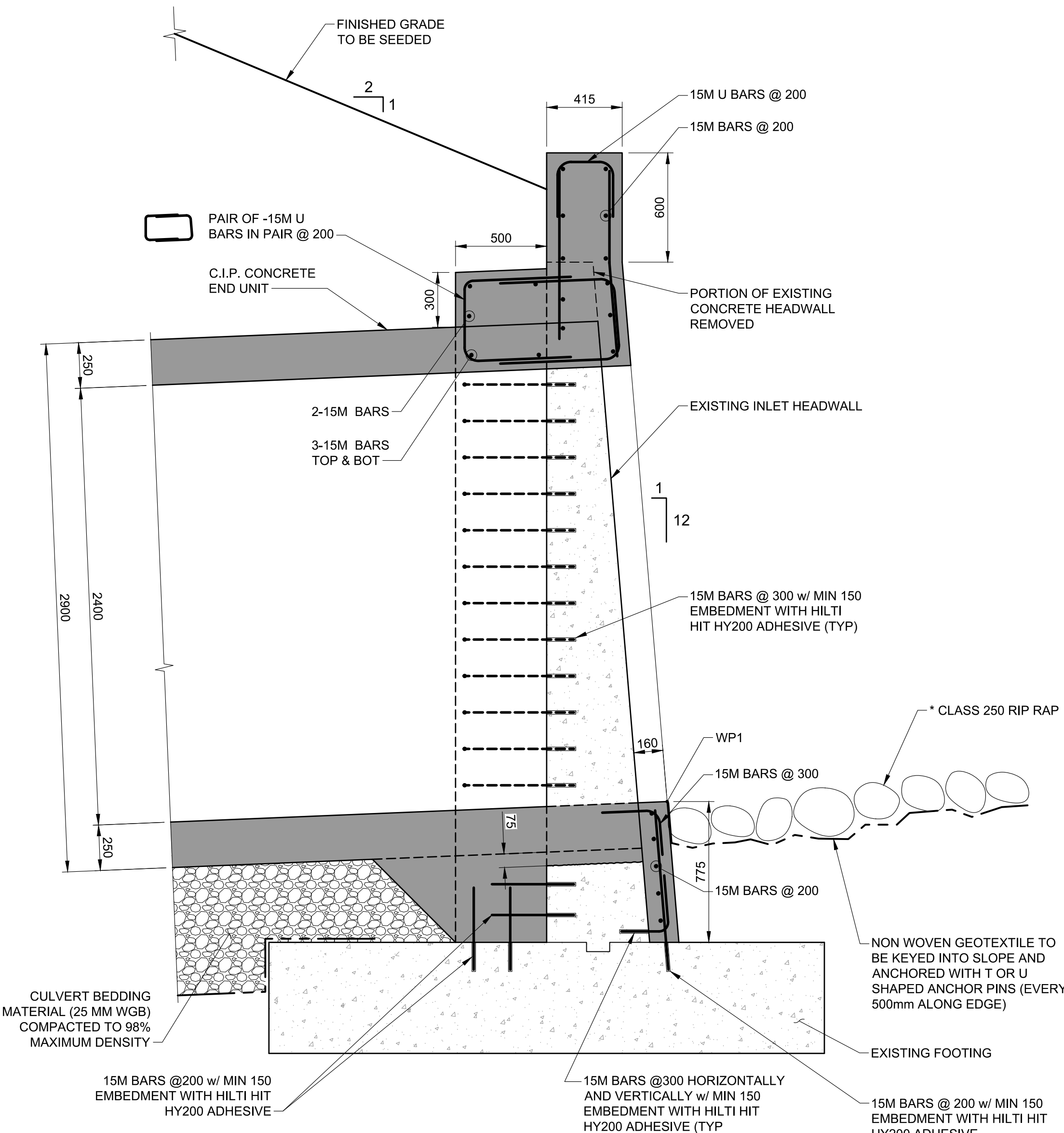
Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
Designed by/Conçeut par SM	Reviewed by/Revisé par BS	Scale/Echelle AS SHOWN
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Date		Date
Project No./Nº du projet 1079-01	Asset No./Nº du bien -	Sheet No./ Nº de la feuille S107
Drawing Set No./Nº de série du dessin 60547362-C6		



CULVERT INLET DETAILS

(LOOKING FROM BACKSIDE
OF THE HEADWALL)

