

TOTE ROAD CV-216

15-JUL-24



A



B



C



D



E



F

Photos 1-2. Photos taken 20 m upstream (top) and 60 m upstream (bottom) in spring 2024: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-216

15-JUL-24



A



B



C

Photos 1-3. Photos taken 100 m upstream in spring 2024: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).

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15-JUL-24



A



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E



F

Photos 1-4. Photos taken of the fish passage culverts at the downstream (top) and upstream (bottom) ends in spring 2024: (A,D) lefthand culvert; (B,E) middle culvert; and (C,F) righthand culvert.

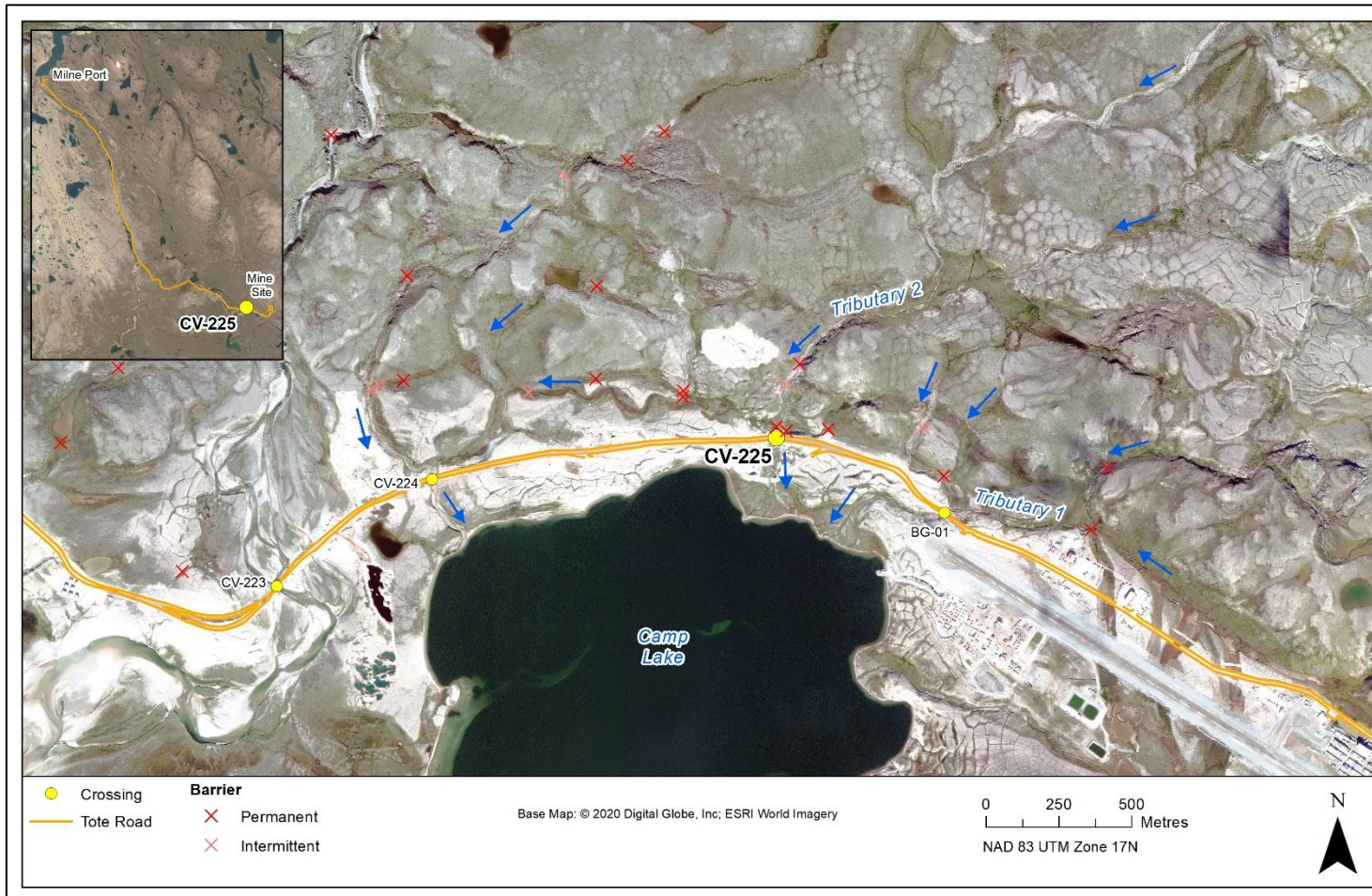
TOTE ROAD CV-225

LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-225	Dates Surveyed:	16-Jul-24	Waterbody Type:	Stream
Project Interaction:	Tote Road Culvert	UTM Coordinates:	17W 554421 E 7915187 N		

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime: Seasonal **Stream Order:** 3



BAFFINLAND IRON MINES
MARY RIVER PROJECT

 **North/South Consultants Inc.**
Aquatic Environment Specialists

FISH HABITAT:

ARCTIC CHAR - YES

NINESPINE STICKLEBACK - POTENTIAL

TOTE ROAD CV-225

SITE SUMMARY

The Tote Road crosses an unnamed stream at site CV-225 that flows south into Camp Lake 250 m downstream of the crossing. Camp Lake has been extensively surveyed and is known to support both overwintering and char spawning. This crossing has been identified for remediation.

