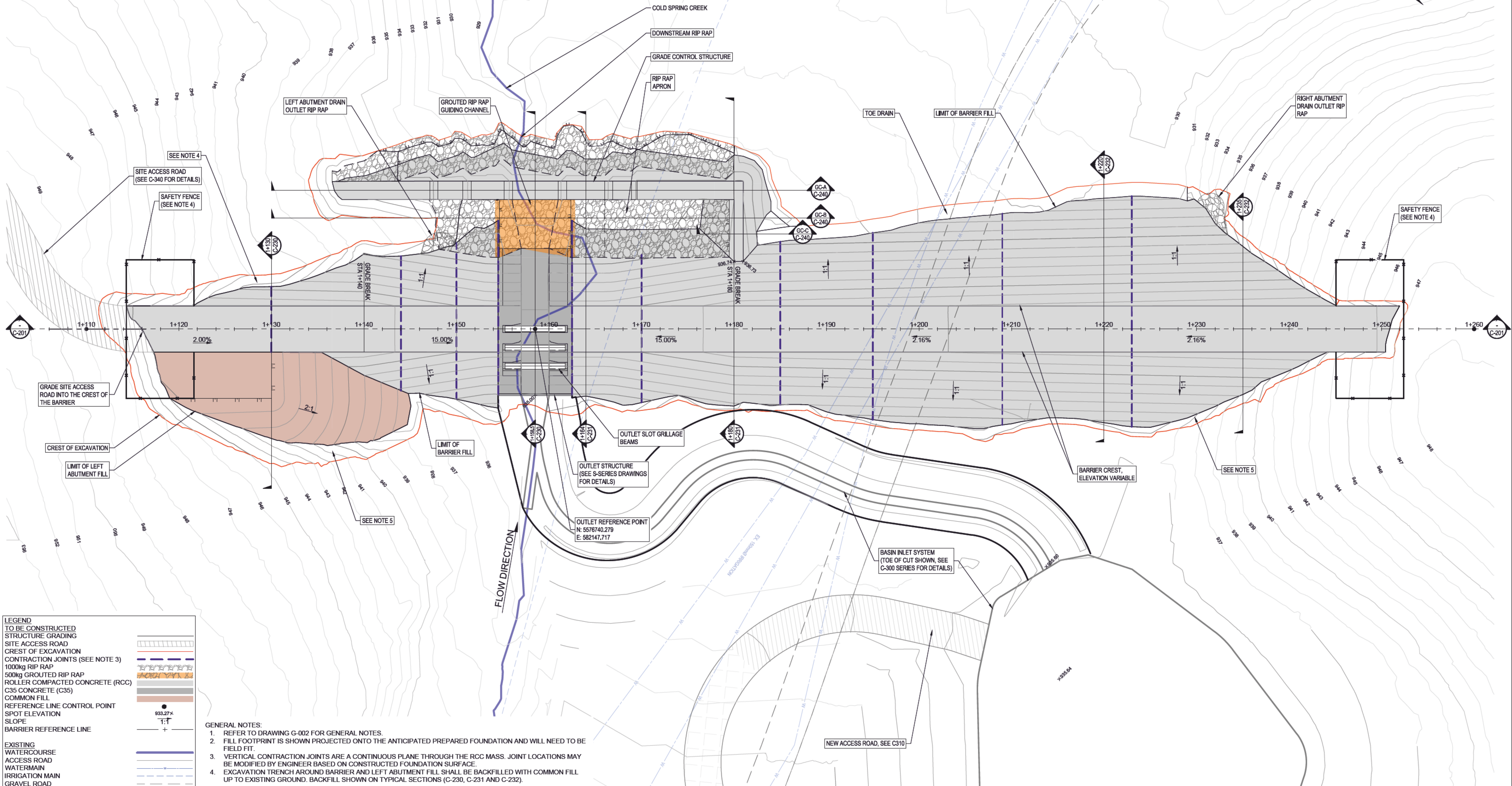


McElhanney ANS D - 202-02-11  
DATE: 2023-07-26 15:18 FILE: X:\2441\Projects\2441-01186-00 - RDEK - Cold Spring Creek Debris Flow Mitigation Ph 210 - Drawings\10.3 - Sheet Files\1186-C0-200.dwg

BARRIER REFERENCE LINE CONTROL POINT TABLE		
STATION	NORTHING	EASTING
1+110	5576700.841	582175.947
1+260	5576822.814	582088.640



LEGEND	
TO BE CONSTRUCTED	STRUCTURE GRADING
SITE ACCESS ROAD	CREST OF EXCAVATION
CONTRACTION JOINTS (SEE NOTE 3)	1000kg RIP RAP
5000kg GROUDED RIP RAP	ROLLER COMPACTED CONCRETE (RCC)
C35 CONCRETE (C35)	COMMON FILL
REFERENCE LINE CONTROL POINT	SPOT ELEVATION
SLOPE	BARRIER REFERENCE LINE
EXISTING WATERCOURSE	ACCESS ROAD
WATERMAIN	IRRIGATION MAIN
GRAVEL ROAD	

- GENERAL NOTES:**
- REFER TO DRAWING G-002 FOR GENERAL NOTES.
  - FILL FOOTPRINT IS SHOWN PROJECTED ONTO THE ANTICIPATED PREPARED FOUNDATION AND WILL NEED TO BE FIELD FIT.
  - VERTICAL CONTRACTION JOINTS ARE A CONTINUOUS PLANE THROUGH THE RCC MASS. JOINT LOCATIONS MAY BE MODIFIED BY ENGINEER BASED ON CONSTRUCTED FOUNDATION SURFACE.
  - EXCAVATION TRENCH AROUND BARRIER AND LEFT ABUTMENT FILL SHALL BE BACKFILLED WITH COMMON FILL UP TO EXISTING GROUND. BACKFILL SHOWN ON TYPICAL SECTIONS (C-230, C-231 AND C-232).

Rev	Date	Description	Drawn	Design	App'd
0	2023-07-25	ISSUED FOR CONSTRUCTION	EO	EM	PN

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0 1:200 10

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BGC

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PERMIT TO PRACTICE  
BGC ENGINEERING INC.  
PERMIT NUMBER: 1000944  
ENGINEERS AND GEOSCIENTISTS BC

Approved Scaled

REGIONAL DISTRICT OF EAST KOOTENAY  
19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5

COLD SPRING CREEK  
DEBRIS-FLOW MITIGATION - BARRIER  
OVERALL PLAN

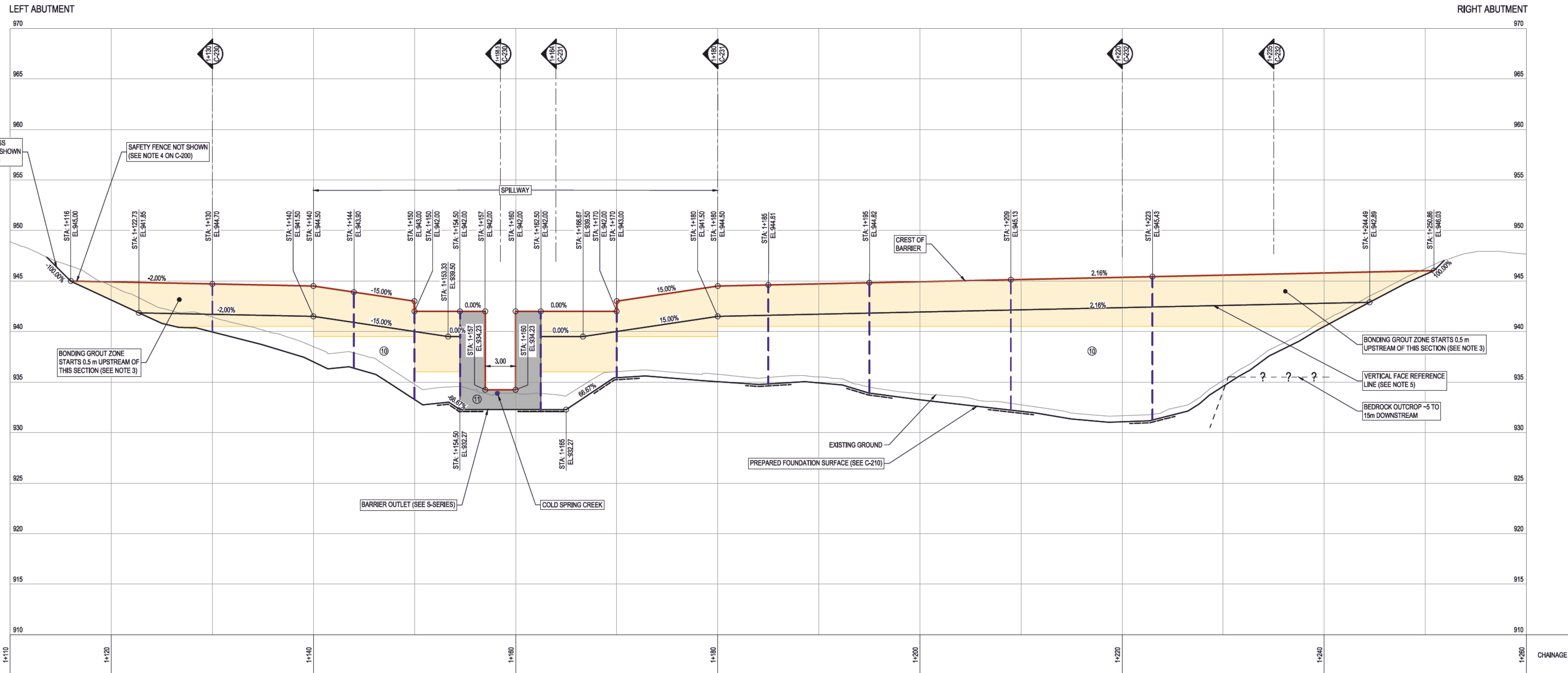
Drawing No. C-200

Project Number 2441-01186

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BARRIER REFERENCE LINE PROFILE

