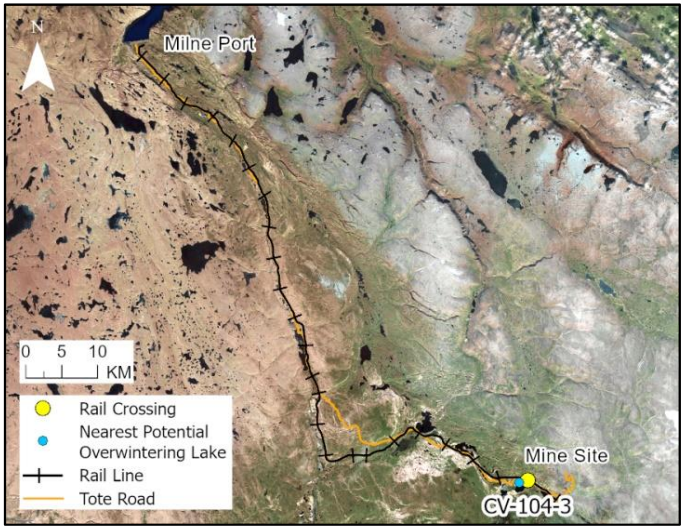
RAIL CV-104-3

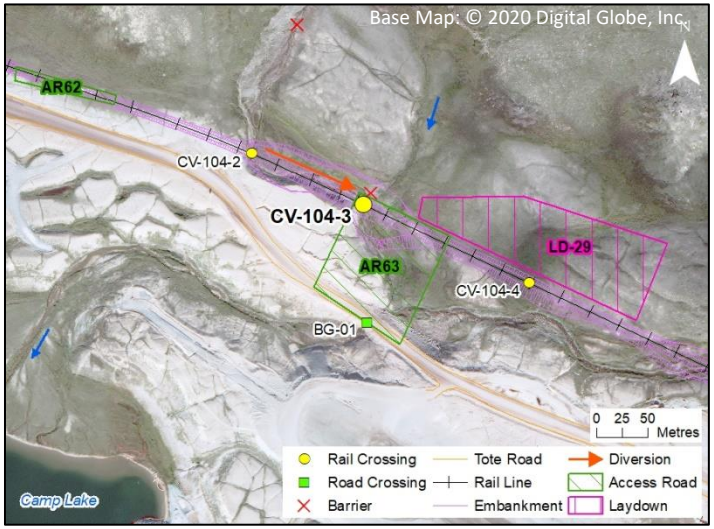
LOCATION AND CROSSING DESCRIPTION

Site ID:	CV-104-3	**Dates Surveyed:**	22-Jun-19; 19-Aug-19	**Waterbody Type:**	Stream
Project Interaction:	Rail Culvert	**Centreline UTM Coordinates:**	17W 557991 E 7915044 N	**Culvert Length (m):**	63
Number of Barrels:	1	**Culvert Diameter/Span (mm):**	900	**Slope (%):**	5

GENERAL PHYSICAL CHARACTERISTICS

Flow Regime:	Seasonal	**Stream Order:**	2	**Drainage Basin Area (km²):**	0.555





SUMMARY

The rail alignment crosses CV-104-3 in a small branch of the same seasonal stream crossed by the rail at CV-104-2. The two branches merge almost immediately downstream of the CV-104-3 crossing. This system then flows into the stream crossed by the rail at CV-104-5 immediately upstream of the Tote Road crossing (BG-01) approximately 130 m downstream. The system drains southwest to Camp Lake another 530 m downstream from the Tote Road. Flow from the stream crossed at CV-104-2 will be diverted to the crossing CV-104-3.

This stream is shallow (<0.10 m) with low to moderate velocities. Habitat is largely riffle over cobble/gravel. There is a permanent steep gradient barrier 25 m upstream from the centreline. There are no natural downstream barriers to fish movement, though high velocities have been observed at the Tote Road culvert outflow during periods of high water.

