BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

TOTE ROAD FISH HABITAT MONITORING
2020 ANNUAL REPORT
EARLY REVENUE PHASE - TOTE ROAD UPGRADES

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SECTION 1.0 - INTRODUCTION

1.1 MARY RIVER PROJECT

The Mary River Project (the Project) is an iron ore mining project operated by Baffinland Iron Mines Corporation (Baffinland) located in the North Baffin region of Baffin Island, Nunavut. The Mary River Mine Site coordinates are approximately latitude 71° 19' 35" North and longitude 79° 22' 30" West. Detailed descriptions of the Project and annual activities can be found in reports from Knight Piésold (2007b, 2008) and Baffinland (2009 to 2019, incl.).

The Tote Road was first established in the 1960s and extends approximately 100 kilometres between the Mary River Mine Site (Mine Site) and Milne Port. Currently, the Tote Road is used as a means of transport of iron ore, personnel, equipment, and supplies between the Mine Site and Milne Port. Since 2013, there have been ongoing upgrades to sections of the Tote Road as part of the construction and operation of the Early Revenue Phase (ERP) for the Project and in an effort to mitigate sedimentation and erosion concerns, and to safely and efficiently transport iron ore from the Mine Site to Milne Port. Tote Road upgrades have included the following activities:

- Clear span bridges were constructed in 2014 replacing sea container crossings;
- Widening, straightening and realignment of the Tote Road at strategic locations;
- Addition of protective armouring on road embankments and erosion mitigation measures; and
- Continued installation, movement and/or extension of culverts at identified stream crossings to improve transportation safety and minimize erosion/sedimentation, while maintaining fish passage.

A Tote Road Earthworks Execution Plan (TREEP) was developed in April 2017 (Golder 2017) to address outstanding concerns (damaged culverts, embankment erosion, etc.) along the Tote Road. The TREEP outlined the planned sedimentation mitigation measures to be completed along the Tote Road in 2017 and subsequent years. Work executed by Baffinland in 2020 followed the guidance, recommendations and designs presented in the TREEP as well as the original 2013 designs prepared by Hatch Limited (Hatch).

1.2 AUTHORIZATION FOR WORKS

Fisheries and Oceans Canada (DFO) (1998) defined Harmful Alteration, Disruption or Destruction (HADD) as: "any meaningful change in one or more habitat components that can reasonably be expected to cause a real reduction in the capacity of the habitat to support the life requisites of

fish". A HADD occurs when the physical, chemical, or biological features of a water body are sufficiently altered, such that habitat becomes less suitable for one or more life history processes of fish. Detailed descriptions of the 2007 HADD authorization and any related amendments and Letters of Advice can be found in previous annual reports (Knight Piésold 2007b, 2008; Baffinland 2009 to 2019, incl.) and the Fish Habitat No Net Loss and Monitoring Plan as described by Knight Piésold (2007a). Habitat compensation is defined by DFO (1998) as "the replacement of natural habitat, increase in the productivity of existing habitat, or maintenance of fish production by artificial means in circumstances dictated by social and economic conditions, where mitigation techniques and other measures are not adequate to maintain habitats for Canada's fisheries resources".

A total of fifty-eight (58) crossings that were originally identified as HADD (August 2007 *Fisheries Act* Authorization), potential compensation, and Letter of Advice (LOA) sites in the August 2007 No Net Loss and Monitoring Plan and/or subsequent amendments were re-surveyed in spring 2020 (Figure 1). This included thirty-seven (37) fish-bearing crossings monitored annually since 2008/2009 and twenty (20) fishless crossings that are periodically surveyed to confirm continued lack of fish use, with the exception of two fishless sites. These two fishless sites (CV-176 and CV-167) no longer have crossings on the Tote Road (see Section 2.2 for additional information on these sites).

In addition to monitoring of fish passage at stream crossings, crossings were surveyed for potential issues with condition and/or performance. Crossings requiring remediation for potential fish passage issues (e.g., perched culverts) were identified, and a remediation plan was prepared and implemented in early fall 2020.

1.3 REPORTING

A written report summarizing the monitoring results is to be submitted to the specified office locations of the Department of Fisheries and Oceans, Fish Habitat Management, Eastern Arctic Area, on or before December 31 of each year. Annual reports have previously been submitted for the years 2007 to 2019 (Knight Piésold 2007b, 2008 and Baffinland 2009 to 2019, incl.).

This 2020 Annual Report, herein, covers the period of activity up to and including December 31, 2020. It summarizes the fish habitat monitoring results and provides a record for additional works or undertakings completed in accordance with the approved No Net Loss and Monitoring Plan (Knight Piésold 2007a) and conditions of the authorization, subsequent amendments, and Letters of Advice. The report also summarizes 2020 remediation works.

SECTION 2.0 - PROJECT DESCRIPTION

2.1 CONSTRUCTION WORK

Design summaries and descriptions of work along the Tote Road completed up to the end of 2009 are presented, in detail, in Knight Piésold (2007c) and Baffinland (2009). Road construction activities and installation of fish access improvement structures at some crossings are described in Baffinland's annual reports to DFO (2010 to 2019, incl.).

In order to safely and efficiently transport iron ore from the Mine Site to Milne Port during the early operational period of the mine, the existing Tote Road has been further upgraded (sections were straightened, widened and/or moved) to accommodate large haul trucks and in efforts to mitigate sedimentation and erosion. The first phase of the upgrades involved replacement of sea container crossings with bridges. Bridge installation was completed during the winter of 2013/14 and seacan container crossings were removed at all locations by early 2017. Modifications to accommodate upgrades to the Tote Road and specific water crossings to support the ERP of the Project commenced in 2013 and remain ongoing. Baffinland has received approvals from DFO in the form of LOAs (Appendix A) and email correspondence to proceed with these changes.

Future Tote Road improvements/realignments required in support of on-going operations and future expansion projects will continue to follow the historical LOAs, original Hatch 2013 drawings and the TREEP. Baffinland will work with the DFO as necessary to ensure planned modifications to fish bearing crossings are in compliance of the *Fisheries Act* and the interim codes of practice for culvert maintenance and temporary cofferdams and diversion channels (as published).

2.2 FISH HABITAT ASSESSMENT

Watercourses initially identified as HADD (n = 25), compensation (n = 12), and LOA (n = 23) sites (Knight Piésold 2007a) were assessed for quality of available fish habitat at least once between 2006 and 2009 (Baffinland 2009). Three sites (CV-183, CV-181, and BG-16) originally identified as potential compensation sites at the onset of the program were not revisited in 2020 because:

- Sites CV-183 and CV-181 no longer exist (these crossings were removed during initial construction upgrades in the winter of 2008/2009).
- Site BG-16 was originally identified as a compensation site during the 2007 habitat assessment based on a desktop assessment rather than a field assessment. After a habitat assessment conducted at the crossing in 2009 confirmed that BG-16 was not a fish bearing crossing, it was removed from the compensation site classification (Baffinland 2009).

In 2020, two additional fishless sites (CV-176 and CV-167) were removed from the compensation site and LOA classifications, respectively. The crossing at CV-176 was significantly altered during the installation of authorized infrastructure involving diversions and infills of stream reaches,

where laydowns were constructed at the Port Site, and no longer exists in its natural state. There are no longer culverts at site CV-167; the watercourse is now diverted to culverts at CV-166.

Sites providing confirmed fish habitat were monitored annually from 2010-2020 while non fish-bearing sites have been monitored periodically, including in 2020, to confirm the continued presence of natural barriers to fish passage preventing access to the crossing area habitat (Knight Piésold 2007b, 2008, Baffinland 2009 to 2019, incl.).

The primary objectives of the 2020 spring monitoring program were to assess the presence of fish, habitat quality, and upstream accessibility through installed culverts at fish-bearing sites and identify crossings requiring remediation to allow for fish passage. Additional non-fish-bearing crossings were surveyed in spring to confirm the absence of fish and to confirm that there have been no changes to accessibility (i.e., natural barriers remain in place). The objective of the program conducted in fall 2020 was to revisit sites identified in spring as requiring remediation and design remediation measures to be implemented in fall/winter, where feasible.

Habitat and fish surveys involved observations of substrate, flow characteristics, and potential fish use along 50 m reaches upstream and downstream of each applicable crossing. Fish presence was determined through visual surveys and the use of a backpack electrofisher. In previous years, both methods have proven to be highly reliable techniques for determining fish presence/absence in the clear, shallow streams that are typical of the study area. Descriptions of habitat and condition of culverts were noted and photographs taken. Results of the 2020 stream crossing monitoring surveys are presented in Section 3.0; photo logs for all of the sites are provided in Appendix B.

Monitoring will continue in 2021 to assess fish passage at crossings on fish-bearing streams, to continue to assess the condition and performance of crossings, and to evaluate the effectiveness and performance of 2020 remediation works conducted.

2.3 FISH HABITAT COMPENSATION

Compensation works completed for the Tote Road prior to 2009 are described in detail in Knight Piésold (2007a) and the results of recent compensation works (e.g., rustic fishway at BG-30) and detailed fish habitat and fish use surveys from 2009 to 2019 are presented in Baffinland (2009 to 2019, incl.). Following successful completion of habitat works at BG-30 (Baffinland 2012), there was a net habitat gain of approximately 1,050 km^2, which together with other gains met the compensation goals described in Knight Piésold (2007a). Fish presence upstream of the fishway in BG-30 has been confirmed during site visits from 2013-2020, indicating continuous structural integrity and successful fish passage.

SECTION 3.0 - AQUATIC MONITORING

An aquatic monitoring program was developed to ensure that all measures and works specified in the No Net Loss and Monitoring Plan (Knight Piésold 2007a), as well as the *Fisheries Act* Authorization and amendments, and the TREEP have been implemented and are functioning as intended. Details of aquatic monitoring conducted up to 2019 are provided in Knight Piésold (2007b, 2008) and Baffinland (2009 to 2019, incl.). Aquatic monitoring in 2020 focused on assessing any changes to fish habitat and accessibility at all fish-bearing crossings.

3.1 CONSTRUCTION AND TURBIDITY MONITORING

There was no in-stream construction work in HADD, compensation, and LOA classification crossings during periods of flow that required turbidity monitoring in 2020.

3.2 WATER QUALITY MONITORING OF BASELINE FISHERIES CULVERTS

Water quality monitoring data from Knight Piésold baseline monitoring work performed during 2005 and 2006, in conjunction with monitoring of the same crossings from 2015-2020 are presented in Table 1.

3.3 FISH USE ASSESSMENTS

Spring fish use assessments were conducted at fifty-eight (58) sites along the Tote Road from 18-20 June 2020 (Table 2). A survey was also conducted downstream of one additional stream crossing (BG-50) in fall 2020 due to concerns regarding the absence of fish at the crossing area in spring surveys in recent years, as well as the potential for perched culverts at the road to be affecting fish use of the south channel of this river. Electrofishing conducted at BG-50 confirmed that fish actively use the south channel even with potential for perched culverts at the crossing (as discussed in Section 3.5).

Tables 3 and 4 summarize catch statistics for sites where fish were present in spring 2020. Table 5 summarizes habitat and fish use assessments for all sites and provides descriptions of potential fish passage or habitat issues noted in the spring survey and subsequent remedial actions completed in fall 2020. A detailed summary of issues and remedial actions is provided in Section 3.5. A photographic log of habitat at each surveyed crossing is provided in Appendix B.

The spring 2020 stream crossing monitoring confirmed results of previous surveys at non-fish bearing crossings; the presence of natural barriers between the road crossings and overwintering habitat prevented fish access to these crossing areas in spring 2020 as in previous surveys (Table 2). The majority of these fishless sites are located at the north end of the Tote Road near Milne Port where the presence of steep slopes and vertical drops prevent upstream access from Phillips

Creek. Some of these streams are also perennially dry channels. There is fish-bearing habitat downstream of the crossing at CV-166, but the crossing area is inaccessible to fish due to a rocky barrier downstream of the culvert.

One (1) additional site (CV-115) that had been previously identified as fish-bearing (in 2010) was nearly dry when surveyed in the spring 2020 despite being surveyed at or near peak freshet. The most recent survey during which the stream at CV-115 was sufficiently wetted to provide fish habitat during survey periods was in 2016, when it consisted of isolated pools each with a few stranded juvenile Arctic Char (Baffinland 2016).

Spring electrofishing surveys captured sixty-nine (69) juvenile Arctic Char and fourteen (14) Ninespine Stickleback at thirteen (13) crossings (Tables 3 and 4). Fish were not captured or observed at any of the remaining 24 fish-bearing crossings in spring 2020 and only six Arctic Char were captured upstream of culverts. Site-specific Arctic Char catches in spring ranged from zero to twenty-two (22) fish and catch-per-unit-effort (CPUE) ranged from 0.00 to 1.90 fish/minute. Site-specific Ninespine Stickleback catches in spring ranged from zero to thirteen (13) fish and CPUE ranged from 0.00 to 1.77 fish/minute.

Fish presence at the Tote Road stream crossing areas and overall catch rates from spring 2020 were relatively low compared with previous years. These differences are attributed to the timing of the survey in 2020. Prior to 2020, surveys were typically conducted later in the spring freshet or later in the open-water season. Due to flight scheduling challenges associated with Covid-19, the 2020 spring survey was largely conducted during peak freshet. Flows were higher and water temperatures lower during the spring 2020 survey relative to previous surveys; it is likely that seasonal movements of juvenile char from overwintering habitat to the stream crossing areas had not yet occurred or were limited at the time of the spring 2020 survey.

The fork length of captured Arctic Char ranged from 49-220 mm (Table 3). More than 50% of the catch was 90-119 mm with a mode of 90-99 mm. Fish captured in 2020 were, on average, larger than those from 2019, which can again be attributed to the timing of the survey. Larger juveniles can tolerate faster flows. Ninespine Stickleback ranged in size from 30-66 mm (Table 4).

Fall electrofishing of the south channel at BG-50 captured forty-one (41) juvenile char downstream of the perched culverts, ranging in length from 55-155 mm. These results indicate that fish continue to use the channel for open-water season rearing habitat despite the fish passage issues at the road crossing (discussed in detail in Section 3.5).

3.4 COMPENSATION WORKS

All compensation works completed prior to 2020 continued to be successful in 2020, including fish use of the rustic fishway installed at BG-30. For more details on habitat compensation activities, see Baffinland (2009 to 2019, incl.).

3.5 REMEDIATION WORKS

Tote Road monitoring in spring 2020 identified twelve (12) sites with potential issues requiring remediation at the culvert crossings. To improve conditions at each of these sites, remediation actions were planned and implemented in early September 2020 (Table 5; Appendix C). Six of these crossings (CV-129, CV-114, CV-111, CV-106, CV-225, and BG-50) involved culverts that were identified as perched in spring 2019 and for which remediation measures were undertaken in fall 2019 or early spring 2020. Three sites (CV-129, CV-114, and CV-106) required minor repairs to the rocky ramps (damage was caused during freshet 2020) installed in 2018 and 2019 to restore full access. NSC completed this work by hand without the use of mechanized equipment or any disturbance occurring to the bed and banks of the watercourses.

At CV-225, rocks were placed on the ice in early spring 2020, prior to thaw, immediately downstream of the perched culverts. The rocks were arranged in a configuration with the objective to create a backwater pool effect at the culverts as the ice thawed, eliminating much of the perching. Surveys of the site in fall 2020 confirmed the success of these remediation measures at crossing CV-225 at improving fish access.

The perch at CV-111 remains too high (0.25 m) to effectively mitigate with a rocky ramp and additional/alternative works will be required to restore access to upstream habitat for all of the size classes of juvenile Arctic Char found downstream of this crossing. The rock ramp installed at BG-50 in fall 2019 was washed away by high flows through the culverts during the 2020 freshet. Alternative remediation works will be required at this site, possibly by reconstructing the ramp with a base of larger, more erosion resistant material and placing smaller material over the base by hand or by reinstalling the culverts. Baffinland will work with the DFO prior to instream remediation work proceeding to decide upon a practical course of action for addressing the perched culvert outlets at the CV-111 and BG-50 crossings.

Culverts at two sites (CV-225, and BG-01), were partially or completely blocked with ice in spring 2020, and at CV-225, water was flowing through the road at alternate locations, causing erosion of the embankments and riparian habitat. Both sites were steamed following identification of the issue to open the culverts and restore flows, and prevent further erosion. At CV-076, there was also seepage under the road 5 m south of the culverts, though the culverts were not obstructed.

Baffinland is evaluating options for sealing the seepage at this site including reinforcing the road embankments during non-flowing winter months.

The spring 2020 survey identified that culverts at CV-057 were nearly completely buried by sediment, which is a recurring problem at this site. The ongoing sedimentation at CV-057 is potentially caused by erosion of the road embankment and/or elevated sediment transport due to erosion of fine-grained glaciofluvial deposits upstream of the crossing during spring freshet conditions. Baffinland will remove the accumulated sediment during non-flowing winter months. This work was not completed during the open-water season to prevent mobilization of sediment in the stream. Larger culverts, improved armouring of the road embankments, and implementation of upstream sediment control measures at locations where sediment enters the water body may also be required to prevent ongoing infilling of the culverts. Options for addressing the sedimentation at CV-057 will be discussed with the DFO prior to remediation work proceeding during non-flowing winter conditions. During the 2021 open-water season, Baffinland will monitor turbidity upstream and downstream of this crossing and inspect the road embankment and upstream sections of the stream to identify and address potential sources of sedimentation with control measures if required.