LEGEND	
ROLLER COMPACTED CONCRETE (RCC)	
FINAL BARRIER SURFACE	
VERTICAL CONTRACTION JOINT (NOTE 2 AND 4)	
EXISTING GROUND SURFACE	
NON-WOVEN GEOTEXTILE (SEE NOTE 4)	
PREPARED FOUNDATION SURFACE	
C35 CONCRETE	
BONDING GROUT ZONE (SEE NOTE 3)	

- GENERAL NOTES:
1. THE BEDROCK SURFACE AND PREPARED FOUNDATION SURFACE ELEVATIONS ARE INFERRED BASED ON LIMITED SUBSURFACE INFORMATION. ACTUAL ELEVATIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT THAN SHOWN.
  2. VERTICAL CONTRACTION JOINTS ARE A CONTINUOUS PLANE THROUGH THE RCC MASS. JOINT LOCATION MAY BE MODIFIED BY ENGINEER BASED ON CONSTRUCTED FOUNDATION SURFACE.
  3. APPLY BONDING GROUT AT EACH LIFT IN ZONE SHOWN PER TECHNICAL SPECIFICATIONS FOR THE UPSTREAM 2 m OF BARRIER RCC FILL. GROUT SHALL BE APPLIED ABOVE EL. 936m BETWEEN STATIONS 1+150 AND 1+170, ABOVE EL. 939.5m BETWEEN STATIONS 1+140 AND 1+150, AND 1+170 AND 1+180, AND ABOVE 940.5 ELSEWHERE. GROUT ZONES ARE SHOWN IN TYPICAL SECTIONS ON C-230 AND C-231.
  4. PLACE 4.5 m WIDE STRIP OF NON-WOVEN GEOTEXTILE ON APPROVED PREPARED FOUNDATION SURFACE BENEATH VERTICAL CONTRACTION JOINTS WHEREVER CONTRACTION JOINT IS ON SOIL.
  5. THE FACE OF THE ROLLER COMPACTED CONCRETE BARRIER IS SLOPED AT 1H:1V BELOW THE VERTICAL FACE REFERENCE LINE.

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ORIGINAL DWG SIZE: ANSI D (22" x 34")



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REGIONAL DISTRICT OF EAST KOOTENAY  
19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5  
**COLD SPRING CREEK  
DEBRIS-FLOW MITIGATION - BARRIER  
REFERENCE LINE PROFILE**

Drawing No.

**C-201**

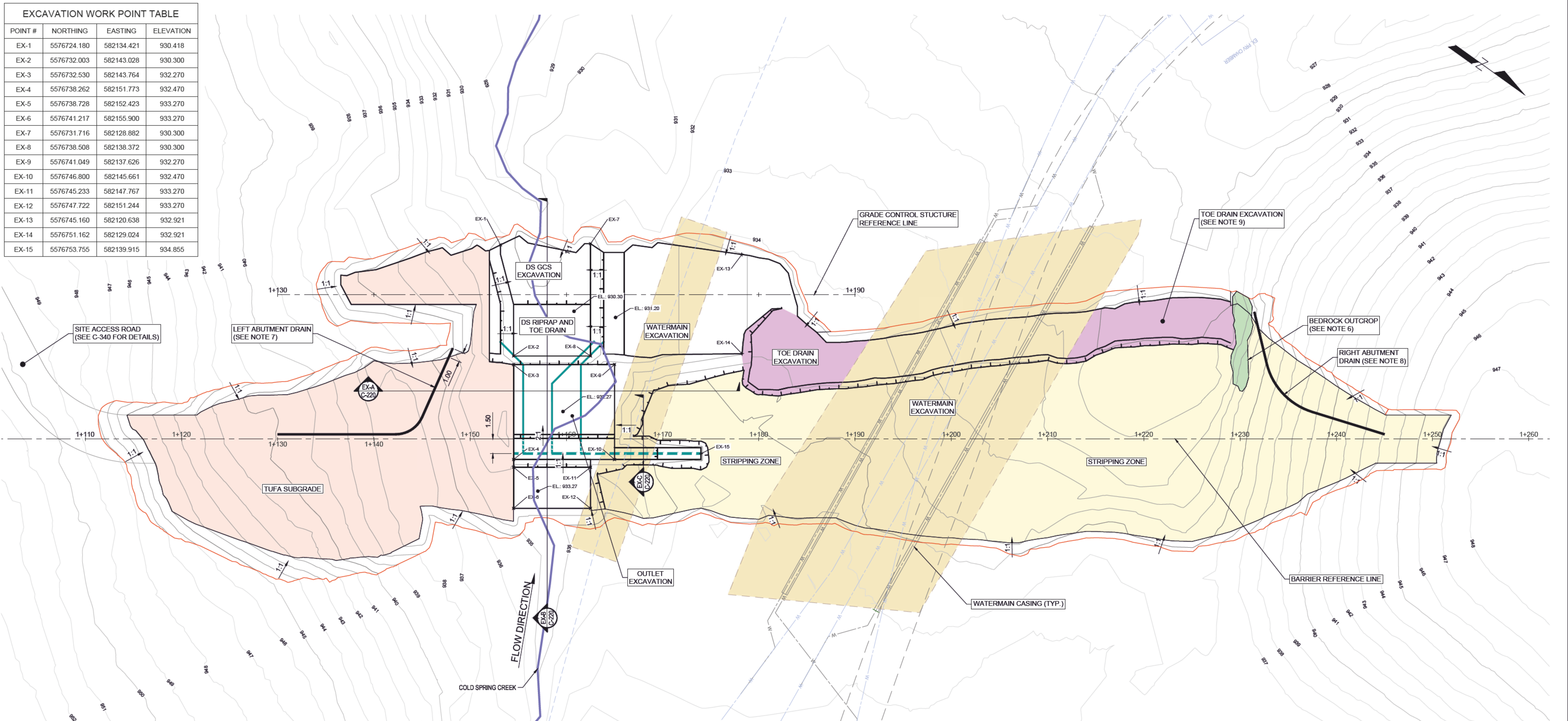
Project Number  
2441-01186

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 DATE: 2023-07-27, 11:28 FILE: \\s2\44\Projects\2441-0118-00 - RDEK - Cold Spring Creek Debris Flow Migration Ph 210 - Drawings\10.3 Sheet Files\0118-00-210.dwg

EXCAVATION WORK POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
EX-1	5576724.180	582134.421	930.418
EX-2	5576732.003	582143.028	930.300
EX-3	5576732.530	582143.764	932.270
EX-4	5576738.262	582151.773	932.470
EX-5	5576738.728	582152.423	933.270
EX-6	5576741.217	582155.900	933.270
EX-7	5576731.716	582128.882	930.300
EX-8	5576738.508	582138.372	930.300
EX-9	5576741.049	582137.626	932.270
EX-10	5576746.800	582145.661	932.470
EX-11	5576745.233	582147.767	933.270
EX-12	5576747.722	582151.244	933.270
EX-13	5576745.160	582120.638	932.921
EX-14	5576751.162	582129.024	932.921
EX-15	5576753.755	582139.915	934.855



LEGEND	
TO BE CONSTRUCTED	—
STRUCTURE GRADING	—
CREST OF EXCAVATION	—
TUFA SUBGRADE (SEE NOTE 3)	—
STRIPPING ZONE (SEE NOTE 4)	—
EXPOSED NATIVE BEDROCK SURFACE (SEE NOTE 6)	—
TOE DRAIN EXCAVATION ZONE (SEE NOTE 9)	—
WATERMAIN EXCAVATION ZONE (SEE C-330)	—
PERFORATED HDPE PIPE (200mmØ)	—
NON-PERFORATED HDPE PIPE (200mmØ)	—
PVC OUTLET PIPE (200mmØ)	—
SPOT ELEVATION	EX-11
SLOPE	1:1
REPLACEMENT WATERMAIN	—
BARRIER REFERENCE LINE	—
EXISTING	—
WATERCOURSE	—
WATERMAIN	—
IRRIGATION MAIN	—
ACCESS ROAD	—