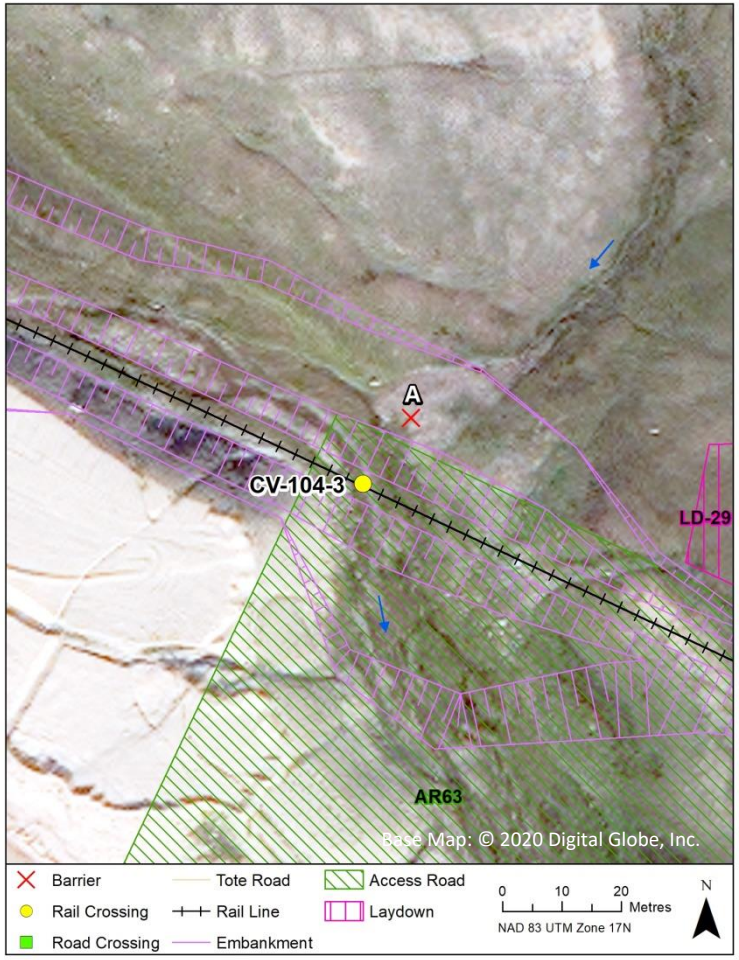
This branch may provide a small amount of open-water season rearing habitat for juvenile Arctic Char, though no char have been observed in the two years it has been surveyed (2018-2019). The stream does not provide overwintering or spawning habitat for char due to lack of flow and sufficient depth in winter.

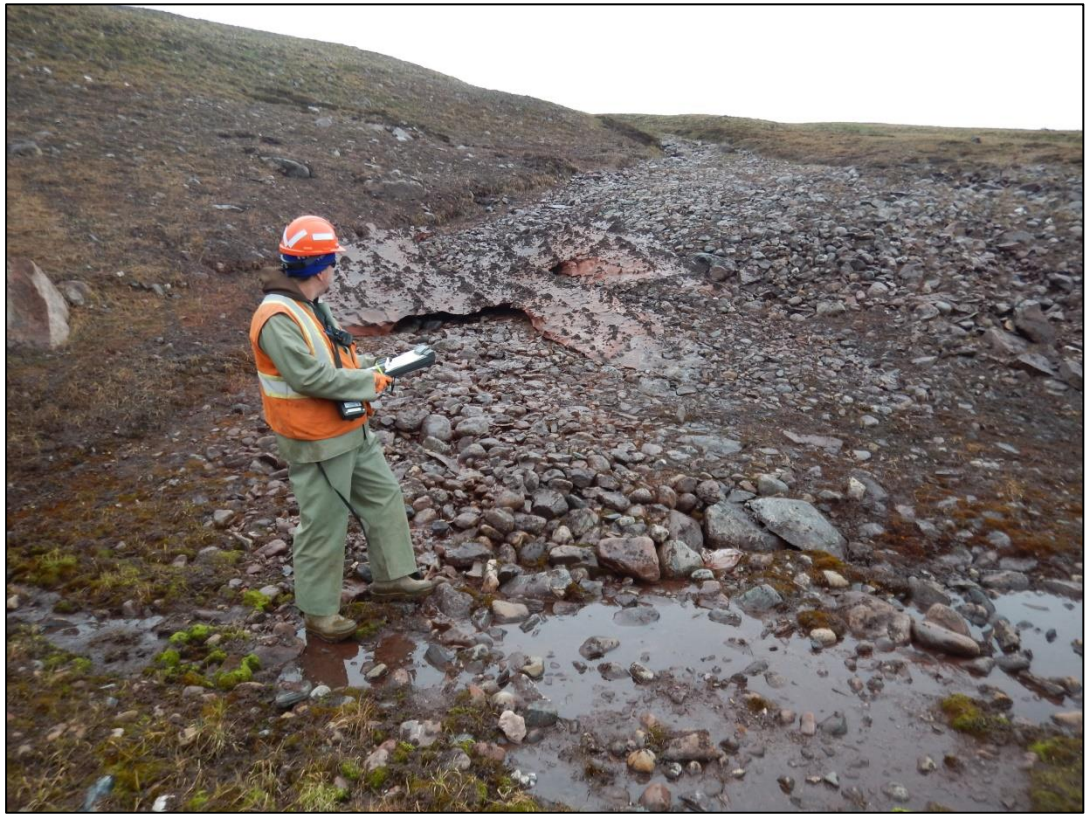
Ninespine Stickleback have been captured at the confluence with Camp Lake downstream of this site, but not at or upstream of the Tote Road since monitoring began in 2006, where habitat is unsuitable for the species.