Scale 1:20



A SECTION

S106 Scale 1:20

NOTE

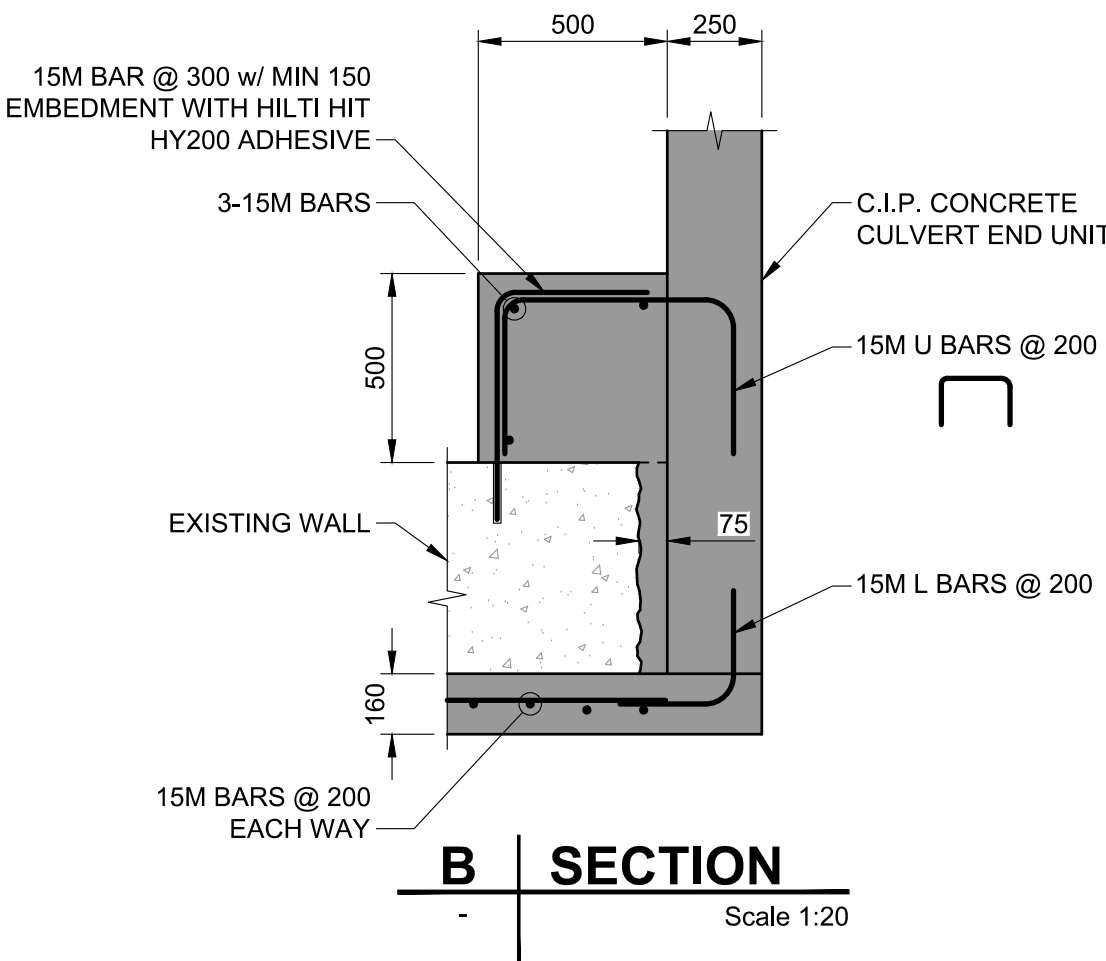
* FOR RIPRAP NOTES REFER TO SHEET S111

CULVERT END TREATMENT NOTES

- CONTRACTOR SHALL INSTALL THE REINFORCING DOWEL BARS USING HILTI HIT-HY 200 SYSTEM AT THE LOCATIONS SHOWN ON SHEETS S107 & S108.
- CONTRACTOR SHALL USE APPROPRIATE SIZE OF DRILL BITS AS PER THE MANUFACTURER'S RECOMMENDATION FOR THE SIZES OF REBARS SHOWN ON THE DRAWINGS. CARE SHOULD BE TAKEN NOT TO DAMAGE TO ANY EXISTING REINFORCING.
- THE CONCRETE SURFACES SHALL BE DRY AND THE HOLES SHALL BE CLEANED THOROUGHLY USING COMPRESSED AIR AS PER MANUFACTURER'S RECOMMENDATION PRIOR TO INSTALLATION OF THE DOWELS. ALSO, THE CONCRETE TEMPERATURE SHALL BE WITHIN THE MANUFACTURER'S SPECIFIED TEMPERATURE RANGE DURING DOWEL INSTALLATION.
- ANY VOIDS UNDERNEATH THE FOOTING SHALL BE FILLED WITH FILLCRETE.
- THE REINFORCING BARS FOR THE WALLS SHALL BE INSTALLED AS SHOWN ON SHEETS S107 & S108.
- CONTRACTOR SHALL USE CONCRETE FORMLINER AND CONCRETE PIGMENTS IN THE CONCRETE MIX TO CREATE A STONE FACING FOR THE WALLS RESEMBLING TO EXISTING STONE FACING OR APPROVED EQUIVALENT.

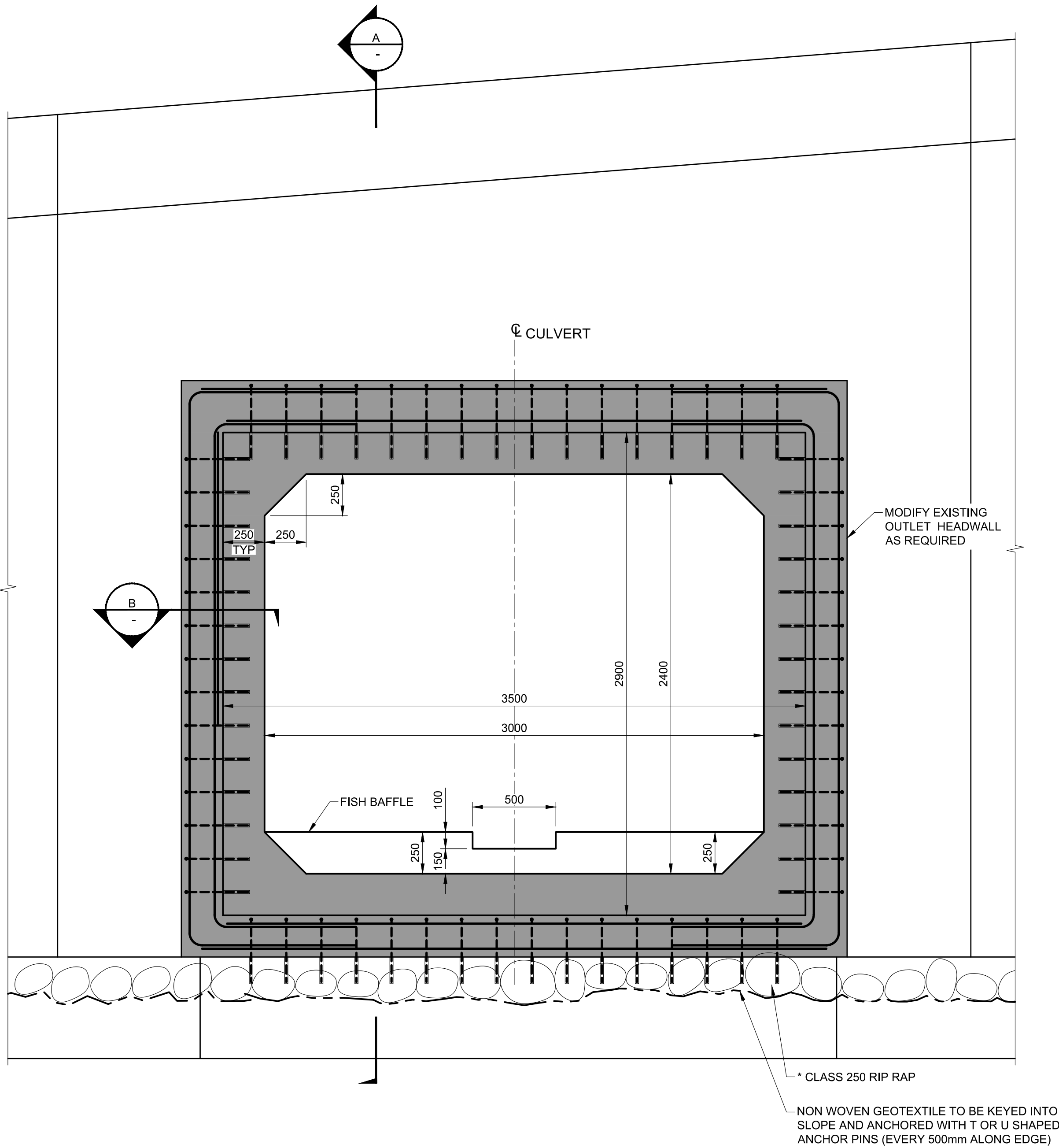
LEGEND:

- DENOTES NEW CONSTRUCTION
CONCRETE AREA
- DENOTES EXISTING CONCRETE AREA

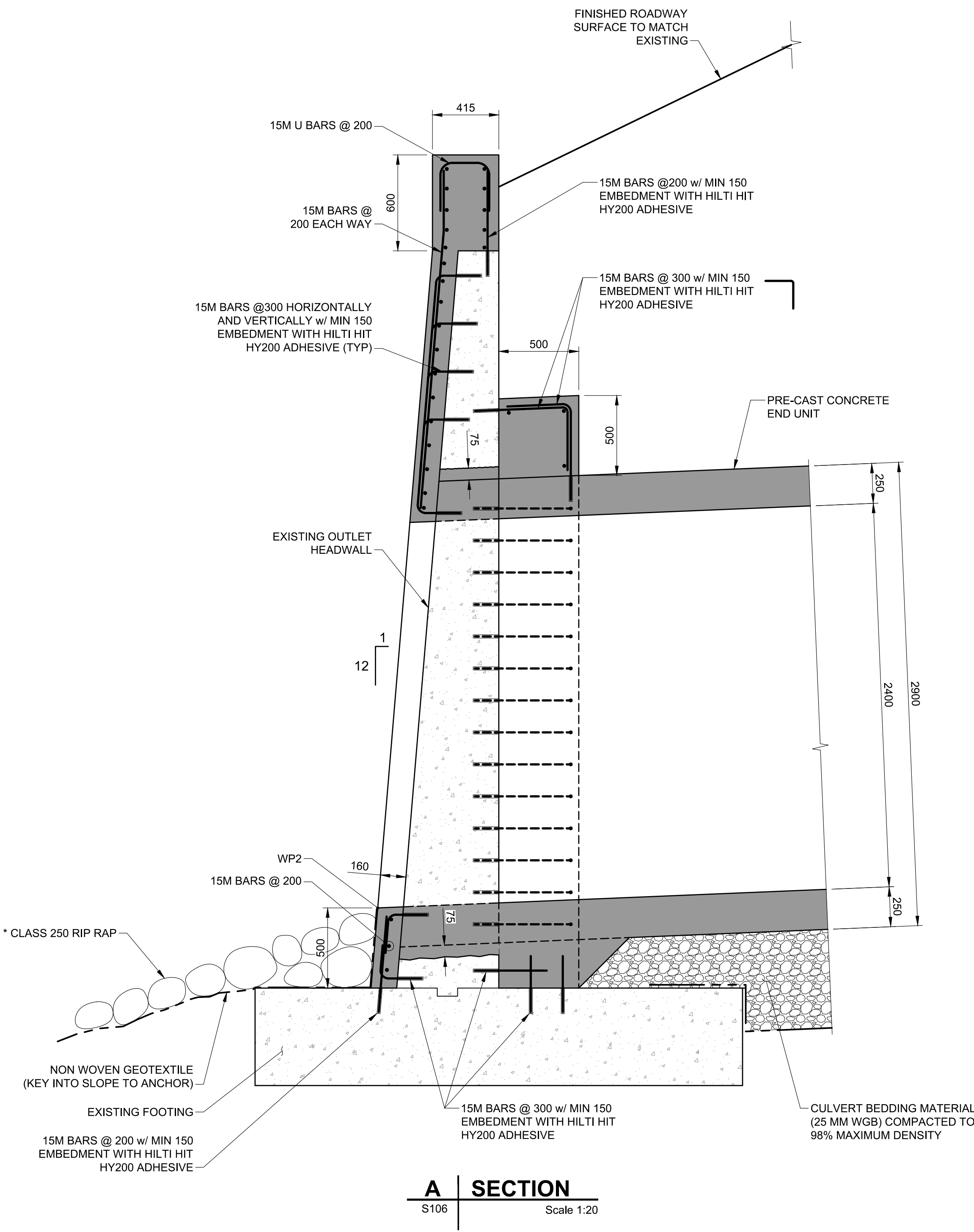
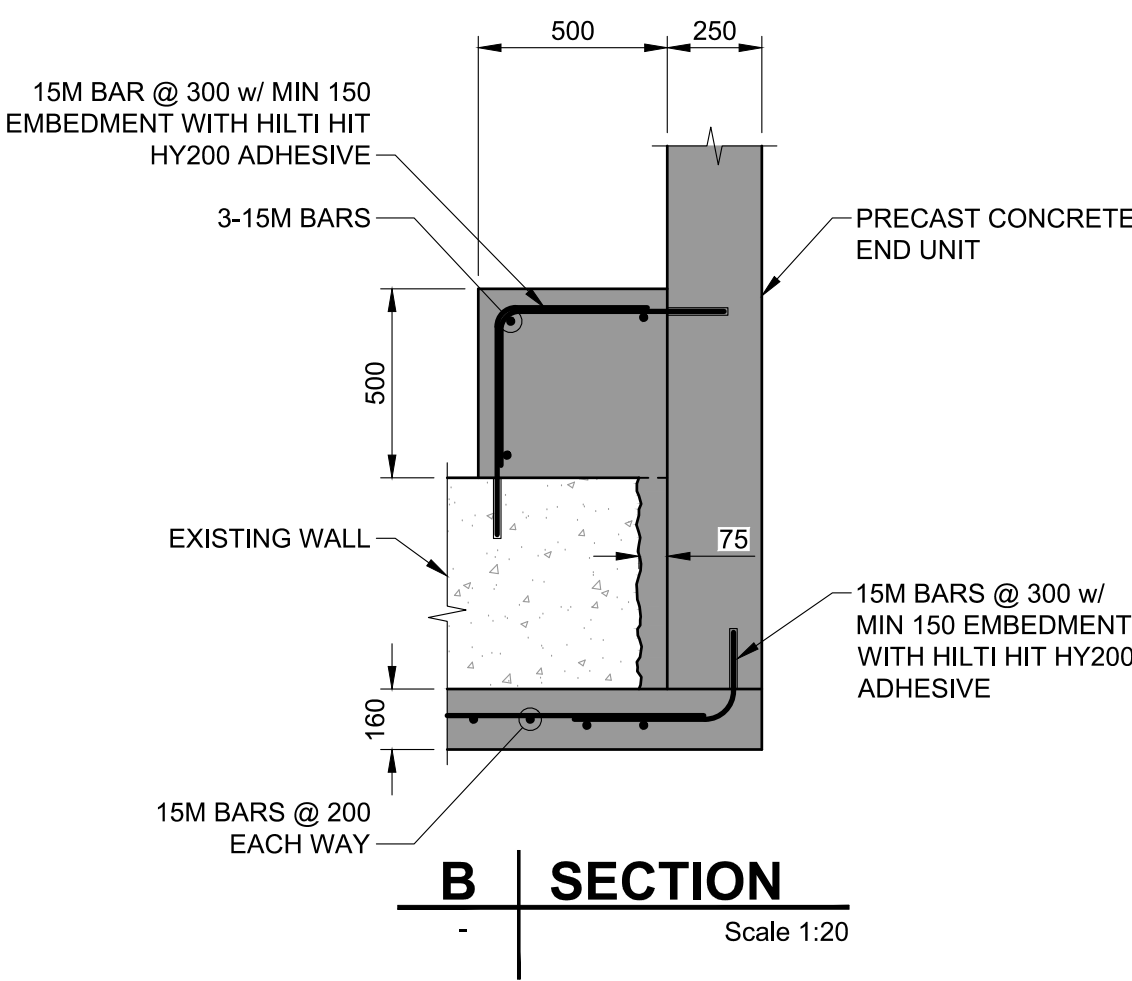