Detailed habitat data were collected in the crossing area in late spring 2024. Wetted widths ranged from 6.1 to 7.2 m. Measured water depths ranged from 0.05-0.28 m. Measured velocities were moderate to high, ranging from 0.12-0.92 m/s. Stream morphology was primarily run and riffle. The substrate was mainly cobble throughout.

Downstream catch rates (5.48 fish/minute) of juvenile Arctic Char were approximately twice as high as upstream (2.60 fish/minute) in spring 2024. Additionally, no fish smaller than 119 mm were captured upstream of the crossing. Both fish passage culverts are perched and the relatively high in-culvert velocities (>1.00 m/s in spring 2024) likely restrict upstream access to only larger juveniles. Char use habitat in the stream for rearing and there is potential for adult use in the deeper pools near Camp Lake. There is no char spawning or overwintering habitat in the stream.

Ninespine Stickleback are abundant within Camp Lake and have been captured in the lowermost reaches of this stream near its confluence with the lake, but the species has not been captured near the road. Relatively high velocities during the open-water period likely prevent this species from using habitat near the crossing.

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FISH HABITAT POTENTIAL

Species	Spawning	Overwintering	Rearing	Adults Present
ARCH	N	N	Y	P
NNST	P	N	P	P

FISHERIES DATA

Location	Species	Survey Date	Temperature (°C)	Distance Fished (m)	Effort (Seconds)	# Fish Captured	# Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
Downstream	ARCH	16-Jul-24	7.0	50	241	22	0	5.477	65-154
	NNST					0	0	0.00	-
Upstream	ARCH			50	185	8	0	2.595	119-149
	NNST					0	0	0.00	-

OTHER NOTES / OBSERVATIONS

Downstream catch rates (5.48 fish/minute) of juvenile Arctic Char were approximately twice as high as upstream (2.60 fish/minute) in spring 2024. Additionally, no fish smaller than 119 mm were captured upstream of the crossing. Both fish passage culverts are perched and the relatively high in-culvert velocities (>1.00 m/s in spring 2024) likely restrict upstream access to only larger juveniles. Ninespine Stickleback are abundant within Camp Lake and have been captured in the lowermost reaches of this stream near its confluence with the lake, but the species has not been captured near the road. Relatively high velocities during the open-water period likely prevent this species from using habitat near the crossing.

TOTE ROAD CV-225

HYDROLOGY CHARACTERISTICS: 16-JUL-24

Wetted/Dry/Shallow (<0.02 m)/Unconnected Pools: Wetted

Stage: Low-Moderate

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
20D	13.60	6.10	0.09	0.20	0.26	0.26	0.27	0.50	0.54	0.92
0 (Centreline)	UNDER TOTE ROAD									
20U	8.70	7.20	0.22	0.06	0.05	0.28	0.78	0.43	0.12	0.85

OTHER NOTES / OBSERVATIONS

Wetted widths ranged from 6.1 to 7.2 m. Measured water depths ranged from 0.05-0.28 m. Measured velocities were moderate to high, ranging from 0.12-0.92 m/s.

TOTE ROAD CV-225

HABITAT CHARACTERISTICS: 16-JUL-24

Wetted/Dry/Shallow (<0.02 m)/Unconnected Pools: Wetted Stage: Low-Moderate

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Rapids	Flat	Fines	Gravel	Small Cobble	Large Cobble	Boulders
20D	30	10	-	60	-	-	-	-	10	30	50	10
0 (Centreline)	UNDER TOTE ROAD											
20U	20	10	-	70	-	-	-	5	5	20	50	20

OTHER NOTES / OBSERVATIONS

Stream morphology was primarily run and riffle. The substrate was mainly cobble throughout.

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16-JUL-24



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Photos 1-1. Photos taken 20 m downstream (top) and 20 m upstream (bottom) in spring 2024: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

TOTE ROAD CV-225

16-JUL-24



A



B

Photos 1-2. Photos taken of the culvert in spring 2024: (A) downstream end; and (B) upstream end.

APPENDIX C

Erosion and Sediment Controls implemented in 2024

During 2024, monitoring was conducted along the Tote Road to monitor the quality of surface water flows at select water crossings (culverts, bridges), in accordance with Appendix D Tote Road Monitoring Program (TRMP) of the Roads Management Plan (BAF-PH1-830-P16-0023). Upstream and downstream water quality was monitored for pH, Total Suspended Solids (TSS), Total Dissolved Solids (TDS) and turbidity. In 2024, no sampling events reported Project related impacts to surface water as a result of the operation and maintenance of the Tote Road. Water quality monitoring results are presented in Table 2.

