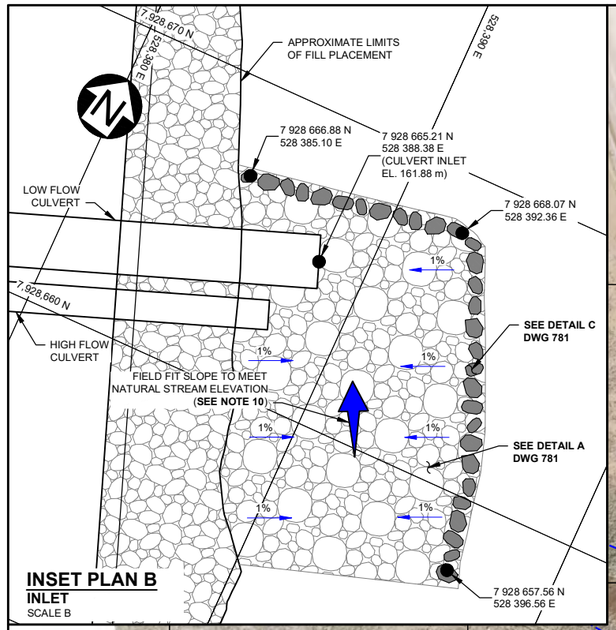
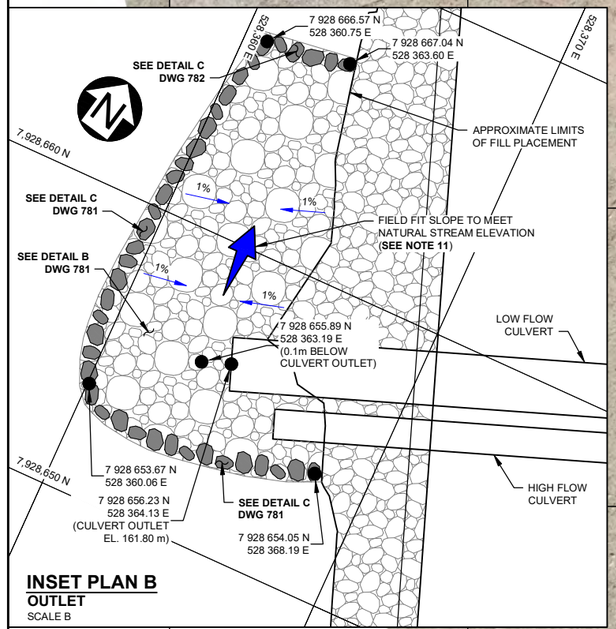
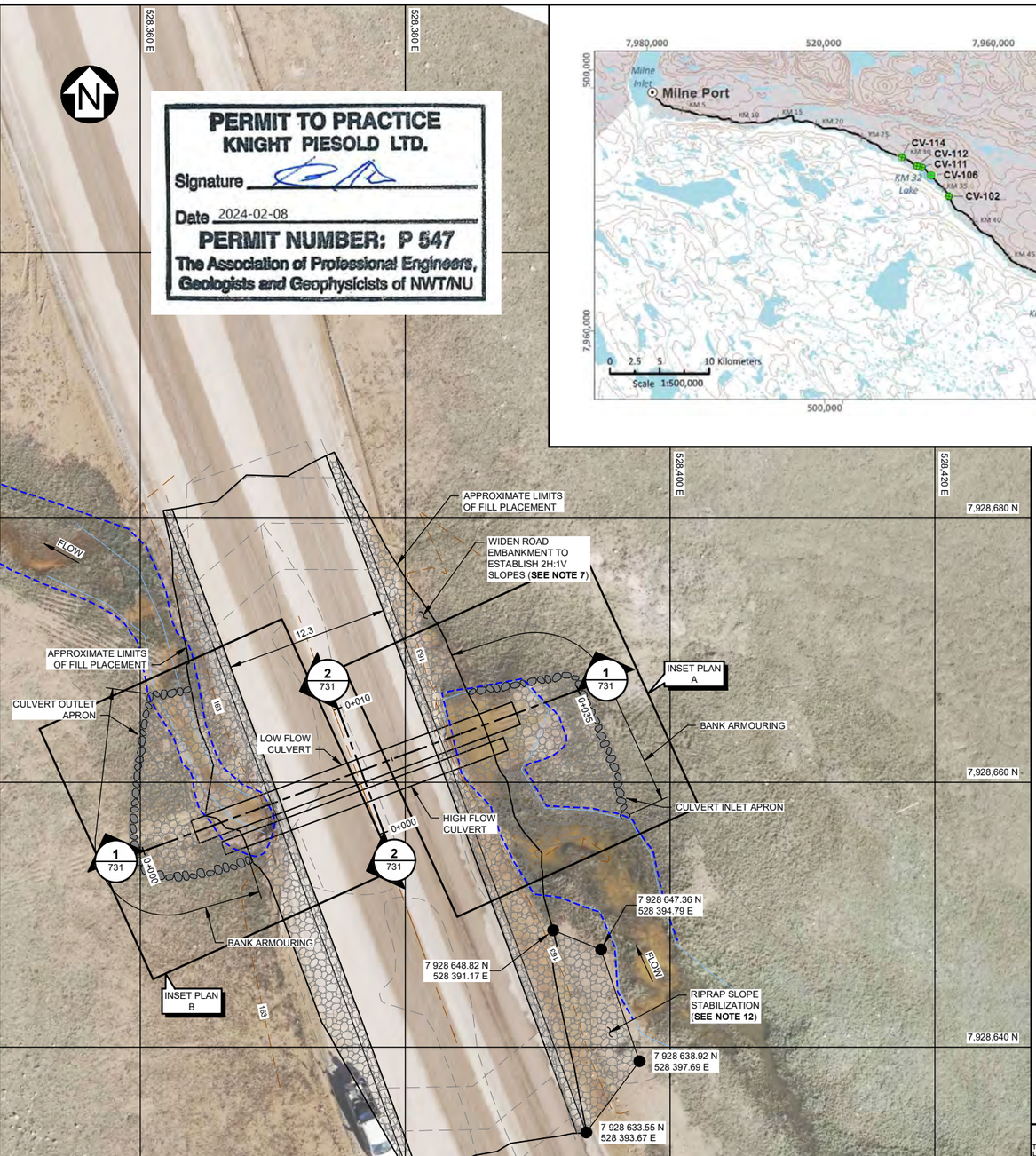


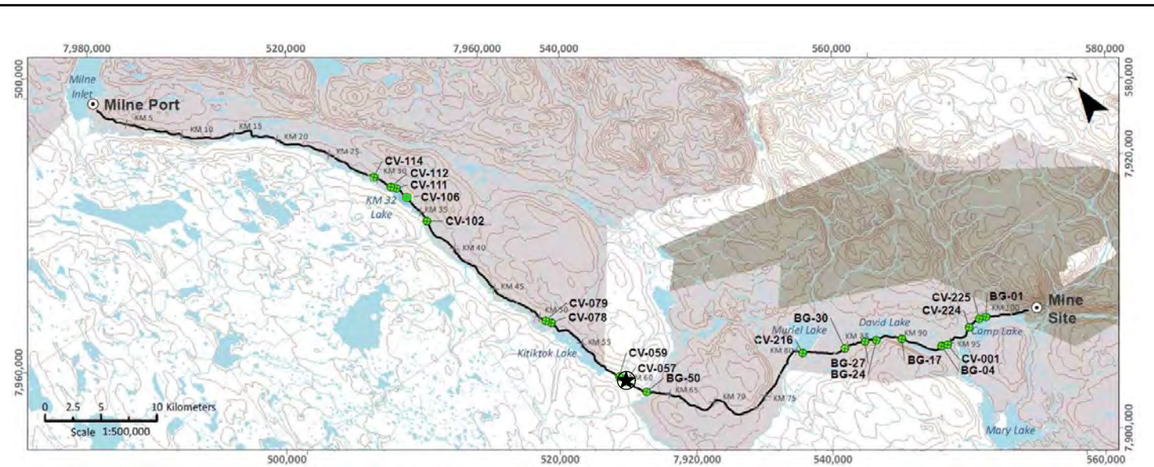
INSET PLAN B
INLET
SCALE B



INSET PLAN B
OUTLET
SCALE B



PLAN
SCALE A



LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- SURVEYED WETTED WIDTH
- SETTING OUT POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- FIELD FIT SLOPE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. IT IS ASSUMED ALL WORK WILL BE COMPLETED DURING FROZEN CONDITIONS.
5. BLASTING MATS MAY BE USED, IF REQUIRED, FOR BLASTING OF FROZEN SOIL/FILL TO REMOVE THE EXISTING CULVERTS. MITIGATION WILL BE IMPLEMENTED AS PER BAFFINLAND'S SURFACE WATER AND AQUATIC ECOSYSTEM MANAGEMENT PLAN AND ENVIRONMENTAL PROTECTION PLAN. ONCE EXCAVATION HAS REACHED THE CULVERTS, THEY WILL BE REMOVED AND THE NEW CULVERTS INSTALLED AS PER THE WORK PLAN.
6. ALL BLASTING SPOILS TO BE REMOVED FROM SITE AND DISPOSED OF AT APPROPRIATE LOCATIONS.
7. CULVERTS TO BE BACKFILLED TO ESTABLISH ROAD SIDE SLOPES AT 2H:1V. ALL SLOPES WILL BE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 731 (SECTION 1)**.
8. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
9. EROSION AND SEDIMENT CONTROL MEASURES INCLUDED ARE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA. THE DESIGN OF OTHER TOTE ROAD EROSION AND SEDIMENT CONTROL MEASURES WILL BE REPORTED SEPARATELY.
10. FIELD FIT INLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS CULVERT INLET.
11. FIELD FIT OUTLET TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS THE STREAM.
12. STABILIZE SLOPE WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.

SCALE A: 4 2 0 4 8 12 16 20 m

SCALE B: 2 1 0 2 4 6 8 10 m

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Signature
Date 2024-02-08
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
731	CSP CULVERTS - CV-057 PLAN AND SECTION
781	CULVERT INLET AND OUTLET WORKS - TYPICAL PLAN AND DETAILS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW	CAP	KEH
2	23JAN'24	DESIGNS MODIFIED - ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

ISSUED FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER — G.M. JOHNSTONE — LICENSEE — 2024-02-08 — NT/NU

Knight Piésold CONSULTING

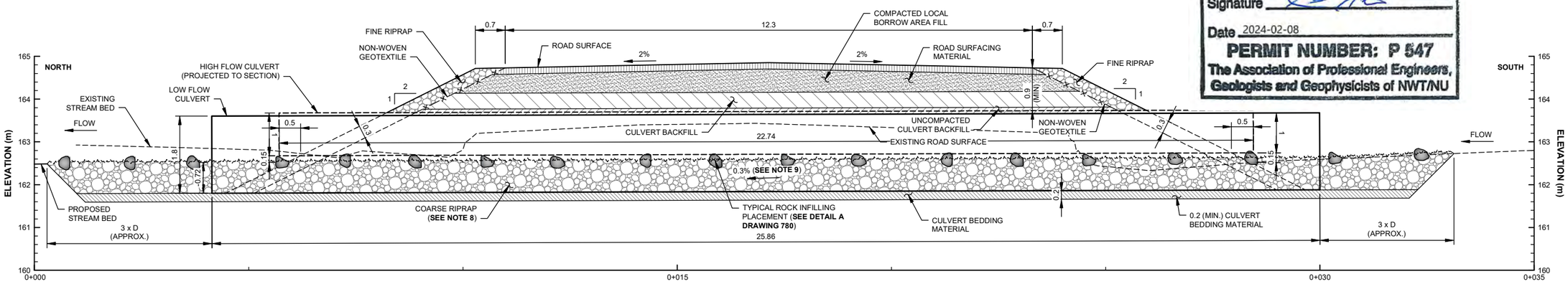
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

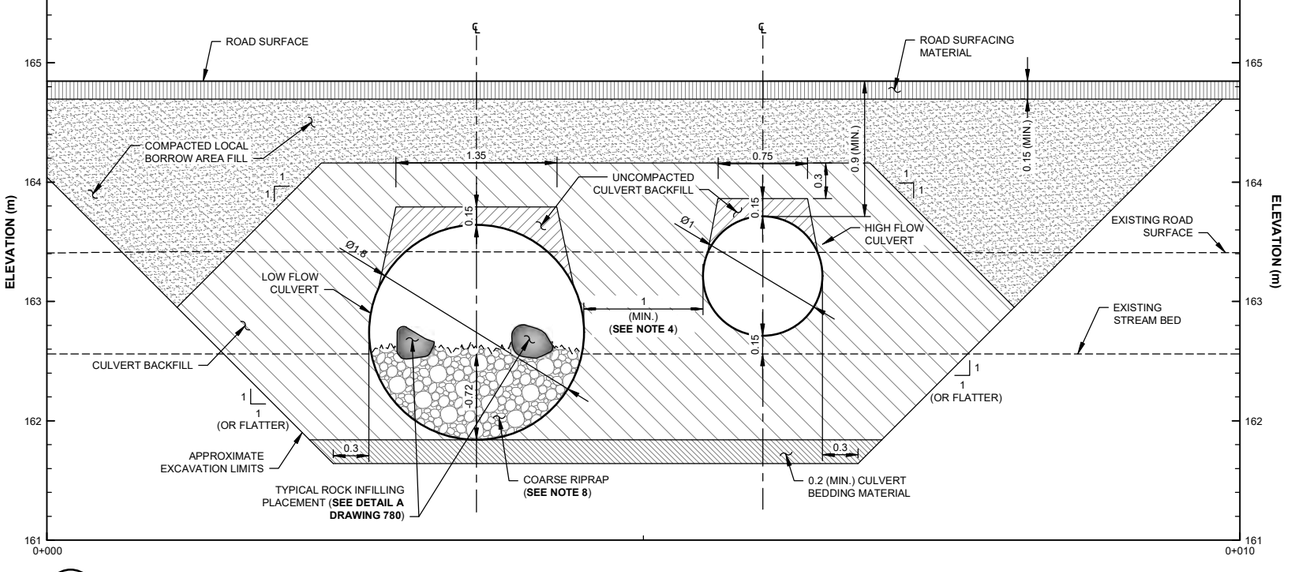
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-057
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	730	3

SAVED: I:\102\00181\177\A\Acad\DWGS\730 731\730 731 R3, 2/8/2024 1:55:00 PM, , ASIMPSON PRINTED: 2/8/2024 1:55:55 PM, 730, , ASIMPSON ACAD VERSION: 24.2S (LMS TECH)



1 / 730 **SECTION**
CV-057 PROFILE
SCALE A



2 / 730 **SECTION**
CV-057 INSTALLATION DETAILS
SCALE B

FISH PASSAGE PARAMETERS	
MODELLED CULVERT JULY OUTLET VELOCITY (m/s)	0.31
MODELLED CULVERT AUGUST OUTLET VELOCITY (m/s)	0.25
MAXIMUM SWIM DISTANCE (m)	46

RIPRAP LOCATIONS	RIPRAP SIZE (mm)	MATERIAL
INLET/OUTLET APRON	300 (D_{50})	COARSE RIPRAP
BANK STABILIZATION	150 (D_{50})	FINE RIPRAP
CULVERT INFILLING	300 (D_{50})	COARSE RIPRAP
IN-CULVERT BOULDERS	300 (MIN.)	COARSE RIPRAP
STEP POOL	NOT REQUIRED	N/A
BOULDER CLUSTER	NOT REQUIRED BY DFO SPOT TOOL	N/A

LEGEND:
- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

ISSUED FOR CONSTRUCTION

NOTES:
1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
8. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.
9. MINIMUM CULVERT SLOPE TO BE 0.3%.