B SECTION

Scale 1:20



CULVERT OUTLET DETAILS
(LOOKING FROM BACKSIDE OF THE HEADWALL)
Scale 1:20



A SECTION
S106 Scale 1:20

NOTE
* FOR RIPRAP NOTES REFER TO SHEET S111

LEGEND:
■ DENOTES NEW CONSTRUCTION CONCRETE AREA
□ DENOTES EXISTING CONCRETE AREA

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No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	B
Detail number	A Numéro de détail
Sheet number	B Numéro de la feuille
Linear dimensions in millimetres	Dimensions linéaires en millimètres
Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
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Canada

Project title/Titre du projet
**HIGHWAY 93 SOUTH
BANFF – WINDERMERE HWY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)**

CULVERT OUTLET DETAILS

Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
Designed by/Concept par SM	Reviewed by/Revisé par BS	Scale/Echelle AS SHOWN
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Project No./Nº du projet 1079-01		Asset No./Nº du bien -
Drawing Set No./Nº de série du dessin 60547362-C6		Sheet No./ Nº de la feuille S108

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Revision / Revision

Linear dimensions in millimetres	Dimensions linéaires en millimètres
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AECOM

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Drawing title/Titre du dessin


Client Acceptance/Acceptation du client	Approved by/Approuvé par
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Project No./N° du projet 1079-01	Asset No./N° du bien -	Sheet No./ N° de la feuille
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Drawing Set No./N° de série du dessin	S109
60547362-C6	



 DENOTES NEW CONSTRUCTION
CONCRETE AREA

 DENOTES EXISTING CONCRETE AREA

1. REFER TO SHEETS S107 & S108 FOR LOCATIONS AND DETAILS OF DOWELS REINFORCING BARS FOR CONNECTING NEW CONCRETE TO EXISTING CONCRETE HEADWALL.

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No.	Date	Description	Drawn by Dessiné par	Approved Approuvé


Revision / Revision

<div><div>A</div><div>B</div></div>	Detail number Sheet number	A Numéro de détail B Numéro de la feuille
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Linear dimensions
in millimètres

Dimensions linéaires
en millimètres

Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
AECOM	

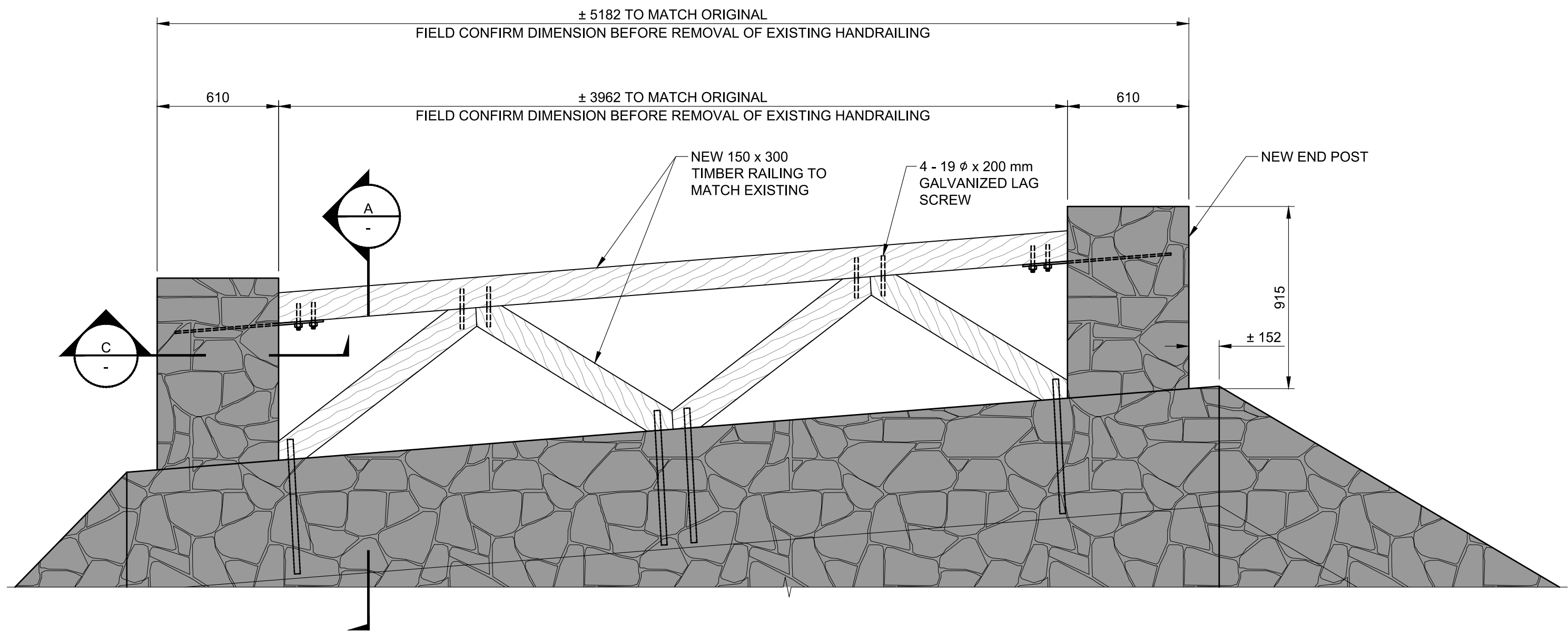
 Parks Canada	Parcs Canada
Asset Management Western and Northern Region	Gestion des biens Région de l'Ouest et du Nord

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Project title/Titre du projet
**HIGHWAY 93 SOUTH
BANFF – WINDERMERE HWY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)**