- EXCAVATION NOTES:**
- REFER TO DRAWING G-002 FOR GENERAL NOTES.
  - THE EXTENT OF THE PREPARED FOUNDATION DEPENDS ON THE TOPOGRAPHY ENCOUNTERED DURING CONSTRUCTION AND MAY NEED TO BE FIELD FIT.
  - THE TUFA SUBGRADE ZONE ASSUMES A NOMINAL SOIL EXCAVATION DEPTH OF 1.5 m TO SUITABLE FOUNDATION (TUFA OR OTHERWISE). THE ACTUAL EXTENT AND DEPTH MAY VARY FROM WHAT IS SHOWN. ADDITIONAL INFORMATION ABOUT THE DEPTH TO TUFA WILL BE COLLECTED DURING A PRE-CONSTRUCTION SITE INVESTIGATION PROGRAM, AS OUTLINED IN THE SPECIFICATIONS.
  - STRIPPING ZONE ASSUMES A NOMINAL SOIL EXCAVATION DEPTH OF 0.6 m TO SUITABLE FOUNDATION. THE ACTUAL EXTENT AND DEPTH MAY VARY FROM WHAT IS SHOWN.
  - THE DOWNSTREAM TOE OF THE GRADE CONTROL STRUCTURE SHOULD BE EMBEDDED A MINIMUM OF 1 m BELOW EXISTING GRADE. THE EXTENT OF EXCAVATION MAY VARY FROM WHAT IS SHOWN.
  - PREPARE THE NATURAL BEDROCK SURFACE WITHIN THE BEDROCK OUTCROP POLYGON. THE EXTENT MAY VARY FROM WHAT IS SHOWN BASED ON THE BEDROCK SURFACE ENCOUNTERED DURING CONSTRUCTION. BEDROCK SURFACE MUST BE APPROVED BY THE ENGINEER.
  - THE LEFT ABUTMENT DRAIN ALIGNMENT TO BE FIELD FIT BASED ON THE DIRECTION OF ENGINEER. DRAIN TO HAVE A MINIMUM TOP WIDTH OF 1m BETWEEN STATION 1+130 AND 1+140, AND A MINIMUM TOP WIDTH OF 2m FROM STATION 1+140 AND DOWNSTREAM.
  - RIGHT ABUTMENT DRAIN ALIGNMENT TO BE FIELD FIT BASED ON DIRECTION OF ENGINEER.
  - TOE DRAIN EXCAVATION ASSUMES A NOMINAL EXCAVATION DEPTH OF 1.2m TO ACCOMMODATE TOE DRAIN FILTERS. THE EXTENT OF EXCAVATION MAY VARY FROM WHAT IS SHOWN.
  - OUTLET DRAIN CONSISTS OF FOUR PIPES - ONE PERFORATED HDPE COLLECTOR PIPE, AND THREE OUTLET PIPES WITH NON-PERFORATED HDPE AND PVC SECTIONS. THE COLLECTOR PIPE IS SHOWN FROM STATION 1+154.5 TO 1+174, BUT MAY EXTEND FURTHER UP THE LEFT ABUTMENT DEPENDING ON THE EXTENT OF TUFA ENCOUNTERED DURING CONSTRUCTION. THE OUTLET PIPES ARE LOCATED AT STATIONS 1+155.5, 1+158.5 AND 1+161.5, AND END IN THE NON-GROUTED RIPRAP.

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0 1:200 10

ORIGINAL DWG SIZE: ANSI D (22" x 34")

**McElhanney**

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 ENGINEERS AND GEOSCIENTISTS BC

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REGIONAL DISTRICT OF EAST KOOTENAY  
 19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5

COLD SPRING CREEK  
 DEBRIS-FLOW MITIGATION - BARRIER  
 EXCAVATION PLAN

Drawing No. **C-210**

Project Number 2441-01186

Rev. 0

DESTROY ALL PRINTS BEARING PREVIOUS REVISION



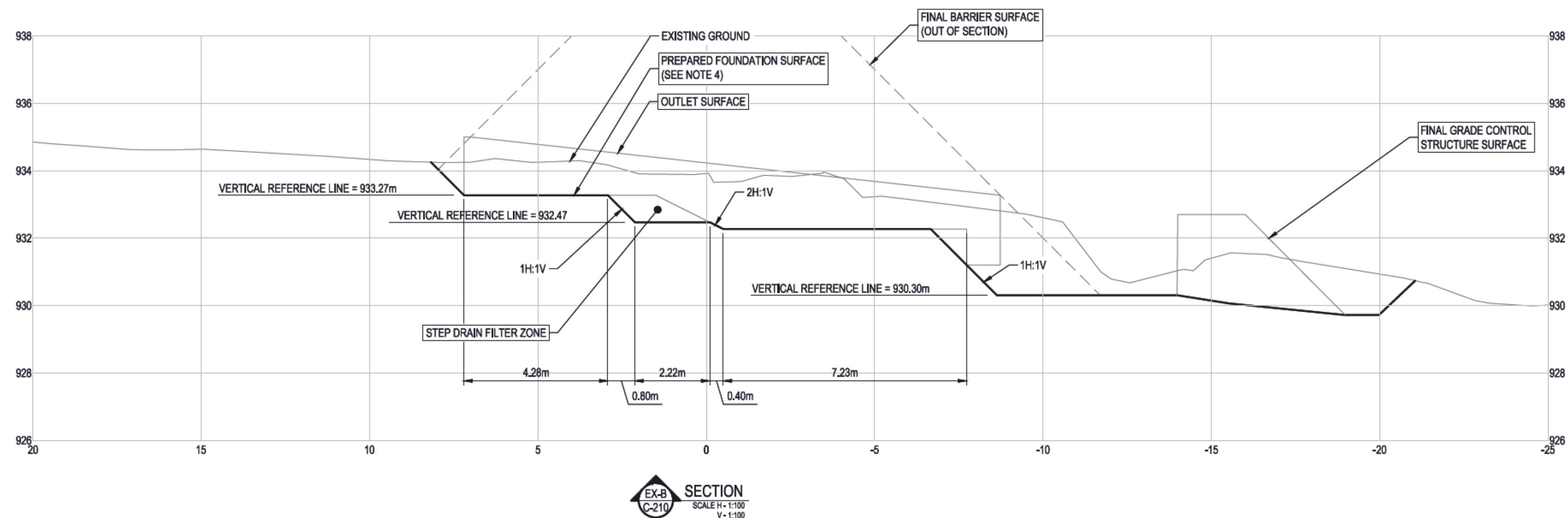
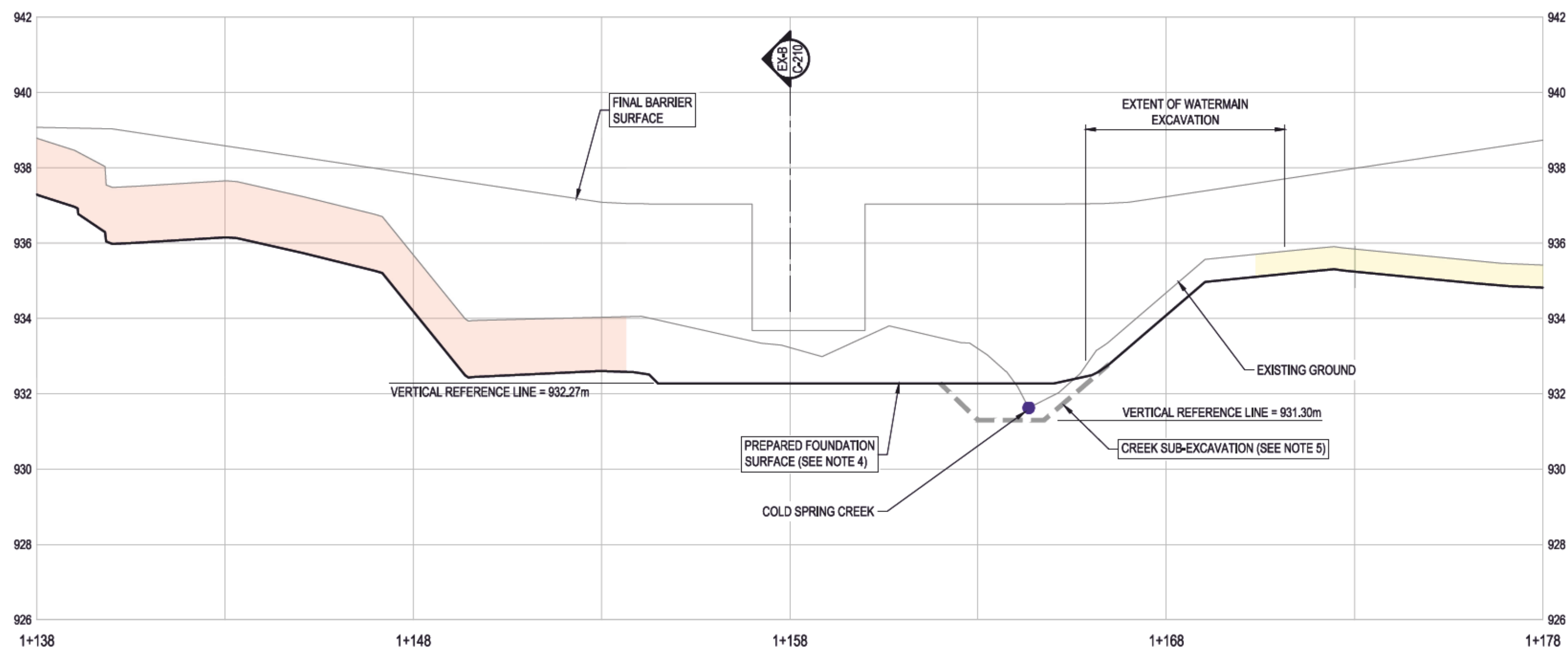
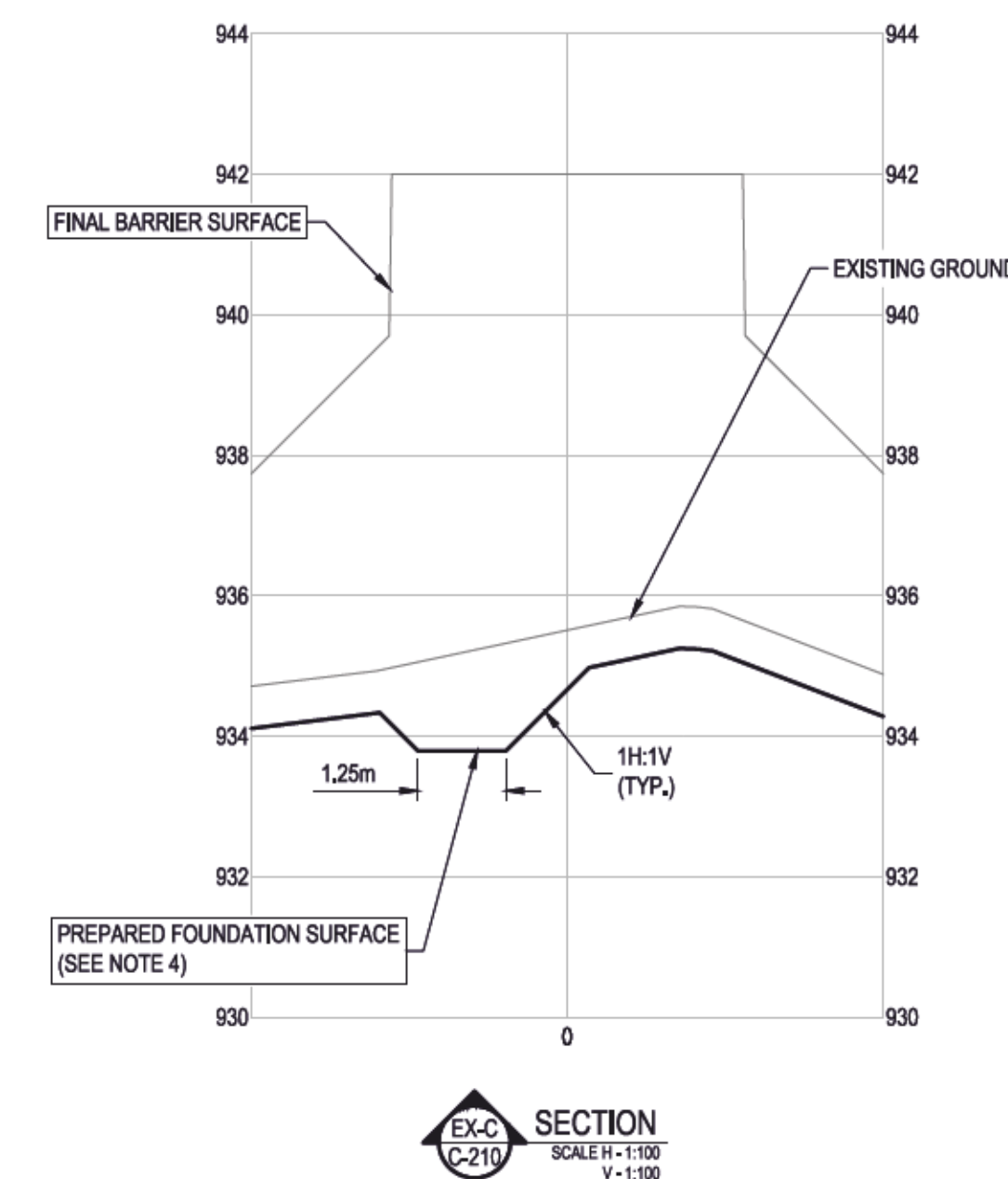
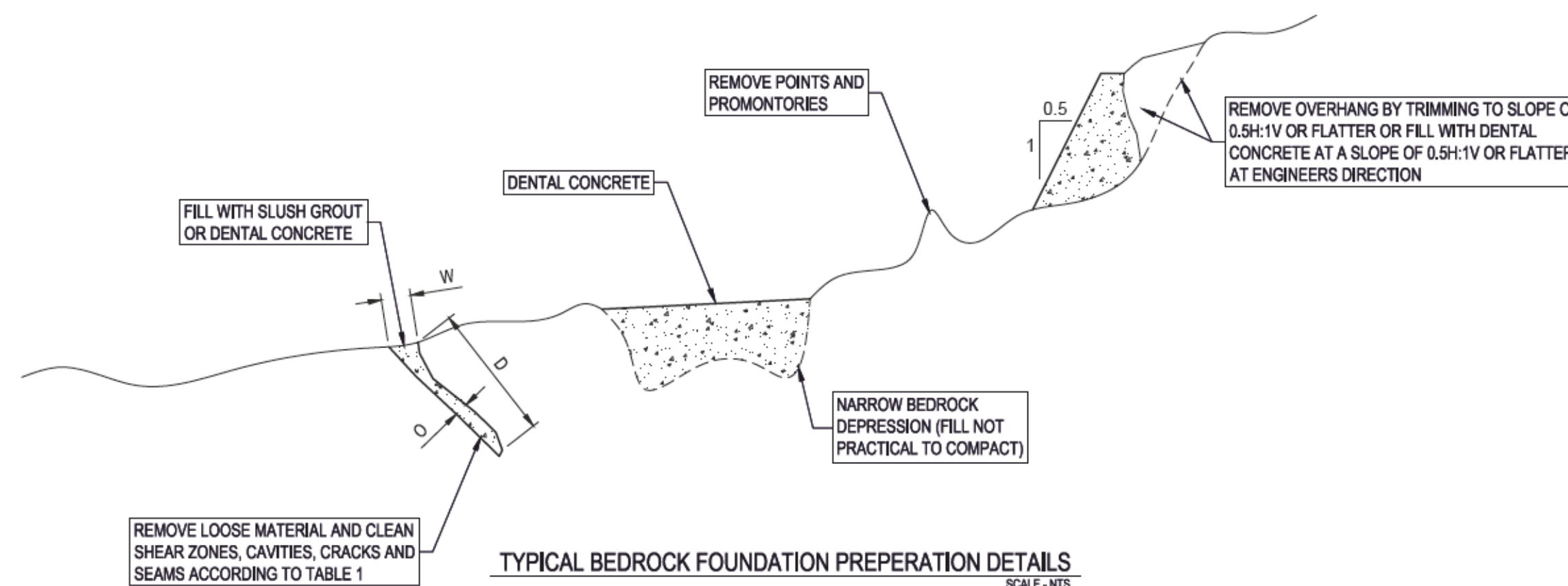