SCALE A: 1 0.5 0 1 2 3 4 5 m
SCALE B: 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

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DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
730	CSP CULVERTS - CV-057 GENERAL ARRANGEMENT
780	CULVERT WORKS - TYPICAL DETAILS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
3	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW	DJP	KEH
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1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

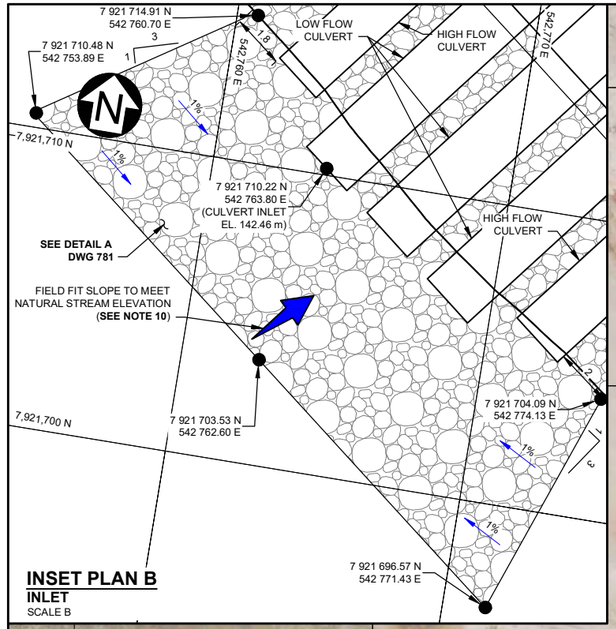
BAFFINLAND IRON MINES CORPORATION

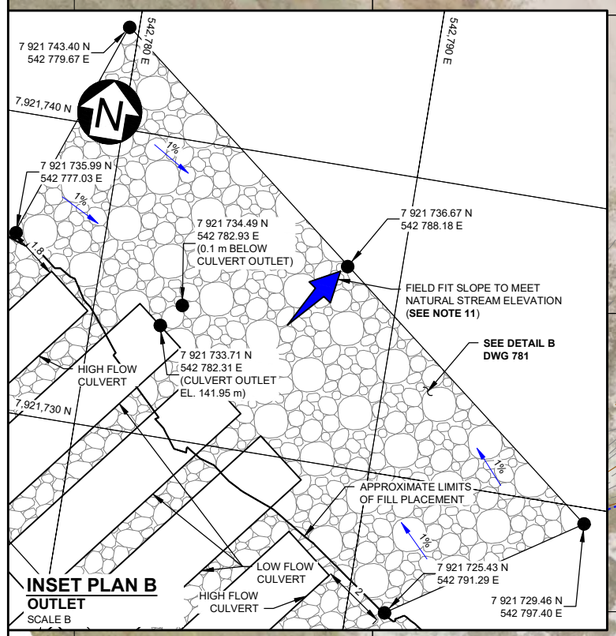
MARY RIVER PROJECT

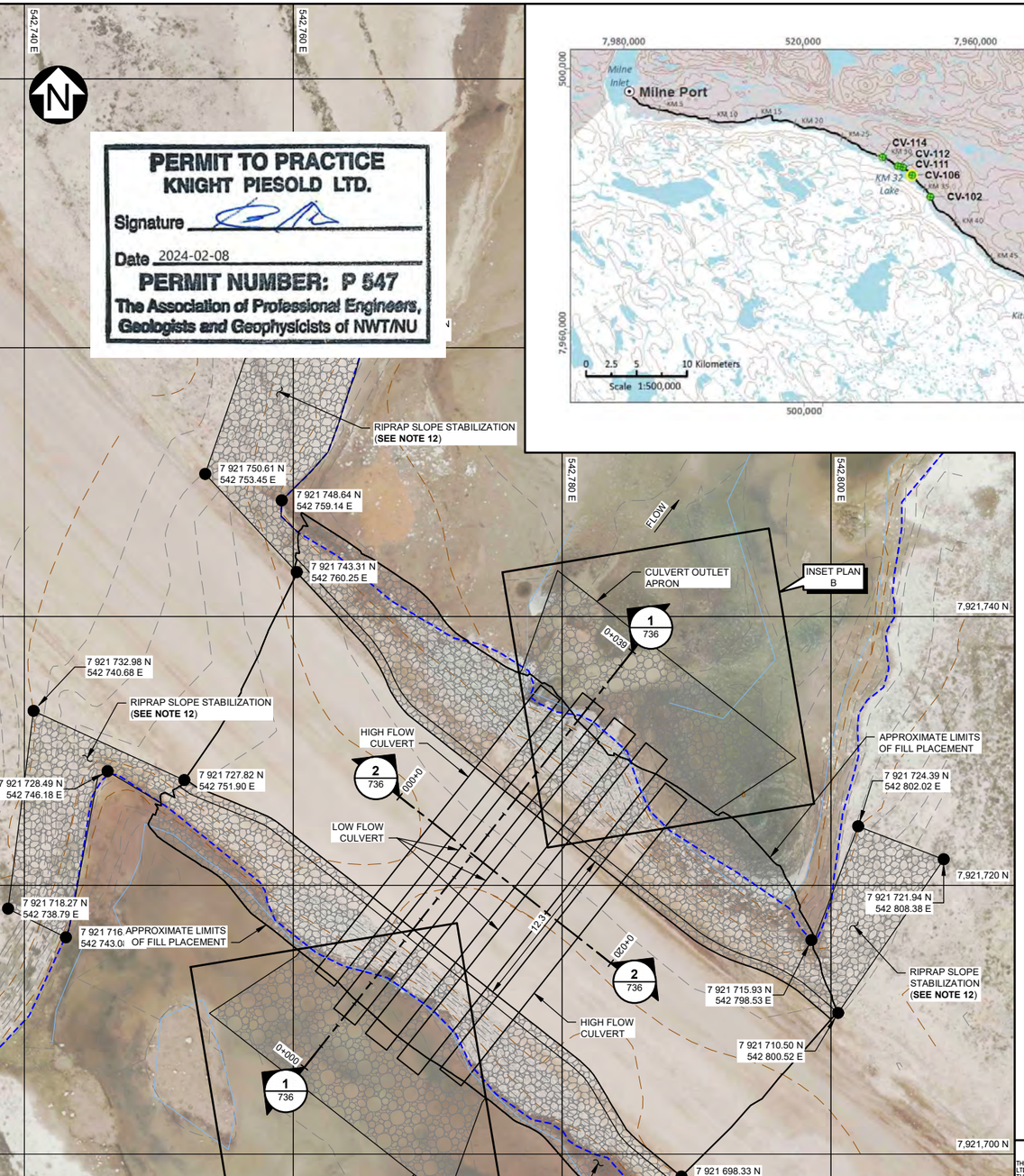
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-057
PLAN AND SECTION

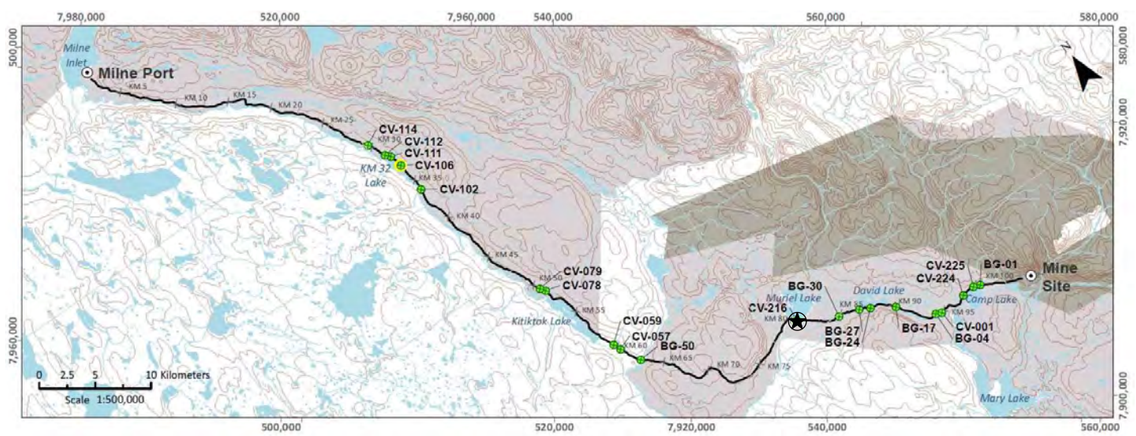
P/A NO.	DRAWING NO.	REVISION
NB102-181/77	731	3

SAVED: I:\102\00181\177\A\Acad\DWGS\730 731\730 731 R3, 2/8/2024 1:55:00 PM, ASIMPSON PRINTED: 2/8/2024 1:55:21 PM, 731, ASIMPSON ACAD VERSION: 24.2S (LMS TECH)









LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- SURVEYED WETTED WIDTH
- SETTING OUT POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- FIELD FIT SLOPE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. IT IS ASSUMED ALL WORK WILL BE COMPLETED DURING FROZEN CONDITIONS.
5. BLASTING MATS MAY BE USED, IF REQUIRED, FOR BLASTING OF FROZEN SOIL/FILL TO REMOVE THE EXISTING CULVERTS. MITIGATION WILL BE IMPLEMENTED AS PER BAFFINLAND'S SURFACE WATER AND AQUATIC ECOSYSTEM MANAGEMENT PLAN AND ENVIRONMENTAL PROTECTION PLAN. ONCE EXCAVATION HAS REACHED THE CULVERTS, THEY WILL BE REMOVED AND THE NEW CULVERTS INSTALLED AS PER THE WORK PLAN.
6. ALL BLASTING SPOILS TO BE REMOVED FROM SITE AND DISPOSED OF AT APPROPRIATE LOCATIONS.
7. CULVERTS TO BE BACKFILLED TO ESTABLISH ROAD SIDE SLOPES AT 2H:1V. ALL SLOPES WILL BE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 736 (SECTION 1)**.
8. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
9. EROSION AND SEDIMENT CONTROL MEASURES INCLUDED ARE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA. THE DESIGN OF OTHER TOTE ROAD EROSION AND SEDIMENT CONTROL MEASURES WILL BE REPORTED SEPARATELY.
10. FIELD FIT INLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS CULVERT INLET.
11. FIELD FIT OUTLET TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS THE STREAM.
12. STABILIZED WITH FINE RIPRAP OVERLAYING NON-WOVEN GEOTEXTILE.

