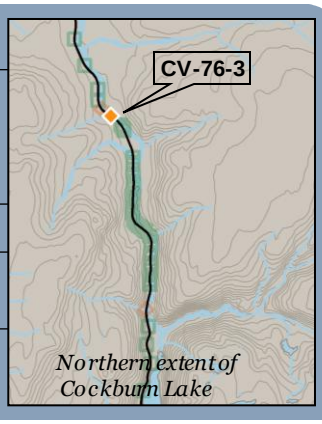
Mary River Iron Mine
Nunavut Water Board Water License
Application Section 9
Representative Crossing Summary Sheet

CV-76-3

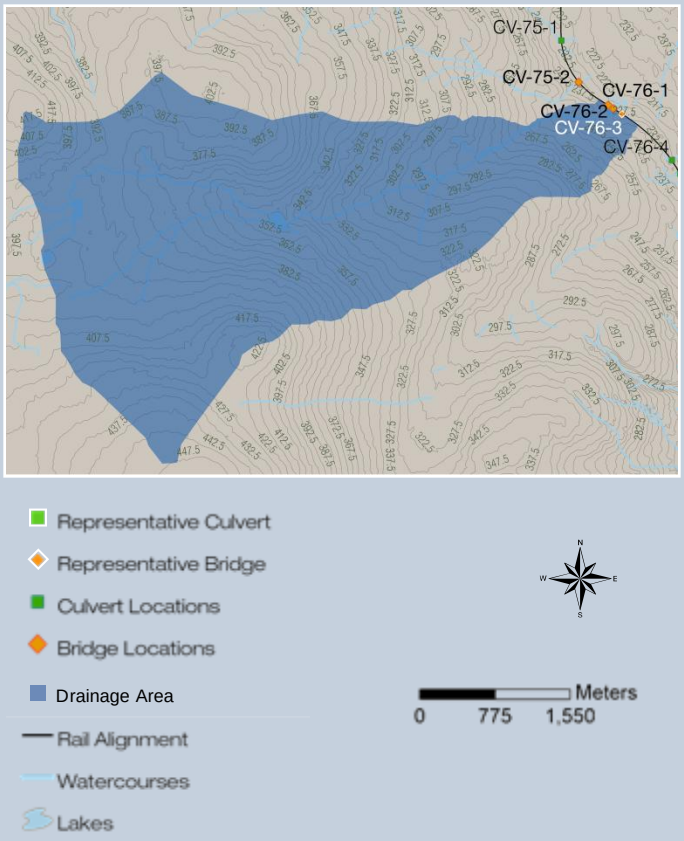
Zone: 17W
Easting: 604396
Northing: 7858569
Station: 76+180

Fish Habitat	No fish habitat
Structure Design	No. Spans: 1 Span Lengths: 30m Bridge Type: Through Plate Girder (TPG) Slope: 3.1 %
Drainage Area	12.93 km^2
Design Flow	10 yr 3 day delay = 2.80 m^3/s 200-yr = 25.26 m^3/s
Downstream Velocity	10 yr 3 day delay = 1.23 m/s 200 yr = 2.45 m/s



Description of Crossing Structure

The representative bridge crossing CV-76-3 will be a through plate girder (TPG) with a 30 metre span over the watercourse. The TPG structure consists of pre-cast concrete abutments and a single steel girder span. No part of the structure will be in the watercourse as abutments will be placed a minimum of 5 metres from the normal watercourse bank width. No short or long term effect on channel or shoreline morphology is anticipated.



Crossing Construction

The crossing involves a clear span structure. Construction can be undertaken anytime. However, it is likely that construction will be undertaken in frozen conditions when there will be no flow of water. Construction of the foundation for the structure will involve the drilling or driving of piles into the permafrost for each of the abutments. Drilling spoils if required, will be collected and either removed from the site or used for the railway embankment construction. No excavation of native material is anticipated for construction of CV-76-3. Pre-cast concrete abutments will be placed and secured over piles and steel girders will be placed onto the secure abutments. The watercourse will remain undisturbed and requires no engineering modification or protection. Silt fencing will be placed to prevent sediment from entering the watercourse during non-frozen periods.

Anticipated machinery required for the construction includes trucks, crane, backhoe/bobcat (for spoils removal), pile rig and cementitous mixers. Materials and machinery will be transported to and from the site on an access road or on the rail alignment. All construction activity will be restricted to the area within the identified construction right-of-way zone.

Temporary crossing of the watercourse will be required and will utilize snow fill or ice bridge in accordance with applicable DFO, Nunavut Operation Statement. The temporary watercourse crossing will remain in place during frozen conditions and will be rebuilt each winter. The temporary crossing will not impact water flow as it will be removed prior to the spring melt.