TABLE 1: SLUSH GROUT AND DENTAL CONCRETE REQUIREMENTS

CASE	WIDTH OF FRACTURE	DEPTH OF FEATURE	TREATMENT
1	50 mm OR LESS	3 TIMES THE WIDTH	SLUSH GROUT
2	GREATER THAN 50 mm TO 1.5 m	3 TIMES THE WIDTH AND TO A DEPTH WHERE OPENING IS 13 mm OR LESS	DENTAL CONCRETE
3	GREATER THAN 1.5 m	3 TIMES THE WIDTH OR AS DIRECTED BY COMPANY'S REPRESENTATIVE	DENTAL CONCRETE



- GENERAL NOTES:
- THE TUFA SUBGRADE ZONE ASSUMES A NOMINAL SOIL EXCAVATION DEPTH OF 1.5 m TO SUITABLE FOUNDATION (TUFA OR OTHERWISE). THE ACTUAL EXTENT AND DEPTH MAY VARY FROM WHAT IS SHOWN. ADDITIONAL INFORMATION ABOUT THE DEPTH TO TUFA WILL BE COLLECTED DURING A PRE-CONSTRUCTION SITE INVESTIGATION PROGRAM, AS OUTLINED IN THE SPECIFICATIONS.
  - STRIPPING ZONE ASSUMES A NOMINAL SOIL EXCAVATION DEPTH OF 0.8 m TO SUITABLE FOUNDATION. THE ACTUAL EXTENT AND DEPTH MAY VARY FROM WHAT IS SHOWN. THE DOWNSTREAM TOE OF THE GRADE CONTROL STRUCTURE SHOULD BE EMBEDDED A MINIMUM OF 1 m BELOW EXISTING GRADE. THE EXTENT OF EXCAVATION MAY VARY FROM WHAT IS SHOWN.
  - THE PREPARED FOUNDATION SURFACE ELEVATIONS ARE INFERRED BASED ON LIMITED SUBSURFACE INFORMATION. ACTUAL ELEVATIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT THAN SHOWN.
  - SUB-EXCAVATION BELOW THE PREPARED FOUNDATION SURFACE MAY BE REQUIRED TO ACHIEVE SUITABLE FOUNDATION. SUB-EXCAVATION SHOULD BE BACKFILLED WITH PROCESSED DEBRIS-FLOW MATERIAL OR STRUCTURAL FILL UP TO THE PREPARED FOUNDATION SURFACE, WITH CONCRETE AND RCC PLACEMENT BEGINNING ABOVE THE PREPARED FOUNDATION SURFACE. SUB-EXCAVATION WILL BE REQUIRED IN LOCAL AREAS AROUND COLD SPRING CREEK (AS SHOWN ON C-220, EX-A) AND MAY BE REQUIRED IN OTHER AREAS AT THE DISCRETION OF THE ENGINEER.
  - THE ELEVATION OF THE BASE OF THE EXCAVATION BETWEEN THE GRADE CONTROL STRUCTURE AND THE BARRIER VARIES BY STATION. REFER TO C-240 FOR A PROFILE OF THE EXCAVATION AND FILL IN THIS AREA.