SCALE A 4 2 0 4 8 12 16 20 m

SCALE B 2 1 0 2 4 6 8 10 m

REFERENCE DRAWINGS	
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
736	CSP CULVERTS - CV-216 PLAN AND SECTION
781	CULVERT INLET AND OUTLET WORKS - TYPICAL PLAN AND DETAILS
DRG. NO.	DESCRIPTION

ISSUED FOR CONSTRUCTION

REVISIONS						
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	DJP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW/AS	CAP	KEH

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REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

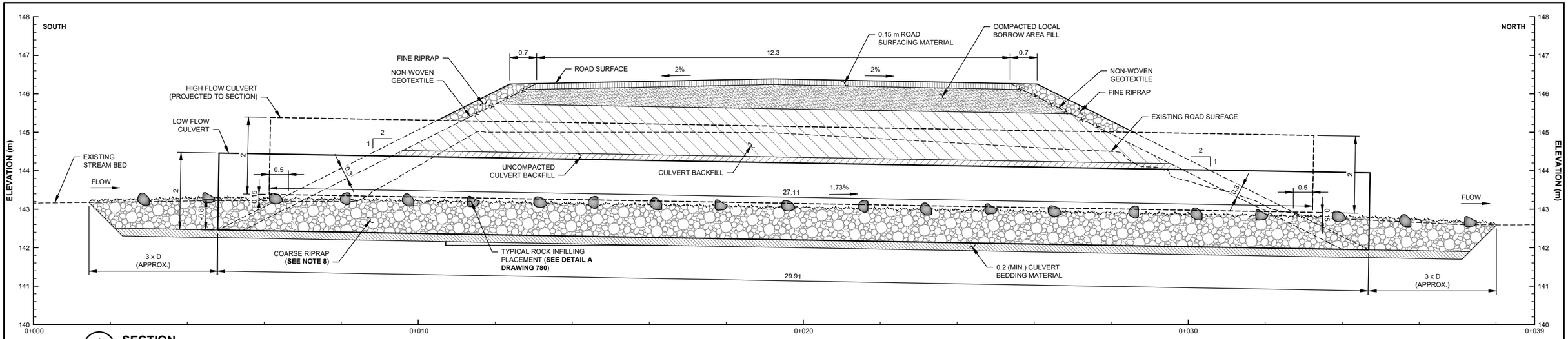
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN ROUND CSP CULVERTS - CV-216 GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	735	2

SAVED: I:\1102\00181\177\A\Acad\DWGS\735 736\735 736 R2, 2/8/2024 1:59:52 PM, ASIMPSON PRINTED: 2/8/2024 2:00:07 PM, 735, ASIMPSON ACAD VERSION: 24.2S (LMS TECH)



1/735 **SECTION**
CV-216 PROFILE
SCALE A

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

FISH PASSAGE PARAMETERS	
MODELLED CULVERT JULY OUTLET VELOCITY (m/s)	0.59
MODELLED CULVERT AUGUST OUTLET VELOCITY (m/s)	0.34
MAXIMUM SWIM DISTANCE (m)	6.7
BOULDER CLUSTER SPACING (m)	6.5

RIPRAP LOCATIONS	RIPRAP SIZE (mm)	MATERIAL
INLET/OUTLET APRON	450 (D_{50})	EXTRA COARSE RIPRAP
CULVERT INFILLING	300 (D_{50})	COARSE RIPRAP
IN-CULVERT BOULDERS	500 (MIN.)	EXTRA COARSE RIPRAP
STEP POOL	NOT REQUIRED BY THE DFO SPOT TOOL	N/A
BOULDER CLUSTER	500 (MIN.)	EXTRA COARSE RIPRAP

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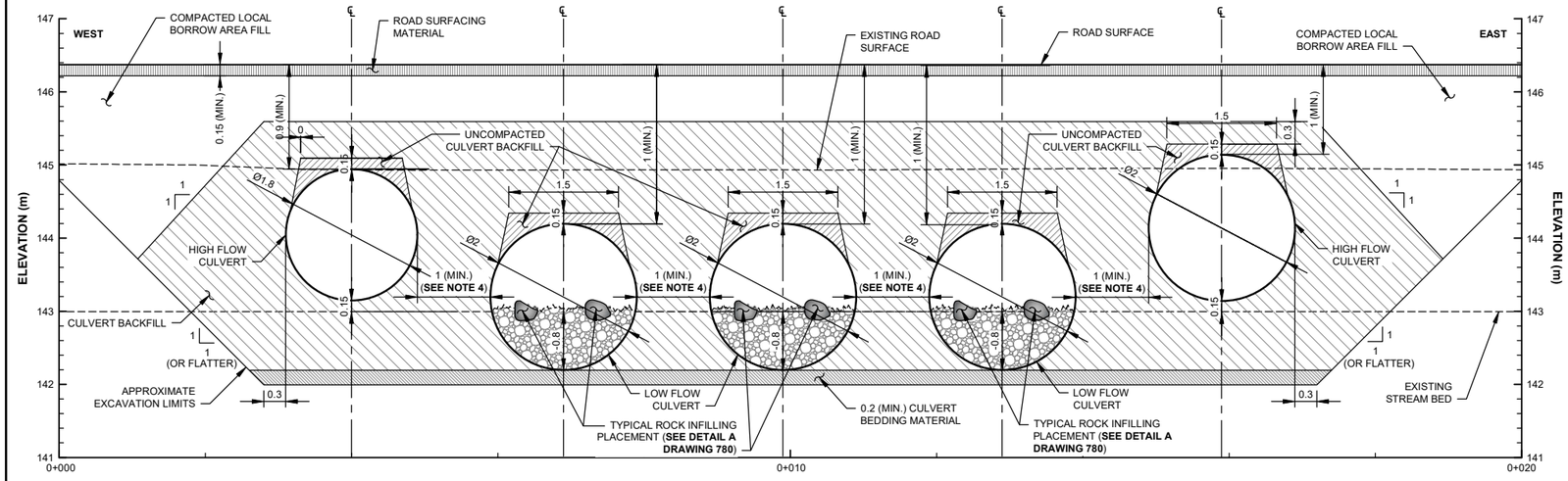
NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
8. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.



2/735 **SECTION**
CV-216 INSTALLATION DETAILS
SCALE B

1 0.5 0 1 2 3 4 5 m
SCALE A

0.8 0.4 0 1 2 3 4 m
SCALE B

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-216
PLAN AND SECTION

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	736	2

ISSUED FOR CONSTRUCTION

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
735	CSP CULVERTS - CV-216 GENERAL ARRANGEMENT
780	CULVERT WORKS - TYPICAL DETAILS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
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REVISIONS

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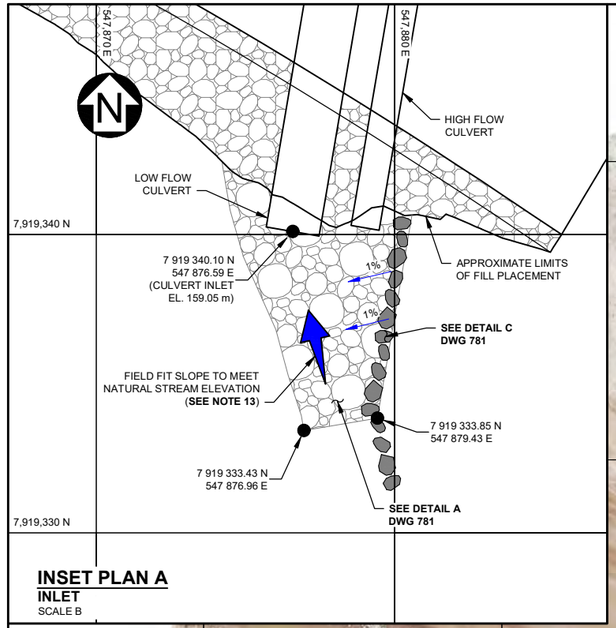
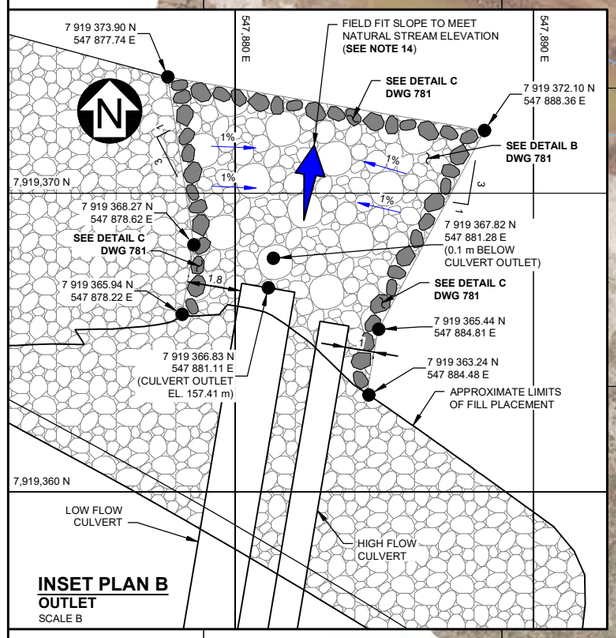
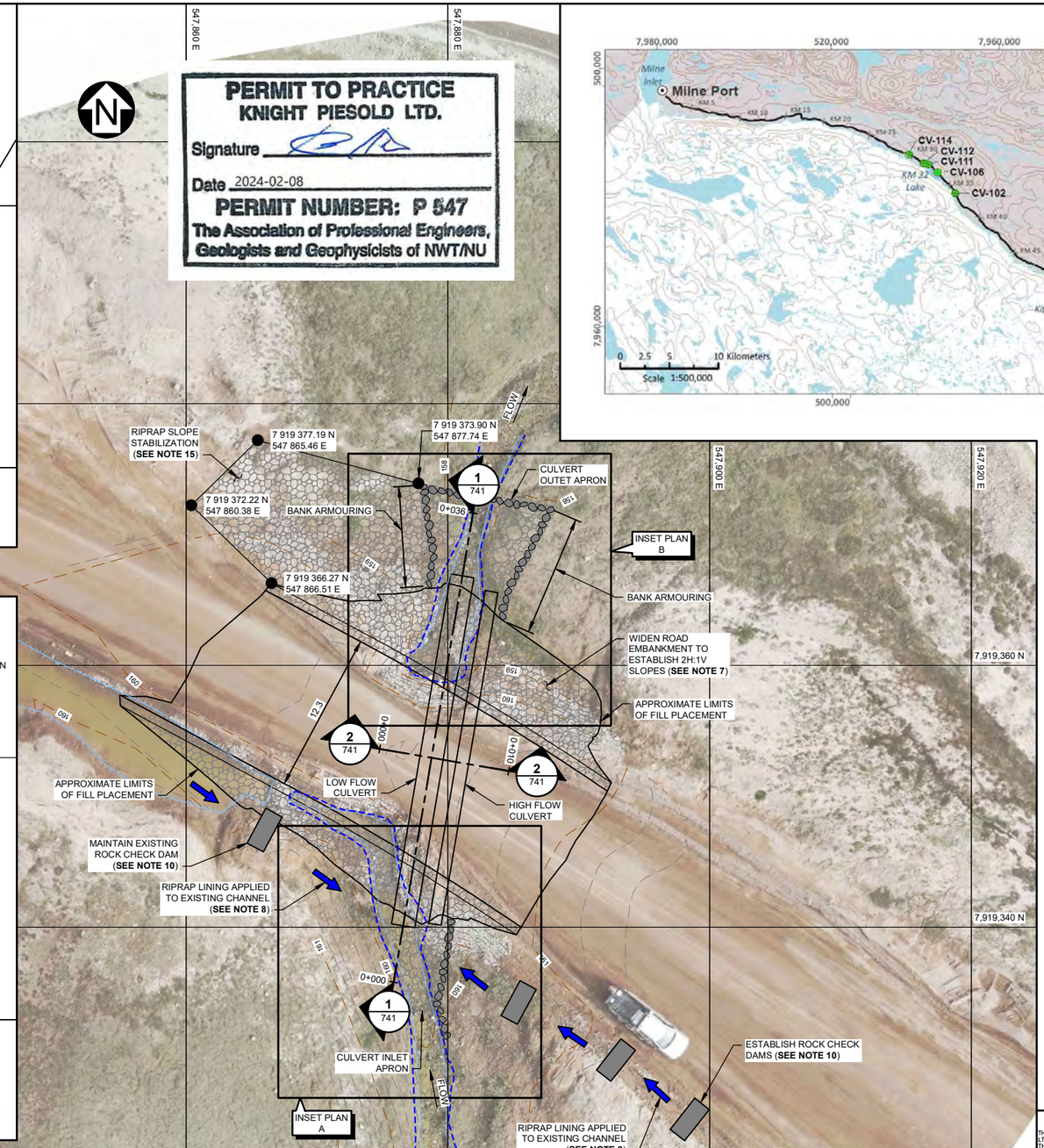


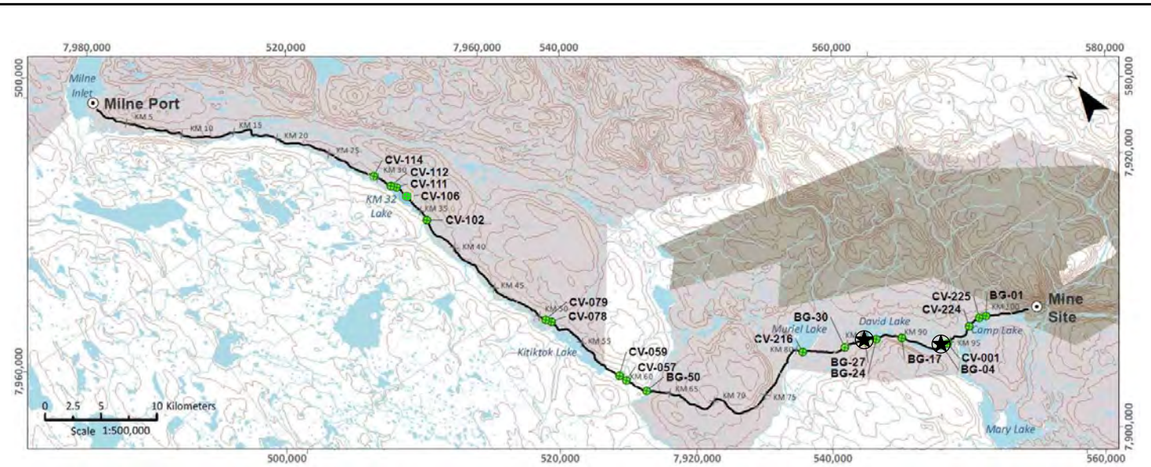
INSET PLAN A
INLET
SCALE B



INSET PLAN B
OUTLET
SCALE B

PLAN
SCALE A





LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- ROCK CHECK DAM
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- SURVEYED WETTED WIDTH
- RIPRAP LINED EXISTING CHANNEL
- SETTING OUT POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- FIELD FIT SLOPE

NOTES:

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6. ALL BLASTING SPOILS TO BE REMOVED FROM SITE AND DISPOSED OF AT APPROPRIATE LOCATIONS.
7. CULVERTS TO BE BACKFILLED TO ESTABLISH ROAD SIDE SLOPES AT 2H:1V. ALL SLOPES WILL BE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 741 (SECTION 1)**.
8. EXISTING DRAINAGE CHANNELS TO BE LINED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE. DITCH GEOMETRY TO BE FIELD FIT TO PROVIDE POSITIVE DRAINAGE.
9. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
10. ROCK CHECK DAMS TO BE CONSTRUCTED OF FINE RIPRAP THAT IS FREE OF FINE AND DELETERIOUS MATERIALS. THE STRUCTURES ARE TO BE CONSTRUCTED IN A STABLE MANNER TO REDUCE RUNOFF WATER FLOW VELOCITIES AND PROMOTE SETTLING OF SUSPENDED PARTICLES. PERIODIC MAINTENANCE WILL BE REQUIRED TO REMOVE ACCUMULATED SEDIMENT.
11. STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.
12. EROSION AND SEDIMENT CONTROL MEASURES INCLUDED ARE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA. THE DESIGN OF OTHER TOTE ROAD EROSION AND SEDIMENT CONTROL MEASURES WILL BE REPORTED SEPARATELY.
13. FIELD FIT INLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS CULVERT INLET.
14. FIELD FIT OUTLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS THE STREAM.
15. STABILIZE SLOPE WITH FINE RIPRAP OVERLAYING NON-WOVEN GEOTEXTILE.