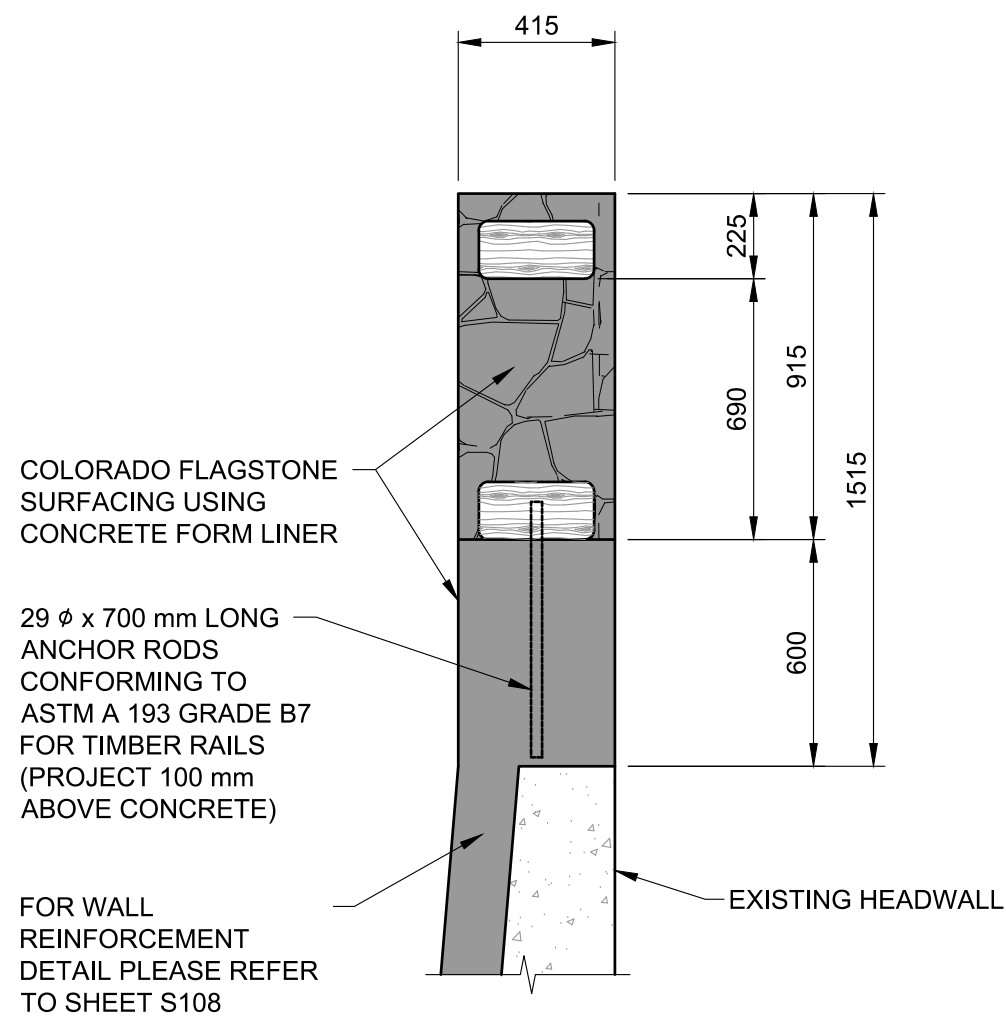
Drawing title/Titre du dessin
**HANDRAIL DETAILS
AT CULVERT OUTLET HEADWALL**

Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
Designed by/Concept par SM	Reviewed by/Revisé par BS	Scale/Echelle AS SHOWN
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Date		Date
Project No./Nº du projet 1079-01	Asset No./Nº du bien -	Sheet No./ Nº de la feuille
Drawing Set No./Nº de série du dessin 60547362-C6		S110