LEGEND

PREPARED FOUNDATION SURFACE	—
TUFA SUBGRADE ZONE (SEE NOTE 1)	▨
STRIPPING ZONE (SEE NOTE 2)	▨
SUBGRADE SURFACE (SEE NOTE 5)	▨

DATE	DESCRIPTION	Drawn	Design	App'd	
0	2023-07-25	ISSUED FOR CONSTRUCTION	EO	EM	PN
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REGIONAL DISTRICT OF EAST KOOTENAY  
19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5

COLD SPRING CREEK  
DEBRIS-FLOW MITIGATION - BARRIER  
EXCAVATION SECTIONS

Project Number  
2441-01186

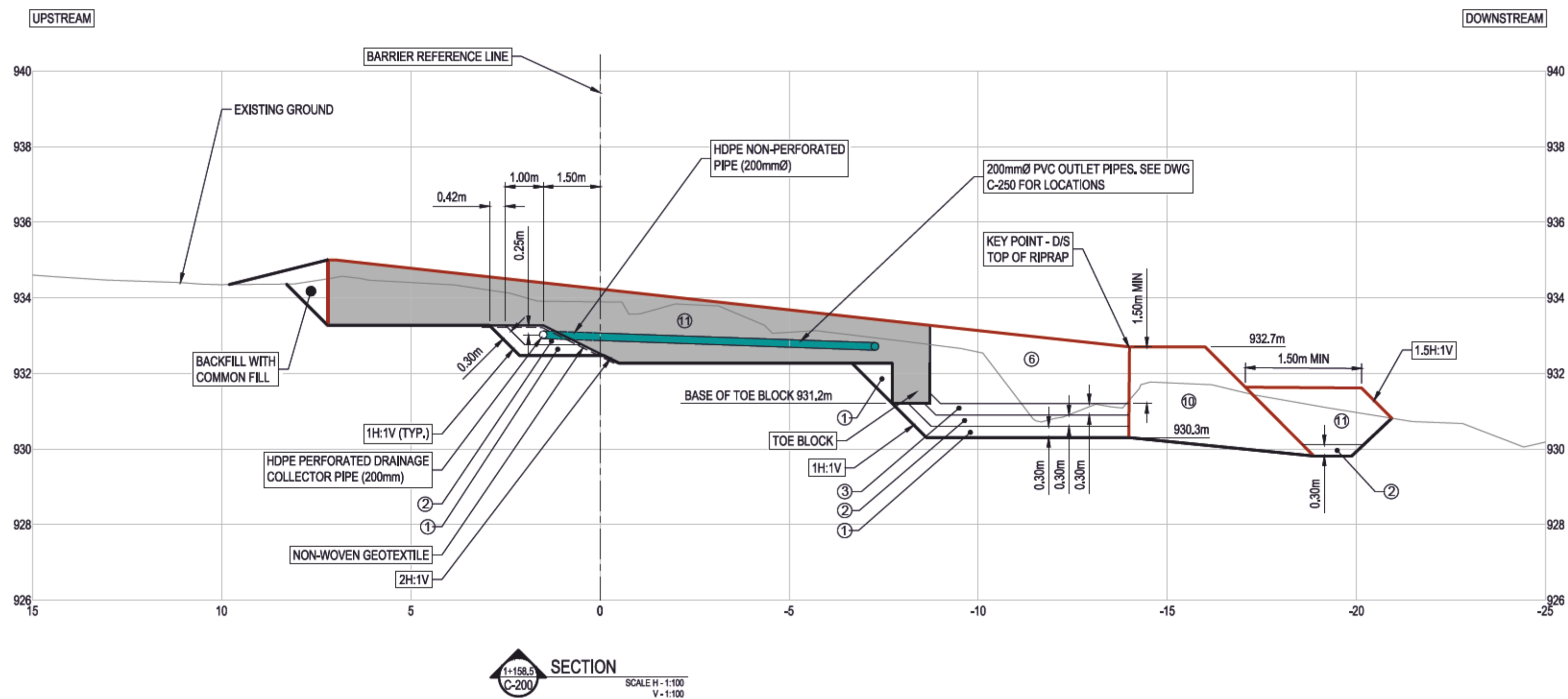
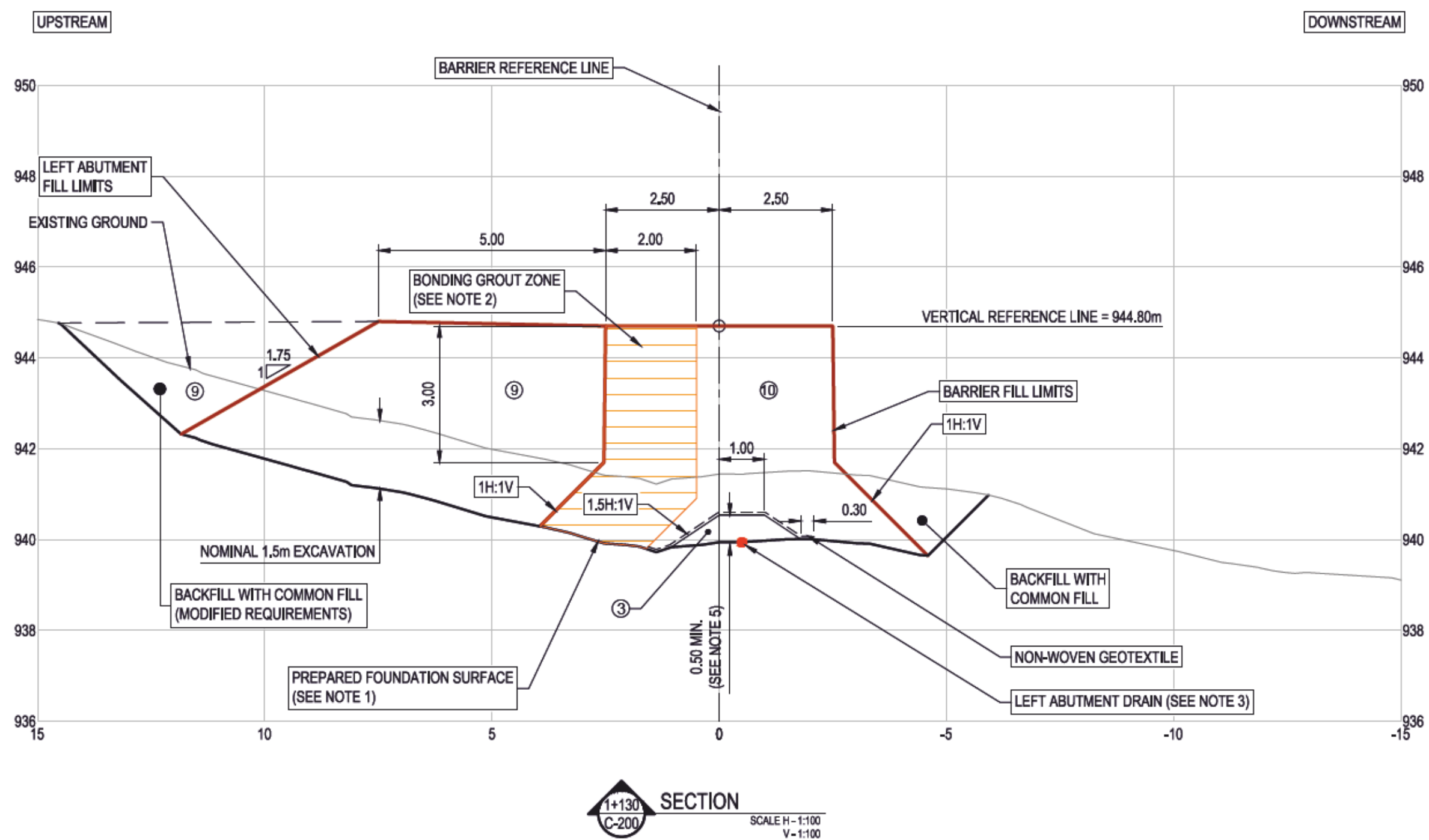
Rev  
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Drawing No.  
C-220

Rev  
0

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LEGEND	
①	SAND FILTER
②	GRAVEL FILTER
③	COBBLE FILTER
④	500kg GROUDED RIPRAP
⑤	COMMON FILL
⑥	RCC
⑦	C35 CONCRETE
⑧	EXISTING GROUND SURFACE
⑨	BARRIER FILL LIMITS
⑩	PREPARED FOUNDATION SURFACE (SEE NOTE 1)
⑪	BONDING GROUT ZONE (SEE NOTE 2)

- GENERAL NOTES:**
- THE PREPARED FOUNDATION SURFACE ELEVATION IS INFERRED BASED ON LIMITED SUBSURFACE INFORMATION. ACTUAL ELEVATIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT THAN SHOWN. REFER TO C-210 FOR ADDITIONAL EXCAVATION DETAILS.
  - APPLY BONDING GROUT AT EACH LIFT IN ZONE SHOWN PER TECHNICAL SPECIFICATIONS FOR THE UPSTREAM 2m OF BARRIER AND RCC FILL IN THIS ZONE. GROUT SHALL BE APPLIED ABOVE EL. 936m BETWEEN STATIONS 1+150 AND 1+170, ABOVE EL. 939.5m BETWEEN STATIONS 1+140 AND 1+150, AND 1+170 AND 1+180, AND ABOVE 940.5m ELSEWHERE. GROUT ZONES ARE SHOWN IN PROFILE ON C-201.
  - THE LEFT ABUTMENT DRAIN TO BE FIELD FIT BASED ON THE DIRECTION OF THE ENGINEER. SEE NOTE 7, C-210 FOR DIMENSION DETAILS.