SCALE A 4 2 0 4 8 12 16 20 m
SCALE B 2 1 0 2 4 6 8 10 m

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Date 2024-02-08
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ISSUED FOR CONSTRUCTION

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
741	CSP CULVERTS - BG-27 PLAN AND SECTION
781	CULVERT INLET AND OUTLET WORKS - TYPICAL PLAN AND DETAILS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	CAP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

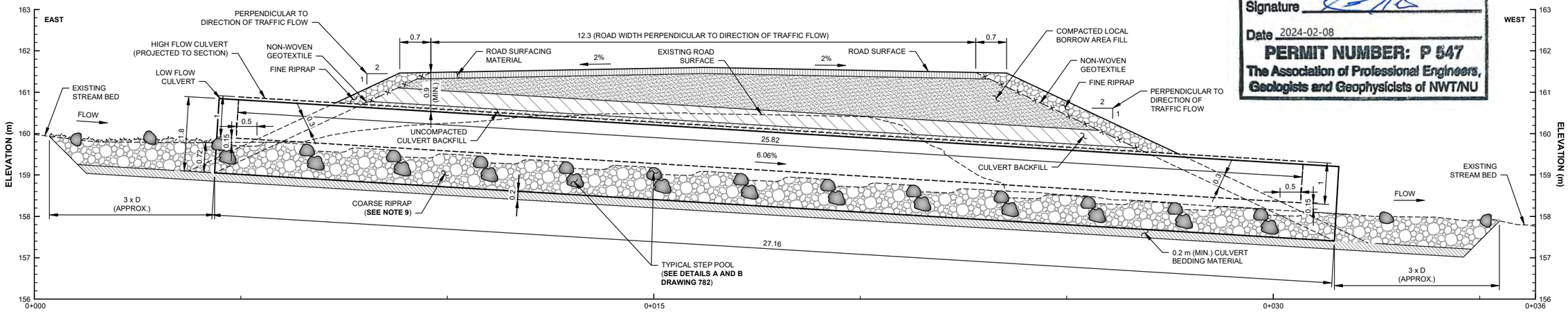
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

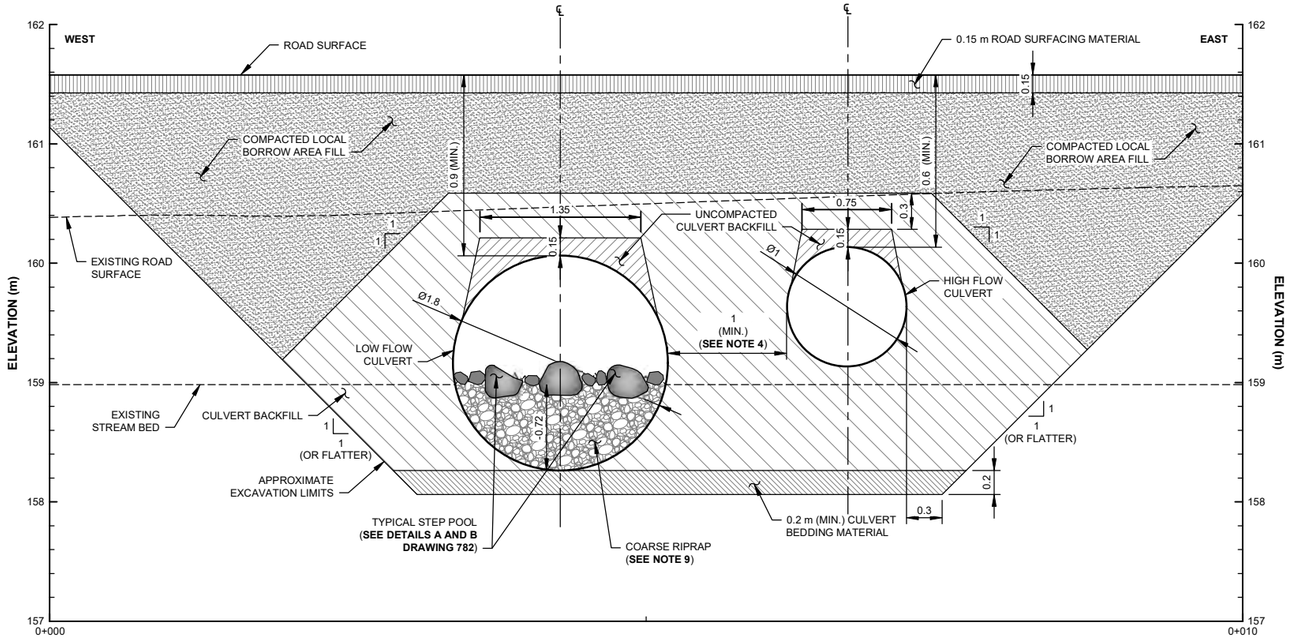
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - BG-27
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	740	2

SAVED: I:\1\02\00181\177\A\Acad\DWGS\740 741\740 741 R2. 2/8/2024 2:01:15 PM, ASIMPSON PRINTED: 2/8/2024 2:02:51 PM, 740, ASIMPSON ACAD VERSION: 24.2S (LMS TECH)



2 / 1 / 740 **SECTION**
BG-27 PROFILE
SCALE A



2 / 2 / 740 **SECTION**
BG-27 INSTALLATION DETAILS
SCALE B

ISSUED FOR CONSTRUCTION

FISH PASSAGE PARAMETERS	
MODELLED CULVERT JULY OUTLET VELOCITY (m/s)	0.6
MODELLED CULVERT AUGUST OUTLET VELOCITY (m/s)	0.47
MAXIMUM SWIM DISTANCE (m)	8
STEP POOL SPACING (m)	2

RIPRAP LOCATIONS	RIPRAP SIZE (mm)	MATERIAL
INLET/OUTLET APRON	300 (D_{50})	COARSE RIPRAP
BANK STABILIZATION	150 (D_{50})	FINE RIPRAP
CULVERT INFILLING	300 (D_{50})	COARSE RIPRAP
IN-CULVERT BOULDERS	300 (MIN.)	COARSE RIPRAP
STEP POOL	300 (MIN.)	COARSE RIPRAP
BOULDER CLUSTER	NOT REQUIRED BY DFO SPOT TOOL	N/A

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. MINIMUM CULVERT SLOPE TO BE 0.3%.
8. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
9. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

SCALE A: 1 0.5 0 1 2 3 4 5 m
SCALE B: 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

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G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

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BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - BG-27
PLAN AND SECTION

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	741	2

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
740	ROUND CSP CULVERTS - BG-27 GENERAL ARRANGEMENT
782	EXTERNAL CULVERT WORKS - TYPICAL DETAILS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	CAP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

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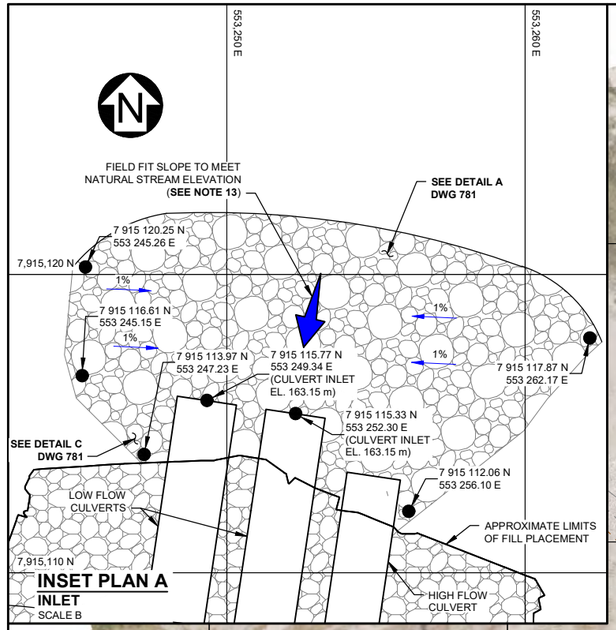