During spring 2020, water was diverted from non fish-bearing crossing (CV-031), due to a frozen culvert, which caused ponding upstream of the crossing. The flow was diverted to a fish-bearing crossing (CV-030) to alleviate potential flooding of the road. Diverting stream flow was done as a safety and environmental measure to prevent washing out of the road embankment and resulting greater sedimentation of downstream fish bearing waters at the Muriel Lake outfall. This diversion caused flooding, erosion, and increased turbidity in the area of the stream at crossing CV-030. Water diversion was ceased after alleviation of flooding upstream of CV-031 shortly after peak freshet.

Baffinland will discuss proposed remediation works with the DFO prior to instream remediation work proceeding at these fish bearing crossings, as necessary to ensure planned modifications to culverts and road embankments are in compliance of the *Fisheries Act* and the interim codes of practice for culvert maintenance and temporary cofferdams and diversion channels (as published).

SECTION 4.0 - AUTHORIZED HADD CROSSING INSTALLATION SUMMARY

The locations for current authorized HADD crossings and habitat compensation sites are presented in Figure 1. As of November 30, 2008, all authorized HADD water crossings were installed. Remedial work up to August 2009 at the habitat compensation sites was substantially completed, and by October 2011, additional habitat compensation investigations and access structure installation were complete at select crossings. In 2012, new culverts were installed at two HADD crossings (BG-04 and BG-32) and habitat compensation works were completed at BG-30. No additional work was completed in 2013 due to pending potential upgrades to large portions of the Tote Road as part of the ERP of the Project. In 2013/14, bridges were installed at four (4) crossings and culvert replacement/extension was initiated on another crossing. The now obsolete sea containers were removed from the CV-223 crossing during late fall 2014 and from BG-50 in late 2016, and from the remaining two (2) crossings in early 2017. During winter 2018/2019, culverts were extended at HADD crossing CV-078 and two (2) improperly installed culverts at HADD site CV-111 were replaced with a single culvert. A complete and updated list of the HADD crossings and habitat compensation sites, including crossing IDs, is provided in Table 6. The data in this table reflect those that were presented in detail in previous reports (Knight Piésold 2007b and 2008, Baffinland 2009), as well as the results from the most recent Tote Road surveys that were completed since 2010 (Baffinland 2010 to 2019, incl.).

SECTION 5.0 - REFERENCES

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TABLES AND FIGURES

TABLE 1. WATER QUALITY MONITORING OF BASELINE FISHERIES, 2005, 2006, 2015-2020

Table 1.1 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-025 (CV-128)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates																							
		2005	2006	2015	2016	2017	2018	2019	2020		14-Jun-06	03-Aug-06	08-Sep-06	03-Jul-15	03-Jul-15	12-Aug-15	12-Aug-15	30-Jun-16	30-Jun-16	25-Aug-16	25-Aug-16	30-Jun-17	30-Jun-17	03-Jul-18	03-Jul-18	02-Sep-18	02-Sep-18	21-Jun-19	21-Jun-19	10-Aug-19	10-Aug-19	22-Jun-20	22-Jun-20	22-Jun-20	19-Jul-20	19-Jul-20	19-Jul-20	14-Aug-20	14-Aug-20
														US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	US Field Blank	DS	US	DS	DS Travel Blank	US	DS
In Situ Parameters																																							
Temperature	ºC	-	-	-	-	-	-	-	-	-	0.32	10.41	3.66	-	-	7.2	7.2	6.1	7.7	9.6	9.2	3.3	3.6	5.9	5.9	4.9	4.9	6.1	6.0	14.5	14.2	6.4		8.1	16.5	17.1		12.3	13.5
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.133	0.12	0.16	0.53	0.58	0.139	0.139	0.390	0.800	0.169	0.116	0.147	0.1575	0.0786	0.0785	0.1357	0.1375	0.0756	0.0754	0.1712	0.1705	0.107		0.1193	0.2385	0.2533		0.2531	0.2825
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	5.5-9.5	13.02	11.71	13.03	-	-																	12.41		12.49	10.46	11.02		10.82	12.95
Dissolved Oxygen	%	-	-	-	-	-	-	-	-		-	-	-	-	-	105.9	105.1	103.5	106.2	101.6	103.7	102.4	102.3	97.9	97.8	102.2	98.5	102.2	101.3	107.3	105.4	100.8		105.5	106.8	114.7		100.6	124.2
pH	pH units	-	-	-	-	-	-	-	-	6.5 - 9.0	8.18	8.12	8.21	8.33	8.14	8.3	8.2	7.9	8.3	8.09	8.05	7.62	7.67	8.00	8.16	8.13	7.78	7.92	8.00	8.32	8.25	7.91		8.04	8.38	8.4		8.28	8.36
Wetted Width	m	-	-	-	-	-	-	-	-	-	76	120	99	-	-	50	50	-	-	-	-	30	30	~25	~25	~40	~35	-	-	-	-	-		-	-	-		-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	too much ice	0.3	0.6	-	-	0.5	0.5	-	-	-	-	5	5	-	-	-	-	-	-	-	-	-		-	-	-		-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	26.73	-	-	-	-	-	-	-	-	-	60	51	-	-	-	-	-	-	-	-	-		-	-	-		-	-
Physical Parameters																																							
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	7.85	7.37	7.51	7.79	7.84	8.16	8.04	8.11	8.15	8.08	8.20	7.83	7.84	7.82	7.83	8.22	8.17	7.91	7.77	8.25	8.32	7.78	5.71	7.89	8.29	8.29	6.27	8.21	8.32
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	145	125.00	166	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	111	<3.0	124	249	269	<3.0	257	298
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	0.6	0.70	-	1.1	1.19	0.45	0.45	10.2	10.8	0.28	0.28	2.43	2.27	2.11	1.92	0.22	0.28	0.48	0.66	0.24	0.31	0.85	<0.10	1.2	0.52	1.08	<0.10	0.73	1.34
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10	0.5	0.5	-	73	65.0	85	42	42.0	63.0	62.0	58	53	84.0	84.0	38	42.0	40	41	81	79.0	44.7	45.1	85.6	85.9	58	<0.50	63.8	129	138	<0.50	137	158
TSS	mg/L	-	-	2	2	2	2	2	2	-	-	-	-	<2.0	<2.0	<2.0	<2.0	**54.8**	**44.4**	<2.0	7.9	8.4	13.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	<2.0	2.2	<2.0
TDS	mg/L	30	5	20	20	20	10/20	20/10	10	-	94	81	108	77	67	72 *	67 *	50	240	78	79	37	44	51	51	85	85	49	54	112	108	56	<10	68	173	148	<10	159	184
Dissolved Anions																																							
Alkalinity (mg/L CaCO3)	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	72	67	86	37	41	61	61	42	38	84	84	29	34	37	37	83	83	47	47	93	92	52	<10	56	123	494	<10	125	129
Br	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	1	<1	1	0.53	0.54	0.85	0.89	0.62	0.60	1.46	1.49	0.89	0.88	0.58	0.61	1.36	1.39	0.52	0.55	1.31	1.33	3.11	<0.50	4.29	7.62	12.4	<0.50	8.83	19.7
Fluoride	mg/L	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.025	0.026	-	-	-	-	-	-	-	-	-	-	-	-
SO_4	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	2	<1	4	0.42	0.47	0.0039	0.0031	0.38	0.36	1.18	1.19	0.38	0.39	0.33	0.37	0.73	0.72	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																							
NH_3+NH_4	mg/L N	0.1	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.1	0.03	0.08	<0.15	<0.15	<0.15	0.19	<0.15	<0.15	<0.15	<0.15	0.16	<0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.005	<0.005	0.016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0010	<0.0010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	<0.10	<0.10	<0.10	<0.020	<0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.021	<0.020	<0.020	<0.020	<0.020	0.109	0.0961
NO_2+NO_3	mg/L N	0.06	0.1	<0.10	<0.10	<0.10	<0.10	0.022	0.022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022	<0.022	<0.022	<0.022	-	-	-	-	-	-	-	-
Ammonia, Total as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	'Variable[1]	<0.050	<0.050	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	<0.010	<0.010	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	0.011	<0.010	0.0073	0.0086
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	-	<0.01	<0.01	0.03	0.0036	0.0044	0.0039	0.0031	0.0677	0.0354	0.0044	0.0085	0.0107	0.0102	0.0045	0.0046	<0.0030	<0.0030	0.0033	0.0033	<0.0030	<0.0030	0.0031	<0.0030	0.0067	0.0047	0.0092	<0.0030	0.0038	0.0052
Dissolved Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																							
Phenols	mg/L	0.001	0.001	-	-	-	-	-	-	0.004	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	1.7	1.60	1.7	1.6	<1.0	<1.0	1.8	1.6	1.84	1.79	1.37	1.33	2.04	0.62	1.72	1.74	1.67	1.96	3.93	1.08	3.91	5.74	5.6	0.95	5.6	5.36
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	1.9	1.90	1.7	1.7	1.8	1.4	1.8	2.9	2.09	2.15	1.54	1.85	2.30	0.54	2.17	2.32	2.05	2.19	3.92	1.36	3.95	6.16	6.05	1.25	5.44	5.17
TKN	mg/L	0.15	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	<0.015	<0.015	<0.15	0.19	<0.15	<0.15	<0.15	<0.15	0.16	<0.15	<0.15	<0.15	<0.15	<0.15	-	-	-	-	-	-	-	-	-	-	-	-
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																							
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[2]	0.006	0.01	0.101	0.029	0.029	0.022	<0.010	0.827	0.759	<0.010	0.014	0.123	0.129	0.047	0.0587	0.0085	0.0053	0.0279	0.0314	0.0078	0.0078	0.0298	0.0192	0.071	0.0103	0.0233	<0.0050	0.0049	0.0208
Antimony	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-			<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.005	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.00010	<0.00010	0.00023	0.00022	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	0.0001	0.00011	<0.00010	0.00015	0.00017
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	<0.01	<0.01	<0.01	-	-	-	-	0.00801	0.00742	0.00663	0.00672	0.00778	0.00386	0.00315	0.00315	0.00589	0.00589	0.00352	0.00351	0.00728	0.00748	0.00322	<0.00010	0.0051	0.00559	0.00792	<0.00010	0.00606	0.00928
Beryllium	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.01	<0.01	<0.01	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0001	0.0001	0.00009	0.00001	0.00001	0.000005	0.000005	0.000005	0.000017	<0.0001	<0.0001	<0.0001	<0.000090	<0.000090	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.05	0.05	0.05	-	17	16	20	9.47	9.42	15.0	15.2	12.5	11.6	19.1	19.4	8.61	9.76	9.45	9.66	18.6	18.6	9.54	10	20.1	19.9	13.8	<0.050	15.1	30.1	32.3	<0.050	31.5	35.6
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00054	<0.00050	<0.00050	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010
Cobalt	mg/L	0.0003	0.0002	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0002	<0.0002	<0.0002	-	-	-	-	0.00042	0.00038	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.00073
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.01	0.3	<0.03	<0.03	0.12	<0.050	<0.050	<0.050	<0.050	0.805	0.734	<0.050	<0.050	0.133	0.147	0.036	0.049	0.012	0.012	0.022	0.030	0.016	0.15	0.124	<0.010	0.127	0.128	0.241	<0.010	0.184	0.257
Lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.00005	0.00005	0.00005	0.001 - 0.007[3]	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00010	<0.00010	0.00069	0.00061	<0.00010	<0.00010	0.000125	0.000158	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000055	<0.0000050	0.000083	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	0.0016	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0014	<0.0010	0.0014	0.0016
Magnesium	mg/L	0.005	1	0.5	0.05	0.05	0.05	0.05	0.05	-	7	6	8	4.24	4.27	6.97	7.23	6.39	5.86	8.93	8.60	4.12	4.18	4.04	4.19	8.41	7.96	4.62	4.60	8.6	8.45	5.7	<0.0050	6.26	13.9	14.2	<0.0050	14.9	16.1
Manganese	mg/L	0.0007	0.01	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.01	<0.01	<0.01	0.0012	0.0013	0.00099	0.00061	0.0247	0.0215	0.00181	0.00265	0.00658	0.0065	0.00211	0.00223	0.00118	0.00122	0.00147	0.00173	0.00159	0.00129	0.00425	<0.00050	0.00938	0.00467	0.0222	<0.00050	0.00765	0.0149
Mercury	mg/L	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001/5	0.000005	0.000026	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum	mg/L	0.0003	0.005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.005	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	0.000059	0.000062	0.000157	0.000164	0.000059	0.000078	0.000057	0.000066	0.000122	0.000127	0.000058	0.000068	0.000166	0.000215	0.000096	<0.0000050	0.00015	0.000116	0.000154	<0.0000050	0.000148	0.000189
Nickel	mg/L	0.001	0.005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.025 - 0.150[3]	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.0010	<0.0010	0.00093	0.00085	<0.00050	<0.00050	<0.00050	<0.00050	0.00428	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus	mg/L	-	-	0.05	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-	-	-	-	0.054	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	0.02	0.01	1	0.05	0.05	0.05	0.05	0.05	-	0.51	0.35	0.51	<1.0	<1.0	0.448	0.454	0.687	0.670	0.564	0.561	0.452	0.455	0.326	0.330	0.491	0.491	0.329	0.325	0.558	0.555	0.424	<0.050	0.657	0.677	0.756	<0.050	0.697	0.766
Rubidium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	0.00235	0.00231	0.00121	0.00122	0.00093	0.00093	0.00072	0.00074	0.00094	0.00095	0.00065	0.00062	0.0013	0.00125	0.00085	<0.00020	0.00138	0.00125	0.00158	<0.00020	0.00141	0.00166
Selenium	mg/L	0.005	0.001	0.0004	0.00005	0.00005	0.00005	0.00005	0.00005	0.001	<0.001	<0.001	<0.001	<0.00040	<0.00040	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon	mg/L	-	-	-	0.05	0.05	0.10	0.10	0.10	-	-	-	-	-	-	-	-	1.98	1.75	0.437	0.451	0.54	0.54	0.32	0.33	0.41	0.4	0.31	0.33	0.54	0.55	0.39	<0.10	0.51	0.54	0.54	<0.10	0.52	0.45
Silver	mg/L	0.0001	0.0001	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium	mg/L	0.05	0.05	0.5	0.5	0.5	0.5	0.05	0.05	-	0.61	0.34	1.15	<0.50	<0.50	0.62	0.63	<0.50	<0.50	0.89	0.88	0.53	0.520	0.332	0.341	0.75	0.737	0.324	0.334	0.788	0.788	0.528	<0.050	0.799	0.894	1.04	<0.050	1.01	1.13
Strontium	mg/L	0.001	0.001	-	0.001	0.001	0.001	0.001	0.001	-	0.012	0.01	0.015	-	-	-	-	0.0074	0.0070	0.0114	0.0116	0.0047	0.0056	0.0057	0.0058	0.0125	0.0129	0.0055	0.0056	0.0127	0.013	0.0095	<0.0010	0.0164	0.021	0.0264	<0.0010	0.0253	0.0289
Sulphur	mg/L	-	-	-	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	<0.50	<0.50	0.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium	mg/L	0.0002	-	0.0003	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	-	-	-	-	-	-	-	0.000016	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	0.00138	0.00131	<0.00010	<0.00010	0.00012	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	0.001	0.01	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.01	<0.01	<0.01	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	-	-	-	-	-	-	-	0.0256	0.0238	<0.00030	0.00042	0.00399	0.0045	0.00145	0.00164	<0.00030	<0.00030	0.00083	0.00129	0.00032	<0.00030	0.00104	<0.00030	0.00227	0.00044	0.00061	<0.00030	0.00057	0.00057
Tungsten	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	-	-	0.001	0.00001	0.00001	0.00001	0.00001	0.00001	0.015	-	-	-	-	-	-	-	0.000505	0.000481	0.00212	0.00209	0.000299	0.000353	0.000346	0.000347	0.00147	0.00154	0.000367	0.000381	0.00211	0.00219	0.000507	<0.0000010	0.00105	0.0011	0.00168	<0.0000010	0.00112	0.00188
Vanadium	mg/L	0.0009	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	-	-	-	-	0.00163	0.00149	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.001	0.01	0.003	0.003	0.003	0.003	0.003	0.003	0.03	<0.01	<0.01	<0.01	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0032	<0.0030	<0.0030	<0.0030	0.0038	<0.0030	0.0036	0.0036
Zirconium	mg/L	-	-	0.0003	0.0003	0.0003	0.0002	0.0002	-	-	-	-	-	-	-	-	-	0.00083	0.00076	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00033
Dissolved Metals