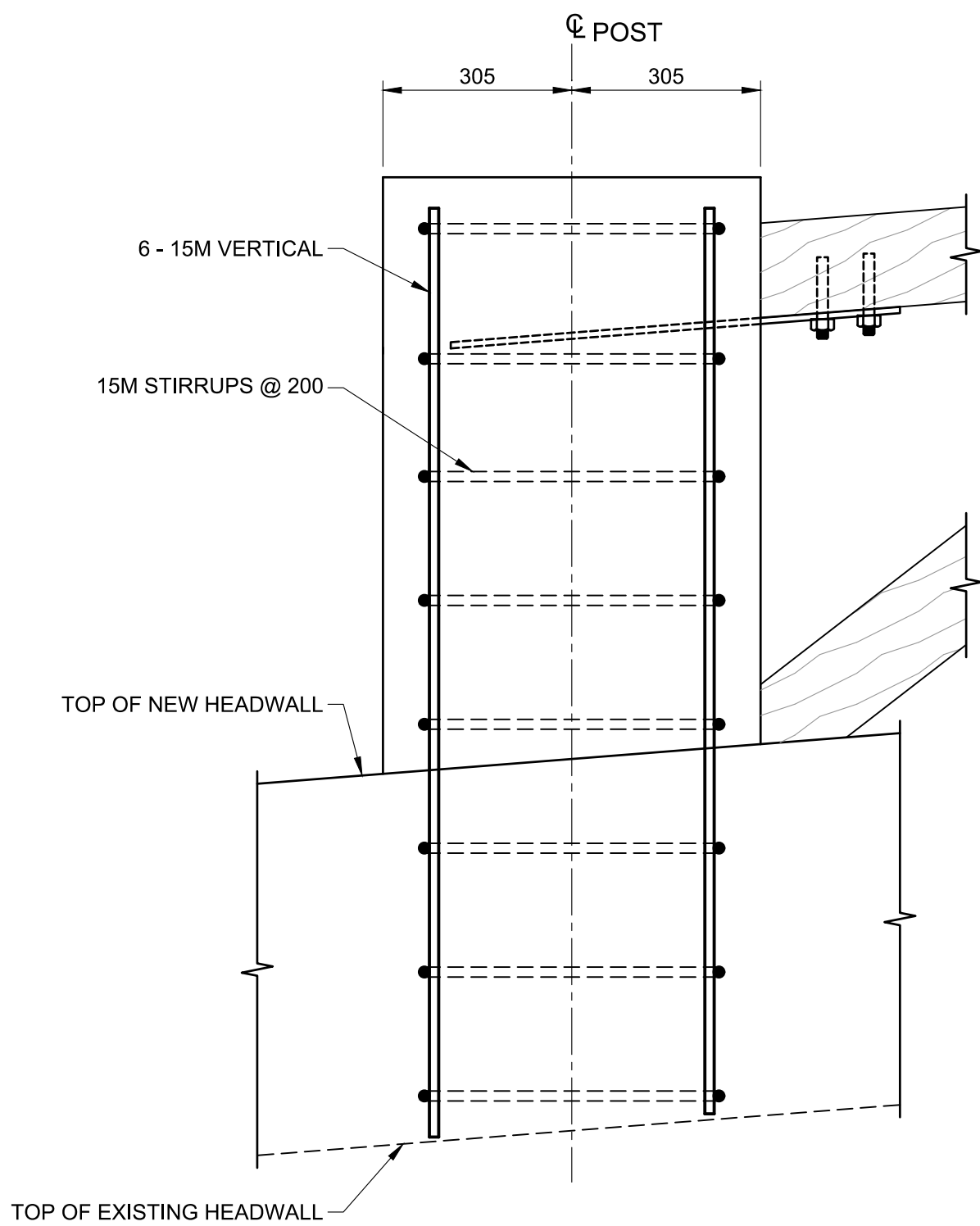
OUTLET - RAILING DETAIL

Scale 1:20



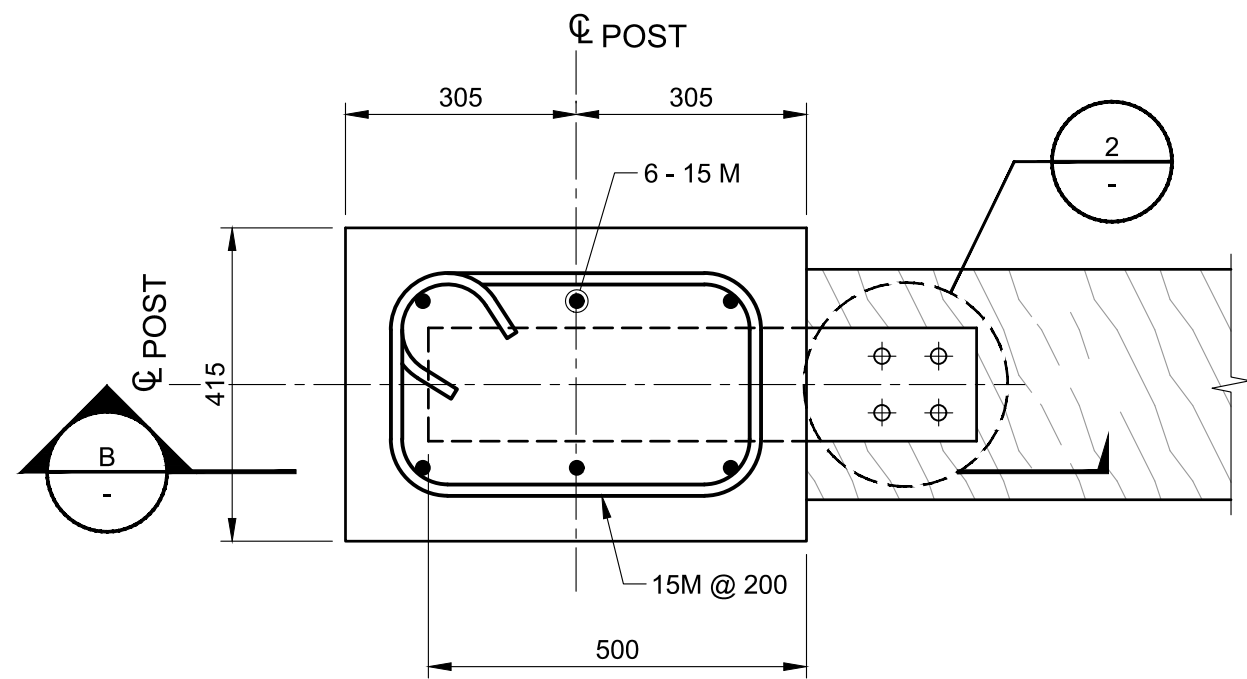
SECTION A-A

Scale 1:20



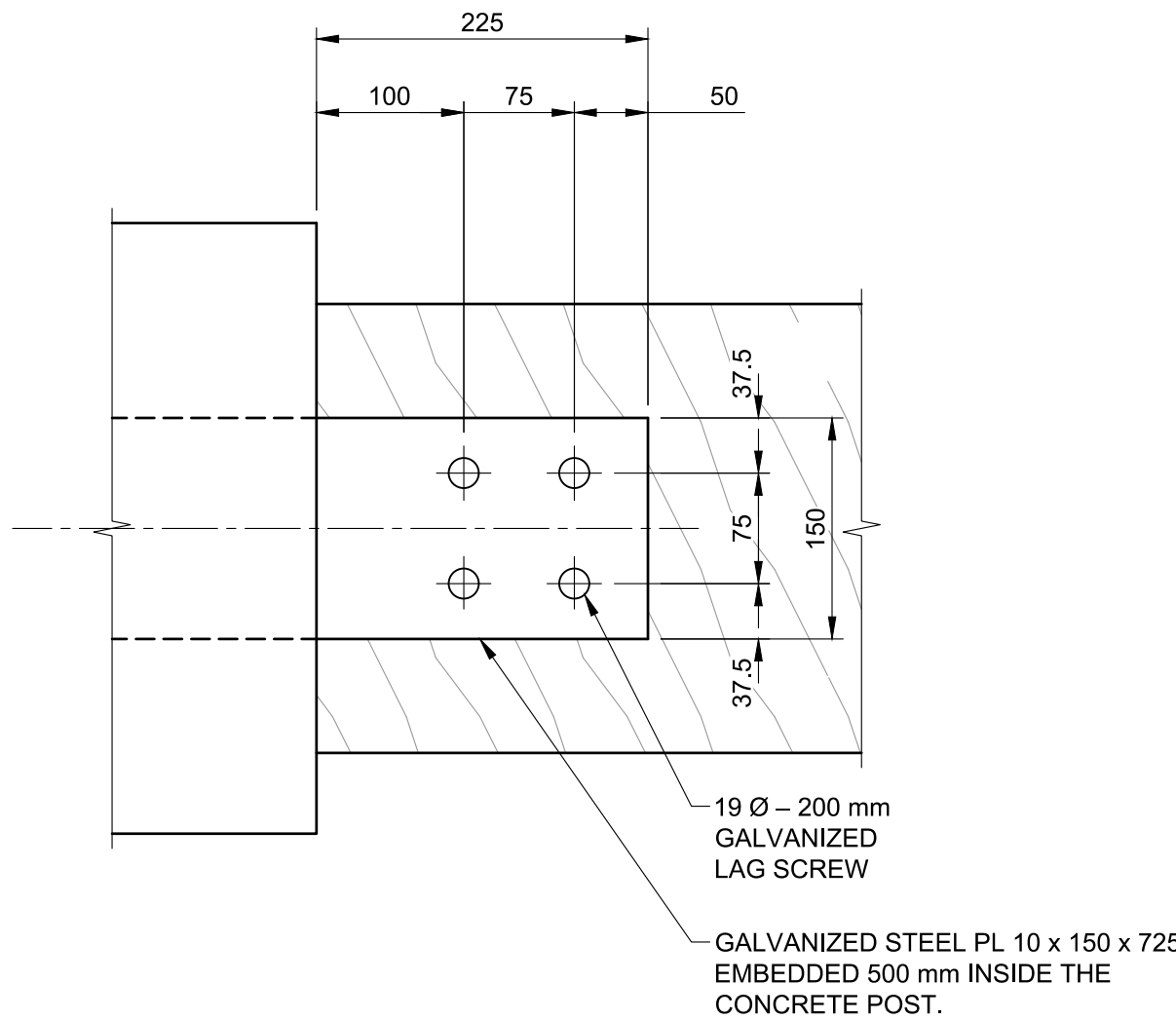
SECTION B-B

Scale 1:10



SECTION C-C

Scale 1:10



DETAIL 2

Scale 1:5

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No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision

A
B

Detail number
Sheet number

A Numéro de détail
B Numéro de la feuille

Linear dimensions
in millimetres

Dimensions linéaires
en millimètres

Consultant's Name
Nom de l'expert-conseil

Eng. Stamp
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Project title/Titre du projet