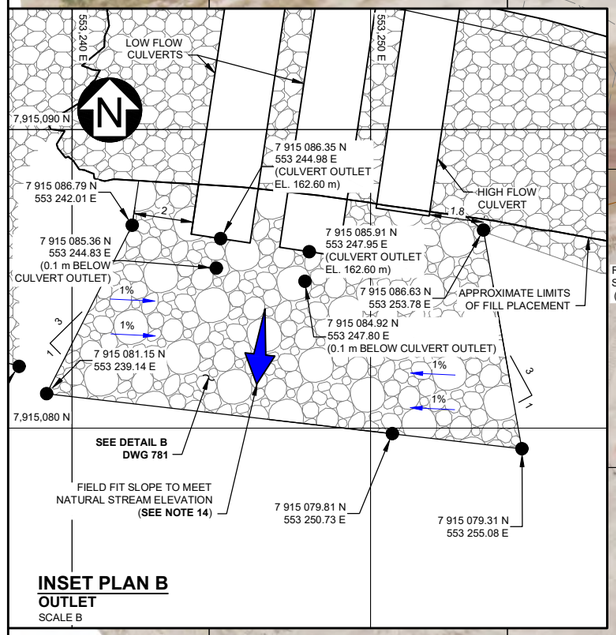

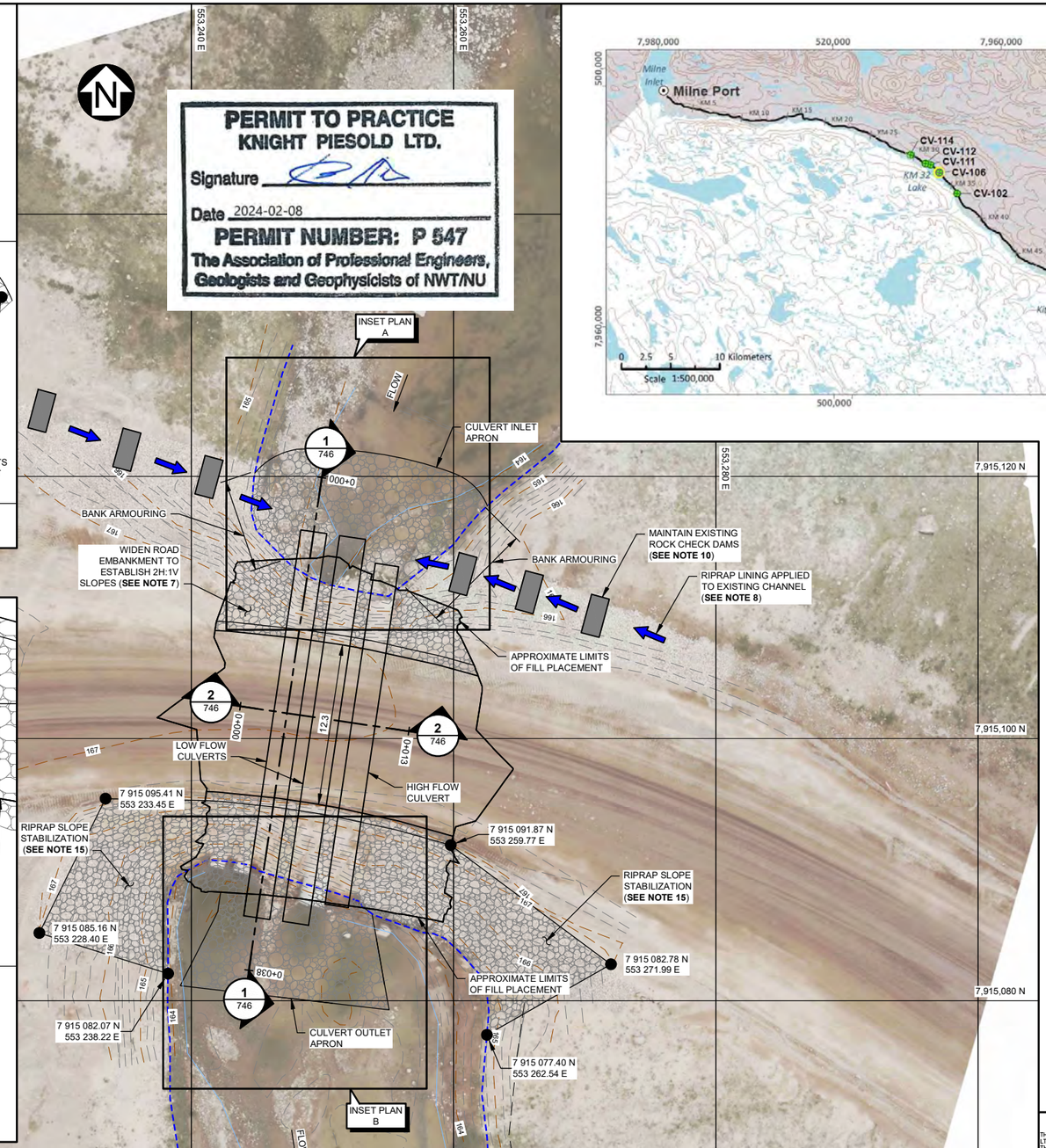

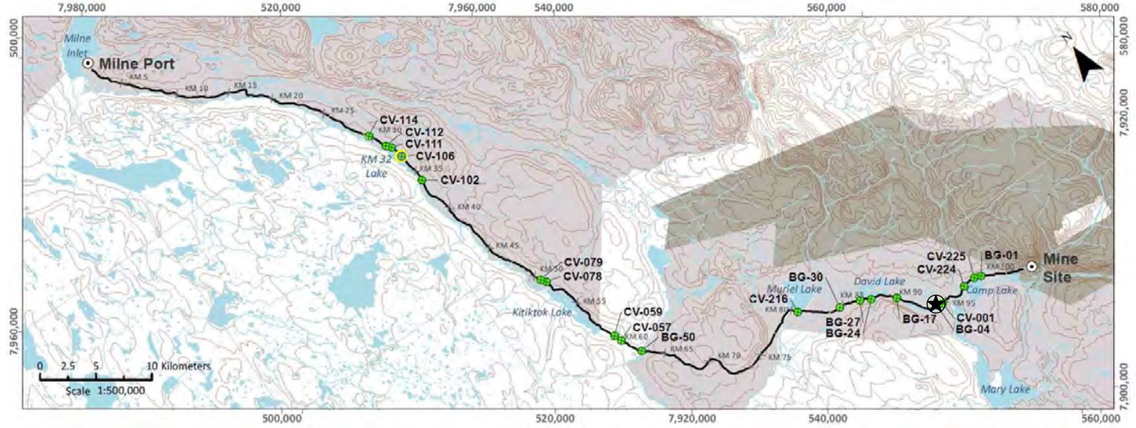

LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- ROCK CHECK DAM
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- SURVEYED WETTED WIDTH
- RIPRAP LINED EXISTING CHANNEL
- SETTING OUT POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- FIELD FIT SLOPE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSION AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. IT IS ASSUMED ALL WORK WILL BE COMPLETED DURING FROZEN CONDITIONS.
5. BLASTING MATS MAY BE USED, IF REQUIRED, FOR BLASTING OF FROZEN SOIL/FILL TO REMOVE THE EXISTING CULVERTS. MITIGATION WILL BE IMPLEMENTED AS PER BAFFINLAND'S SURFACE WATER AND AQUATIC ECOSYSTEM MANAGEMENT PLAN AND ENVIRONMENTAL PROTECTION PLAN. ONCE EXCAVATION HAS REACHED THE CULVERTS, THEY WILL BE REMOVED AND THE NEW CULVERTS INSTALLED AS PER THE WORK PLAN.
6. ALL BLASTING SPOILS TO BE REMOVED FROM SITE AND DISPOSED OF AT APPROPRIATE LOCATIONS.
7. CULVERTS TO BE BACKFILLED TO ESTABLISH ROAD SIDE SLOPES AT 2H:1V. ALL SLOPES WILL BE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 746 (SECTION 1)**.
8. EXISTING DRAINAGE CHANNELS TO BE LINED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE. DITCH GEOMETRY TO BE FIELD FIT TO PROVIDE POSITIVE DRAINAGE.
9. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
10. ROCK CHECK DAMS TO BE CONSTRUCTED OF FINE RIPRAP THAT IS FREE OF FINE AND DELETERIOUS MATERIALS. THE STRUCTURES ARE TO BE CONSTRUCTED IN A STABLE MANNER TO REDUCE RUNOFF WATER FLOW VELOCITIES AND PROMOTE SETTLING OF SUSPENDED PARTICLES. PERIODIC MAINTENANCE WILL BE REQUIRED TO REMOVE ACCUMULATED SEDIMENT.
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13. FIELD FIT INLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS CULVERT INLET.
14. FIELD FIT OUTLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS THE STREAM.
15. STABILIZE SLOPE WITH FINE RIPRAP OVERLAYING NON-WOVEN GEOTEXTILE.

SCALE A: 4 2 0 4 8 12 16 20 m

SCALE B: 2 1 0 2 4 6 8 10 m

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PLAN
SCALE A

ISSUED FOR CONSTRUCTION

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
746	ROUND CSP CULVERTS - BG-04 PLAN AND SECTION
781	CULVERT INLET AND OUTLET WORKS - TYPICAL PLAN AND DETAILS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW	DP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

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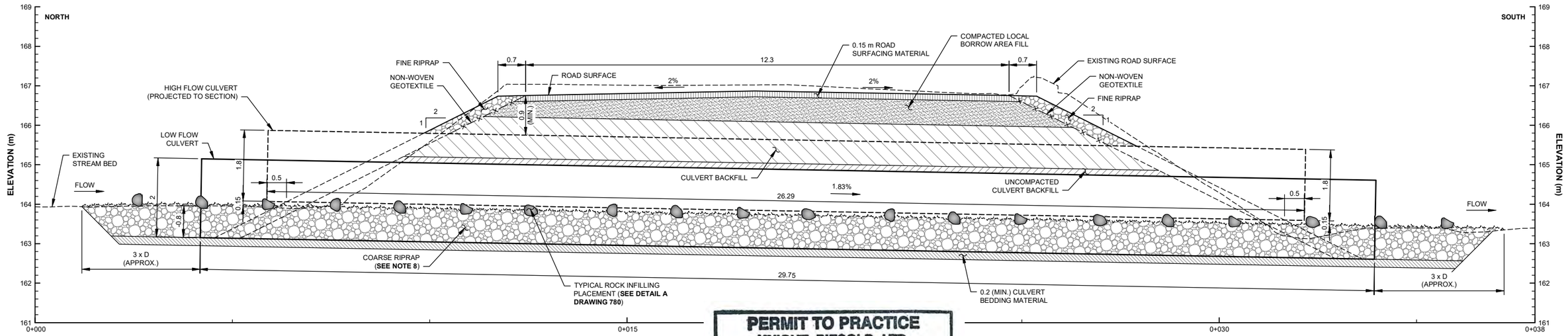
MARY RIVER PROJECT

PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - BG-04
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	745	2

SAVED: I:\1\02\00181\177\A\Acad\DWGS\745 746\745 746 R2_ 2/8/2024 2:03:25 PM, ASIMPSON PRINTED: 2/8/2024 2:05:35 PM, 745, ASIMPSON ACAD VERSION: 24.2S (LMS TECH)



2 1 745 **SECTION**
BG-04 PROFILE
SCALE A

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Date 2024-02-08
PERMIT NUMBER: P 547
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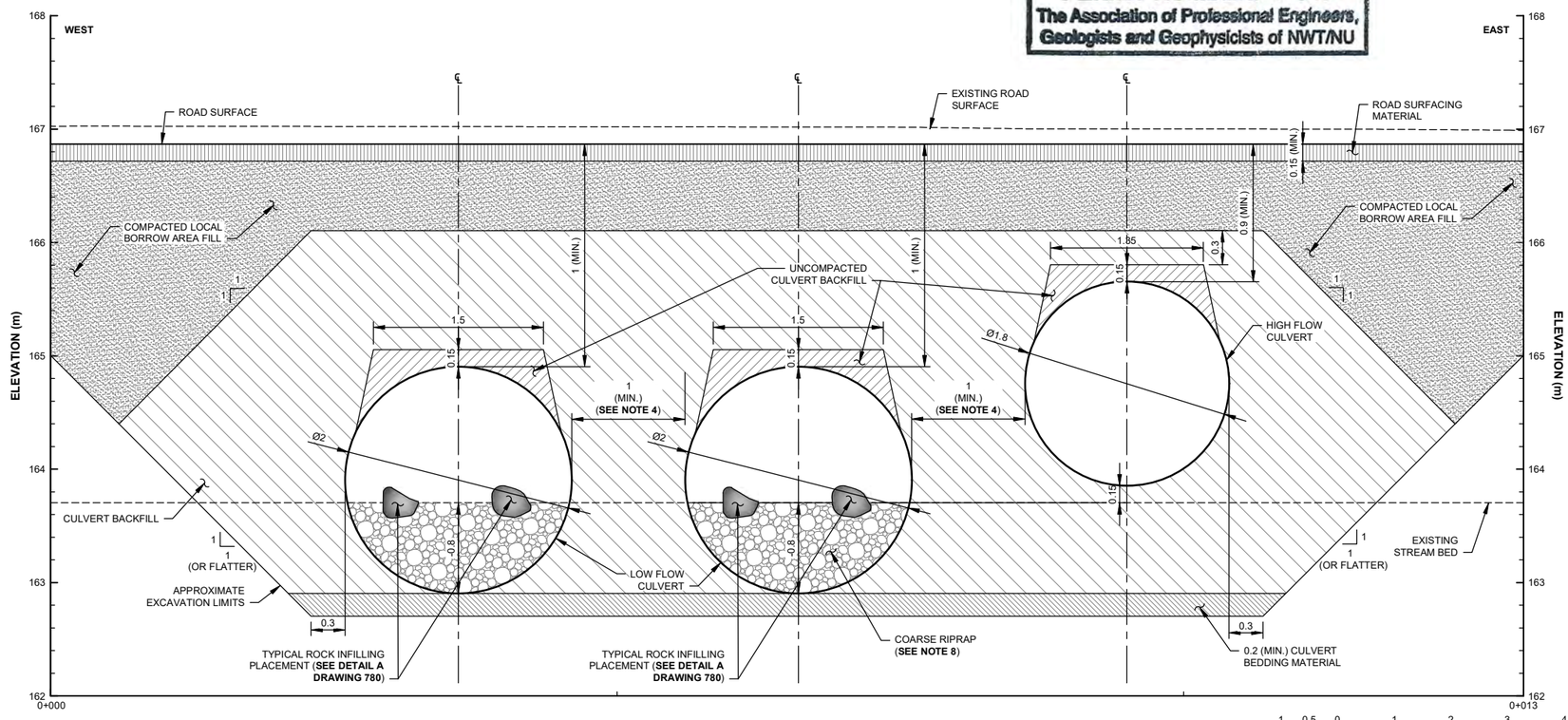


2 2 745 **SECTION**
BG-04 INSTALLATION DETAILS
SCALE B

SCALE A 1 0.5 0 1 2 3 4 5 m
SCALE B 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

LEGEND:
- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

FISH PASSAGE PARAMETERS	
MODELLED CULVERT JULY OUTLET VELOCITY (m/s)	0.78
MODELLED CULVERT AUGUST OUTLET VELOCITY (m/s)	0.63
MAXIMUM SWIM DISTANCE (m)	3.7
BOULDER CLUSTER SPACING (m)	3.5

RIPRAP LOCATIONS	RIPRAP SIZE (mm)	MATERIAL
INLET/OUTLET APRON	300 (D_{50})	COARSE RIPRAP
CULVERT INFILLNG	300 (D_{50})	COARSE RIPRAP
IN-CULVERT BOULDERS	400 (MIN.)	COARSE RIPRAP
STEP POOL	NOT REQUIRED	N/A
BOULDER CLUSTER	400 (MIN.)	COARSE RIPRAP

NOTES:
1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
8. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
745	ROUND CSP CULVERTS - BG-04 GENERAL ARRANGEMENT
780	CULVERT WORKS - TYPICAL DETAILS

REFERENCE DRAWINGS

ISSUED FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW	DJP	KEH
1	06SEP'23	REVISED WITH UPDATED SURVEY DATA	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

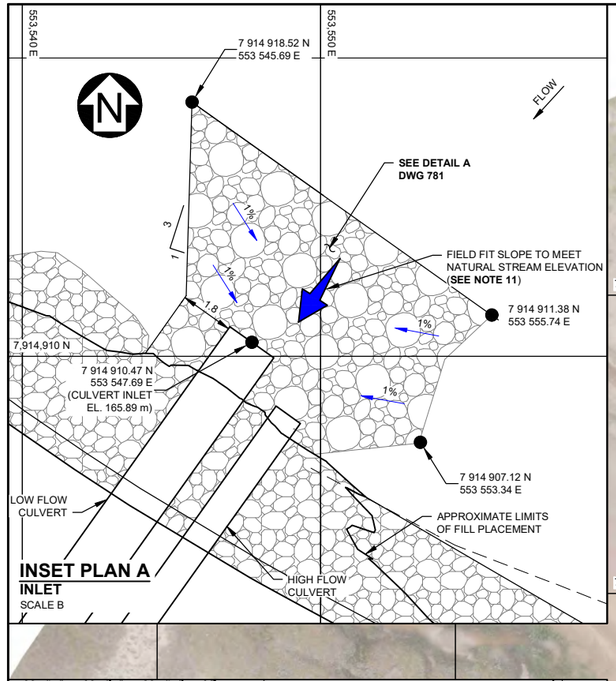
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

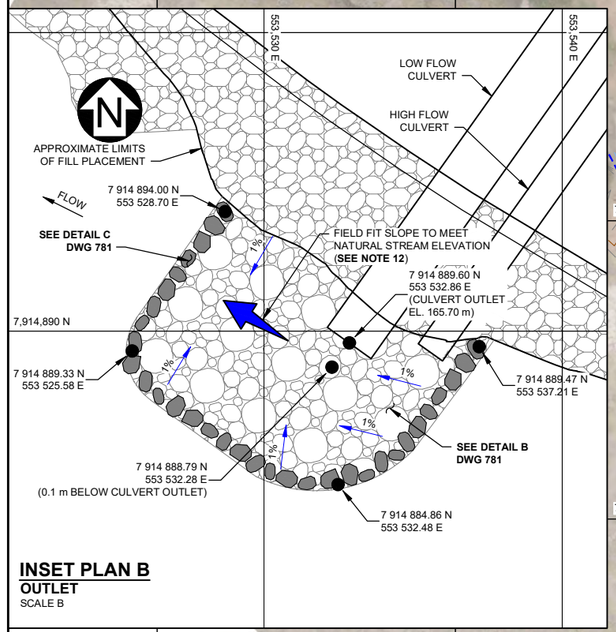
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - BG-04
PLAN AND SECTION