Table 1.2 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-050 (CV-099)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates																							
		2005	2006	2015	2016	2017	2018	2019	2020		13-Jun-05	06-Aug-05	09-Sep-05	14-Jun-06	03-Aug-06	08-Sep-06	03-Jul-15	03-Jul-15	12-Aug-15	12-Aug-15	30-Jun-16	30-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	03-Jul-18	03-Jul-18	02-Sep-18	02-Sep-18	21-Jun-19	21-Jun-19	11-Aug-19	11-Aug-19	22-Jun-20	22-Jun-20	20-Jul-20	20-Jul-20	14-Aug-20	14-Aug-20	14-Aug-20
																	US	DS	US	DS	US	DS	DS	US	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	DS Travel Blank
In Situ Parameters																																							
Temperature	ºC	-	-	-	-	-	-	-	-	-	0.11	9.36	4.13	0.04	8.31	2.74	-	-	9.3	8.2	10.83	12.19	9	9.1	1.6	2.2	6.1	6.2	5.10	4.50	7.00	7.10	12.4	11.9	1.60	1.70	13.80	13.50	9.30	9.00	9.00
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.104	0.220	0.308	0.112	0.254	0.305	0.112	0.111	0.337	0.338	-	-	0.347	0.353	0.136	0.1489	0.1536	0.1518	0.2694	0.2699	0.1631	0.1634	0.3530	0.3534	0.0672	0.0681	0.2853	0.2816	0.3798	0.3798	0.3798
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	5.5-9.5	13.69	10.95	12.74	13.80	12.02	13.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.83	13.8	10.23	10.49	11.37	11.65	11.65
Dissolved Oxygen	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103.5	101.7	97.4	97	102.5	107.5	101.6	103.3	98.10	98.20	99.30	98.30	98.90	98.70	100.5	98.6	98.8	99.1	98.5	100.6	98.8	100.9	100.9
pH	pH units	-	-	-	-	-	-	-	-	6.5 - 9.0	7.54	8.31	8.07	8.17	8.36	8.55	8.27	8.28	8.55	8.53	7.97	7.93	8.24	8.3	7.77	7.81	8.12	8.09	8.38	8.33	8.26	8.28	8.37	8.37	7.69	7.81	8.35	8.45	8.52	8.50	8.50
Wetted Width	m	-	-	-	-	-	-	-	-	-	-	-	-	ice	11	12	6	6	2	2	-	-	2	2	~15	~20	7.80	4.60	-	-	-	-	-	-	-	-	-	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.15	0.3	0.1	0.1	0.15	0.15	-	-	-	-	0.3	2	0.09	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	-	-	-	0.82	1.88	-	-	-	-	-	-	-	-	0.396	3.4	-	-	0.13	0.11	-	-	-	-	-	-	-	-	-	-	-
Physical Parameters																																								
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	-	-	-	7.68	8.14	8.13	8.13	8.13	8.37	8.36	8.09	8.08	8.42	8.46	7.8	7.8	8.11	8.10	8.43	8.40	8.24	8.21	8.48	8.46	7.68	7.65	8.41	8.42	8.55	-	6.32
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	105	235	296	122	259	315	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70.00	70.70	293.00	293.00	389.00	390.00	<2.0
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	-	0.84	0.23	<0.10	0.9	0.2	-	0.32	0.48	1.07	0.12	0.42	0.47	0.13	0.16	1.93	2.43	0.92	0.69	0.12	0.11	0.20	0.19	0.15	0.12	0.65	0.69	0.13	<0.10	<0.10	<0.10	<0.10
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10/20	0.5	0.5	-	54.2	128	177	62	144	162	81	80	157	156	59	60	185	187	36	34	82	81	166	166	100	98	173	179	37.3	37.7	150	150	208	203	<0.50
TSS	mg/L	-	-	2	2	2	2	2	2	-	-	-	-	-	-	-	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	11.3	13.6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.00	<2.0	<2.0	<2.0	<2.0	<2.0
TDS	mg/L	30	5	20	20	20	10	20	10	-	57	123	170	79	168	205	93	77	168	157	70	65	176	178	36	38	99	95	160	165	102	100	196	230	32	44	153	158	216	221	18
Dissolved Anions																																								
Alkalinity	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	52	134	156	61	141	163	80	81	161	160	60	61	176	179	31	30	75	77	154	160	95	96	183	184	35	35	145	145	185	183	<1.0
Br	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	1.1	0.6	1.9	<1	1	3	1.2	1.22	4.14	4.15	1.16	1.06	8.54	8.68	<0.50	<0.50	1.18	1.20	4.05	4.14	1.32	1.39	7.96	8.05	0.61	0.62	6.84	7.10	13.80	13.80	<0.50
Fluoride	mg/L	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	0.021	<0.020	0.03	0.029	<0.020	<0.020	0.021	0.021	0.042	0.042	-	-	-	-	-	-	-	-	-	-	-
SO_4	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	0.6	1.1	2.5	2.0	2.0	2.0	6.0	1.1	1.2	4.80	5.12	1.03	0.84	7.13	6.77	<0.30	<0.30	0.87	0.87	3.72	3.81	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																								
NH_3+NH_4	mg/L N	0.1	0.02	0.15	0.15	0.15	0.15	-	-	0.021 - 231[1]	0.3	0.2	0.6	0.09	0.04	<0.02	<0.15	<0.15	0.23	0.17	<0.15	<0.15	<0.15	0.16	<0.15	<0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.06	<0.06	<0.06	<0.005	<0.005	0.017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0010	<0.0010	<0.0010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.020	<0.020	0.031	0.037	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.0050	0.01	<0.0050
NO_2+NO_3	mg/L N	0.06	0.1	-	-	-	-	0.022	0.022	-	<0.06	<0.06	<0.06	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022	<0.022	<0.022	<0.022	-	-	-	-	-	-	-
Total Ammonia as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	'Variable[1]	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	0.048	<0.020	<0.020	<0.020	<0.020	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.0050	<0.0050
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	-	<0.02	<0.02	<0.10	<0.01	<0.01	<0.01	<0.0030	<0.0030	<0.0030	0.0034	0.0051	0.0037	0.0041	0.0137	0.0114	0.014	0.0040	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.01	0.01	<0.0030	<0.0030	<0.0020	0.0020	<0.0020
Dissolved Phosphorus	mg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																								
Phenols	mg/L	-	-	-	-	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	1.8	1.7	2.7	2.8	1.3	1.3	2.5	2.5	2.13	2.16	2.45	2.33	2.81	2.90	2.80	2.60	2.69	2.75	2.80	2.92	3.19	3.41	2.97	2.98	<0.50
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	1.8	1.8	2.7	2.8	1.4	1.5	2.6	2.8	2.43	1.27	2.66	2.56	3.39	2.44	3.23	3.47	3.11	3.15	3.14	3.17	3.62	3.71	2.92	2.93	<0.50
TKN	mg/L	-	-	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	-	<0.15	0.23	0.23	0.17	<0.15	<0.15	<0.15	0.16	0.15	<0.15	<0.15	<0.15	<0.15	<0.15	-	-	-	-	-	-	-	-	-	-	-
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																								
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[2]	0.026	0.005	<0.004	0.015	<0.005	<0.005	0.012	0.014	<0.010	<0.010	0.021	0.015	<0.010	<0.010	0.111	0.108	0.0086	0.0208	<0.0050	<0.0050	0.0148	0.01	<0.0050	0.0071	0.0472	0.0419	<0.0050	0.0055	<0.0030	<0.0030	<0.0030
Antimony	mg/L	0.0004	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00010	0.00011	<0.00010	<0.00010	0.00014	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	0.00015	0.00015	<0.00010	<0.00010	<0.00010	0.00011	0.00017	0.00015	<0.00010
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	0.002	0.004	0.005	<0.01	<0.01	<0.01	-	-	-	-	0.00241	0.00253	0.0066	0.0068	<0.00186	0.00175	0.00271	0.00278	0.00555	0.00565	0.00347	0.00335	0.00753	0.00765	0.00330	0.00162	0.00616	0.00601	0.00712	0.00701	<0.00010
Beryllium	mg/L	0.005	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0001	0.0001	0.00009	0.00001	0.00001	0.0000005	0.0000005	0.0000005	0.000017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000090	<0.000090	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000152	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.05	0.05	0.05	-	13.0	29.3	39.8	16	34	37	17.6	18	35.9	34.9	13.7	13.2	41.3	41.2	8.06	7.67	19.10	18.9	37.80	38.50	22.40	21.90	38.2	40.8	8.77	9.03	34.1	34.5	43.8	44.0	<0.050
Cesium	mg/L	-	-	-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	0.00014	0.00013	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00	<0.00050	<0.00050
Cobalt	mg/L	0.0003	0.0002	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	<0.0008	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00374	<0.00050	0.00058	0.00059	0.00056	0.00056	<0.00050
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.01	-	<0.05	<0.02	<0.02	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.050	<0.050	0.124	0.111	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.049	0.043	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	0.0021	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0011	0.0010	0.0011	0.0017	0.0019	<0.0010	<0.0010	0.0019	0.0018	0.0024	0.0024	<0.0010
Magnesium	mg/L	0.005	1	0.5	0.5	0.5	0.05	0.05	0.05	-	5.29	13.2	18.7	6	15	17	8.01	7.96	19	18.4	6.04	6.63	19.9	20.5	3.76	3.59	8.33	8.14	17.30	16.90	9.50	9.85	18.3	18.6	4.03	3.93	16.1	16.2	22.3	22.0	<0.0050
Manganese	mg/L	0.0007	0.01	0.0005	-	-	-	-	0.0005	-	0.0060	<0.0007	<0.0007	<0.01	<0.01	<0.01	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00186	0.00175	0.00271	0.00278	0.00555	0.00565	0.00347	0.00335	0.00753	0.00765	0.00330	0.00162	0.00282	0.00231	0.00055	0.00050	<0.00050
Mercury	mg/L	-	-	-	0.05	-	-	-	0.000005	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Molybdenum	mg/L	0.0003	0.005	0.00005	-	-	-	-	0.00005	-	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	<0.00010	<0.00010	<0.00010	<0.00010	0.000107	0.000112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	0.000099	0.000091	0.000121	0.000141	<0.00050
Nickel	mg/L	0.001	0.005	-	-	-	-	-	0.0005	-	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	0.02	0.01	0.5	0.5	0.5	0.5	-	0.05	-	0.52	0.44	0.52	0.52	0.34	0.53	<0.0050	<0.0050	0.616	0.631	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.234	0.240	0.704	0.682	0.789	0.771	<0.050
Selenium	mg/L	0.005	0.001	-	-	-	-	-	0.00005	-	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.00050	<0.00050	0.386	0.360	<0.000050	<0.000050	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silver	mg/L	0.0001	0.0001	0.00001	-	-	-	-	0.00005	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium	mg/L	0.05	0.05	-	-	-	-	-	0.05	-	0.42	0.67	1.10	0.34	0.68	1.61	0.76	0.73	2.41	2.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.342	0.361	3.25	3.26	5.66	5.51	<0.050
Strontium	mg/L	0.001	0.001	0.00001	-	-	-	-	0.001	-	0.0070	0.0147	0.0188	0.009	0.019	0.023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0042	0.0046	0.0221	0.0217	0.0256	0.0256	<0.00020
Thallium	mg/L	0.0002	-	-	-	-	-	-	0.00001	-	<0.0002	<0.0002	<0.0002	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	0.001	0.01	0.001	-	-	-	-	0.0005	-	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium	mg/L	-	-	-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-	-	-	-	0.00023	0.000251	0.000911	0.000966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000046	0.000055	0.000791	0.000855	0.00129	0.00131	<0.000010
Vanadium	mg/L	0.0009	0.001	-	-	-	-	-	0.0005	-	<0.0009	0.0046	0.0046	<0.001	<0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.001	0.01	0.001	-	-	-	-	0.001	-	0.009	0.002	0.002	<0.01	<0.01	<0.01	0.0017	0.0044	<0.0010	0.0182	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	0.0026	<0.0010	0.0012	<0.0010	<0.0010	<0.0010
Dissolved Metals and Non-Metals																																								
Aluminum	mg/L	0.004	0.005	0.005	-	-	-	-	0.005	-	0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0083	0.0076	<0.0050	<0.0050	<0.0010	<0.0010	<0.0010
Antimony	mg/L	0.0004	-	0.0001	-	-	-	-	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	-	-	-	-	-	0.0001	-	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00011	0.00010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	0.00012	0.00013	0.00010	<0.00010	<0.00010
Barium	mg/L	0.001	0.01	-	-	-	-	-	0.0001	-	0.002	0.004	0.005	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00140	0.00142	0.00607	0.00609	0.00729	0.00724	<0.00010
Beryllium	mg/L	0.005	-	0.00001	-	-	-	-	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	0.05	-	-	-	-	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	-	-	-	-	-	0.01	-	<0.05	0.02	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0001	0.0001	-	-	-	-	-	0.0000005	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	0.05	1	0.0002	-	-	-	-	0.05	-	12.3	29.7	37.4	15	33	37	18.4	18.8	34.7	34.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.41	8.63	33.4	33.4	43.6	44.5	0.068
Chromium	mg/L	0.001	0.001	0.01	-	-	-	-	0.0005	-	<0.001	0.002	0.002	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010
Cobalt	mg/L	0.0003	0.0002	0.00005	-	-	-	-	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.05	-	-	-	-	0.0002	-	<0.0008	<0.0008	<0.0008	<0.001	<0.001	<0.001	0.00030	0.00031	0.00050	0.00055	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	0.00027	0

Table 1.3 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-053 (CV-093)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates															
		2005	2006	2015	2016	2017	2018	2019	2020		14-Jun-06	03-Aug-06	08-Sep-06	12-Aug-15	12-Aug-15	30-Jun-16	30-Jun-16	29-Jun-17	29-Jun-17	03-Jul-18	03-Jul-18	21-Jun-19	21-Jun-19	27-Jul-19	27-Jul-19	28-Jun-20	28-Jun-20
In Situ Parameters														US	DS	DS	US	US	DS	US	DS	US	DS	US	DS	US	DS
Temperature	ºC	-	-	-	-	-	-	-	-	-	-0.08	9.96	5.77	5.5	5.9	11.3	5.6	3.2	3.8	0.5	2.2	3.4	7.6	4.8	8.9	3.9	8.0
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.148	0.160	0.182	0.340	0.320	11.570	11.570	0.197	0.182	0.211	0.197	0.2043	0.2032	0.2934	0.2754	0.1997	0.2005
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	5.5-9.5	13.70	10.81	12.46	-	-	-	-	-	-	-	-	-	-	-	-	13.1	11.9
Dissolved Oxygen	%	-	-	-	-	-	-	-	-	-	-	-	-	99.4	101.1	99.4	99.0	101.8	102.0	97.4	98.1	100.8	99.8	97.5	99.2	99.8	100.6
pH	pH units	-	-	-	-	-	-	-	-	6.5 - 9.0	8.32	8.15	8.24	8.42	8.43	8.02	7.99	7.90	7.85	8.12	8.12	8.22	8.40	8.21	8.40	8.05	8.07
Wetted Width	m	-	-	-	-	-	-	-	-	-	20	33	28	2.5	2.5	-	-	1.3	3.8	0.2	1.1	-	-	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	0.15	0.20	0.20	0.50	0.50	-	-	0.09	0.06	0.04	0.03	-	-	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	2	4.62	6.85	-	-	-	-	0.02223	0.10944	0.002	0.015	-	-	-	-	-	-
Physical Parameters																											
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	7.91	7.84	7.64	8.36	8.26	8.27	8.2	8.13	8.15	8.15	8.17	8.2	8.36	8.08	8.31	8.16	8.28
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	161	165	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	.1	0.1	0.1	-	0.5	0.2	-	0.19	1.22	0.92	1.31	0.31	1.74	0.66	0.99	0.23	0.74	0.20	2.20	0.18	0.93
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10/20	0.5	0.5	-	85	86	95	152	158	99	100	81	84	112	108	128	123	-	-	-	-
TSS	mg/L	-	-	2	2	2	2	2	2	-	-	-	-	<2.0	2.0	<2.0	4.4	2.1	5.5	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.6
TDS	mg/L	30	5	20	20	20	10	20	10	-	105	107	123	147	159	115	105	89	86	128	116	143	139	138	149	138	121
Dissolved Anions																											
Alkalinity	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	80	85	93	155	163	103	99	77	81	99	98	117	115	-	-	-	-
Br^-	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl^-	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	<1	<1	<1	0.74	3.07	0.61	0.57	<0.50	0.6	1.10	1.95	1.16	2.72	-	-	-	-
Fluoride	mg/L	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	0.036	0.03	0.028	0.027	0.053	0.035	-	-	-	-	-	-
SO_4^-	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	3	2	7	2.66	3.9	1.22	1.24	0.62	1	3.02	2.04	-	-	-	-	-	-
Nutrients																											
NH_3+NH_4	mg/L N	0.1	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.04	<0.02	<0.02	0.23	<0.15	<0.15	<0.15	-	-	-	-	-	-	-	-	-	-
NO_2^-(Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.005	<0.005	0.015	-	-	-	-	-	-	-	-	<0.010	<0.010	-	-	-	-
NO_3^-(Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	<0.10	<0.10	<0.10	0.023	0.026	<0.020	0.023	<0.020	<0.020	0.054	0.040	0.038	0.032	-	-	-	-
NO_2+NO_3	mg/L N	0.06	0.1	-	-	-	-	0.022	0.022	-	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	0.038	0.032	-	-	-	-
Ammonia total as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	'Variable[1]	-	-	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.010	0.010	-	-	-	-
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	-	<0.01	<0.01	<0.01	<0.0030	0.0037	0.0216	0.0657	0.0042	0.0046	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	-
Dissolved Phosphorus	mg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																											
Phenols	mg/L	0.001	0.001	-	-	-	-	-	-	0.004	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	1.8	2.4	<1.0	<1.0	1.18	1.05	1.17	1.34	1.71	1.74	-	-	-	-
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	1.8	2.1	1.2	<1.0	1.41	2.72	1.49	1.46	2.28	2.63	-	-	-	-
TKN	mg/L	-	-	0.15	0.15	0.15	0.15	-	-	-	-	-	-	0.23	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	-	-	-	-	-	-
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																											
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[2]	<0.005	<0.005	0.007	0.018	0.012	0.025	0.139	0.0133	0.048	0.0315	0.0346	0.0211	0.0332	-	-	-	-
Antimony	mg/L	0.0004	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Arsenic	mg/L	0.005	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.005	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	<0.01	<0.01	<0.01	-	-	0.00459	0.00434	0.00172	0.00297	0.0019	0.00283	0.00229	0.00415	-	-	-	-
Beryllium	mg/L	0.005	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Bismuth	mg/L	0.0003	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.01	<0.01	<0.01	-	-	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	-	-	-	-
Cadmium	mg/L	0.0001	0.0001	0.00009	0.00001	0.00001	0.000005	0.000005	0.000005	0.000017	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	-
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.05	0.05	0.05	-	24	25	27	44	43.6	31.2	31.6	26.8	26.9	35.4	34.8	38.4	37.7	-	-	-	-
Cesium	mg/L	-	-	-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-			<0.000010	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Cobalt	mg/L	0.0003	0.0002	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0002	<0.0002	<0.0002	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Copper	mg/L	0.0008	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	-
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.01	0.3	<0.03	<0.03	<0.03	<0.050	<0.050	<0.050	0.179	<0.050	0.057	0.022	0.026	0.021	0.023	-	-	-	-
Lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.00005	0.00005	0.00005	0.001 - 0.007[3]	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0020	0.0014	0.0026	0.0024	-	-	-	-
Magnesium	mg/L	0.005	1	0.5	0.05	0.05	0.005	0.005	0.005	-	6.0	5.0	6.0	11.8	13.8	5.02	5.19	3.5	4.13	5.74	5.15	6.60	6.10	-	-	-	-
Manganese	mg/L	0.0007	0.01	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.01	<0.01	<0.01	<0.00050	<0.00050	0.00058	0.00362	<0.00050	0.00128	<0.00050	0.00074	0.00053	0.00085	-	-	-	-
Mercury	mg/L	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000005	0.000026	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-
Molybdenum	mg/L	0.0003	0.005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.005	<0.005	<0.005	<0.00050	<0.00050	0.000093	0.000091	<0.000050	0.000068	0.000118	0.000094	0.000127	0.000130	-	-	-	-
Nickel	mg/L	0.001	0.005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.025 - 0.150[3]	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Phosphorus	mg/L	-	-	-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	-	-	-
Potassium	mg/L	0.02	0.01	1	0.05	0.05	0.05	0.05	0.05	-	0.24	0.15	0.23	0.339	0.515	0.618	0.539	0.299	0.475	0.383	0.437	0.443	0.682	-	-	-	-
Rubidium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	0.00122	0.00107	0.00023	0.00064	<0.00020	0.0006	0.00021	0.00112	-	-	-	-
Selenium	mg/L	0.005	0.001	0.0004	0.00005	0.00005	0.00005	0.00005	0.00005	0.001	<0.001	<0.001	<0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Silicon	mg/L	0.0001	0.0001	-	0.05	0.05	0.1	0.1	0.10	-	<0.0001	<0.0001	<0.0001	-	-	0.643	0.846	0.44	0.59	0.79	0.64	0.87	0.75	-	-	-	-
SIlver	mg/L	-	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	-
Sodium	mg/L	0.05	0.05	0.5	0.5	0.5	0.05	0.05	0.05	-	0.34	0.23	0.58	0.61	1.75	<0.50	<0.50	<0.50	<0.50	0.234	0.232	0.251	0.275	-	-	-	-
Strontium	mg/L	0.001	0.001	-	0.001	0.001	0.001	0.001	0.001	-	0.019	0.018	0.022	-	-	0.0295	0.0284	0.0216	0.0242	0.0337	0.0336	0.0369	0.0434	-	-	-	-
Sulfur	mg/L	-	-	-	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	0.74	<0.50	<0.50	0.66	1.2	0.9	2.10	1.27	-	-	-	-
Tellurium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	-	-	-	-