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0	2023-07-25	ISSUED FOR CONSTRUCTION	EO	EM	PN

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ORIGINAL DWG SIZE: ANSI D (22" x 34")



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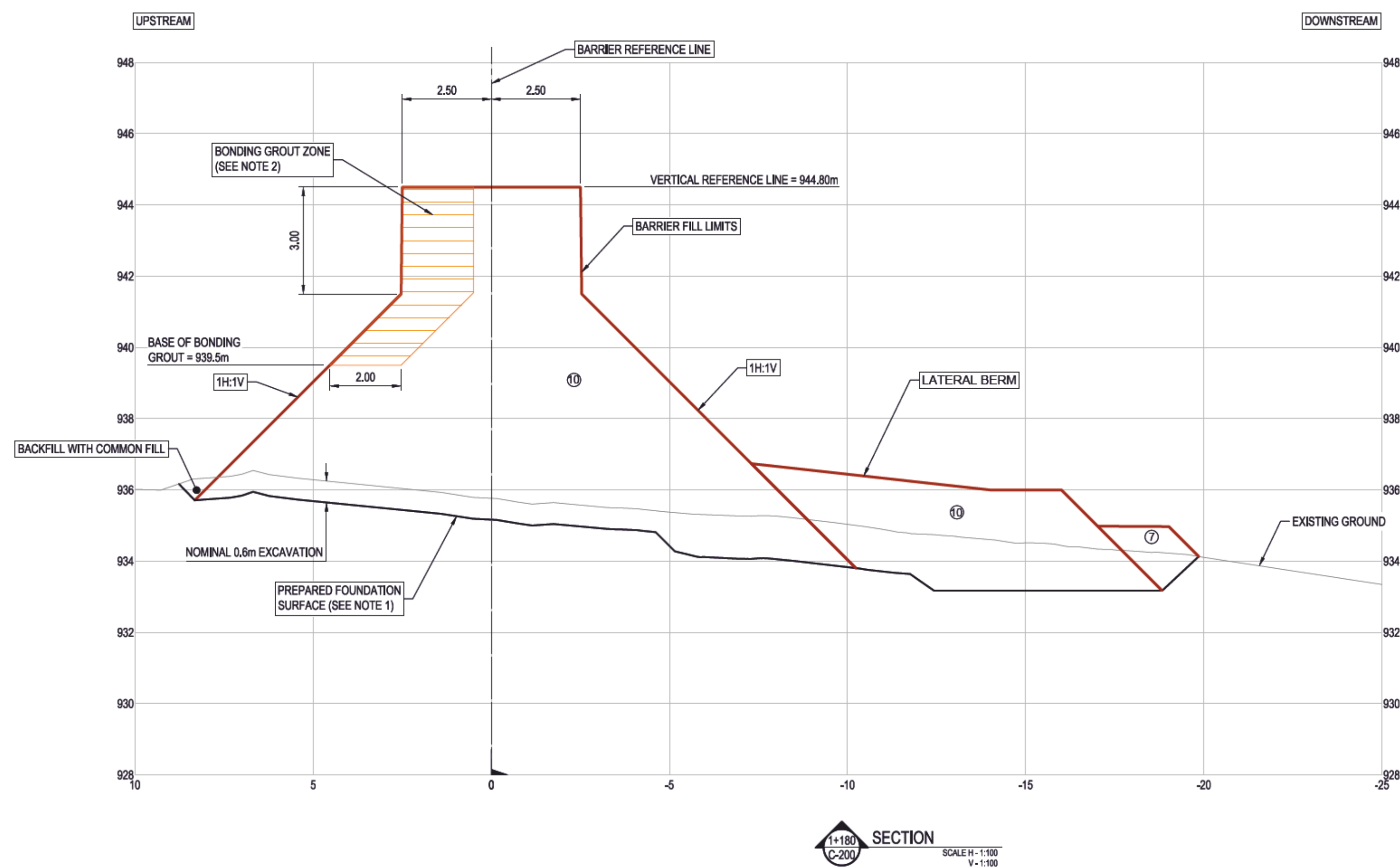
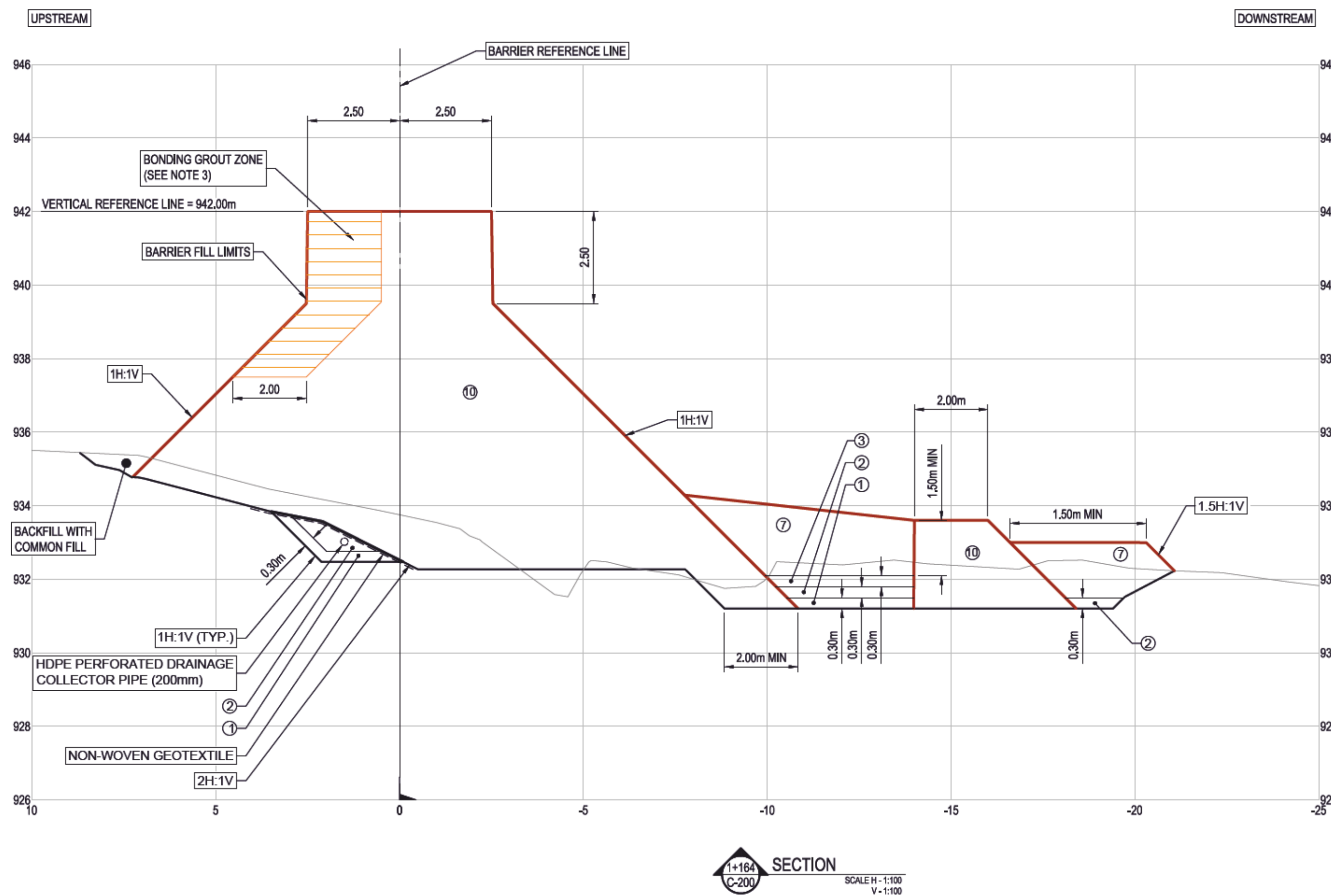
**REGIONAL DISTRICT OF EAST KOOTENAY**  
19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5

**COLD SPRING CREEK  
DEBRIS-FLOW MITIGATION - BARRIER  
TYPICAL SECTIONS  
(SHEET 1 OF 3)**

Drawing No.	
<b>C-230</b>	
Project Number	Rev.
2441-01186	0

Approved Scaled





LEGEND	
	SAND FILTER
	GRAVEL FILTER
	COBBLE FILTER
	1000kg RIPRAP
	RCC
	EXISTING GROUND SURFACE
	FILL LIMITS
	PREPARED FOUNDATION SURFACE (SEE NOTE 1)
	BONDING GROUT ZONE (SEE NOTE 2)

- GENERAL NOTES:**
- THE PREPARED FOUNDATION SURFACE ELEVATION IS INFERRED BASED ON LIMITED SUBSURFACE INFORMATION. ACTUAL ELEVATIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT THAN SHOWN. REFER TO C-210 FOR ADDITIONAL EXCAVATION DETAILS.
  - APPLY BONDING GROUT AT EACH LIFT IN ZONE SHOWN PER TECHNICAL SPECIFICATIONS FOR THE UPSTREAM 2m OF BARRIER AND RCC FILL IN THIS ZONE. GROUT SHALL BE APPLIED ABOVE EL. 936m BETWEEN STATIONS 1+150 AND 1+170, ABOVE EL. 939.5m BETWEEN STATIONS 1+140 AND 1+150, AND 1+170 AND 1+180, AND ABOVE 940.5m ELSEWHERE. GROUT ZONES ARE SHOWN IN PROFILE ON C-201.