RAIL CV-104-3

BARRIERS

Upstream/ Downstream	UTM		Barrier Type			Height (m)	Gradient (°)	Description	Site Label
	Easting	Northing	1	2	3				
Downstream	NO BARRIERS								
Upstream	557999	7915055	SSF	HG			14	Permanent Barrier: Steep rocky hillside with subsurface flow	A





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RAIL CV-104-3

FISH HABITAT POTENTIAL

Nearest Potential Overwintering Habitat - ARCH: Camp Lake **Distance to Nearest Potential Overwintering Habitat - ARCH (km):** ~0.70

Overwintering Habitat Upstream of Site - ARCH (Y/N): No

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

FISHERIES DATA

Date: 22-Jun-19 **Temperature (°C):** 7.0 **Gear Used:** Visual

Distance Fished (m): N/A **Duration Fished (seconds):** N/A

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Spring	-	-	0	0	-	-
NNST	Spring	-	-	0	0	-	-

Date: 19-Aug-19 **Temperature (°C):** 11.0 **Gear Used:** Visual

Distance Fished (m): N/A **Duration Fished (seconds):** N/A

Species	Season	Pass	Effort (Seconds)	Fish Captured	Fish Observed	CPUE (No. Fish/60 Seconds)	Length Range (mm)
ARCH	Summer/Fall	-	-	0	0	-	-
NNST	Summer/Fall	-	-	0	0	-	-

COMMENTS

Char have not yet been observed in this small branch, but they have been observed in the CV-104-2 stream. Stickleback were not captured or observed in this stream or in the CV-104-5 stream upstream of the Tote Road since monitoring began in 2006.