**HIGHWAY 93 SOUTH
BANFF – WINDERMERE HWY
CULVERT REPLACEMENT
SINCLAIR CREEK (KM 100.6)**

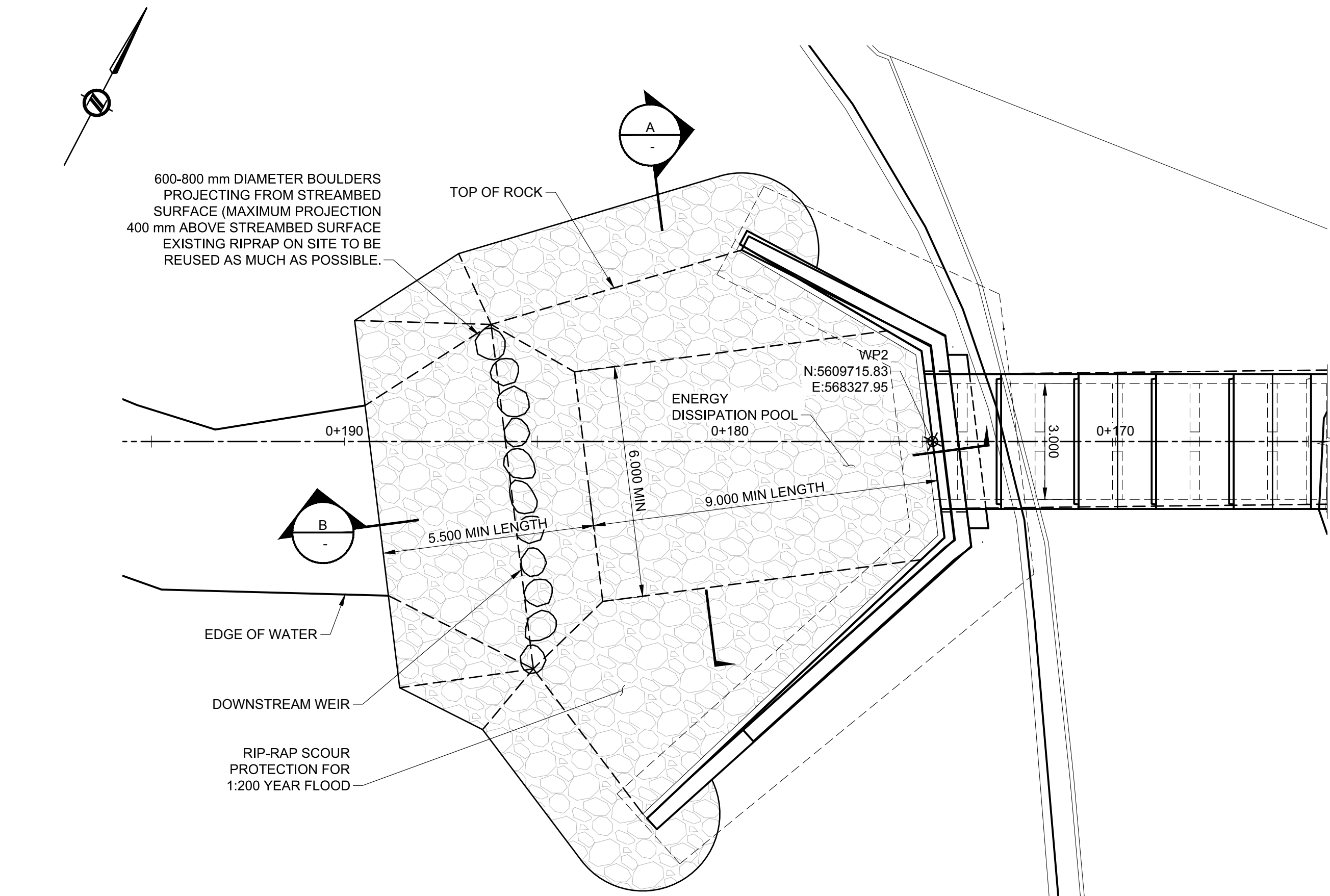
Drawing title/Titre du dessin

INLET & OUTLET RIPRAP DETAILS

Surveyed by/Arpenté par SA	Drawn by/Dessiné par ES	Date 2018-01-29
Designed by/Concept par SM	Reviewed by/Revisé par BS	Scale/Echelle AS SHOWN

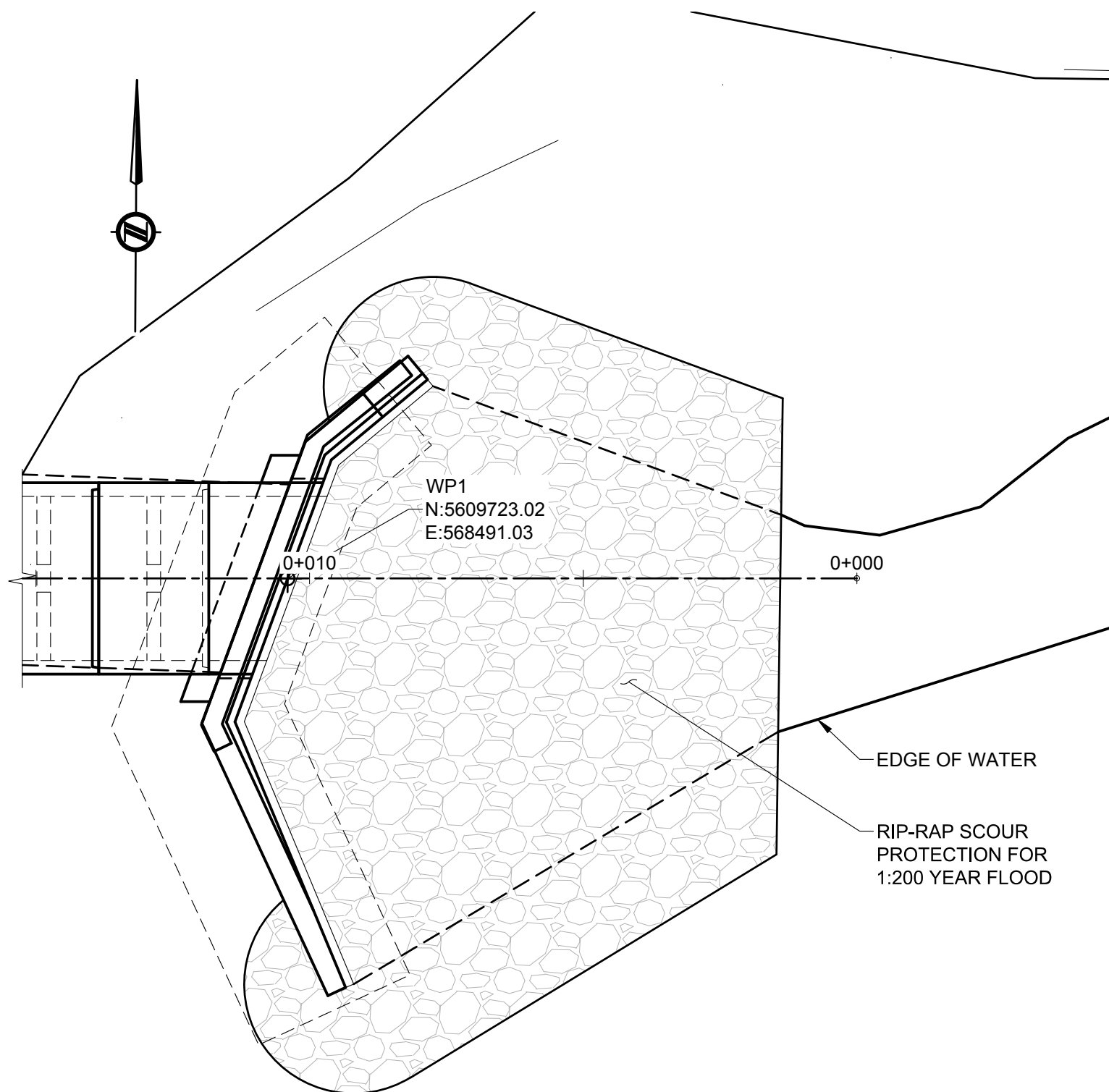
Client Acceptance/Acceptation du client	Approved by/Approuvé par
Date	Date