Table 1.3 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-053 (CV-093)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates															
		2005	2006	2015	2016	2017	2018	2019	2020		14-Jun-06	03-Aug-06	08-Sep-06	12-Aug-15	12-Aug-15	30-Jun-16	30-Jun-16	29-Jun-17	29-Jun-17	03-Jul-18	03-Jul-18	21-Jun-19	21-Jun-19	27-Jul-19	27-Jul-19	28-Jun-20	28-Jun-20
Thallium	mg/L	0.0002	-	0.0003	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-
Thorium	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Tin	mg/L	0.001	0.01	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.01	<0.01	<0.01	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Titanium	mg/L	0.003	-	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	-	-	-	-	-	0.00097	0.00745	0.00043	0.00305	<0.0020	0.00136	0.00103	0.00113	-	-	-	-
Tungsten	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-
Uranium	mg/L	-	-	0.001	0.00001	0.00001	0.00001	0.00001	0.00001	0.015	-	-	-	0.000422	0.00059	0.000159	0.000159	0.000082	0.000125	0.000174	0.000193	0.000196	0.000347	-	-	-	-
Vanadium	mg/L	0.0009	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-
Zinc	mg/L	0.001	0.01	0.003	0.003	0.003	0.003	0.003	0.003	0.03	<0.01	<0.01	<0.01	<0.0030	0.0033	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0032	-	-	-	-
Zirconium	mg/L	-	-	-	0.0003	0.0003	0.0003	0.0002	0.0002	-	-	-	-	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00020	<0.00020	-	-	-	-
Dissolved Metals and Non-Metals																											
Aluminum	mg/L	0.004	0.005	0.005	-	-	-	-	0.005	-	<0.005	<0.005	<0.005	<0.0050	0.0412	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.0004	-	0.0001	-	-	-	-	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.005	0.001	-	-	-	-	-	0.0001	-	<0.001	<0.001	<0.001	<0.00010	<0.00010	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	0.001	0.01	-	-	-	-	-	0.0001	-	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.005	-	0.00001	-	-	-	-	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	0.0003	-	0.05	-	-	-	-	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.05	0.01	-	-	-	-	-	0.01	-	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.0001	0.0001	-	-	-	-	-	0.000005	-	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	0.05	1	0.0002	-	-	-	-	0.05	-	24	26	28	43	41.9	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.001	0.001	0.00005	-	-	-	-	0.0005	-	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0003	0.0002	0.05	-	-	-	-	0.0001	-	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	0.0008	0.001	0.0005	-	-	-	-	0.0002	-	<0.001	<0.001	<0.001	0.00024	0.00038	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	0.02	0.03	0.00001	-	-	-	-	0.01	-	<0.03	<0.03	<0.03	<0.010	0.03	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.0002	0.001	0.00005	-	-	-	-	0.00005	-	<0.001	<0.001	<0.001	<0.000050	<0.000050	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	0.005	1	0.05	-	-	-	-	0.005	-	6	5	6	10.9	13	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.0007	0.01	0.00005	-	-	-	-	0.0005	-	<0.01	<0.01	<0.01	<0.00050	0.00051	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	0.000005	-	-	-	-	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.0003	0.005	0.5	-	-	-	-	0.00005	-	<0.005	<0.005	<0.005	0.000076	0.000118	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	0.001	0.005	-	-	-	-	-	0.0005	-	<0.005	<0.005	<0.005	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	0.02	0.01	-	-	-	-	-	0.05	-	0.24	0.15	0.25	0.344	0.538	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.005	0.001	-	-	-	-	-	0.00005	-	<0.001	<0.001	<0.001	<0.000050	<0.000050	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.0001	0.0001	0.00005	-		-	-	0.00005	-	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	0.05	0.05	0.5	-		-	-	0.05	-	0.32	0.24	0.4	0.6	1.61	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	0.001	0.001	-	-		-	-	0.001	-	0.018	0.019	0.022	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	0.0002	-	0.00001	-		-	-	0.00001	-	-	-	-	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	0.001	0.01	-	-		-	-	0.0001	-	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	0.003	-	-	-	-	-	-	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	-	-	0.00001	-		-	-	0.00001	-	-	-	-	0.000414	0.000573	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	0.0009	0.001	-	-		-	-	0.0005	-	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	0.001	0.01	0.001	-		-	-	0.001	-	<0.01	<0.01	<0.01	<0.0010	0.0025	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
CV-093 was not sampled in August 2019 because it was dry, however, physical parameters from a Tote Road Monitoring Program sample taken on July 27, 2019 are included.
CV-093 was not sampled in July or August 2020 because it was dry, however, physical parameters from a Tote Road Monitoring Program sample taken on June 28, 2020 are included.
Site Performance Objective's (SPOs) are identified in Baffinland's 2AM-MRY-1325 Water Licence
2006 dissolved oxygen values in mg/L; 2015, 2016, 2017, 2018, 2019, and 2020 dissolved oxygen values in % saturation
2018 TDS LOR was 10 in June, 20 in September; 2019 TDS LOR was 20 in June, 10 in August. 2019 Mercury LOR was 0.00001 in June, 0.00005 in August.
* Result qualified by analytical laboratory
SPO and CCME guideline values are pH or Hardness dependent. The lowest to highest applicable guideline value is shown
(1) pH /Temp dependent
(2) pH dependent
(3) Hardness dependent
Analytical values which exceed SPO or calculated CCME guideline value are indicated below:

1	Shaded values exceed CCME guidelines
1	Bold values exceed SPO guidelines

Table 1.4 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-060 (CV-078)

Parameters	Units	Method Detection Limit			LOR						CCME Guideline	Date																									
		2005	2006	2011	2015	2016	2017	2018	2019	2020		13-Jun-05	06-Aug-05	09-Sep-05	13-Jun-06	02-Aug-06	08-Sep-06	12-Aug-15	12-Aug-15	30-Jun-16	30-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	03-Jul-18	03-Jul-18	02-Sep-18	02-Sep-18	02-Sep-18	22-Jun-19	22-Jun-19	11-Aug-19	11-Aug-19	22-Jun-20	22-Jun-20	20-Jul-20	20-Jul-20	20-Jul-20	14-Aug-20	14-Aug-20
																		US	DS	DS	US	DS	US	DS	US	DS	US	DS	US Duplicate	DS	US	DS	US	DS	US	DS	US	DS	DS01	US	DS
In Situ Parameters																																								
Temperature	ºC	-	-	-	-	-	-	-	-	-	-	0.22	9.28	4.02	-0.06	13.05	3.95	9.6	9.3	8.16	9.36	9.8	10	3.8	4.4	5.2	5.5	6.0	6.0	5.6	4.3	3.9	13.6	13.6	1.9	1.9	15.6	15.2	15.2	8.5	8.3
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	-	0.079	0.222	0.284	0.097	0.237	0.267	0.314	0.315	7.264	7.264	0.299	0.297	0.154	0.123	0.1668	0.1668	0.237	0.2367	0.2371	0.1616	0.1619	0.3037	0.3044	0.0960	0.0966	0.257	0.2582	0.2582	0.3185	0.3189
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	5.5-9.5	13.48	10.95	12.72	14.17	11.43	12.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.57	13.63	9.93	9.00	9.00	11.75	11.72
Dissolved Oxygen	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102.7	102.3	100.4	100.1	102.5	103.8	102.20	102.80	97.70	97.60	99.30	99.30	96.30	99.30	98.60	98.7	99.8	-	98.10	99.4	98.50	98.50	100.4	99.60
pH	pH units	-	-	-	-	-	-	-	-	-	6.5 - 9.0	7.36	8.30	7.96	8.22	8.26	8.36	8.53	8.48	7.81	7.93	8.24	8.25	7.65	7.87	8.19	8.18	8.39	8.39	8.3	8.22	8.23	8.26	8.36	7.98	7.97	8.39	8.40	8.40	8.45	8.39
Wetted Width	m	-	-	-	-	-	-	-	-	-	-	-	-	-	ice	9	9	3	3	-	-	-	-	11	10	12.4	12.7	4.5	4.5	4.3	-	-	-	-	-	-	-	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	0.25	0.2	0.1	0.1	-	-	-	-	2	0.19	0.1	0.12	0.08	0.08	0.12	-	-	-	-	-	-	-	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.74	0.96	-	-	-	-	-	-	2.90	2.78	1.11	0.75	0.10	0.10	0.08	-	-	-	-	-	-	-	-	-	-	-
Physical Parameters																																								
pH	pH units	-	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	-	-	-	7.56	8.10	8.10	8.16	8.32	8.09	8.09	8.42	8.42	7.93	7.91	8.18	8.17	8.42	8.37	8.41	8.24	8.22	8.39	8.46	7.84	7.81	8.38	8.36	8.37	8.49	8.46
Conductivity	µS/cm	1	5	5	-	-	-	-	-	-	-	83	234	269	104	244	277	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	99.4	100	266	268	268	326	329
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	0.1	-1	0.1	0.1	-	0.40	<0.10	<0.10	0.5	<0.10	-	1.45	0.24	0.26	0.17	0.13	0.14	0.5	0.37	0.29	0.56	<0.10	<0.10	<0.10	0.13	0.14	0.15	0.21	0.36	0.45	<0.10	<0.10	<0.10	<0.10	<0.10
Hardness	mg/L as $CaCO_3$	0.5	1	0.5	10	10	10	10/20	0.5	0.5	-	41.0	124	160	52	137	141	156	152	60	59	165	163	46	44	91	90	146	150	147	106	105	153	156	53	53.3	143	143	143	183	181
TSS	mg/L	30	5	1	2	2	2	2	2	2	-	-	-	-	-	-	-	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
TDS	mg/L	-	-	2	20	20	20	10	20	10	-	63	123	120	68	159	180	159 *	143 *	65	70	152	148	50	56	102	101	140	155	155	99	103	163	166	55	53	138	154	152	194	183
Dissolved Anions																																								
Alkalinity	mg/L as $CaCO_3$	2	5	5	10	10	10	10	10	10	-	40	120	141	51	132	146	158	152	61	64	161	158	41	43	85	82	149	146	149	103	104	166	171	50	50	142	143	143	170	168
Br^-	mg/L	0.3	0.05	0.25	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl^-	mg/L	0.2	1	1	0.5	0.5	0.5	0.5	0.5	0.5	-	0.9	0.2	0.6	<1	<1	<1	3.08	0.79	<0.50	<0.50	1.19	1.19	<0.50	<0.50	0.69	0.7	0.98	0.99	1.16	0.59	0.64	1.21	1.41	<0.50	0.61	1.44	1.8	1.52	2.57	2.79
Fluoride	mg/L	-	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	0.023	0.024	<0.020	<0.020	0.023	0.023	0.037	0.038	0.037	-	-	-	-	-	-	-	-	-	-	-
SO_4^-	mg/L	0.5	1	1	0.3	0.3	0.3	0.3	-	-	-	0.6	0.8	1.9	2.0	1.0	5.0	3.84	2.68	<0.30	0.31	3.37	3.35	<0.30	<0.30	0.62	0.62	2.02	2.02	2.03	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																								
NH_3+NH_4	mg/L N	0.1	0.02	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.2	0.6	0.8	<0.02	<0.02	<0.02	0.24	0.25	<0.15	<0.15	<0.15	<0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	0.1	-	-	-	-	0.01	0.01	0.06	<0.06	<0.06	<0.06	<0.005	<0.005	0.018	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0010	<0.0010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	0.030	0.026	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.027	0.041	<0.020	0.0362	0.0371
NO_2+NO_3	mg/L N	0.06	0.1	0.1	-	-	-	-	0.022	0.022	-	<0.06	<0.06	<0.06	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022	<0.022	<0.022	<0.022	-	-	-	-	-	-	-
Ammonia total as N	mg/L	-	-		0.05	0.02	0.02	0.02	0.01	0.01	'Variable[1]	-	-	-	-	-	-	<0.050	<0.050	0.021	<0.020	0.027	0.041	<0.020	<0.020	<0.020	<0.020	-	-	-	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.0050
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	0.003	-	<0.02	<0.02	<0.10	<0.01	<0.01	<0.01	0.0044	<0.0030	0.0193	0.0282	0.01	0.0139	0.0085	0.0304	<0.0030	<0.0030	0.015	<0.0030	<0.0030	<0.0030	<0.0030	0.012	<0.0030	0.0132	0.0034	<0.0030	<0.0030	<0.0030	<0.0020	<0.0020
Dissolved Phosphorus	mg/L	0.02	-		-	-	-	-	-	-	-	<0.02	<0.02	<0.10	-	-	-	-	-	-	-	-	-	-	-	<0.0030	<0.0030	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																								
Phenols	mg/L	0.001	0.001	0.001	-	-	-	-	-	-	0.004	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	0.5	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.4	1.9	1	<1.0	1.5	1.5	1.75	1.78	1.75	1.74	1.72	1.86	1.72	1.73	1.81	1.62	1.7	2.93	2.83	2.47	2.28	2.11	1.92	2.00
TOC	mg/L	-	-	0.5	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.2	1.8	1.1	1.0	1.6	1.6	2.24	2.13	2.13	1.76	2.01	2.45	2.62	2.34	2.54	3.39	3.23	3.04	3.24	2.74	2.77	2.67	1.55	1.81
TKN	mg/L	-	-	0.1	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	-	0.24	0.25	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.18	<0.15	-	-	-	-	-	-	-	-	-	-	-
Chlorophyll-a	mg/m3	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																								
Aluminum	mg/L	0.004	0.005	0.003	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[2]	0.006	<0.004	<0.004	0.006	<0.005	<0.005	0.059	0.016	0.011	0.016	<0.010	<0.010	0.0271	0.024	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.009	0.0097	0.0053	0.0074	0.0164	0.0277	<0.0050	0.0067	0.0054	<0.0030	0.0033
Antimony	mg/L	0.0004	-	0.0001	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.0001	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013
Barium	mg/L	0.001	0.01	0.00005	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	<0.001	0.002	0.003	<0.01	<0.01	<0.01	-	-	0.00166	0.0019	0.00389	0.00385	0.00131	0.00128	0.00202	0.00213	0.00349	0.00348	0.00351	0.00236	0.00260	0.00459	0.0045	0.00153	0.00216	0.00383	0.00418	0.0039	0.00428	0.00442
Beryllium	mg/L	0.005	-	0.0005	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	0.0005	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010
Cadmium	mg/L	0.0001	0.0001	0.00001	0.00009	0.00001	0.00001	0.000005	0.000005	0.000005	0.000017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000075	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	0.05	1	0.05	0.5	0.5	0.5	0.5	0.05	0.05	-	13.2	35.5	44.7	17	41	41	45	43.1	17.4	16.8	45.9	45.6	12.6	12.1	26	25.3	41.4	42.3	41.1	30.4	29.1	44.1	42.8	15.2	14.3	41	40	40.5	48	49.5
Cesium	mg/L	-	-		-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium	mg/L	0.001	0.001	0.0005	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	0.0003	0.0002	0.0001	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.0005	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	<0.0008	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	0.00097	<0.00050	<0.00050	<0.00050	<0.00050
Iron	mg/L	0.02	0.03	0.03	0.05	0.05	0.05	0.01	0.01	0.01	0.3	<0.05	<0.02	<0.02	<0.03	<0.03	<0.03	0.053	<0.050	<0.050	<0.050	<0.050	<0.050	0.075	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.034	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	0.0002	0.001	0.00005	0.0005	0.0001	0.0001	0.00005	0.00005	0.00005	0.001 - 0.007[3]	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000051	0.000085	<0.00050	0.000051	<0.00050	<0.00050	<0.00050
Lithium	mg/L	-	-	0.005	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	0.0015	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0012	0.0012	<0.0010	<0.0010	0.0015	0.0014	0.0014	0.0017	0.0017
Magnesium	mg/L	0.005	1	0.1	0.5	0.05	0.05	0.005	0.005	0.005	-	1.91	8.74	11.7	3	9	11	14	11.7	3.94	4.03	12.2	11.9	3.44	3.4	6.38	6.53	10.3	10.8	10.7	7.61	7.79	11.5	11.2	3.60	3.45	9.96	10.0	10.3	13.7	13.7
Manganese	mg/L	0.0007	0.01	0.00005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	0.0016	<0.0007	<0.0007	<0.01	<0.01	<0.01	0.000850	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00113	0.00096	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00098	0.00192	<0.00050	<0.00050	<0.00050	<0.00010	0.00016
Mercury	mg/L	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000005	0.000026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.0003	0.005	0.00005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	<0.00050	<0.00050	<0.000050	<0.000050	0.000093	0.000091	<0.000050	<0.000050	<0.000050	<0.000050	0.000078	0.000075	0.000067	<0.000050	<0.000050	0.000105	0.000091	<0.000050	<0.000050	0.000069	0.000068	0.000071	0.000093	0.000098
Nickel	mg/L	0.001	0.005	0.0005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.025 - 0.150[3]	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0007	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phosphorus	mg/L	-	-		-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	0.02	0.01	0.05	1	0.05	0.05	0.05	0.05	0.05	-	0.26	0.26	0.27	0.22	0.28	0.30	0.508	0.355	0.21	0.216	0.344	0.355	0.24	0.245	0.227	0.234	0.301	0.299	0.304	0.252	0.262	0.365	0.368	0.229	0.338	0.366	0.389	0.387	0.346	0.351
Rubidium	mg/L	-	-		-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	<0.00020	0.00022	0.00032	0.00034	0.00021	0.00022	<0.00020	<0.00020	0.00022	0.00025	0.00026	0.00021	0.00023	0.00035	0.00042	<0.00020	0.00034	0.00035	0.00043	0.00043	0.00029	0.00031
Selenium	mg/L	0.005	0.001	0.001	0.0004	0.00005	0.00005	0.00005	0.00005	0.00005	0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon	mg/L	-	-	0.05	-	0.05	0.05	0.1	0.1	0.10	-	-	-	-	-	-	-	-	-	0.368	0.385	0.789	0.749	-	-	-	-	-	-	-	-	-	-	-	0.28	0.3	0.88	0.88	0.88	0.88	0.87
Silver	mg/L	0.0001	0.0001	0.000001	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010
Sodium	mg/L	0.05	0.05	0.0012	0.5	0.5	0.5	0.5	0.05	0.05	-	0.31	0.27	0.36	0.31	0.31	0.47	1.71	0.61	<0.50	<0.50	0.72	0.7	<0.50	<0.50	0.338	0.34	0.584	0.58	0.581	0.355	0.356	0.67	0.661	0.275	0.437	0.795	0.812	0.813	1.19	1.18
Strontium	mg/L	0.001	0.001	0.0001	-	0.001	0.001	0.001	0.001	0.001	-	0.0098	0.0226	0.0293	0.013	0.029	0.030	-	-	0.0123	0.0121	0.035	0.0337	0.0078	0.0079	0.0178	0.0179	0.0311	0.0315	0.0313	0.0207	0.0214	0.0367	0.0361	0.0102	0.0097	0.0307	0.0309	0.0314	0.0407	0.0413
Sulfur	mg/L	-	-		-	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	<0.50	<0.50	1.52	1.46	<0.50	<0.50	<0.50	<0.50	1.05	1.03	1.02	<0.50	0.53	2.67	1.23	<0.50	<0.50	1.16	1.27	1.29	2.29	2.23
Tellurium	mg/L	-	-		-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium	mg/L	0.0002	-	0.0001	0.0003	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	<0.0002	<0.0002	<0.0002	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium	mg/L	-	-		-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	0.001	0.01	0.0001	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	0.01	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	0.0006	0.00083	<0.00030	0.00032	0.00091	0.00087	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.00049	<0.00030	<0.00030	0.00038	0.00053	0.00093	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungstun	mg/L	-	-		-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00