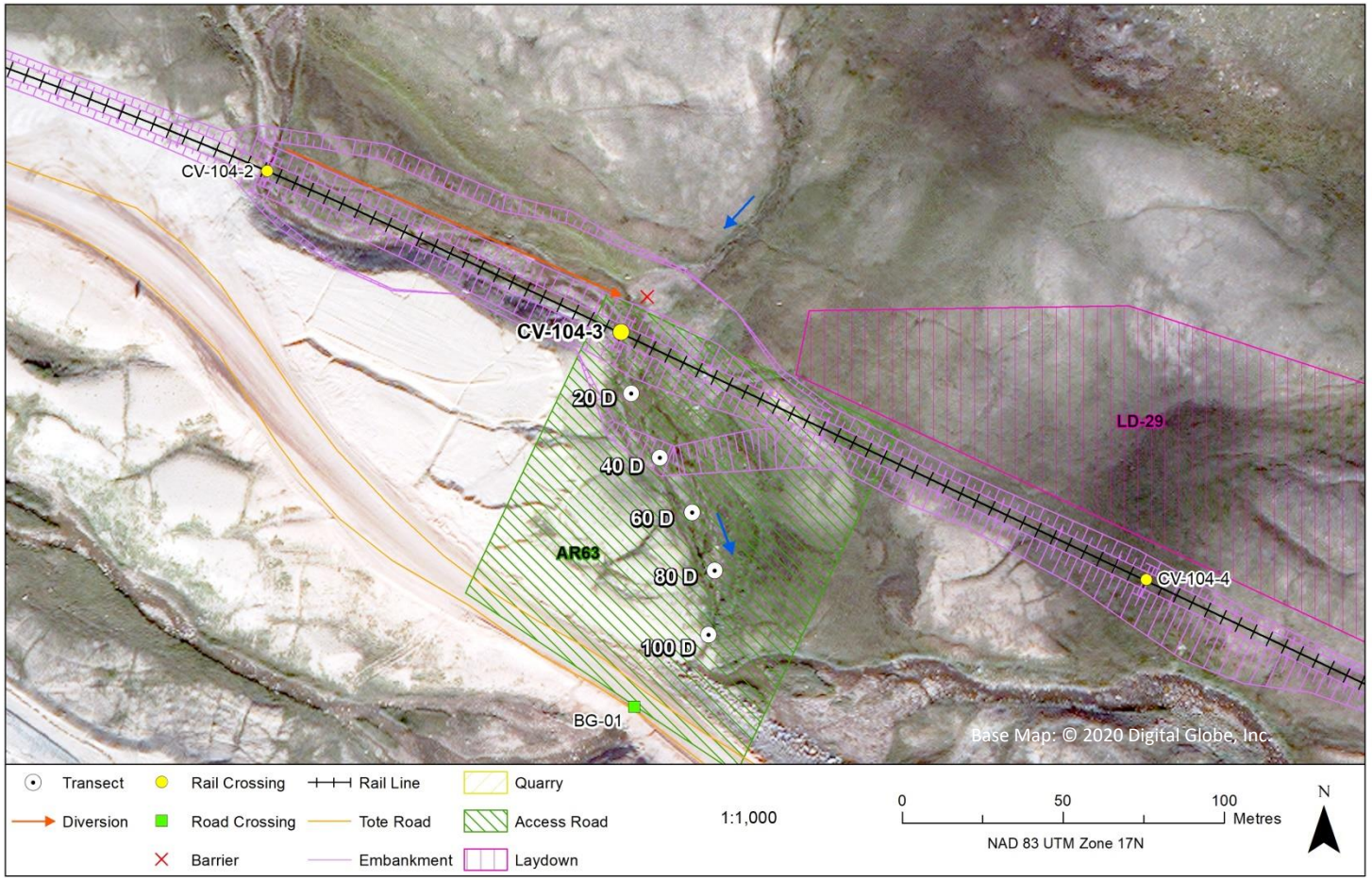
RAIL CV-104-3

GENERAL HABITAT CHARACTERISTICS

Channel Confinement: PC **Stream Morphology:** Meandering **Riparian Vegetation Type (%):** Grass 90, Other 10

Centreline	Height (m)	Stability	Materials (%)	Shape
LHB	0.29	Moderate	Boulder 25, CGS 10, Mineral Soil 30, Organic 35	Vertical
RHB	0.21	Moderate	CGS 80, Mineral Soil 10, Organic 10	Vertical

HABITAT SURVEY SITES



RAIL CV-104-3

HYDROLOGY & HABITAT CHARACTERISTICS: 22-JUN-19

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

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	4.0	1.5	0.02	0.07	0.05	0.11	0.20	0.09	0.05	0.55
80D	9.6	4.1	0.04	0.03	0.02	0.10	0.26	0.11	0.12	0.28
60D	10.1	4.5	0.05	0.03	0.06	0.10	0.21	0.05	0.18	0.29
40D	11.5	4.2	0.02	0.05	0.03	0.05	0.17	0.10	0.10	0.28
20D	14.9	11.5	0.03	0.03	0.02	0.06	0.08	0.28	0.05	0.30
0 (Centreline)	8.1	4.3	0.03	0.06	0.02	0.09	0.03	0.30	0.07	0.49
20U	7.6	2.5	0.03	0.05	0.03	0.08	0.16	0.23	0.14	0.63
40U	UPSTREAM BARRIER									
60U										
80U										
100U										

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	100	-	-	-	-	-	-	-	10	40	40	10
80D	100	-	-	-	-	-	-	-	10	40	40	10
60D	90	10	-	-	-	-	-	-	10	40	40	10
40D	100	-	-	-	-	-	-	-	20	40	40	-
20D	100	-	-	-	-	-	-	-	20	35	40	5
0 (Centreline)	100	-	-	-	-	-	-	-	15	40	40	5
20U	100	-	-	-	-	-	-	-	10	45	40	5
40U	UPSTREAM BARRIER											
60U												
80U												
100U												

OTHER NOTES / OBSERVATIONS

This branch merges with the CV-104-2 stream almost immediately downstream from the rail centreline. Downstream data are shared by the two sites. Habitat is shallow riffle with moderate velocities over mainly cobble/gravel substrate.