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SCALE H-1:100  
V-1:100

1+180  
C-200

0 1:100 5

**McElhanney**

**BGC**

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PERMIT NUMBER: 1000944  
ENGINEERS AND GEOSCIENTISTS BC

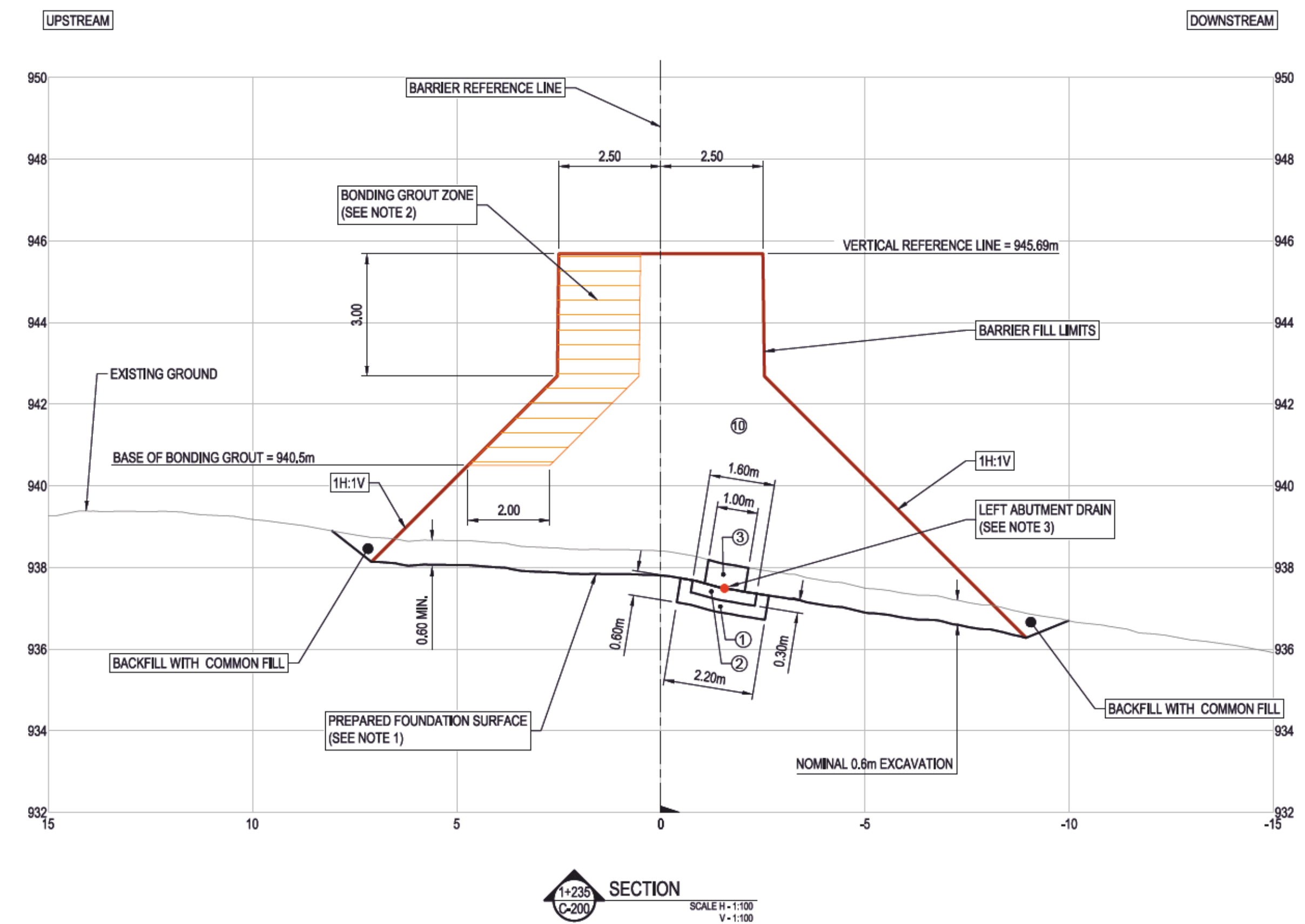
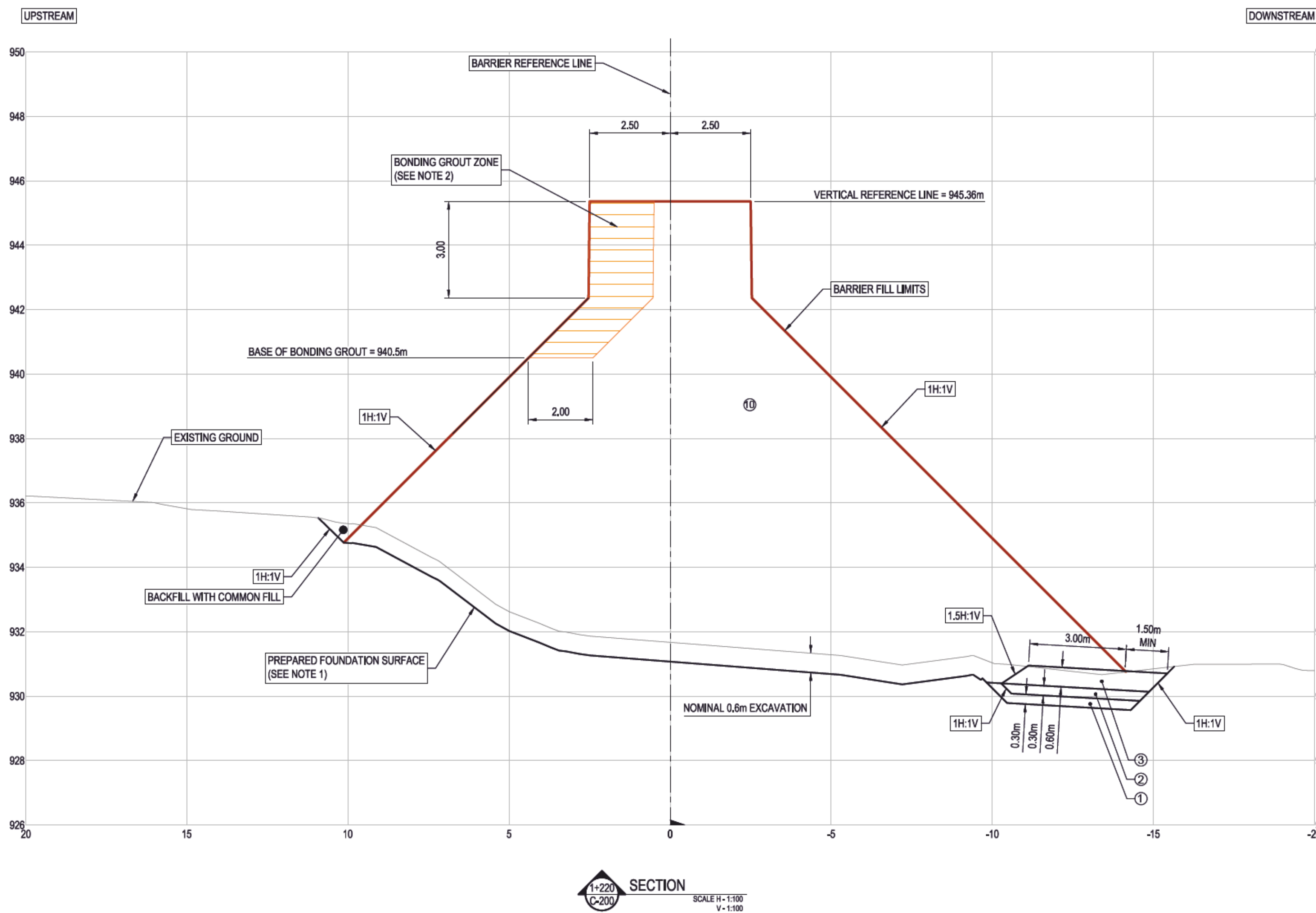
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REGIONAL DISTRICT OF EAST KOOTENAY  
19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5

COLD SPRING CREEK  
DEBRIS-FLOW MITIGATION - BARRIER  
TYPICAL SECTIONS  
(SHEET 2 OF 3)

Drawing No.	C-231
Project Number	2441-01186
Rev.	0





LEGEND	
SAND FILTER	①
GRAVEL FILTER	②
COBBLE FILTER	③
COMMON FILL	④
RCC	⑤
EXISTING GROUND SURFACE	⑩
BARRIER FILL LIMITS	—
PREPARED FOUNDATION SURFACE (SEE NOTE 1)	—
BONDING GROUT ZONE (SEE NOTE 2)	—

GENERAL NOTES:

1. THE PREPARED FOUNDATION SURFACE ELEVATION IS INFERRED BASED ON LIMITED SUBSURFACE INFORMATION. ACTUAL ELEVATIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT THAN SHOWN. REFER TO C-210 FOR ADDITIONAL EXCAVATION DETAILS.
2. APPLY BONDING GROUT AT EACH LIFT IN ZONE SHOWN PER TECHNICAL SPECIFICATIONS FOR THE UPSTREAM 2m OF BARRIER AND RCC FILL IN THIS ZONE. GROUT SHALL BE APPLIED ABOVE EL. 936m BETWEEN STATIONS 1+150 AND 1+170, ABOVE EL. 939.5m BETWEEN STATIONS 1+140 AND 1+150, AND 1+170 AND 1+180, AND ABOVE 940.5m ELSEWHERE. GROUT ZONES ARE SHOWN IN PROFILE ON C-201.
3. THE RIGHT ABUTMENT DRAIN ALIGNMENT TO BE FIELD FIT BASED ON THE DIRECTION OF THE ENGINEER. SEE C-210 FOR ALIGNMENT.

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ORIGINAL DWG SIZE: ANSI D (22" x 34")



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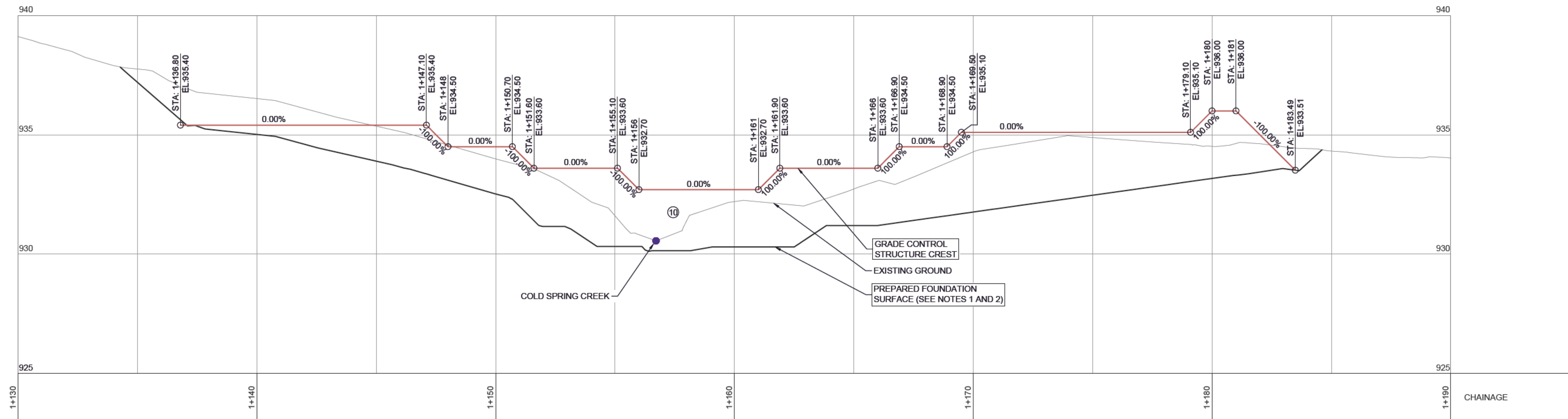
REGIONAL DISTRICT OF EAST KOOTENAY  
19 24TH AVENUE SOUTH, CRANBROOK BC V1C 2N5