Table 1.4 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-060 (CV-078)

Parameters	Units	Method Detection Limit			LOR						CCME Guideline	Date																							
		2005	2006	2011	2015	2016	2017	2018	2019	2020		13-Jun-05	06-Aug-05	09-Sep-05	13-Jun-06	02-Aug-06	08-Sep-06	12-Aug-15	12-Aug-15	30-Jun-16	30-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	03-Jul-18	03-Jul-18	02-Sep-18	02-Sep-18	02-Sep-18	22-Jun-19	22-Jun-19	11-Aug-19	11-Aug-19	22-Jun-20	22-Jun-20	20-Jul-20	20-Jul-20	20-Jul-20	14-Aug-20	14-Aug-20
Lead	mg/L	0.0002	0.001	0.00005	0.00001	-	-	-	-	0.00005	-	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.000050	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Magnesium	mg/L	0.005	1	0.1	0.0005	-	-	-	-	0.005	-	2.09	9.19	11.0	3	9	10	12.8	10.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.73	3.84	10.4	10.4	10.5	13.9	13.2
Manganese	mg/L	0.0007	0.01	0.00005	0.05	-	-	-	-	0.0005	-	0.0013	<0.0007	<0.0007	<0.01	<0.01	<0.01	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00092	0.00077	<0.00050	<0.00050	<0.00050	<0.00010	<0.00010
Mercury	mg/L	-	-	0.00001	0.00005	-	-	-	-	0.000005	-	-	-	-	-	-	-	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.0003	0.005	0.00005	-	-	-	-	-	0.00005	-	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	0.000125	0.000086	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	0.000074	0.000074	0.000074	0.000095	0.000112
Nickel	mg/L	0.001	0.005	0.0005	0.5	-	-	-	-	0.0005	-	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	0.02	0.01	0.05	-	-	-	-	-	0.05	-	0.26	0.28	0.26	0.20	0.27	0.28	0.488	0.361	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.226	0.227	0.404	0.417	0.401	0.494	0.422
Selenium	mg/L	0.005	0.001	0.001	0.00001	-	-	-	-	0.00005	-	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.000050	<0.000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silver	mg/L	0.0001	0.0001	0.000001	0.00001	-	-	-	-	0.00005	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1.61	0.61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010
Sodium	mg/L	0.05	0.05	0.0012	-	-	-	-	-	0.05	-	0.30	0.28	0.34	0.30	0.30	0.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28600	0.286	0.851	0.809	0.806	1.23	1.18
Strontium	mg/L	0.001	0.001	0.0001	0.001	-	-	-	-	0.001	-	0.0099	0.0247	0.0281	0.012	0.028	0.030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00960	0.0097	0.0328	0.0335	0.0332	0.0381	0.0385
Thallium	mg/L	0.0002	-	0.0001	0.00001	-	-	-	-	0.00001	-	<0.0002	<0.0002	<0.0002	-	-	-	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	0.001	0.01	0.0001	-	-	-	-	-	0.0001	-	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	0.01	-	-	-	-	-	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00036	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium	mg/L	-	-	0.00001	0.00001	-	-	-	-	0.00001	-	-	-	-	-	-	-	0.000549	0.000409	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000058	0.000061	0.000331	0.000349	0.000369	0.000537	0.000548
Vanadium	mg/L	0.0009	0.001	0.001	-	-	-	-	-	0.0005	-	<0.0009	0.0043	0.0042	<0.001	<0.001	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.001	0.01	0.003	0.001	-	-	-	-	0.001	-	<0.001	0.001	0.002	<0.01	<0.01	<0.01	<0.0010	0.0026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0025	0.0029	0.0028	0.0018	0.0016	0.0011	0.0018

Notes:
Site Performance Objective's (SPOs) are identified in Baffinland's 2AM-MRY-1325 Water Licence
2006 dissolved oxygen values in mg/L; 2015, 2016, 2017, 2018, 2019, and 2020 dissolved oxygen values in % saturation
2018 TDS LOR was 10 in June, 20 in September; 2019 TDS LOR was 20 in June, 10 in August. 2019 Mercury LOR was 0.00001 in June, 0.00005 in August.
* Result qualified by analytical laboratory
SPO and CCME guideline values are pH or Hardness dependent. The lowest to highest applicable guideline value is shown
(1) pH /Temp dependent
(2) pH dependent
(3) Hardness dependent
Analytical values which exceed SPO or calculated CCME guideline value are indicated below:

1	Shaded values exceed CCME guidelines
1	Bold values exceed SPO guidelines

Table 1.5 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-070 (BG-S0)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates																					
		2005	2006	2015	2016	2017	2018	2019	2020		07-Jun-05	06-Aug-05	09-Sep-05	13-Jun-06	02-Aug-06	08-Sep-06	03-Jul-15	03-Jul-15	11-Aug-15	11-Aug-15	30-Jun-16	30-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	03-Jul-18	03-Jul-18	03-Jul-18	02-Sep-18	02-Sep-18	22-Jun-19	22-Jun-19
																	US	DS	US	DS	US	DS	US	US	US	DS	US	US Duplicate	DS	US	DS	US	DS
In Situ Parameters																																
Temperature	ºC	-	-	-	-	-	-	-	-	-	0.26	9.75	6.05	-0.05	13.74	6.53	-	-	11.4	11.3	10.4	7.2	11.5	11.3	5.9	8.5	6.3	6.3	6.5	7.9	7.9	3.1	3.1
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.067	0.139	0.145	0.112	0.137	0.152	0.130	0.084	0.183	0.180	6.109	6.213	0.175	0.175	0.126	0.171	0.104	0.104	0.1041	0.1394	0.1418	0.1177	0.1177
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	5.5-9.5	13.06	10.71	11.89	13.58	10.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	101.5	101.9	98.5	99.4	101.4	100.5	102.4	111.7	96.1	96.1	96.6	100.4	101.2	99.0	99.1
pH	pH units	-	-	-	-	-	-	-	-	6.5 - 9.0	7.58	8.03	7.70	8.02	8.1	8.16	8.20	8.17	8.42	8.42	6.21	7.47	8.22	8.15	7.78	7.76	8.17	8.17	8.06	8.37	8.40	8.16	8.12
Wetted Width	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	10.6	-	-	7.9	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	-	-	0.2	0.2	-	-	-	-	2	0.19	-	-	0.09	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	-	-	-	4.09	-	-	-	-	-	-	-	-	-	3.8	1.06742	-	-	0.244	-	-	-	-
Physical Parameters																																
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	-	-	-	7.7	7.61	7.64	7.98	7.99	8.20	8.17	7.86	7.94	8.32	8.28	7.94	7.92	7.97	7.95	7.99	8.34	8.39	8.09	8.11
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	72	149	143	124	140	171	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	123	123
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	-	0.33	0.25	0.16	0.5	0.3	-	0.29	0.28	0.2	0.2	0.6	0.46	0.28	0.26	0.44	0.72	0.63	0.8	0.6	0.24	0.23	0.23	0.25
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10/20	0.5	0.5	-	32.4	79.5	82.0	61	75	80	63	62	80	81	48	48	85	93	55	55	52	52	53	81	85	74	74.2
TSS	mg/L	-	-	2	2	2	2	2	2	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
TDS	mg/L	30	5	20	20	20	10	20	10	-	54	74	86	81	91	111	70	73	86 *	84 *	60	65	83	84	66	66	68	72	55	90	95	77	80
Dissolved Anions																																
Alkalinity	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	33	74	71	62	74	87	63	63	82	80	47	50	84	89	51	50	43	51	47	83	85	73	74
Br	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	0.9	0.8	0.9	<1	<1	2	1.29	1.30	2.06	2.20	1.26	1.26	1.89	1.88	1.29	1.3	1.12	1.13	1.16	1.55	1.76	1.46	1.45
Fluoride	mg/L	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	0.024	0.025	<0.020	<0.020	<0.020	<0.020	<0.020	0.03	0.029	-	-
SO_4	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	0.7	0.5	0.6	2	<1	3	0.82	1.03	1.55	2.28	0.65	0.62	1.25	1.21	0.64	0.61	0.58	0.58	0.6	0.84	0.91	-	-
Nutrients																																
NH_3+NH_4	mg/L N	0.1	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.2	0.1	<0.10	0.04	0.11	<0.02	<0.15	<0.15	0.28	0.22	<0.15	<0.15	0.2	<0.15	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.06	<0.06	<0.06	<0.005	<0.005	0.013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	0.06	<0.05	<0.05	<0.10	<0.10	<0.10	<0.020	0.035	<0.020	0.052	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
NO_2+NO_3	mg/L N	0.06	0.1	-	-	-	-	0.022	0.022	-	0.06	<0.06	<0.06	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022	<0.022
Ammonia total as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	'Variable'[1]	-	-	-	-	-	-	-	-	-	-	<0.020	0.054	0.061	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	<0.010	<0.010
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.03	0.003	0.003	-	<0.02	<0.02	<0.10	<0.01	<0.01	<0.01	0.0043	0.0058	0.0040	0.0038	0.0044	0.0032	0.0231	0.0088	0.0061	0.0066	0.004	0.0037	0.004	<0.0030	<0.0030	0.0119	0.0033
Dissolved Phosphorus	mg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																
Phenols	mg/L	0.001	0.001	-	-	-	-	-	-	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.1	2.1	2.5	2.6	2.1	1.9	2.1	2.3	2.24	2.14	1.9	2.07	1.87	2.48	2.41	2.68	2.79
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.1	1.9	2.7	2.6	2.3	2.2	2.5	2.2	2.48	2.79	2.16	2.18	2.08	3.19	3.00	3.39	3.27
TKN	mg/L	-	-	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	-	<0.15	<0.15	0.28	0.22	<0.15	<0.15	0.2	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	-	-
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[2]	0.008	<0.004	<0.004	<0.005	<0.005	<0.005	<0.010	<0.010	<0.010	<0.010	0.018	0.014	<0.010	<0.010	0.0282	0.0269	0.0063	0.0067	0.0085	<0.0050	0.0058	0.0183	0.0086
Antimony	mg/L	0.0004	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	0.001	0.004	0.004	0.01	0.01	0.01	0.00347	0.0034	0.00545	0.00569	0.00391	0.00394	0.00328	0.00337	0.00336	0.00532	0.00527	0.00484	0.00471	0.00594	0.0069	0.00469
Beryllium	mg/L	0.005	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0001	0.0001	0.00009	0.00001	0.00001	0.000005	0.00005	0.000005	0.000017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000090	<0.000090	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.05	0.05	0.05	-	8.86	18.3	18.5	14	17	19	14.1	13.9	20.2	19.2	10.5	10.6	19	21.2	12.3	12.5	12.1	12.1	12.2	18.9	20.5	16.3	16.5
Cesium	mg/L	-	-	-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	0.0008	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	0.0003	0.0002	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.3	-	<0.02	<0.02	<0.02	<0.03	<0.03	<0.03	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.027	0.016
Lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.00005	0.00005	0.00005	0.001 - 0.007[3]	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	0.0012	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	0.005	1	0.5	0.05	0.05	0.005	0.005	0.005	-	2.49	8.23	8.71	7.7	7.21	8	8	6.28	6.36	9.52	9.21	5.19	5.14	9.19	9.72	5.89	5.87	5.37	5.39	5.41	8.21	8.16
Manganese	mg/L	0.0007	0.01	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	0.0071	0.0010	0.0009	<0.01	<0.01	<0.01	<0.0010	<0.0010	<0.00050	0.00118	0.00154	0.00144	0.00101	0.00106	0.00222	0.00208	0.00089	0.00084	0.00093	0.00073	0.00078
Mercury	mg/L	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000026	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum	mg/L	0.0003	0.005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	0.000063	0.000054	0.000067	0.000065	0.00054	0.00046	<0.000050	<0.000050	0.000071	0.000066	0.000076	0.000056	0.000064
Nickel	mg/L	0.001	0.005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.025 - 0.150[3]	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.0010	<0.0010	0.00071	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus	mg/L	-	-	-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	0.02	0.01	1	0.05	0.05	0.05	0.05	0.05	-	0.49	0.47	0.50	0.62	0.45	0.51	<1.0	<1.0	0.669	0.665	0.482	0.475	0.639	0.68	0.557	0.563	0.443	0.437	0.445	0.583	0.578	0.581	0.557
Rubidium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	-	-	0.00053	0.00051	0.00075	0.00073	0.00062	0.00058	0.00049	0.00048	0.00045	0.00065	0.00064	0.00065	0.00064
Selenium	mg/L	0.005	0.001	0.0004	0.00005	0.00005	0.00005	0.00005	0.00005	0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.00040	<0.00040	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon	mg/L	-	-	-	0.05	0.05	0.1	0.1	0.10	-	-	-	-	-	-	-	-	-	-	-	0.4	0.393	0.545	0.567	0.48	0.47	0.37	0.36	0.37	0.4	0.4	0.50	0.50
Silver	mg/L	0.0001	0.0001	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium	mg/L	0.05	0.05	0.5	0.5	0.5	0.05	0.05	0.05	-	0.30	0.52	0.54	0.5	0.53	0.94	0.89	0.91	1.57	1.56	0.85	0.84	1.41	1.52	0.96	0.95	0.745	0.738	0.749	1.08	1.1	0.958	0.939
Sulfur	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	0.0073	0.007	0.0128	0.0134	0.0077	0.0083	0.0081	0.0081	0.0083	0.0125	0.013	0.0103	0.0102
Tellurium	mg/L	-	-	-	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	<0.50	<0.50	0.59	0.66	0.53	<0.50	<0.50	<0.50	<0.50	0.57	0.55	<0.50	<0.50
Strontium	mg/L	0.001	0.001	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	0.0057	0.0094	0.0098	0.009	0.01	0.014	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium	mg/L	0.0002	-	0.0003	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	<0.0002	<0.0002	<0.0002	-	-	-	<0.00030	<0.00030	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Thorium	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	0.001	0.01	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	0.00076	0.00049	0.00038	<0.00030	0.00106	<0.0015	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.00081	0.00033
Tungsten	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	-	0.001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.015	-	-	-	-	-	-	<0.0010	<0.0010	0.0010	0.000460	0.000435	0.000216	0.000211	0.000419	0.000445	0.000233	0.000233	0.000223	0.000219	0.00023	0.000415	0.000433	0.000331
Vanadium	mg/L	0.0009	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.0009	<0.0009	<0.0009	<0.001	<0.001	<0.001	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.001	0.01	0.003	0.003	0.003	0.003	0.003	0.003	0.03	0.0010	<0.001	<0.001	<0.01	<0.01	<0.01	<0.0030	<0.0030	<0.0030	0.00380	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium	mg/L	-	-	-	0.0003	0.0003	0.0003	0.0002	0.0002	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00020	<0.00020
Dissolved Metals and Non-Metals																																
Aluminum	mg/L	0.004	0.005	0.005	-	-	-	-	0.005	-	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	0.0056	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	0.0004	-	-	-	-	-	-	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.005	0.001	-	-	-	-	-	0.0001	-	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	0.001	0.01	-	-	-	-	-	0.0001	-	0.001	0.004	0.004	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	0.005	-	0.00001	-	-	-	-	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	0.0003	-	0.05	-	-	-	-	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.05	0.01	-	-	-	-	-	0.01	-	<0.05	0.02	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.0001	0.0001	-	-	-	-	-	0.000005	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000011	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	0.05	1	0.0002	-	-	-	-	0.05	-	9.62	18.3	17.2	13	17	19	14.9	13.9	17.9	18.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.001	0.001	0.01	-	-	-	-	0.0005	-	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	0.0003	0.0002	0.00005	-	-	-	-	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	0.0008	0.001	0.05	-	-	-	-	0.0002	-	<0.0008	<0.0008	<0.0008	<0.001	<0.001	<0.001	0.001	0.00041	0.00072	0.00045	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	0.02	0.03	0.0005	-	-	-	-	0.01	-	<0.02	0.02	<0.02	<0.03	<0.03	<0.03	0.052	<0.010	0.017	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	0.0002	0.001	0.00001	-	-	-	-	0.00005	-	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	0.000085	<0.000050	0.000050	<0.000050	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	0.005	1	0.00005	-	-	-	-	0.005	-	2.67	8.24	7.80	7	8	8	6.24	6.64	8.57	8.60	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	0.0007	0.01	0.0005	-	-	-	-	0.0005	-	0.0068	<0.0007	<0.0007	<0.01	<0.01	<0.01	0.00271	<0.00050	0.00105	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	0.05	-	-	-	-	0.000005	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.0003	0.005	0.00005	-	-	-	-	0.00005	-	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	0.00008	0.000055	0.000067	0.000072	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	0.001	0.005	-	-	-	-	-	0.0005	-	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	0.02	0.01	0.5	-	-	-	-	0.05	-	0.52	0.48	0.49	0.61	0.46	0.49	0.589	0.58	0.672	0.688	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.005	0.001	-	-	-	-	-	0.00005	-	<0.005	<0.005	<0.005	<0.001	<0.001