RAIL CV-104-3

HYDROLOGY & HABITAT CHARACTERISTICS: 19-AUG-19

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

Site	Channel Width (m)		Water Depth (m)				Water Velocity (m/s)			
	Bankfull	Wetted	25%	50%	75%	Max	25%	50%	75%	Max
100D	2.8	1.5	0.07	0.15	0.13	0.21	0.10	0.21	0.18	0.82
80D	5.2	4.2	0.10	0.08	0.06	0.30	0.24	0.13	0.32	0.63
60D	8.0	4.3	0.06	0.05	0.05	0.12	0.15	0.27	0.25	0.47
40D	9.6	5.2	0.07	0.04	0.04	0.13	0.22	0.16	0.54	0.73
20D	8.7	8.0	0.06	0.03	0.05	0.09	0.36	0.20	0.32	0.60
0 (Centreline)	13.6	8.4	0.06	0.06	0.02	0.10	0.30	0.17	0.17	0.67
20U	3.3	2.3	0.04	0.09	0.06	0.12	<0.01	0.33	0.14	0.66
40U	UPSTREAM BARRIER									
60U										
80U										
100U										

Site	Stream Morphology Composition (%)							Substrate Composition (%)				
	Riffle	Pool (<0.2 m)	Pool (>0.2 m)	Run	Cascade	Flat	Rapids	Fines	Gravel	Small Cobble	Large Cobble	Boulders
100D	30	15	10	20	25	-	-	-	10	70	15	5
80D	40	25	5	-	30	-	-	1	25	64	5	5
60D	35	30	-	-	35	-	-	1	25	69	4	1
40D	45	30	-	-	25	-	-	1	44	50	4	1
20D	60	20	-	-	20	-	-	2	13	80	4	1
0 (Centreline)	60	20	-	-	-	20	-	10	20	55	10	5
20U	45	30	-	-	25	-	-	10	20	65	5	-
40U	UPSTREAM BARRIER											
60U												
80U												
100U												

OTHER NOTES / OBSERVATIONS

Water levels and velocities were slightly higher in summer/fall than during spring. Habitat was otherwise similar between the sampling periods.

RAIL CV-104-3

22-JUN-19

A

B

C

D

E

F

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

RAIL CV-104-3

22-JUN-19

A

B

C

D

E

F

Photos 2. Photos taken 40 m downstream (top) and 60 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-104-3

22-JUN-19

A

B

C

D

E

F

Photos 3. Photos taken 80 m downstream (top) and 100 m downstream (bottom) in spring: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-104-3

22-JUN-19

A

B

C

Photos 4. Photos taken 20 m upstream in spring: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank).

RAIL CV-104-3

19-AUG-19

A

B

C

D

E

F

Photos 5. Photos taken at the crossing centerline in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank); (D) diagonal from right bank above the centreline looking downstream; (E) across (right bank looking at right bank); and (F) diagonal from right bank below the centreline looking upstream.

RAIL CV-104-3

19-AUG-19

A

B

C

D

E

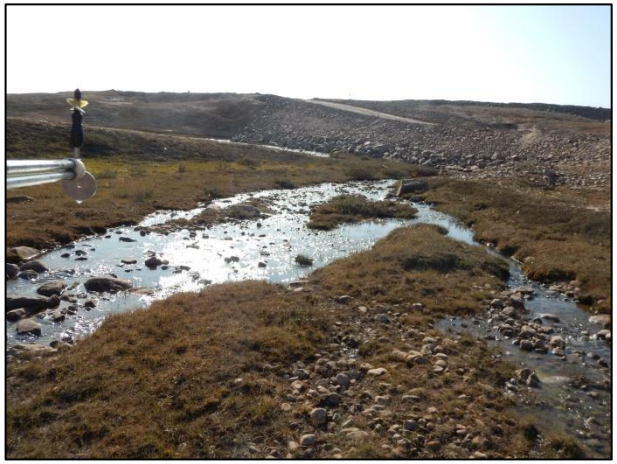
F

Photos 6. Photos taken 20 m downstream (top) and 40 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-104-3

19-AUG-19

A



B

C

D

E

F

Photos 7. Photos taken 60 m downstream (top) and 80 downstream (bottom) in summer/fall: (A,D) facing upstream; (B,E) facing downstream; and (C,F) across (left bank looking at right bank).

RAIL CV-104-3

19-AUG-19

A

B

C

Photos 8. Photos taken 100 m downstream in summer/fall: (A) facing upstream; (B) facing downstream; (C) across (left bank looking at right bank).

RAIL CV-104-3

19-AUG-19

A

B

C

Photos 9. Photos taken 20 m upstream in summer/fall: (A) facing upstream; (B) facing downstream; and (C) across (left bank looking at right bank).