**COLD SPRING CREEK  
DEBRIS-FLOW MITIGATION - BARRIER  
TYPICAL SECTIONS  
(SHEET 3 OF 3)**

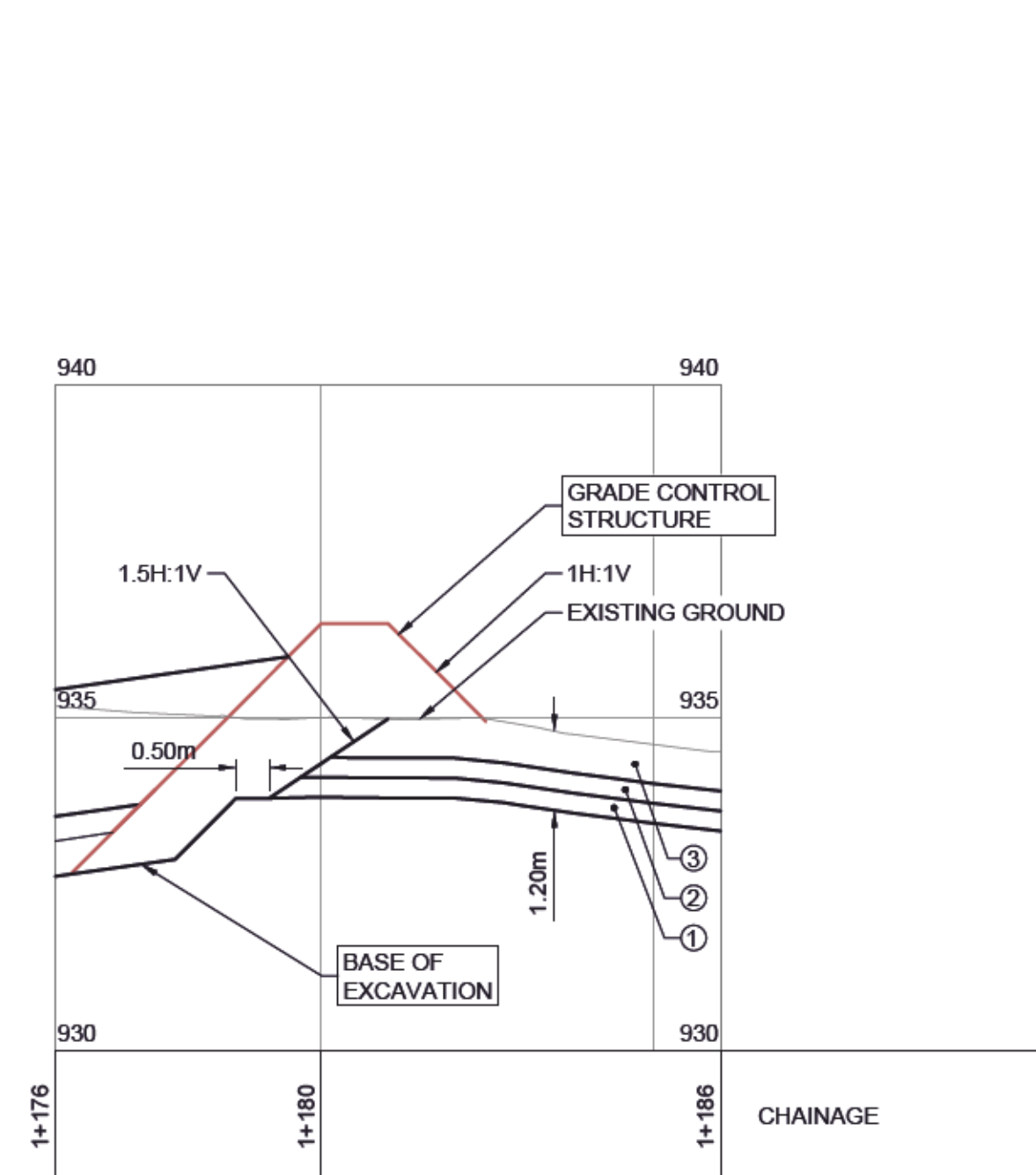
Drawing No.	C-232
Project Number	2441-01186
Rev.	0



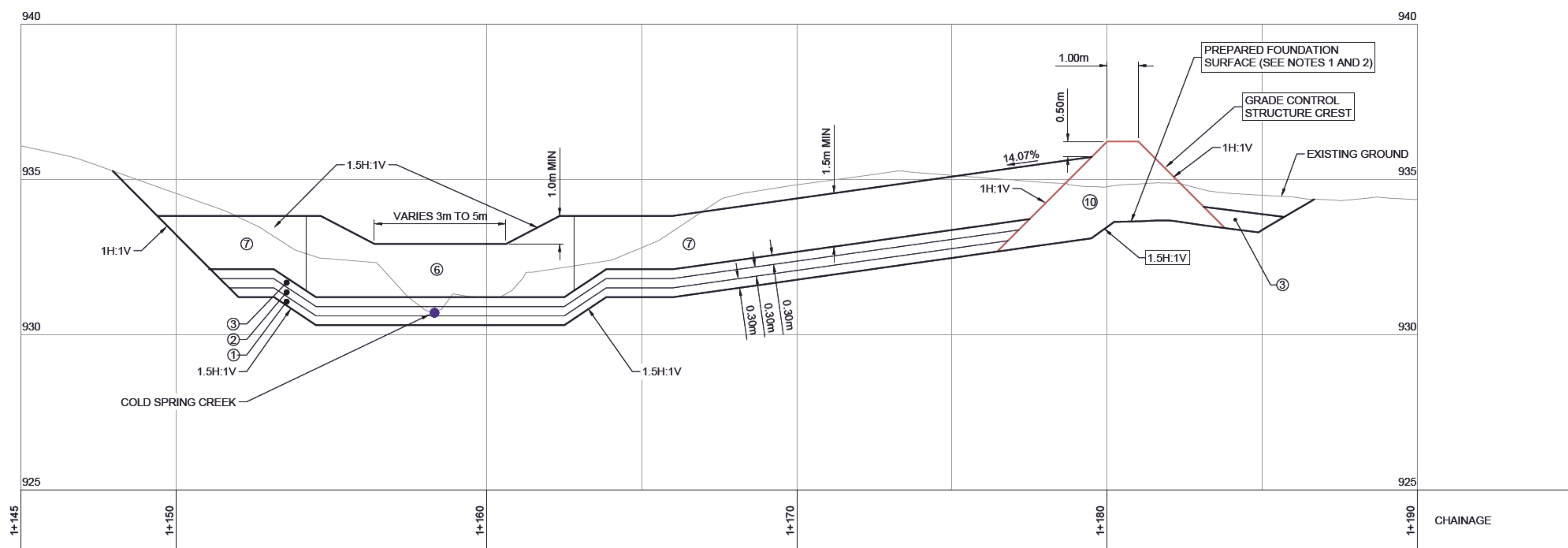
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**GC-A**  
**C-200**  
 GRADE CONTROL STRUCTURE PROFILE  
 SCALE: 1:100



**GC-C**  
**C-200**  
 GRADE CONTROL STRUCTURE PROFILE  
 SCALE: 1:100



**GC-B**  
**C-200**  
 DOWNSTREAM EROSION CONTROL PROFILE  
 SCALE: 1:100

**LEGEND**

SAND FILTER	①
GRAVEL FILTER	②
COBBLE FILTER	③
500kg GROUTED RIPRAP	④
1000kg RIPRAP	⑤
ROLLER COMPACTED CONCRETE (RCC)	⑥
	⑦
	⑧
	⑨
	⑩

- GENERAL NOTES:**
1. THE PREPARED FOUNDATION SURFACE ELEVATIONS ARE INFERRED BASE ON LIMITED SUBSURFACE INFORMATION. ACTUAL ELEVATIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT THAN SHOWN.
  2. SUB-EXCAVATION BELOW THE PREPARED FOUNDATION SURFACE MAY BE REQUIRED TO ACHIEVE SUITABLE FOUNDATION. SUB-EXCAVATION SHOULD BE BACKFILLED WITH PROCESSED DEBRIS-FLOW OR STRUCTURAL FILL MATERIAL UP TO THE PREPARED FOUNDATION SURFACE, WITH FILTER, CONCRETE AND RCC PLACEMENT BEGINNING ABOVE THE PREPARED FOUNDATION SURFACE. SUB-EXCAVATION WILL BE REQUIRED IN LOCAL AREAS AROUND COLD SPRING CREEK (AS SHOWN ON C-220, EX-A) AND MAY BE REQUIRED IN OTHER AREAS AT THE DISCRETION OF THE ENGINEER.

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REGIONAL DISTRICT OF EAST KOOTENAY  
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**COLD SPRING CREEK  
 DEBRIS-FLOW MITIGATION - BARRIER  
 DOWNSTREAM EROSION PROTECTION  
 PLAN PROFILE AND SECTIONS**

Drawing No.	C-240
Project Number	2441-01186
Rev.	0

DESTROY ALL PRINTS BEARING PREVIOUS REVISIONS