Additional fish bearing crossings along the Tote Road were also assessed for erosion and sediment conditions. A combination of Erosion Sediment Control (ESC) Best Management Practices and operational maintenance, were implemented to reduce sediment transport and protect fish habitat as required which included:

- silt fencing
- coir logs
- spring berms
- geotextile
- rock armouring of road side embankments and ditches
- rock check dams
- water diversion ditches
- clearing and steaming snow from culvert inlets/ outlets
- regular monitoring of snow stockpile run-off
- removing sediment from ditches and ESC structures

Beginning in May, ESC assessments focused on the annual impacts of freshet. When required, the appropriate ESC controls were installed to mitigate erosion and sedimentation and support the management of turbid water when identified during water quality monitoring. As freshet conditions subsided, emphasis was directed to the maintenance and repair of ESC controls.

Remedial construction of seven (7) culvert crossings was completed between February and May to address fish passage concerns and mitigate potential for sedimentation at select locations:

- BG-04
- CV-001
- CV-057
- CV-059
- CV-102
- CV-106
- CV-216

A late season, unprecedented rainfall estimated to be a 1 in 1000 year, 24-hour event, occurred September 20-22. The Project Site experienced, high flows in watercourses, overland flooding, and erosion and sedimentation along the Tote Road between kilometres 50 and 87.5. The Tote Road was closed to all traffic commencing September 20 and re-opened to light vehicle traffic September 29 after the re-construction of degraded road sections. The Tote Road was washed out at CV-049 (km 63.5) by elevated flows generated from surface water drainage, from the large water catchment that converges through this crossing and BG-50 (km 63). Re-construction of CV-049 was completed as part of an emergency measures plan, to immediately facilitate emergency vehicles, critical fuel supplies and resources, and the transportation of staff and hunters/ visitors as required between the Mary River and Milne Port sites.

The following series of photographs documents the general erosion and sediment controls implemented in 2024 as presented in Table 1.



Photo 1. CV-112 downstream (east side), north bank. Pile of snow and aggregate identified adjacent to watercourse.



Photo 2. CV-112 downstream (east side), north bank. Pile of mixed snow and aggregate has been removed.



Photo 3. CV-106 upstream, culvert inlet after remedial construction.



Photo 4. CV-106 upstream, culvert inlet apron after remedial construction.



Photo 5. CV-106 downstream, culvert outlet after remedial construction.



Photo 6. CV-106 downstream, culvert outlet apron after remedial construction.



Photo 7. CV-102 upstream, culvert inlet after remedial construction.



Photo 8. CV-102 upstream, culvert inlet apron after remedial construction.



Photo 9. CV-102 downstream, culvert outlet after remedial construction.



Photo 10. CV-102 downstream, culvert outlet apron after remedial construction.



Photo 11. CV-102 downstream, culvert outlet apron rip rap thinned out to improve fish passage.



Photo 12. CV-078 upstream, culvert inlets detached and road embankment eroded during September rain event, repaired yet to be completed.



Photo 13. CV-078 downstream, re-established safe travel on the downstream lane of the road and re-armoured the embankment.



Photo 14. CV-060 downstream, silt fence in disrepair.



Photo 15. CV-060 downstream, silt fence replaced.



Photo 16. CV-059 upstream culvert inlet after remedial construction.



Photo 17. CV-059 upstream, culvert inlet apron after remedial construction.



Photo 18. CV-059 downstream culvert outlet apron after remedial construction.



Photo 19. CV-057 upstream culvert inlet after remedial construction.



Photo 20. CV-057 upstream culvert inlet apron after remedial construction.



Photo 21. CV-057 downstream culvert outlet after remedial construction.



Photo 22. CV-057 downstream culvert outlet apron after remedial construction.



Photo 23. BG-50 sediment removal from snow stockpile check dams.



Photo 24. CV-049 looking upstream, silte fence installed to prevent sediment deposition into watercourse during to re-construction of the washed out crossing.



Photo 25. CV-049 upstream, geotextile placed behind rock armouring to prevent culvert bedding material from entering watercourse during re-construction



Photo 26. CV-049 downstream, coir logs placed during to protect culvert bedding material from erosion due to back eddy flow at culvert outlet.



Photo 27. CV-049 upstream, culvert inlet completed with rock armouring of embankment



Photo 28. CV-049 downstream, culvert outlet completed with rock armouring of embankment



Photo 29. CV-216 upstream, culvert inlets after remedial construction.



Photo 30. CV-216 upstream, culvert inlet apron after remedial construction.



Photo 31. CV-216 downstream, culvert outletapron after remedial construction.



Photo 32. BG-04 upstream, culvert inlets after remedial construction.



Photo 33. BG-04 upstream, culvert inlet and apron after remedial construction.



Photo 34. BG-04 downstream, culvert outlet after remedial construction.



Photo 35. BG-04 downstream, culvert outlet apron after remedial construction.



Photo 36. CV-001 upstream, culvert inlet after remedial construction.



Photo 37. CV-001 downstream, culvert outlet after remedial construction.



Photo 38. CV-224 downstream, silt fence in disrepair.