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	746	2

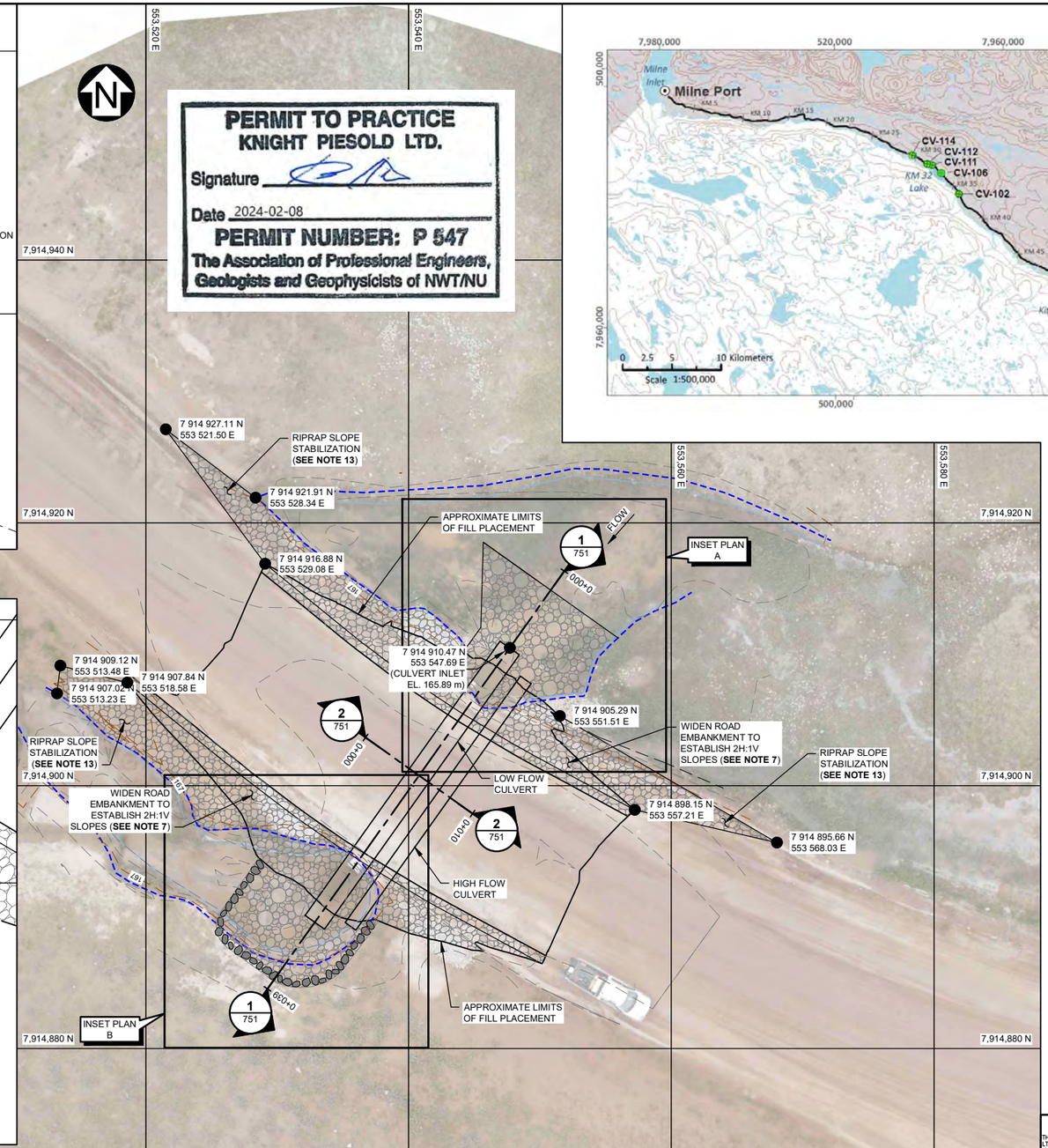
SAVED: I:\1102\00181\77\A\Acad\DWGS\745 746\745 746 R2, 2/8/2024 2:03:25 PM, ASIMPSON PRINTED: 2/8/2024 2:04:58 PM, 746, ASIMPSON ACAD VERSION: 24.2S (LMS TECH)



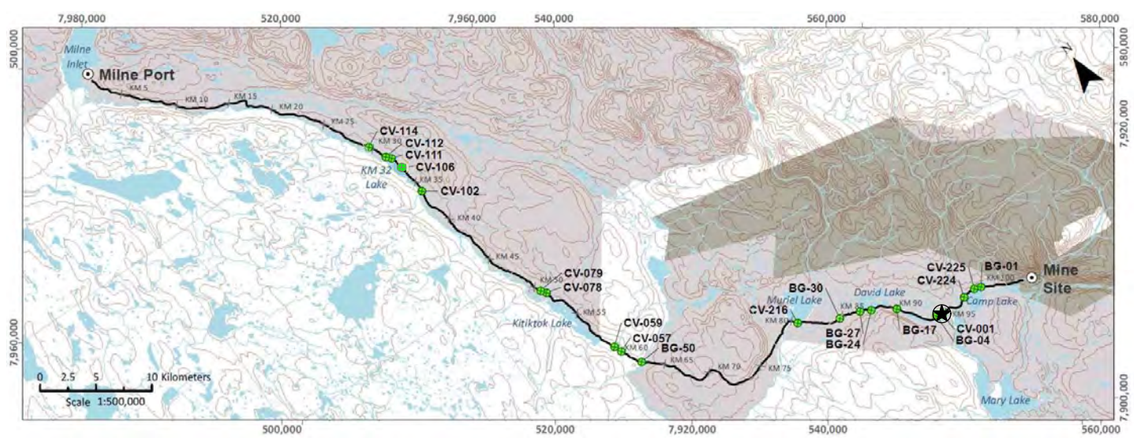
INSET PLAN A
INLET
SCALE B



INSET PLAN B
OUTLET
SCALE B



PLAN
SCALE A



LEGEND:

- COARSE RIPRAP
- FINE RIPRAP
- APPROXIMATE LIMITS OF FILL PLACEMENT
- APPROXIMATE HIGH WATER MARK (HWM)
- SURVEYED WETTED WIDTH
- RIPRAP LINED EXISTING CHANNEL
- SETTING OUT POINT
- RIPRAP FOR BANK ARMOURING AND FIELD FIT CHANNEL OUTLET
- FIELD FIT SLOPE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. ALL WORK TO BE COMPLETED DURING FROZEN CONDITIONS.
5. BLASTING MATS MAY BE USED, IF REQUIRED, FOR BLASTING OF SOIL TO REMOVE THE EXISTING CULVERTS. MITIGATION WILL BE IMPLEMENTED AS PER BAFFINLAND'S SURFACE WATER AND AQUATIC ECOSYSTEM MANAGEMENT PLAN AND ENVIRONMENTAL PROTECTION PLAN. ONCE EXCAVATION HAS REACHED THE CULVERTS, THEY WILL BE REMOVED AND THE NEW CULVERTS INSTALLED AS PER THE WORK PLAN.
6. ALL BLASTING SPOILS TO BE REMOVED FROM SITE AND DISPOSED AT APPROPRIATE LOCATIONS.
7. CULVERTS TO BE BACKFILLED TO ESTABLISH ROAD SIDE SLOPES AT 2H:1V. ALL SLOPES WILL BE STABILIZED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE AS SHOWN ON **DRAWING 751 (SECTION 1)**.
8. EXISTING DRAINAGE CHANNELS TO BE LINED WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE. GEOMETRY TO BE FIELD FIT TO PROVIDE POSITIVE DRAINAGE.
9. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
10. EROSION AND SEDIMENT CONTROL MEASURES INCLUDED ARE LIMITED TO THE WATER CROSSING AND THE IMMEDIATE SURROUNDING AREA. THE DESIGN OF OTHER TOTE ROAD EROSION AND SEDIMENT CONTROL MEASURES WILL BE REPORTED SEPARATELY.
11. FIELD FIT INLET TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS CULVERT INLET.
12. FIELD FIT OUTLET SLOPE TO BE CONSTRUCTED OF RIPRAP MIXED WITH MATERIAL SIMILAR TO NATURAL STREAM SUBSTRATE WITH POSITIVE DRAINAGE TOWARDS THE STREAM.
13. STABILIZE SLOPE WITH FINE RIPRAP OVERLYING NON-WOVEN GEOTEXTILE.

SCALE A: 4 2 0 4 8 12 16 20 m
SCALE B: 2 1 0 2 4 6 8 10 m

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REFERENCE DRAWINGS	
DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
751	CSP CULVERTS - CV-001 PLAN AND SECTION
781	CULVERT INLET AND OUTLET WORKS - TYPICAL PLAN AND DETAILS

REVISIONS						
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	EDW/AS	DP	
1	06SEP'23	REVISED WITH UPDATED DATA SURVEY	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-001
GENERAL ARRANGEMENT

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	750	2

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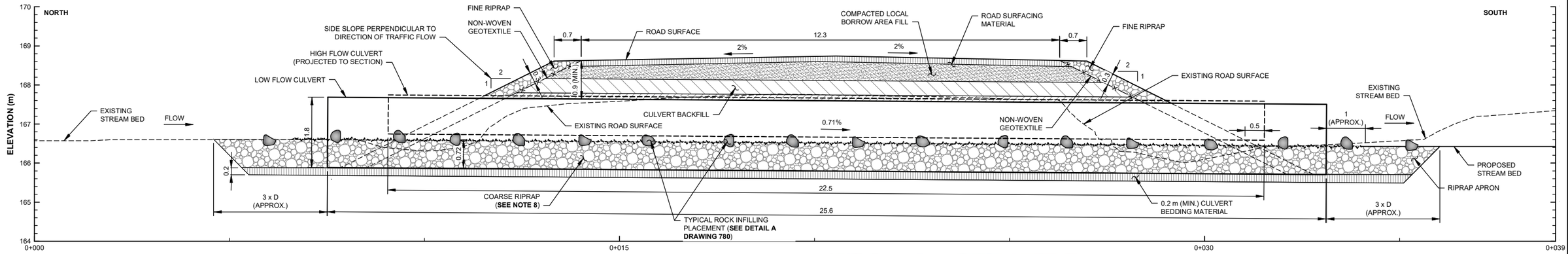
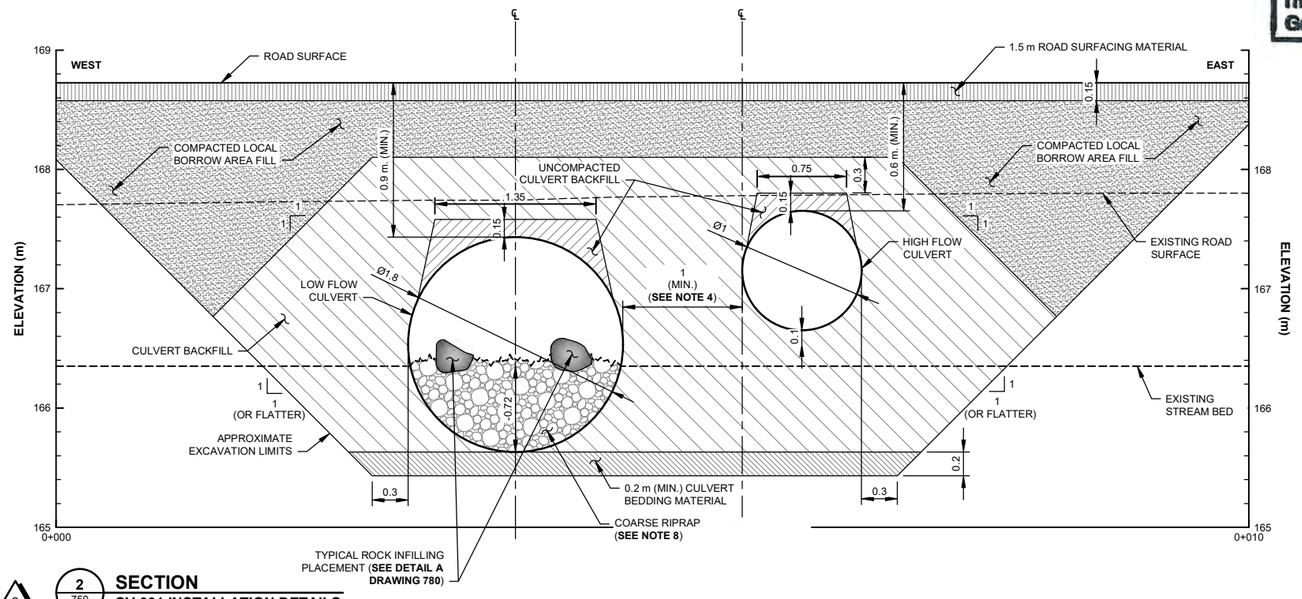


2 1/750 **SECTION**
CV-001 PROFILE
SCALE A



2 2/750 **SECTION**
CV-001 INSTALLATION DETAILS
SCALE B

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Date 2024-02-08
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- CULVERT BEDDING MATERIAL
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

FISH PASSAGE PARAMETERS	
MODELLED CULVERT JULY OUTLET VELOCITY (m/s)	0.33
MODELLED CULVERT AUGUST OUTLET VELOCITY (m/s)	0.26
MAXIMUM SWIM DISTANCE (m)	41

RIPRAP LOCATIONS	RIPRAP SIZE (mm)	MATERIAL
INLET/OUTLET APRON	300 (D_{50})	COARSE RIPRAP
BANK STABILIZATION	150 (D_{50})	FINE RIPRAP
CULVERT INFILLING	300 (D_{50})	COARSE RIPRAP
IN-CULVERT BOULDERS	300 (MIN.)	COARSE RIPRAP
STEP POOL	NOT REQUIRED	N/A
BOULDER CLUSTER	NOT REQUIRED BY DFO SPOT TOOL	N/A

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.
6. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
7. CULVERT INFILL MATERIAL TO BE INSPECTED DURING AND AFTER FIRST FRESHET FOLLOWING CONSTRUCTION TO DETERMINE IF ADDITIONAL MATERIAL IS REQUIRED.
8. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS.