Project No./Nº du projet 1079-01	Asset No./Nº du bien -	Sheet No./ Nº de la feuille S111
Drawing Set No./Nº de série du dessin 60547362-C6		



OUTLET PLAN

Scale 1:100



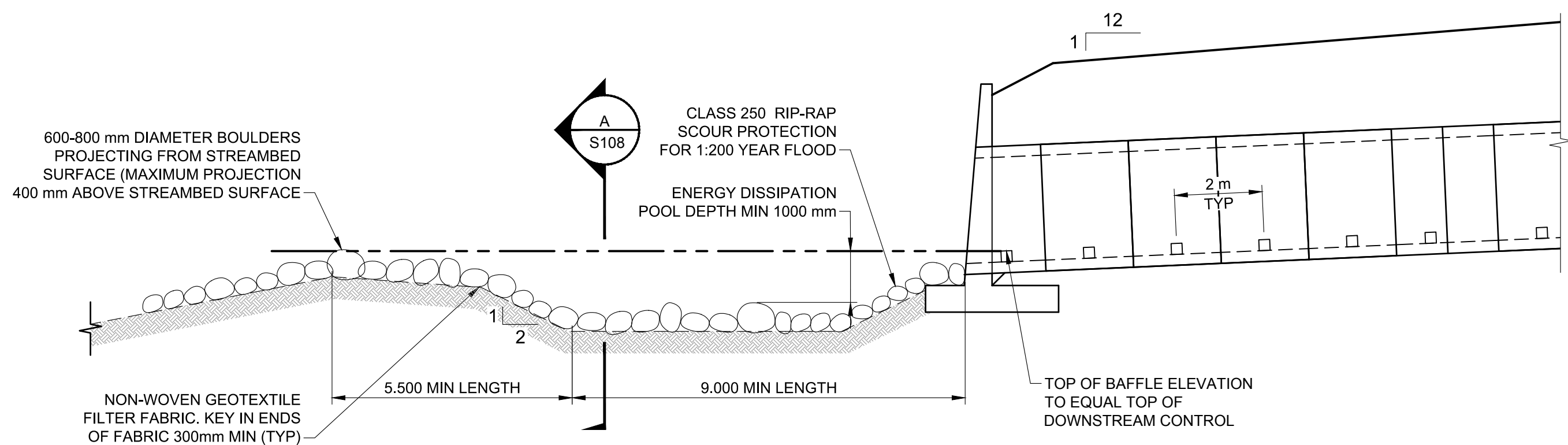
INLET PLAN

Scale 1:100

GENERAL NOTES

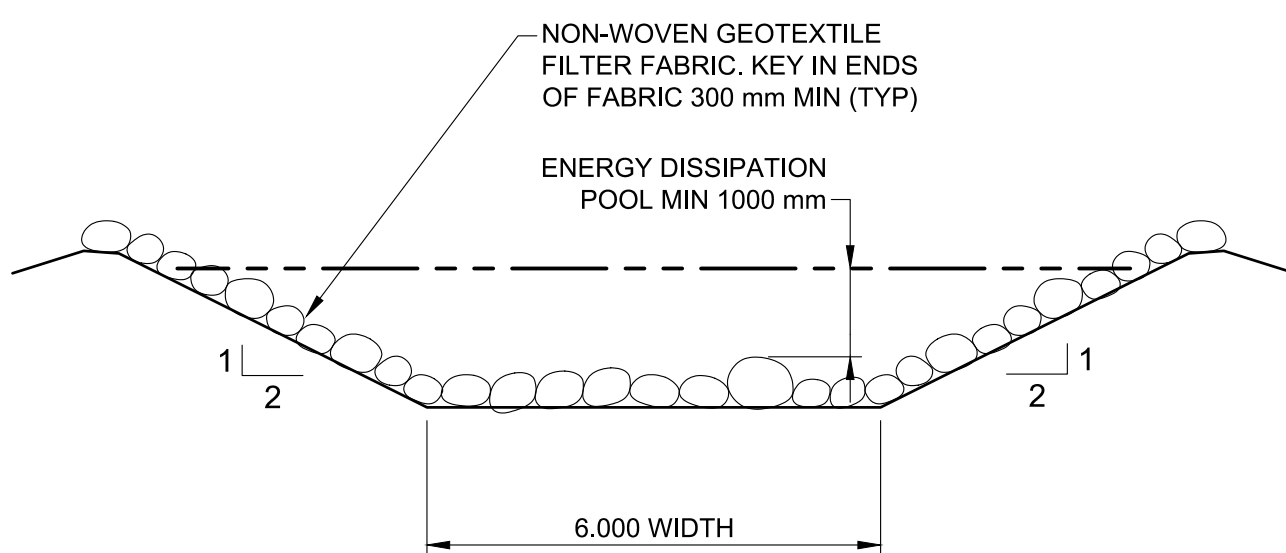
- FOR THE ENERGY DISSIPATION POOL HEAVY ROCK RIPRAP SHALL COVER THE AREA SHOWN ON THIS DRAWING.
- CLASS 250 RIPRAP TO BE PLACED TO THE ELEVATIONS SHOWN ON THIS DRAWINGS AND SHALL BE PLACED TO A MINIMUM THICKNESS OF 800 mm OVER AN AREA OF APPROXIMATELY 150 m² FOR OUTLET AND 75 m² FOR THE INLET, TOTAL = 225 m².
- EXISTING RIPRAP AT CULVERT INLET AND OUTLET TO BE REUSED WHERE FEASIBLE.
- PLACE NON-WOVEN GEOTEXTILE FILTER FABRIC UNDER ALL HEAVY ROCK RIPRAP.
- GEOTEXTILE FILTER FABRIC SHOWN SHALL MEET THE FOLLOWING REQUIREMENTS:

NON-WOVEN GEOTEXTILE FILTER FABRIC SPECIFICATIONS AND PHYSICAL PROPERTIES	
	CLASS 250
GRAB STRENGTH	900 N
ELONGATION (FAILURE)	50%
PUNCTURE STRENGTH	550 N
TRAPEZOIDAL TEAR	350 N
MINIMUM FABRIC LAP TO BE 100mm	



B | SECTION

Scale 1:100



A | SECTION

Scale 1:100