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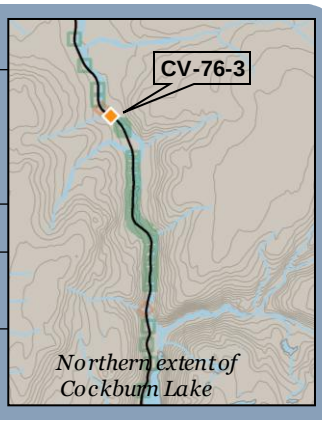
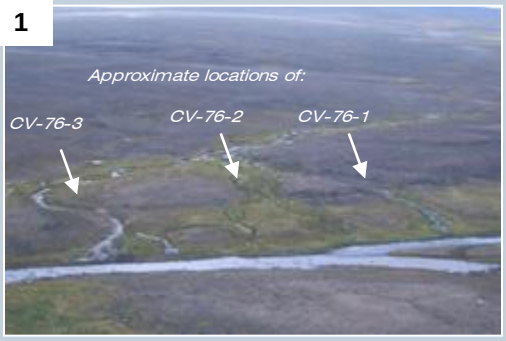


Site Photos

1



2

3

Photo 1 is an aerial image giving the approximate locations of CV-76-1 to CV-76-3, demonstrating the topography of the alluvial fan. Photo 2 is looking downstream from the approximate crossing location, while Photo 3 shows the habitat conditions at the approximate crossing location.

Existing Conditions at Crossing Site

The area where CV-76-3 is located is an alluvial fan area. There are three distinct braids. CV-76-3 is a relatively steep stream and carries most of the flow out of the 3 main braids. Because of the nature of drainage features in these fan areas (i.e., multiple shallow watercourses), the distribution of flow under design flow conditions does not necessarily follow the flow paths apparent under low flow conditions. Hydraulic analysis indicates that the channel CV-76-3 can convey the total 200 year design flow.

Navigability:	Not navigable	
Width and Depth:	Bankflow width = 9.5 m Wetted width = 9 m Maximum Depth = 0.15m	
Substrate and Vegetation:	The channel has cobbled and grass substrate. Channel Morphology: 60% Pool, 40% Cascade Substrate Composition: 10% Gravel, 85% Cobble, 5% Boulder Stream Cover: 5% Boulder, 40% large Cobble	
Channel Meander Pattern:	Floodplain Width (m): 100.6 Channel Pattern: Sinuous Channel Confinement: Unconfined Channel Gradient: 2°	Bank Height (L/R; m): 0.05-0.93 Bank Shape (L/R): Sloped / Vertical Bank Stability: mod
Fish Habitat :	Although it appears to be suitable fish habitat, Arctic char are not present in the large river downstream, so this crossing does not provide Arctic char habitat. There was no spawning or overwintering observed and this is not a migration corridor.	

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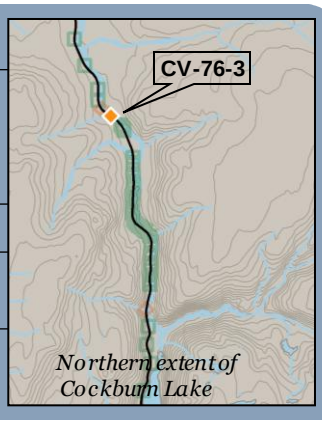

Predicted Environmental Impact	Proposed Mitigation
Direct loss of fish habitat from structure installation.	• No fish habitat at this proposed crossing.
Potential for fish stranding or mortality during construction	• No fish habitat at this proposed crossing.
Potential for barriers to fish passage	• Meet DFO requirements for fish passage. • Following construction of the crossing and where it is safe to do so, a v-notch in the centre of the ice bridge will be created to allow it to melt from the centre and also to prevent blocking fish passage, channel erosion and flooding. Compacted snow will be removed from snow fills prior to the spring freshet.
Potential for loss of riparian habitat within the footprint	• Restoration of riparian habitat and provision of culvert pools as required
Sediment effects and degradation of habitat (water quality) due to sediment or other contaminants both at the crossing and downstream	• Construction will follow practices outlined in the Section 9.6 and Project EMS (DEIS, Vol. 10) • Timing of works in and adjacent to watercourses during winter window to avoid potential impacts to water quality and potential fish habitat downstream of the crossing.
Damage to stream banks from construction equipment increases the potential for erosion	• Operate machinery on land (above the HWM) and in a manner that minimizes disturbance to the banks of the watercourse. • Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
Removal of vegetation at crossing locations.	• This removal should be kept to a minimum and within the right-of-way. • Approaches will be designed and constructed so that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation. • Any disturbed areas will be vegetated by planting and seeding native species and areas with be covered by mulch to prevent erosion and to help seeds germinate. The site will be maintained until site is stabilized by vegetation.
Direct or indirect impact from blasting.	• If blasting is required near watercourse DFO Blasting Guideline (Wright and Hopky) will be followed
Potential for spills of fuel or other fluid from construction vehicles	• Adhere to contingency plans identified in the project EMS (DEIS, Volume 10). • Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks. • Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water. • Keep an emergency spill kit on site in case of fluid leaks or spills from machinery. • Use snow berms (if possible) to prevent deleterious substances from entering the watercourse.
Solid waste could foul the local environment and attract scavengers	• Solid waste generated at the crossing site will be removed from the site and disposed of in accordance with applicable Nunavut regulations