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS
750	CSP CULVERTS - CV-001 GENERAL ARRANGEMENT
780	CULVERT WORKS - TYPICAL DETAILS

REFERENCE DRAWINGS

ISSUED FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
2	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	AS	CAP	KEH
1	06SEP'23	REVISED WITH UPDATED DATA SURVEY	GMJ	EL/EDW	CAP	KEH
0	03FEB'23	ISSUED FOR CONSTRUCTION	GMJ	EDW	CAP	KEH

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

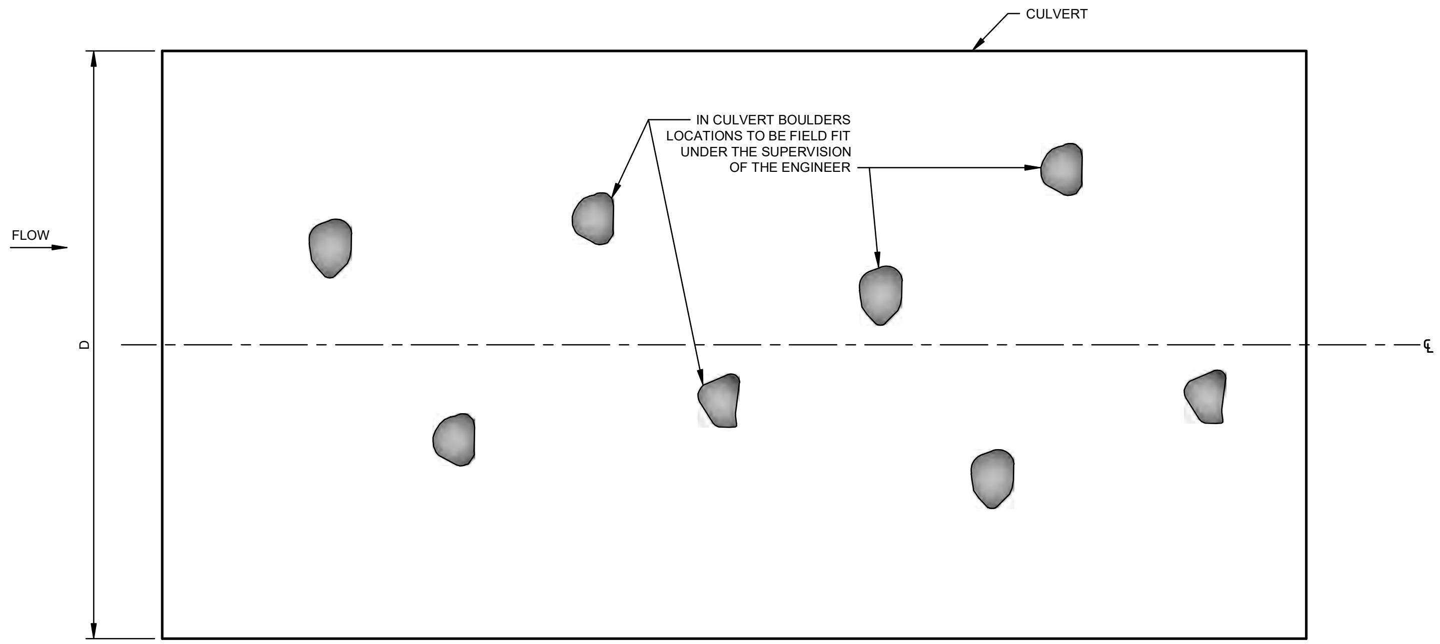
BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

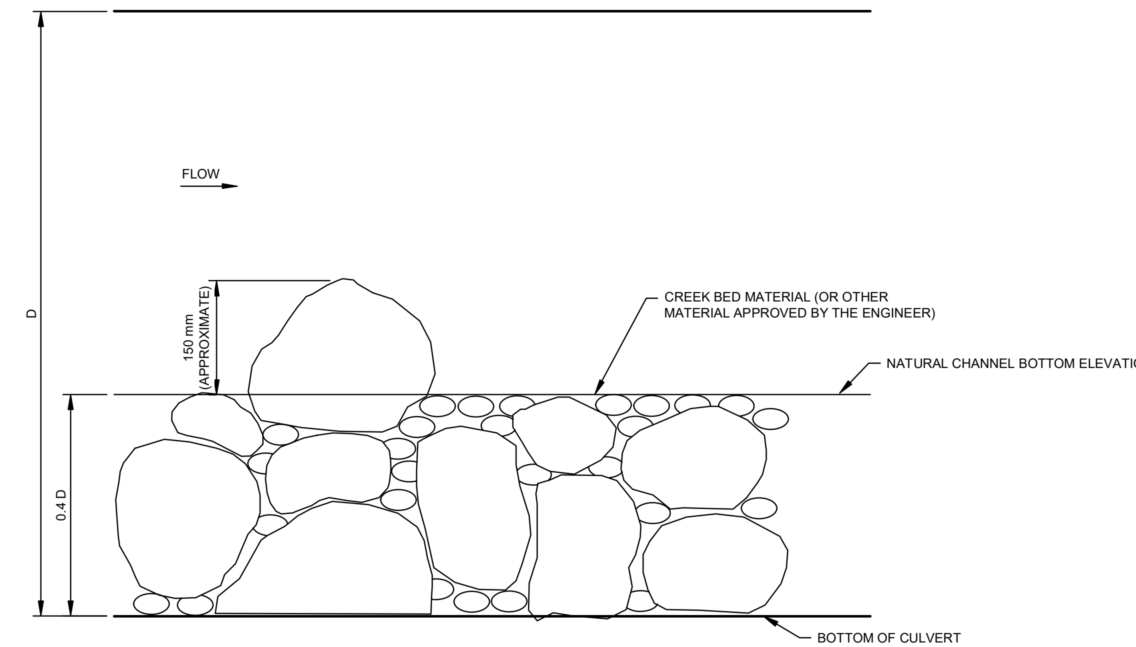
PERMANENT CROSSING PLAN
ROUND CSP CULVERTS - CV-001
PLAN AND SECTION

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	751	2

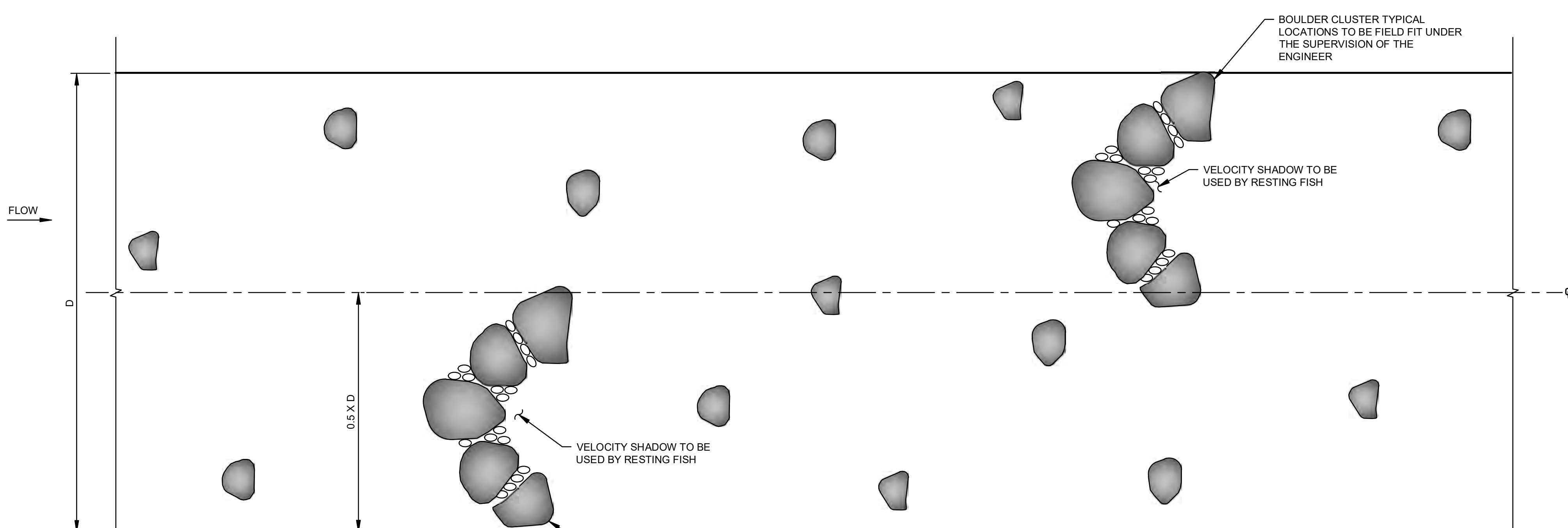
SAVED: I:\1\02\00181\177\A\Acad\DWGS\750 751\750 751 R2, 2/8/2024 2:06:06 PM, ASIMPSON, PRINTED: 2/8/2024 2:06:28 PM, 751, ASIMPSON ACAD VERSION: 24.2S (LMS TECH)



A DETAIL
TYPICAL IN CULVERT BOULDER PLACEMENT PLAN
SCALE A



C DETAIL
BOULDER CLUSTER AND IN CULVERT BOULDER SECTION
NTS



B DETAIL
BOULDER CLUSTERS WITHIN CULVERTS PLAN
SCALE A

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Signature
Date 2024-02-08
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. RIPRAP TO BE CLEAN, DURABLE AND ANGULAR.
3. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
4. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS.THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAM BED CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAMBED CONDITIONS.

ISSUED FOR CONSTRUCTION

SCALE A 0.5 0.25 0 0.5 1.0 1.5 2.0 2.5 m

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

TOTE ROAD CULVERT REMEDIATION
IN CULVERT WORKS
TYPICAL DETAILS

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	780	1

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
1	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	AS		
0	23JAN'24	ISSUED FOR CONSTRUCTION	GMJ	AS	CAP	KEH

REVISIONS

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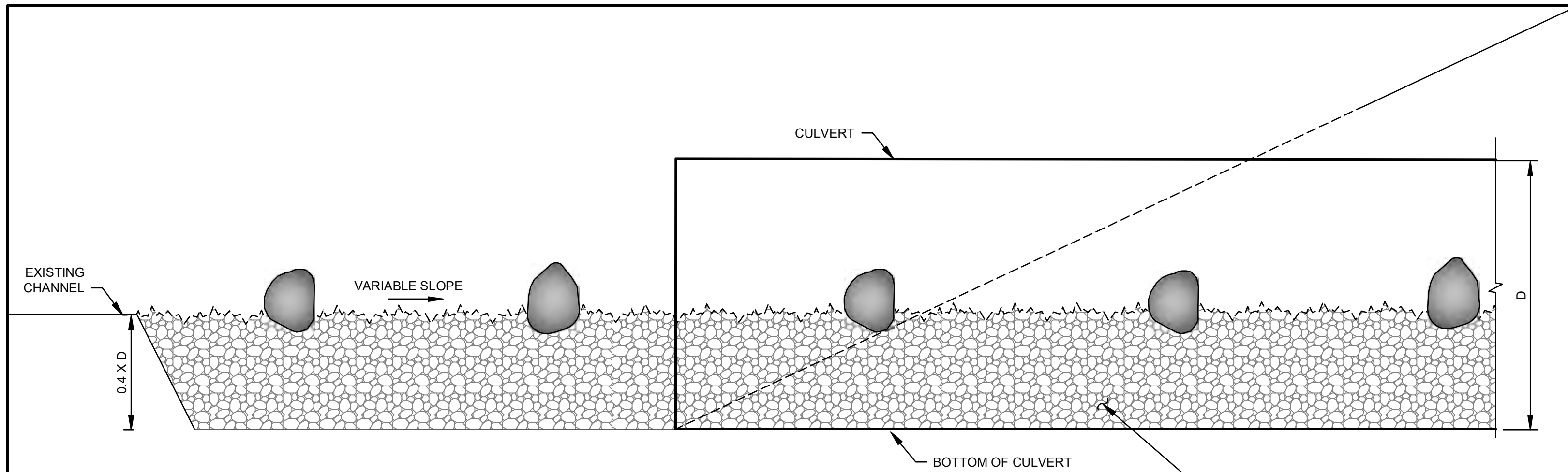
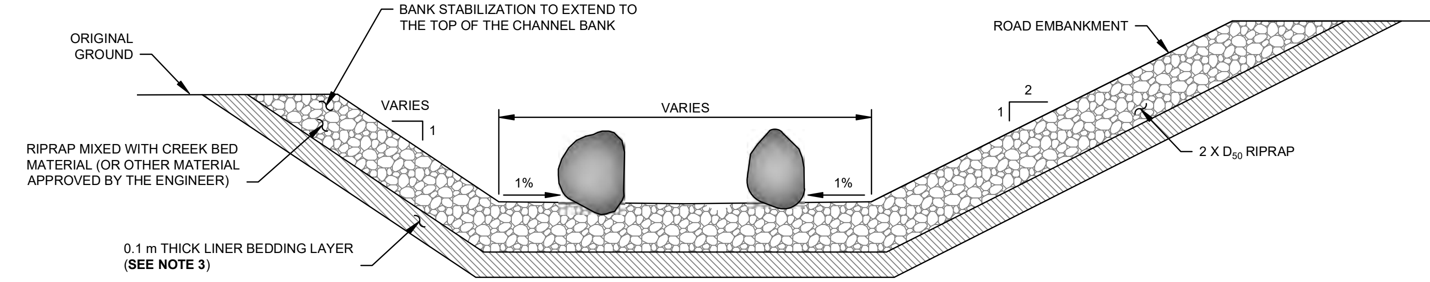
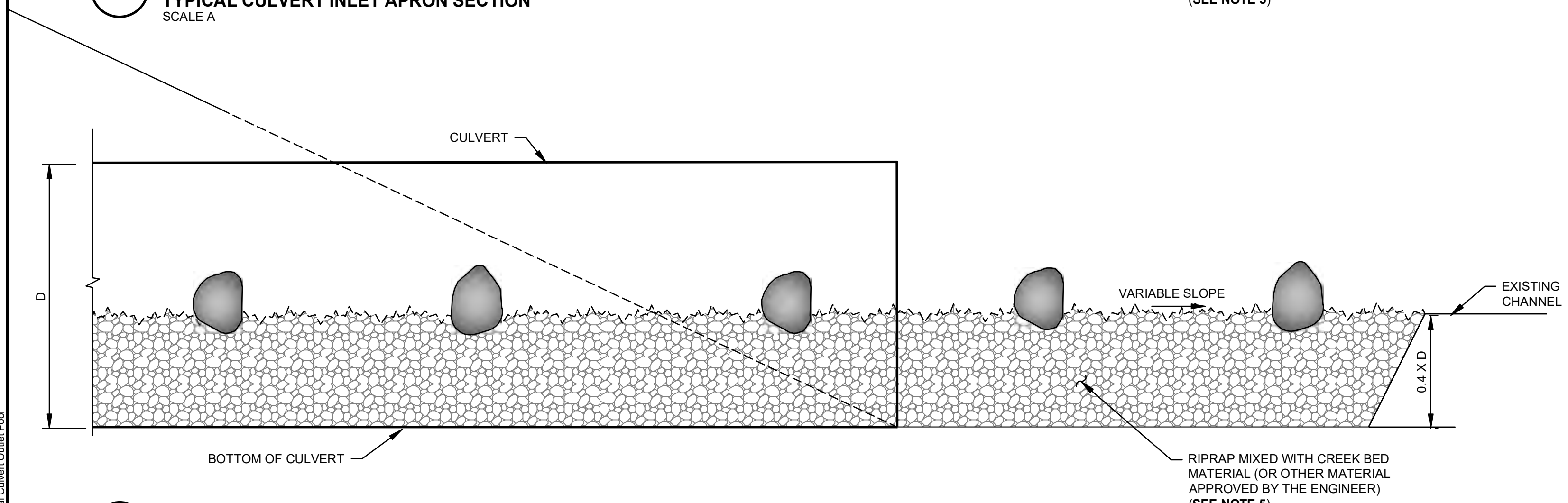