Table 1.6 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-080 (CV-040)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates																									
		2005	2006	2015	2016	2017	2018	2019	2020		13-Jun-05	06-Aug-05	09-Sep-05	13-Jun-06	13-Jun-06	02-Aug-06	08-Sep-06	03-Jul-15	03-Jul-15	11-Aug-15	11-Aug-15	29-Jun-16	29-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	04-Jul-18	04-Jul-18	03-Sep-18	03-Sep-18	03-Sep-18	22-Jun-19	22-Jun-19	09-Aug-19	09-Aug-19	22-Jun-20	22-Jun-20	22-Jun-20	21-Jul-20	21-Jul-20	14-Aug-20	14-Aug-20
In Situ Parameters																		US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	DS Field Blank	US	DS	DS Travel Blank	US	DS	US	DS
Temperature	ºC	-	-	-	-	-	-	-	-	-	0.07	10.80	4.78	-0.1	-0.1	14.96	4.91	-	-	12.8	12.7	15.7	16	-	11.1	3.8	2.4	8.1	8.5	3.4	3.3	3.3	2.70	2.50	17	16.2	1.3	1.4	-	14.1	13.80	8.2	7.90
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.047	0.243	0.318	0.084	0.084	0.264	0.306	0.130	0.125	0.387	0.390	0.151	0.151	-	0.391	0.177	0.101	0.2026	0.1968	0.3137	0.3133	0.31	0.1952	0.19	0.3854	0.3800	0.0786	0.0764	-	0.3699	0.36	0.4612	0.4573
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	5.5-9.5		13.48	10.39	12.74	13.65	13.65	10.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.72	13.58	-	10.31	10.08	11.82	11.72
Dissolved Oxygen	%	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	101.7	102.3	99.8	103.6	-	99.8	109.2	100.8	94.1	94.4	96.3	95.3	95.3	97.40	97.10	101.8	100	97.2	96.4	-	100.2	97.40	100.2	98.90
pH	pH units	-	-	-	-	-	-	-	6.5 - 9.0		6.99	8.39	8.05	7.97	7.97	8.37	8.50	8.32	8.16	8.61	8.65	8.19	8.23	-	8.36	7.64	7.84	8.24	8.24	8.27	8.24	8.24	8.26	8.23	8.48	8.37	7.86	7.89	-	8.42	8.37	8.46	8.44
Wetted Width	m	-	-	-	-	-	-	-	-	-	-	-	-	ice	-	3	4	-	-	7	7	-	-	-	-	12.1	30.8	9.2	7.7	9.2	7.3	7.3	-	-	-	-	-	-	-	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.25	0.2	-	-	0.2	0.2	-	-	-	-	0.14	0.12	0.06	0.08	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28	-	-	-	0	0	-	-	-	-	1.13	1.55	0.07	0.133	.052	.144	.144	-	-	-	-	-	-	-	-	-	-	-
Physical Parameters																																										
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	-	-	-	7.40	7.47	8.22	8.18	8.18	8.19	8.53	8.50	8.1	8.19	8.47	8.51	7.73	7.75	8.24	8.24	8.43	8.37	5.77	8.26	8.26	8.21	8.41	7.62	7.65	5.72	8.43	8.38	8.53	8.5
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	54	257	303	92	93	273	321	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81.4	79.7	<3.0	390	378	473	468
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	-	0.37	0.13	<0.10	0.6	0.5	0.2	-	0.44	0.54	0.19	0.15	1.48	1.05	0.28	0.33	0.77	0.71	0.62	0.64	0.5	0.27	<0.10	0.17	0.22	0.33	0.44	0.5	0.64	0.1	0.12	0.26	0.55	0.31
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10	20/20	0.5	0.5	-	25.1	138	178	48	48	153	159	95	94	168	169	68	69	193	202	35	37	106	102	176	182	<10	121	121	180	187	43.5	41.6	<0.50	181	177	234	234
TSS	mg/L	-	-	2	2	2	2	2	2	2	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	5.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
TDS	mg/L	30	5	20	20	20	10	20	10	-	46	126	200	60	61	177	209	77	90	178 *	170 *	65	65	208	201	44	46	112	118	195	205	<20	133	127	208	204	49	49	<13	207	200	257	258
Dissolved Anions																																										
Alkalinity	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	24	130	167	45	45	147	167	112	99	175	177	68	75	187	191	32	27	103	100	171	168	<10	120	118	182	188	40	39	<10	170	166	202	204
Br	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	0.9	0.7	2.4	<1	<1	1	5	2.48	2.28	8.34	8.66	1.81	1.84	13.5	13.8	0.57	0.57	3.16	2.91	13.5	13.8	<0.50	4.08	4.52	16.8	14.4	1.02	0.94	<0.50	17	15.2	31.3	29.6
Fluoride	mg/L	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	0.026	0.027	<0.020	<0.020	0.031	0.024	0.042	0.041	<0.020	-	-	-	-	-	-	-	-	-	-	-
SO_4	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	0.6	0.8	2.1	2	2	<1	4.00	1.58	1.47	4.81	5.36	0.76	0.84	6.03	6.52	0.3	<0.30	1.3	0.89	3.62	3.52	<0.30	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																										
NH_3+NH_4	mg/L N	0.1	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.2	0.5	0.6	0.05	0.09	0.04	<0.02	0.17	<0.15	0.37	0.28	<0.15	<0.15	0.24	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.06	<0.06	<0.06	<0.005	<0.005	<0.005	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.001	<0.0010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	2.2	<0.020	<0.020	<0.020	<0.020	<0.020	0.0165	0.0172
NO_2+NO_3	mg/L N	0.06	0.1	-	-	-	-	0.022	0.022	-	<0.06	<0.06	<0.06	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	-	<0.020	0.085	-	-	-	-	-	-	-	<0.022	<0.022	2.2	0.022	-	-	-	-	-	-	-
Ammonia total as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	Variable[1]	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.020	<0.020	-	-	<0.020	<0.020	<0.020	<0.020	-	-	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0050	<0.0050
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	-	0.030	<0.02	<0.10	<0.01	<0.01	<0.01	<0.01	0.0040	0.0032	<0.0030	<0.0030	0.0067	0.0038	0.0048	0.0034	0.0158	0.0159	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0113	0.0133	<0.0030	<0.0030	0.0039	0.0039	0.0023
Dissolved Phosphorus	mg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																										
Phenols	mg/L	0.001	0.001	-	-	-	-	-	-	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	-	2.2	2.2	3.4	3.5	1.6	1.4	3.2	3	3.93	3.56	3.2	3.05	3.27	3.16	0.51	3.00	3	3.34	3.1	4.71	4.61	1.19	4.41	4.67	3.8	3.98
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	-	2.4	2.5	3.6	3.5	1.9	2.1	3.6	3.3	4.45	4.17	3.4	3.28	4.01	3.61	0.62	4.10	3.85	3.83	3.73	5.15	5.21	1.53	4.9	4.92	3.45	3.7
TKN	mg/L	-	-	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	-	-	0.17	<0.15	0.37	0.28	<0.15	<0.15	0.24	0.17	0.29	0.26	<0.15	<0.15	0.18	0.27	<0.15	-	-	-	-	-	-	-	-	-	-	-
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																										
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[2]	0.005	<0.004	<0.004	0.006	0.005	<0.005	<0.005	0.019	0.025	0.011	<0.010	0.096	0.042	0.024	0.02	0.0527	0.065	0.0092	0.0121	0.0239	0.011	<0.0050	0.0067	0.0113	0.0224	0.0225	0.0351	0.0558	<0.0050	0.0075	0.0154	0.0033	0.0155
Antimony	mg/L	0.0004	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00010	<0.00010	<0.00010	0.00014	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00012	0.00014	0.00015
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	0.001	0.006	0.007	<0.01	<0.01	<0.01	<0.01	-	-	-	-	0.0055	0.0052	0.0119	0.0118	0.00266	0.00274	0.00574	0.00561	0.0101	0.0104	<0.00010	0.00634	0.00648	0.0123	0.0125	0.00296	0.00282	<0.00010	0.0114	0.0114	0.0126	0.0123
Beryllium	mg/L	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.00009	0.00001	0.00001	0.00001	0.000005	0.000005	0.000005	0.000005	0.000017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0010	<0.0010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000055	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.05	0.05	0.05	-	6.07	33.9	42.9	11	11	38	40	-	-	42.3	40.5	16.9	16.8	44.7	46.1	8.08	8.64	25.1	24.6	41.2	43.6	<0.050	27.9	28.5	42.4	46.1	10.3	10.2	<0.050	43.7	45	52.1	53.9
Cesium	mg/L	-	-	-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-	-	-	-	-	-	-	-	-	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cobalt	mg/L	0.0003	0.0002	0.00005	-	-	-	-	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	<0.0008	<0.0008	0.0008	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	0.0025	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00053	<0.00050	<0.00050	0.00089	0.00098	0.00080	0.0008
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.01	0.3	<0.05	<0.02	<0.02	<0.03	<0.03	<0.03	<0.03	<0.050	<0.050	<0.050	<0.050	0.11	<0.050	<0.050	<0.050	0.056	0.068	0.01	0.014	0.031	0.023	<0.010	<0.010	0.013	0.033	0.027	0.040	0.065	<0.010	<0.010	0.042	<0.010	0.028
lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.0001	0.00005	0.00005	0.001 - 0.007[3]	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000081	0.00009	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000066	0.000081	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	0.0022	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0011	<0.0010	0.0012	0.0012	0.0018	0.0015	<0.0010	<0.0010	<0.0010	0.0019	0.0019	0.0025	0.0026
Magnesium	mg/L	0.005	1	0.5	0.5	0.5	0.05	0.05	0.05	-	2.41	12.9	17.2	5	5	14	15	9.67	9.14	19.6	19.6	6.2	6.64	19.8	21.1	3.65	3.65	10.6	9.91	17.8	17.8	<0.050	12.0	11.7	18.1	15.7	4.29	4.11	<0.050	20	18.9	24.8	24.3
Manganese	mg/L	0.0007	0.01	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	0.0029	<0.0007	<0.0007	<0.01	<0.01	<0.01	<0.01	<0.0010	<0.0010	<0.00050	0.00187	0.00217	0.00082	0.00172	0.00115	0.00244	0.00296	0.0005	0.00086	0.00112	0.00162	<0.00050	<0.00050	0.00156	0.00139	0.00279	0.00332	0.00428	<0.00050	0.00087	0.00568	0.00144	0.00591
Mercury	mg/L	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000005	0.000026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Molybdenum	mg/L	0.0003	0.005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	<0.005	<0.00050	<0.00050	<0.00050	<0.00050	0.00007	0.000073	0.000203	0.000224	<0.00050	<0.00050	0.00068	0.000089	0.000208	0.000219	<0.00050	0.000092	0.000131	0.000259	0.000272	<0.000050	0.000056	<0.000050	0.000159	0.000183	0.00022	0.000229
Nickel	mg/L	0.001	0.005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.025 - 0.150[3]	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	0.00342	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus	mg/L	-	-	-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	0.02	0.01	0.5	-	-	-	-	-	-	0.39	0.72	0.76	0.61	0.60	0.73	0.80	0.644	0.607	1.24	1.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.449	0.425	<0.050	1.13	1.15	1.39	1.36
Selenium	mg/L	0.005	0.001	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silver	mg/L	0.0001	0.0001	0.00001	-	-	-	-	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010
Sodium	mg/L	0.05	0.05	-	-	-	-	-	0.05	-	0.29	1.25	1.96	0.42	0.46	1.38	3.12	2.54	2.41	7.10	6.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.532	0.457	<0.050	7.44	6.55	12.1	10.9
Strontium	mg/L	0.001	0.001	0.00001	-	-	-	-	0.001	-	0.0027	0.0192	0.0224	0.005	0.005	0.023	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0053	0.0051	<0.0010	0.0284	0.0317	0.0346	0.0360
Thallium	mg/L	0.0002	-	-	-	-	-	-	0.00001	-	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	0.001	0.01	0.001	-	-	-	-	0.0001	-	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	-	-	-	-	-	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium	mg/L	-	-	0.00001	-	-	-	-	0.00001	-	-	-	-	-	-	-	-	0.00101	0.00096	0.00300	0.00288	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000168	0.000167	<0.000010	0.00272	0.00258	0.00384	0.00363
Vanadium	mg/L	0.0009	0.001	-	-	-	-	-	0.0005	-	<0.0009	0.0047	0.0045	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.001	0.01	0.001	-	-	-	-	0.001	-	0.001	0.002	0.002	<0.01	<0.01	<0.01	<0.01	0.0025	0.0037	<0.0010	0.0029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0029	0.0028	<0.0010	<0.0010	0.0041	<0.0010	0.0024

Notes:
Site Performance Objective's (SPOs) are identified in Baffinland's 2AM-MRY-1325 Water Licence
2006 dissolved oxygen values in mg/L; 2015, 2016, 2017, 2018, and 2019 dissolved oxygen values in % saturation
2018 TDS LOR was 10 in June, 20 in September; 2019 TDS LOR was 20 in June, 10 in August. 2019 Mercury LOR was 0.00001 in June, 0.00005 in August.
* Result qualified by analytical laboratory
SPO and CCME guideline values are pH or Hardness dependent. The lowest to highest applicable guideline value is shown
(1) pH /Temp dependent
(2) pH dependent
(3) Hardness dependent
Analytical values which exceed SPO or calculated CCME guideline value are indicated below:

1	Shaded values exceed CCME guidelines
1	Bold values exceed SPO guidelines

Table 1.7 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-100 (CV-217)

Parameters	Units	Method Detection Limit		LOR						CCME Guideline	Dates																							
		2005	2006	2015	2016	2017	2018	2019	2020		07-Jun-05	06-Aug-05	09-Sep-05	13-Jun-06	29-Jul-06	10-Sep-06	12-Aug-15	12-Aug-15	29-Jun-16	29-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	04-Jul-18	04-Jul-18	04-Jul-18	02-Sep-18	02-Sep-18	22-Jun-19	22-Jun-19	09-Aug-19	09-Aug-19	22-Jun-20	22-Jun-20	21-Jul-20	21-Jul-20	13-Sep-20	13-Sep-20	13-Sep-20
																	US	DS	US	DS	US	DS	US	DS	US	US Travel Blank	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	DS Field Duplicate
In Situ Parameters																																							
Temperature	ºC		-	-	-	-	-	-	-	-	0.74	9.35	6.59	1.56	7.36	3.02	9.6	9.4	5.6	6.4	8.7	10.7	4.4	3.2	2.7	2.7	2.6	8.0	8.7	2.7	2.6	15.8	15.2	2.6	2.0	13.0	12.1	4.17	4.00	4.00
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.019	0.081	0.088	0.031	0.083	0.091	0.100	0.101	0.640	0.800	0.102	0.095	0.166	0.125	0.0826	0.0826	0.0824	0.0723	0.0904	0.0691	0.0695	0.0894	0.0852	0.0578	0.0593	0.0944	0.0921	126.4	152.1	152.1
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	5.5-9.5	12.14	11.62	12.82	12.71	13.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.38	13.76	11.54	11.45	12.16	12.40	12.40
Dissolved Oxygen	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102.30	102.8	107.4	109.5	94.1	100.0	107.1	101.9	93.5	93.5	93.5	102.8	103.3	97.6	97.3	105.2	105	98.7	99.3	108.4	104.9	94.5	94.8	94.8
pH	pH units	-	-	-	-	-	-	-	-	6.5 - 9.0	7.20	7.60	7.02	7.38	7.59	7.92	8.08	8.07	7.74	8.36	8.19	8.11	7.45	7.71	7.76	7.76	7.92	8.23	8.30	7.97	8.08	8.45	8.17	7.74	7.64	7.95	7.91	7.92	7.97	7.97
Wetted Width	m	-	-	-	-	-	-	-	-	-	-	-	-	-	54	59	-	-	-	-	-	-	-	15.4	50	50	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2.5	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5276	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Parameters																																							
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	-	-	-	-	-	6.97	7.03	6.97	7.80	7.81	7.42	7.41	8.08	7.96	7.65	7.72	7.65	6.29	7.67	7.97	7.95	7.64	7.68	7.63	7.75	7.52	7.49	7.75	7.81	7.83	7.81	7.82
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	27	90	93	38	86	97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60	62	98	98	133	165	162
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	-	0.50	0.99	0.55	0.7	1.1	1.4	1.0	1.1	1.1	1.1	2.0	1.0	1.06	1.01	0.72	0.19	1.88	0.75	0.69	0.57	0.66	0.61	0.68	1.33	0.86	1.19	1.13	0.24	2.14	4.24
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10/20	0.5	0.5	-	8.57	42.0	46.3	16	41	43	37	38	27	29	42	38	28	33	34	34	<10	34	34	37.0	36.9	37.5	36.6	37.9	26.2	27.1	39.6	39.0	46	52	52
TSS	mg/L	-	-	2	2	2	2	2	2	-	-	-	-	-	-	-	2	2	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5	5
TDS	mg/L	30	5	20	20	20	20	10	20	10	-	31	<30	<30	25	56	63	50 *	46 *	40	25	52	38	34	41	48	<10	53	65	67	47	53	41	43	54	55	64	58	70	78	89
Dissolved Anions																																							
Alkalinity	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	8	43	45	16	44	47	38	35	30	31	41	35	17	27	33	<10	32	35	34	37	37	38	38	24	25	36	36	41	41	46
Br	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	0.8	1.0	1.2	<1	1	2	4.96	5.29	2.44	2.49	3.87	3.79	2.50	3.74	5.66	<0.50	5.68	5.39	10.90	4.42	4.51	4.05	4.66	3.43	3.62	6.50	6.50	13.0	20.8	19.8
Fluoride	mg/L	-	-	0.02	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-	-	-	-	-	-	-	-	-
SO_4	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	0.7	0.6	0.7	2	2	3	1.30	1.35	0.70	0.72	1.15	0.97	0.71	1.06	1.06	<0.30	1.11	0.86	1.28	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																							
NH_4+NH_3	mg/L N	0.1	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.5	<0.10	0.4	0.04	0.05	0.04	0.27	0.28	<0.15	<0.15	<0.15	<0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.06	<0.06	<0.06	<0.005	0.018	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.020	<0.020	<0.020	<0.020	0.03	<0.020	<0.020	<0.020	0.027	<0.020	0.027	<0.020	<0.020	0.027	0.025	0.025	0.027	<0.020	0.023	0.233	<0.020	<0.020	0.032	0.040
NO_2+NO_3	mg/L N	0.06	0.1	-	-	-	-	0.022	0.022	-	<0.06	<0.06	<0.06	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	0.027	0.025	0.025	0.027	-	-	-	-	-	-	-
Ammonia total as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	[Variable][2]	-	-	-	-	-	-	<0.050	<0.050	<0.020	0.05	<0.020	<0.020	0.029	<0.020	<0.020	<0.020	<0.020	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	-	<0.02	<0.02	<0.10	<0.01	<0.01	0.02	0.0080	0.0058	0.0068	<0.0030	0.0071	0.0095	0.0084	0.0087	0.0041	<0.0030	0.0032	0.006	0.050	0.0043	0.0037	<0.0030	<0.0030	0.0129	0.0084	<0.0030	0.0038	0.0033	<0.0030	0.0045
Dissolved Phosphorus	mg/L	0.02	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																							
Phenols	mg/L	0.001	0.001	-	-	-	-	-	-	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.2	2.2	1.8	1.9	2.3	1.9	2.01	1.88	1.92	<0.50	1.97	2.17	2.22	2.45	2.43	2.15	2.07	3.46	3.21	2.64	2.96	2.92	3.82	2.66
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.3	2.3	1.9	1.8	2.3	2.0	2.24	2.17	2.18	0.65	2.25	2.51	2.84	2.81	2.92	2.33	2.83	3.77	3.87	3.02	3.15	4.16	3.76	4.72
TKN	mg/L	-	-	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	-	0.27	0.28	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	-	-	-	-	-	-	-	-	<0.15	<0.15	<0.15
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																							
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[7]	0.025	0.039	0.020	0.023	0.043	0.066	0.091	<0.010	0.042	0.150	0.052	0.037	0.033	0.071	0.0189	<0.0050	0.018	0.0249	0.0204	0.0202	0.0391	0.0378	0.0367	0.0375	0.0436	0.0423	0.0452	0.0156	0.094	0.165
Antimony	mg/L	0.00004	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	0.002	0.004	0.005	<0.01	<0.01	<0.01	-	-	0.00368	0.00433	0.00576	0.00502	0.00389	0.00457	0.00410	<0.00010	0.00413	0.00438	0.00455	0.00446	0.00475	0.00526	0.00571	0.00352	0.00376	0.00540	0.00502	0.00531	0.00656	0.00757
Beryllium	mg/L	0.005	-	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0001	0.0001	-	0.00001	0.00001	0.00001	0.00001	0.00001	0.000017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.5	0.05	0.05	-	1.51	8.62	9.34	3.0	8.0	9.0	7.76	7.77	5.19	5.58	8.32	7.66	5.61	6.66	6.90	<0.050	6.88	6.82	7.40	7.19	7.19	7.34	8.00	5.26	5.17	7.98	8.00	8.77	10.2	9.92
Cesium	mg/L	-	-	-	0.00001	0.00001	0.00001	0.00001	0.00001	-	-	-	-	-	-	-	-	-	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	0.000027
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cobalt	mg/L	0.0003	0.0002	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[3]	0.0009	0.0010	0.0008	<0.001	<0.001	0.001	<0.0010	<0.0010	<0.0010	0.0011	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00054	0.00062	0.00102	0.00084	0.00084	0.00115	0.00123
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.01	0.3	0.05	0.03	0.02	0.07	0.04	0.04	0.121	<0.050	0.052	0.186	0.058	<0.050	0.058	0.10	0.032	<0.010	0.033	0.031	0.025	0.035	0.061	0.045	0.041	0.057	0.058	0.056	0.049	0.025	0.113	0.175
Lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.00005	0.00005	0.00005	0.001 - 0.007[3]	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	0.000	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000055	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000117	0.000193
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
Magnesium	mg/L	0.005	1	0.5	0.5	0.5	0.5	0.005	0.005	-	1.16	4.97	5.59	2.0	5.0	5.0	5.07	4.94	3.30	3.59	5.04	4.71	3.48	4.08	4.19	<0.050	4.13	4.13	4.56	4.40	4.37	4.09	4.46	3.20	3.33	4.73	4.69	5.88	6.74	6.79
Manganese	mg/L	0.0007	0.001	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	0.0183	0.0012	0.0009	<0.01	<0.01	<0.01	0.00319	0.00084	0.00201	0.00408	0.00217	0.00159	0.00400	0.00380	0.00263	<0.00050	0.00267	0.00115	0.00151	0.00383	0.00461	0.00179	0.00383	0.00505	0.00556	0.00284	0.00272	0.00157	0.00581	0.00838
Mercury	mg/L	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000005	0.000026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Molybdenum	mg/L	0.0003	0.005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	0.001	0.001	0.000065	0.000069	0.000099	0.000075	0.000063	0.000078	0.000089	<0.000050	0.000080	0.000077	0.000086	0.000085	0.000073	0.000106	0.000115	0.000058	0.000071	0.000094	0.000102	0.000094	0.000134	0.000136
Nickel	mg/L	0.001	0.005	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	0.02	0.01	1	0.05	0.05	0.05	0.05	0.05	-	0.81	0.58	0.60	0.49	0.58	0.57	0.631	0.627	0.516	0.580	0.717	0.645	0.613	0.688	0.594	<0.050	0.598	0.581	0.639	0.628	0.628	0.585	0.624	0.601	0.609	0.682	0.666	0.751	0.900	0.969
Rubidium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	0.000073	0.00109	0.00138	0.00110	0.00082	0.00101	0.00095	<0.00020	0.00098	0.00093	0.00097	0.00090	0.00102	0.00102	0.00131	0.00081	0.00084	0.00114	0.00110	0.00111	0.00150	0.00182
Selenium	mg/L	0.005	0.001	0.0004	0.00005	0.00005	0.00005	0.00005	0.00005	0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon	mg/L	-	-	-	0.05	0.05	0.1	0.1	0.10	-	-	-	-	-	-	-	-	-	0.390	0.603	0.636	0.525	0.470	0.520	0.470	<0.10	0.480	0.380	0.380	0.440	0.500	0.48	0.5	0.450	0.430	0.620	0.610	0.52	0.70	0.83
Silver	mg/L	0.0001	0.0001	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium	mg/L	0.05	0.05	0.5	0.5	0.5	0.5	0.05	0.05	-	0.34	0.68	0.70	0.31	0.72	0.93	2.81	2.91	1.40	1.49	2.25	2.39	1.55	2.09	2.70	<0.050	2.85	2.60	5.10	2.34	2.21	1.95	1.99	1.54	1.74	3.36	3.37	6.65	9.95	9.42
Strontium	mg/L	0.001	0.001	-	0.001	0.001	0.001	0.001	0.001	-	0.0012	0.0049	0.0054	0.002	0.006	0.007	-	-	0.0046	0.0048	0.0079	0.0074	0.0049	0.0060	0.0081	<0.0010	0.0081	0.0079	0.0122	0.0072	0.0072	0.0079	0.0086	0.0048	0.0051	0.0090	0.0087	0.0133	0.0188	0.0181
Sulfur	mg/L	-	-	0.5	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	<0.50	<0.50	<0.50	0.53	0.51	<0.50	0.52	<0.50	0.51	0.53	0.64	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	0.56	0.71	1.11	1.13
Tellurium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium	mg/L	0.0002	-	0.0003	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	<0.0002	<0.0002	<0.0002	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	<0.000010	0.00012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	0.001	0.01	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	<0.0020 *	0.00821	0.00203	0.00165	<0.0015	0.00388	0.00051	<0.00030	0.00055	0.0008	0.00064	0.00086	0.00217	0.00184	0.00149	0.0012	0.00166	0.00199	0.00169	<0.00060	0.00478	0.00833
Tungsten	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	0.0001	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.015	-	-	-	-	-	-	0.000319	0.000324	0.000210	0.000238	0.000368	0.000319	0.000193	0.000261	0.000263	<0.000010	0.000250	0.000279	0.000310	0.000262	0.000250	0.000333	0.000347	0.000235	0.000279	0.000460	0.000424	0.000537	0.000684	0.000754
Vanadium	mg/L	0.0009	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.0009	<0.0009	<0.0009	<0.001	<0.001	<0.001	-	-	<0.00050	<0.00050

Table 1.8 Water Quality Monitoring Of Baseline Fisheries Culverts Surface Water Quality Summary For Sample Site N1-110 (BG-24)