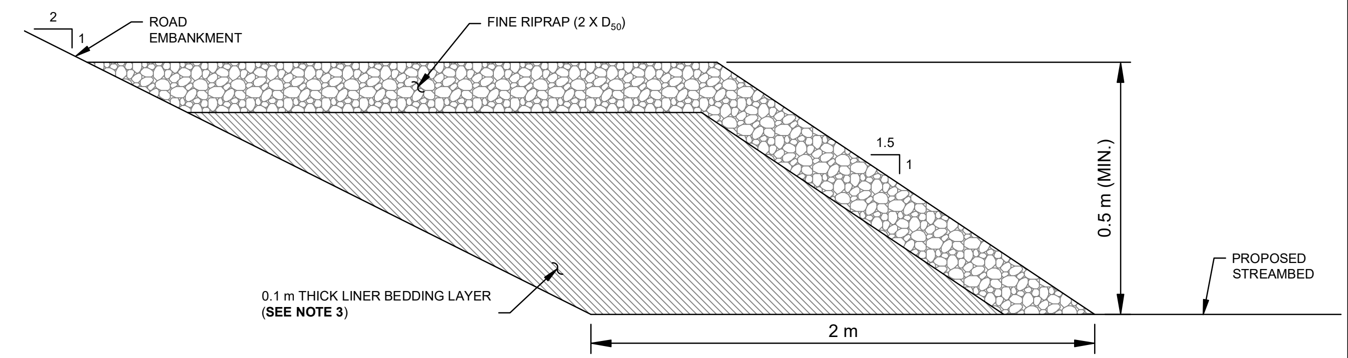
A DETAIL
TYPICAL CULVERT INLET APRON SECTION
SCALE A



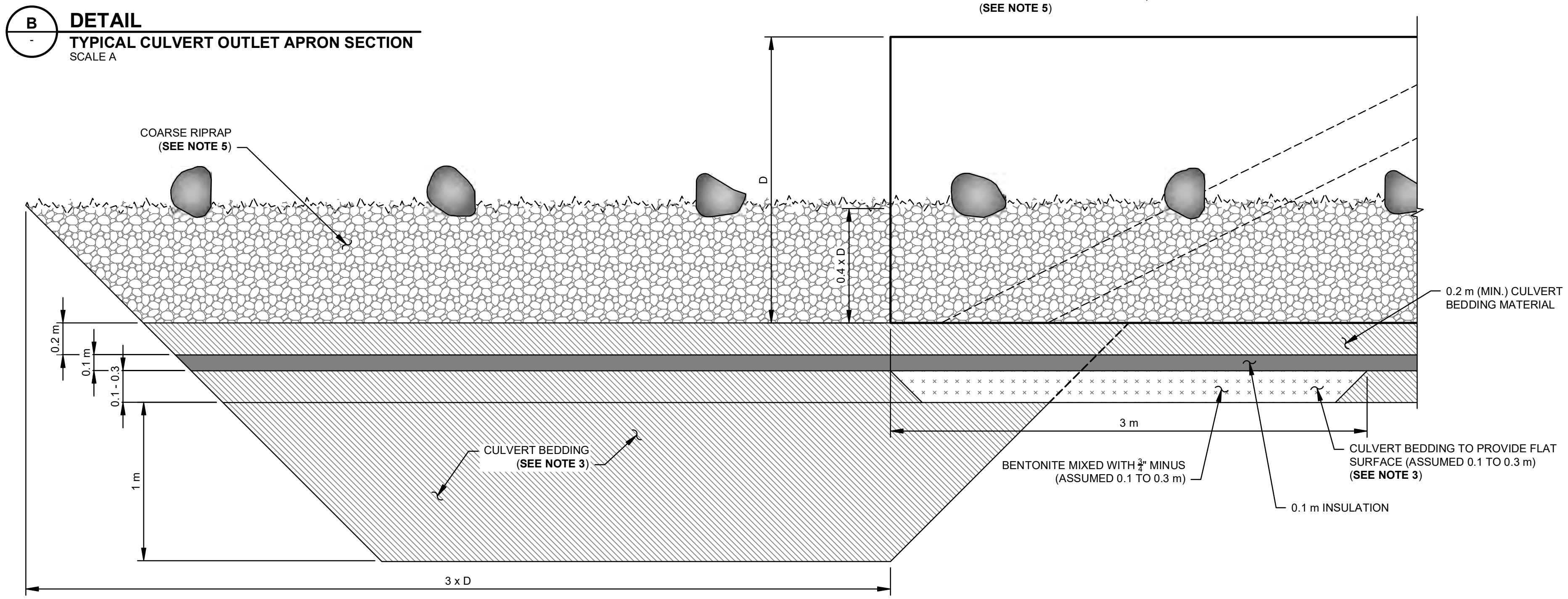
C DETAIL
BANK STABILIZATION AND APRON SECTION
SCALE B



B DETAIL
TYPICAL CULVERT OUTLET APRON SECTION
SCALE A



E DETAIL
CV-102 AND CV-106 THERMAL BERM
SCALE B



D DETAIL
CV-102 AND CV-106 INLET APRON
SCALE A

LEGEND:

- RIPRAP
- CULVERT BEDDING MATERIAL
- BENTONITE MIXED WITH ¾" MINUS
- INSULATION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. RIPRAP TO BE CLEAN, DURABLE AND ANGULAR.
3. BEDDING LAYER TO BE THE SAME MATERIAL AS FINE CULVERT BACKFILL (**SEE DRAWING 703**).
4. MATERIAL SPECIFICATIONS INCLUDED ON **DRAWING 703**.
5. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS. THE FINISHED SURFACE TO BE ROUGHENED TO MIMIC ADJACENT STREAMBED CONDITIONS.

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Signature
Date 2024-02-08
PERMIT NUMBER: P 547
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

ISSUED FOR CONSTRUCTION

SCALE A: 0.4 0.2 0 0.4 0.8 1.2 1.6 2.0 m
SCALE B: 0.3 0.15 0 0.5 1.0 1.5 m

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

TOTE ROAD CULVERT REMEDIATION
CULVERT INLET AND OUTLET WORKS
TYPICAL PLAN AND DETAILS

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	781	1

REFERENCE DRAWINGS

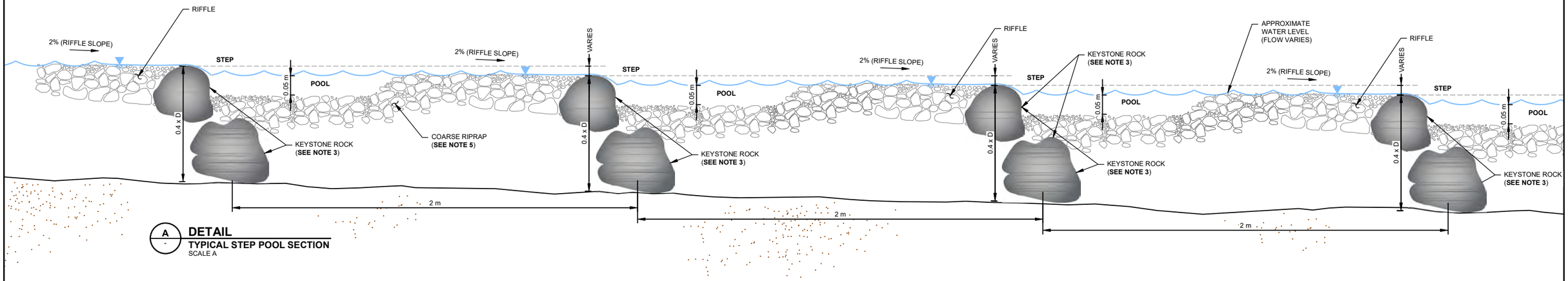
DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS

REVISIONS

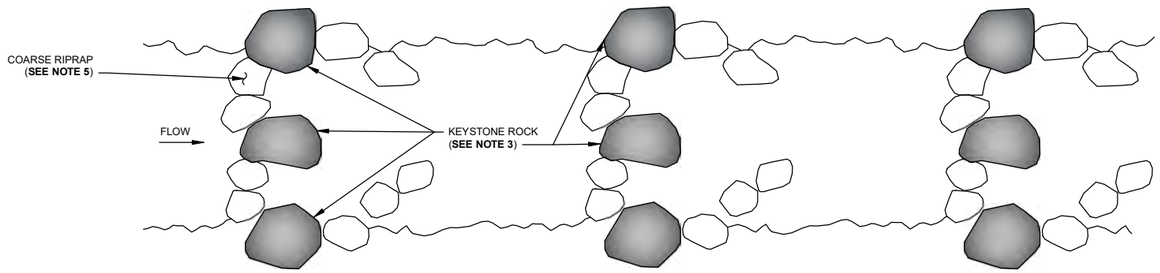
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
1	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	AS	TJP	KEH
0	23JAN'24	ISSUED FOR CONSTRUCTION	GMJ	AS	CAP	KEH



A — **DETAIL**
TYPICAL STEP POOL SECTION
SCALE A



B — **DETAIL**
STEP POOL CONFIGURATION PLAN
NTS

LEGEND:
- BEDDING
- RIPRAP
- WATER LEVEL

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. RIPRAP TO BE CLEAN, DURABLE AND ANGULAR.
3. LARGE BOULDERS (COARSE RIPRAP COARSE LIMIT D_{85} TO D_{100}) TO BE PLACED TO CREATE STEPS AND POOLS AT APPROPRIATE INTERVALS ALONG THE STREAM REALIGNMENT AS DETERMINED BY THE DFO SPOT TOOL.
4. BEDDING LAYER TO BE THE SAME MATERIAL AS CULVERT BACKFILL (**SEE DWG 703**).
5. INTERSTITIAL SPACES OF THE RIPRAP ON THE CHANNEL BED SHALL BE FILLED WITH CREEK BED MATERIAL (OR OTHER MATERIAL APPROVED BY THE ENGINEER) AND GRADED TO MATCH THE ADJACENT CHANNEL BED ELEVATION. THE CONTRACTOR SHALL MINIMIZE VOID SPACE BETWEEN RIPRAP STONES SUCH THAT CREEK FLOWS ARE MAINTAINED ABOVE THE CHANNEL BED DURING LOW-FLOW CONDITIONS.

ISSUED FOR CONSTRUCTION

SCALE A 0.2 0.1 0 0.2 0.4 0.6 0.8 1 m

REGISTERED PROFESSIONAL ENGINEER
G.M. JOHNSTONE
LICENSEE
2024-02-08
NT/NU

Knight Piésold CONSULTING

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

TOTE ROAD CULVERT REMEDIATION
EXTERNAL CULVERT WORKS
TYPICAL DETAILS

P/A NO.	DRAWING NO.	REVISION
NB102-181/77	782	0

DRG. NO.	DESCRIPTION
703	CULVERT FILL MATERIALS AND GEOSYNTHETICS SPECIFICATIONS

REFERENCE DRAWINGS

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REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
0	08FEB'24	REVISED INCORPORATING DFO ADVICE	GMJ	AS	DJP	GMJ

REVISIONS

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XREF FILE(S): X-G-INT-KEH, X-G-INT-TIP IMAGE FILE(S): 1 3 (2) 4 5 6 Boulder Cobbles Gconstone_NJ Seal KHewton_NT Seal KHewton_PTP_NT MicrosoftTeams-image (23) Step Bed Typical Culvert Outlet Pool