Parameter	Units	Method Detection Limit		LOR						CCME Guideline	Dates																					
		2005	2006	2015	2016	2017	2018	2019	2020		07-Jun-05	06-Aug-05	09-Sep-05	13-Jun-06	29-Jul-06	10-Sep-06	12-Aug-15	12-Aug-15	29-Jun-16	29-Jun-16	25-Aug-16	25-Aug-16	29-Jun-17	29-Jun-17	04-Jul-18	04-Jul-18	31-Aug-18	31-Aug-18	22-Jun-19	22-Jun-19	09-Aug-19	09-Aug-19	22-Jun-20	22-Jun-20	21-Jul-20	21-Jul-20	14-Aug-20	14-Aug-20	14-Aug-20
In Situ Parameters																																						DS Field Blank
Temperature	ºC	-	-	-	-	-	-	-	-	-	3.76	9.54	7.0	1.99	7.11	4.35	6.8	6.9	5.1	5.0	4.5	5.1	1.8	3.5	2.4	2.5	3.6	3.9	1.9	2.0	6.8	7.2	0.9	1.0	8.9	10.2	3.1	3.4	3.4	3.4
Specific Conductance	mS/cm	-	-	-	-	-	-	-	-	-	0.019	0.079	0.082	0.075	0.076	0.095	0.05	0.05	0.112	0.114	0.371	0.367	0.116	0.105	0.132	0.134	0.2278	0.2352	0.1486	0.1513	0.4873	0.4753	0.093	0.0863	0.3193	0.3294	0.399	0.665	0.665
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	5.5-9.5	10.4	10.91	11.71	12.8	13.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.1	13.97	11.73	11.3	13.36	13.08	13.08	13.08
Dissolved Oxygen	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.30	103.00	104.9	105.8	99.3	103.2	101.8	103.6	96.8	96.3	101.5	98.3	98.5	97.6	101.9	100.3	98.7	98.1	100.6	91.2	99.5	98.1	98.1
pH	pH units	-	-	-	-	-	-	-	-	6.5 - 9.0	8.07	7.58	7.02	7.55	7.51	7.88	8.58	8.51	7.75	7.84	7.91	7.97	7.41	7.68	8.02	7.83	8.33	7.29	8.11	7.94	8.31	8.18	7.75	7.74	8.34	8.33	8.24	8.04	8.04
Wetted Width	m	-	-	-	-	-	-	-	-	-	-	-	-	6	17	5	1.5	1.5	4.8	4.8	-	-	5.9	4.4	1.4	2.7	1.45	1.6	-	-	-	-	-	-	-	-	-	-	-
Average Depth	m	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.9	0.3	0.25	0.25	0.2	0.2	-	-	0.17	0.45	0.22	0.1	0.04	0.1	-	-	-	-	-	-	-	-	-	-	-
Flow Rate	m^3/s	-	-	-	-	-	-	-	-	-	-	-	-	1.1	3.64	0.39	-	-	-	-	-	-	0.71213	0.5148	0.111	0.097	0.012	0.021	-	-	-	-	-	-	-	-	-	-	-
Physical Parameters																																						
pH	pH units	-	-	0.01	0.1	0.1	0.1	0.1	0.1	6.5 - 9.0	-	-	-	7.40	6.95	6.95	8.34	8.29	7.84	7.91	8.15	8.30	7.90	7.91	7.97	8.03	8.45	8.37	8.13	8.15	8.25	8.29	7.62	7.74	8.31	8.26	8.3	8.26	6.47
Conductivity	µS/cm	1	5	-	-	-	-	-	-	-	26	88	82	84	78	119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86.5	91	322	347	694	674	<2.0
Turbidity	NTU	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	-	0.42	3.64	1.93	0.5	2.3	4.9	0.16	0.27	0.41	0.39	0.34	0.22	0.49	0.42	0.73	0.84	0.20	0.43	0.40	0.60	0.25	0.58	0.43	0.50	0.23	0.50	0.1	2.79	<0.10
Hardness	mg/L as $CaCO_3$	0.5	1	10	10	10	10/20	0.5	0.5	-	7.14	43.6	43.4	47	41	52	133	136	52	52	168	169	43	43	68	69	130	139	91.2	92.3	193	185	39.5	42.0	132	134	227	233	<0.50
TSS	mg/L	-	2	2	2	2	2	2	2	-	-	-	-	-	-	-	<2	<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
TDS	mg/L	30	5	20	20	20	10	20	10	-	<30	51	<30	55	51	77	146 *	139 *	45	45	183	183	42	40	75	65	130	155	102	106	269	267	66	64	175	186	378	392	10
Dissolved Anions																																							
Alkalinity	mg/L as $CaCO_3$	2	5	10	10	10	10	10	10	-	5	43	41	41	40	53	135	141	51	53	152	149	41	42	49	65	126	131	90	91	148	151	37	40	111	116	158	163	<1.0
Br	mg/L	0.3	0.05	-	-	-	-	-	-	-	<0.3	<0.3	<0.3	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cl	mg/L	0.2	1	0.5	0.5	0.5	0.5	0.5	0.5	-	1.3	0.6	0.7	1	<1	4	5.18	5.26	0.8	0.8	16.5	18.0	1.04	1.07	1.26	1.39	6.98	7.41	2.35	2.51	50.1	45.7	13.8	3.12	25.8	26.5	97.9	90.5	<0.50
Fluoride	mg/L	-	-	-	0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.1	0.1	0.022	0.021	0.037	0.037	0.069	0.064	-	-	-	-	-	-	-	-	-	-	-
SO_4	mg/L	0.5	1	0.3	0.3	0.3	0.3	-	-	-	-	-	-	2	2	4	5.54	5.38	0.8	0.6	12.2	13.7	0.46	0.58	0.91	0.91	7.38	6.48	-	-	-	-	-	-	-	-	-	-	-
Nutrients																																							
NH_3+NH_4	mg/L N	0.1	0.02	0.15	0.15	0.15	-	-	-	0.021 - 231[1]	0.7	0.4	0.6	<0.02	<0.02	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NO_2 (Nitrite)	mg/L N	0.06	0.005	-	-	-	-	0.01	0.01	0.06	<0.06	<0.06	<0.06	<0.005	0.017	0.009	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.0050	<0.0050	<0.0010
NO_3 (Nitrate)	mg/L N	0.05	0.1	0.02	0.02	0.02	0.02	0.02	0.02	2.9	0.12	<0.05	<0.05	<0.10	<0.10	<0.10	0.03	0.03	<0.020	<0.020	0.07	0.08	<0.020	<0.020	0.02	<0.020	<0.020	<0.020	0.025	0.026	0.047	0.038	1.55	0.372	0.054	0.041	0.369	0.321	<0.0050
NO_2+NO_3	mg/L N	0.06	0.1	-	-	-	-	0.022	0.022	-	0.12	<0.06	<0.06	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	0.025	0.026	0.047	0.038	-	-	-	-	-	-	-
Ammonia, total as N	mg/L	-	-	0.05	0.02	0.02	0.02	0.01	0.01	'Variable'[2]	-	-	-	-	-	-	<0.050	<0.050	0.07	0.07	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.0050	<0.0050	<0.0050
Total Phosphorus	mg/L	0.02	0.01	0.003	0.003	0.003	0.003	0.003	0.003	-	-	0.02	<0.02	<0.10	<0.01	0.01	<0.0030	<0.0030	<0.0030	0.01	0.00	0.00	0.0086	0.0082	0.0060	0.0046	<0.0030	<0.0030	0.0064	0.0031	<0.0030	<0.0030	0.0095	0.0070	<0.0030	0.0033	0.0022	0.0041	<0.0020
Dissolved Phosphorus	mg/L	0.02	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic Compounds																																							
Phenols	mg/L	0.001	0.001	-	-	-	-	-	-	0.004	0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.3	2.3	<1.0	<1.0	2.0	2.0	1.46	1.57	1.98	1.90	2.29	2.35	2.18	2.25	2.09	2.07	3.14	3.00	3.11	3.01	2.37	3.02	<0.50
TOC	mg/L	-	-	1	1	0.5	0.5	0.50	0.50	-	-	-	-	-	-	-	2.3	2.4	<1.0	<1.0	2.2	2.1	1.64	1.76	2.38	2.27	2.70	4.32	3.34	2.99	2.5	2.47	3.60	3.78	3.29	3.49	2.26	2.87	0.56
TKN	mg/L	-	-	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	-	0.24	0.29	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.15	<0.15	-	-	-	-	-	-	-	-	-	-	-
Chlorophyll-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheophytin-a	mg/m3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals and Non-Metals																																							
Aluminum	mg/L	0.004	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005 - 0.100[3]	0.017	0.075	0.073	0.010	0.072	0.153	<0.010	0.018	0.022	0.015	0.011	<0.010	0.0214	0.0225	0.0219	0.0195	0.006	0.0137	0.0248	0.0271	0.01	0.0244	0.0337	0.0382	0.0096	0.0247	0.0039	0.0819	<0.0030
Antimony	mg/L	0.0004	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0004	<0.0004	<0.0004	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	0.005	0.001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	0.0001	0.0001	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00013	<0.00010	<0.00010	<0.00010	0.0001	0.00012	0.00012	<0.00010
Barium	mg/L	0.001	0.01	-	0.0002	0.0002	0.0001	0.0001	0.0001	-	<0.001	0.004	0.004	0.004	<0.01	<0.01	<0.01	<0.01	0.00197	0.00176	0.00778	0.00702	0.00228	0.00236	0.00485	0.00602	0.00327	0.00353	0.00972	0.0101	0.00194	0.00193	0.00611	0.00687	0.0137	0.0141	<0.00010
Beryllium	mg/L	0.005	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.005	<0.005	<0.005	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	0.0003	-	-	0.00005	0.00005	0.00005	0.00005	0.00005	-	<0.0003	<0.0003	<0.0003	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	0.05	0.01	-	0.01	0.01	0.01	0.01	0.01	-	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.013	<0.010	<0.010	0.018	0.017	0.043	0.037	<0.010
Cadmium	mg/L	0.0001	0.0001	0.00009	0.00001	0.00001	0.000005	0.000005	0.000005	0.000017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	0.05	1	0.5	0.5	0.5	0.05	0.05	0.05	-	1.43	9.01	8.72	8	8	12	29.9	32.2	10.9	10.8	35.3	35.8	8.82	8.83	14.7	14.8	28.4	30.1	19.0	19.1	40.8	41.3	8.56	8.99	27.3	28.2	45.9	45.6	<0.050
Cesium	mg/L	-	-	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	-	-	-	-	-	-	-	-	-	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010
Chromium	mg/L	0.001	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.00248	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	0.0003	0.0002	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.0003	<0.0003	<0.0003	<0.0002	<0.0002	<0.0002	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	0.0008	0.001	0.05	0.001	0.001	0.001	0.001	0.001	0.002 - 0.004[4]	<0.0008	0.0009	<0.0008	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.00059	<0.00050	0.00088	0.00083	0.00097	0.00099	<0.00050
Iron	mg/L	0.02	0.03	0.05	0.05	0.05	0.01	0.01	0.3	-	<0.02	0.05	0.06	0.03	0.05	0.08	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.017	0.016	<0.010	0.023	0.018	0.024	<0.010	0.035	0.034	0.039	<0.010	0.026	<0.010	0.099	<0.010
Lead	mg/L	0.0002	0.001	0.0005	0.0001	0.0001	0.00005	0.00005	0.00005	0.001 - 0.007[3]	<0.0002	0.0004	<0.0002	<0.001	<0.001	<0.001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000065	<0.000050	<0.000050	<0.000050	<0.000050	0.000128	<0.000050
Lithium	mg/L	-	-	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	<0.0010	0.0013	0.0041	0.0044	<0.0010	<0.0010	0.0015	0.0015	0.0025	0.0024	0.0021	0.002	0.0046	0.0046	<0.0010	<0.0010	0.0043	0.0043	0.0080	0.0072	<0.0010
Magnesium	mg/L	0.005	1	0.5	0.05	0.05	0.005	0.005	0.005	-	0.868	5.12	5.24	5	5	7	16.4	17.4	5.94	5.95	19.3	19.3	4.99	5.12	7.71	7.78	14.4	15.4	10.2	10.5	20.9	20.3	4.76	4.82	14.6	15.4	25.2	25.0	<0.0050
Manganese	mg/L	0.0007	0.01	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	-	0.0097	0.0024	0.0014	<0.01	<0.01	<0.01	0.00054	0.00335	0.00126	<0.00050	0.00526	0.0008	0.00062	0.00087	0.00052	0.00074	<0.00050	0.00383	<0.00050	0.00108	0.00065	0.0038	0.00122	0.0016	<0.00050	0.00287	0.00047	0.00639	<0.00010
Mercury	mg/L	0.0001	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000005	0.000026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	0.0003	0.005	0.0005	0.00005	0.00005	0.00005	0.00005	0.00005	0.073	<0.0003	<0.0003	<0.0003	<0.005	<0.005	<0.005	<0.0050	<0.00050	<0.00050	<0.00050	0.000109	0.000112	<0.00050	<0.00050	0.000057	0.000052	0.000102	0.000151	0.000066	0.000077	0.000159	0.000155	<0.00050	<0.00050	0.000114	0.000168	0.000174	<0.00050
Nickel	mg/L	0.001	0.005	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.025 - 0.150[3]	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus	mg/L	-	-	-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	0.02	0.01	1	0.05	0.05	0.05	0.05	0.05	-	0.77	0.48	0.51	0.50	0.51	0.50	0.565	0.649	0.297	0.269	0.818	0.731	0.308	0.317	0.294	0.31	0.584	0.7	0.408	0.458	0.978	1.0	0.39	0.388	0.997	1.02	2.16	2.06	<0.050
Rubidium	mg/L	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	0.00033	0.00024	0.00094	0.00046	0.00031	0.00032	0.00029	0.00034	0.00038	0.00074	0.00036	0.00055	0.0007	0.00111	0.00038	0.00041	0.00044	0.00078	0.00069	0.00127	<0.00020
Selenium	mg/L	0.005	0.001	0.0004	0.00005	0.00005	0.00005	0.00005	0.00005	0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon	mg/L	-	-	-	0.05	0.05	0.1	0.1	0.10	-	-	-	-	-	-	-	-	-	0.393	0.381	0.743	0.73	0.4	0.41	0.54	0.54	0.6	0.61	0.59	0.58	0.74	0.76	0.42	0.42	0.68	0.69	1.17	1.25	<0.10
Silver	mg/L	0.0001	0.0001	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	mg/L	0.05	0.05	0.5	0.5	0.5	0.05	0.05	0.05	-	0.43	0.51	0.48	0.57	0.48	1.61	5.22	5.33	0.77	0.75	8.94	9.62	0.83	0.81	1.1	1.16	4.81	4.51	2.04	1.96	19.5	17.3	2.33	2.34	18.1	17.8	49.9	45.4	<0.050
Strontium	mg/L	0.001	0.001	-	0.001	0.001	0.001	0.001	0.001	-	0.0011	0.0049	0.0048	0.005	0.005	0.008	-	-	0.0056	0.0056	0.025	0.0262	0.0044	0.0045	0.0083	0.0085	0.0192	0.0205	0.0112	0.0119	0.0345	0.0329	0.0062	0.006	0.0274	0.0262	0.0701	0.063	<0.00020
Sulphur	mg/L	-	-	-	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	<0.50	<0.50	4.8	5.24	<0.50	<0.50	0.73	0.53	2.83	2.57	0.97	1.02	11.9	10.7	0.68	0.63	5.32	5.28	17.9	16.4	<0.50
Tellurium	mg/L	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium	mg/L	0.0002	-	0.00003	0.00001	0.00001	0.00001	0.00001	0.00001	0.0008	<0.0002	<0.0002	<0.0002	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	0.001	0.01	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	0.003	-	-	0.0003	0.0003	0.0003	0.0003	0.0003	-	<0.003	<0.003	<0.003	-	-	-	-	-	0.00087	0.00052	0.00055	<0.00030	0.00075	0.00088	0.00074	0.00071	<0.00030	0.00061	0.00100	0.00114	0.00036	0.00127	0.0012	0.00162	0.00041	0.00103	<0.00030	0.00479	<0.00030
Tungsten	mg/L	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	mg/L	-	0.001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.015	-	-	-	-	-	-	-	0.000941	0.000143	0.000116	0.000109	0.0012	0.00131	0.000068	0.000071	0.000217	0.000219	0.000954	0.000937	0.000398	0.000437	0.00153	0.00148	0.000099	0.000115	0.000893	0.000936	0.0023	0.0022	<0.000010
Vanadium	mg/L	0.0009	0.001	-	0.0005	0.0005	0.0005	0.0005	0.0005	-	<0.0009	<0.0009	<0.0009	<0.001	<0.001	<0.001	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	0.001	0.01	0.003	0.003	0.003	0.003	0.003	0.003	0.03	0.0040	0.0010	0.0020	<0.01	<0.01	<0.01	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0

TABLE 2. LIST OF HADD SITES FROM THE AUGUST 2007 FISHERIES ACT AUTHORIZATION, STREAM CROSSINGS COVERED BY LETTERS OF ADVICE (LOA), AND COMPENSATION SITES (COMP) FOR THE MILNE INLET TOTE ROAD SURVEYED IN SPRING 2020

Location ID [1]	Authorization Type	UTM [2]		2020 Survey Date	Fish Habitat at Crossing (Y/N)
		Easting	Northing		
CV-170	COMP	505015	7972930	19-Jun	N
CV-166	COMP	505538	7972370	19-Jun	N
CV-159	COMP	506920	7970839	19-Jun	N
CV-157	COMP	507367	7970512	19-Jun	N
CV-156	COMP	507531	7970286	19-Jun	N
CV-154	COMP	507629	7970074	19-Jun	N
CV-153	LOA	508173	7969723	19-Jun	N
CV-152	COMP	508231	7969686	19-Jun	N
CV-151	LOA	508295	7969583	19-Jun	N
CV-129	HADD	512381	7966783	19-Jun	Y
CV-128	HADD	513556	7965889	19-Jun	Y
CV-125	LOA	515296	7963851	19-Jun	N
CV-120	LOA	517355	7961693	19-Jun	N
CV-119	LOA	517762	7961153	19-Jun	N
CV-115	LOA	519222	7958135	19-Jun	Y
CV-114	HADD	520278	7956528	19-Jun	Y
CV-113	COMP	520747	7955659	19-Jun	N
CV-112	LOA	521033	7954935	19-Jun	Y
CV-111	HADD	521355	7954524	19-Jun	Y
CV-202	LOA	521603	7953731	19-Jun	N
CV-106	LOA	521663	7953392	19-Jun	Y
CV-104	HADD	521732	7952788	19-Jun	Y
CV-203	LOA	521741	7952440	19-Jun	N
CV-102	LOA	521934	7950591	20-Jun	Y
CV-099	HADD	521886	7948843	20-Jun	Y
CV-094	HADD	522805	7945397	20-Jun	N
CV-086	LOA	523746	7940983	20-Jun	N
CV-082	LOA	525254	7938131	20-Jun	N
CV-079	HADD	525538	7937314	20-Jun	Y
CV-078	HADD	525852	7936787	20-Jun	Y
CV-076	LOA	526586	7935498	20-Jun	Y
CV-072	HADD	526897	7934576	20-Jun	Y
CV-060	HADD	527622	7930342	20-Jun	Y
CV-059	LOA	528094	7929347	20-Jun	Y

Location ID [1]	Authorization Type	UTM [2]		2020 Survey Date	Fish Habitat at Crossing (Y/N)
		Easting	Northing		
CV-058	LOA	528322	7928839	20-Jun	Y
CV-057	LOA	528379	7928657	20-Jun	Y
BG-50	HADD	529294	7926852	20-Jun	Y
CV-049	HADD	529654	7926545	20-Jun	Y
CV-048	HADD	530415	7925875	20-Jun	N
CV-046	LOA	531686	7924265	20-Jun	N
CV-040	HADD	535168	7920326	20-Jun	N
CV-030	LOA	540123	7921310	20-Jun	Y
BG-32	HADD	540729	7921597	20-Jun	Y
CV-217	HADD	542321	7922189	20-Jun	Y
CV-216	HADD	542764	7921724	18-Jun	Y
BG-30	COMP	546070	7919844	18-Jun	Y
BG-29	LOA	546229	7919877	18-Jun	Y
BG-27	LOA	547876	7919355	20-Jun	Y
BG-24	HADD	548766	7918878	20-Jun	Y
BG-17	HADD	550703	7917643	20-Jun	Y
BG-04	HADD	553250	7915100	20-Jun	Y
CV-001	COMP	553544	7914897	20-Jun	Y
CV-223	HADD	555705	7914676	20-Jun	Y
CV-224	HADD	556238	7915044	20-Jun	Y
CV-225	HADD	557421	7915187	20-Jun	Y
BG-01	HADD	558000	7914928	20-Jun	Y
CV-186	LOA	560705	7913498	20-Jun	Y
CV-187	COMP	560957	7913414	20-Jun	Y

1 - Two sites originally identified as potential compensation at the onset of the program (CV-183 and CV-181) no longer exist. One additional site (BG-16) originally identified as a compensation site was subsequently removed from the compensation site classification as it had been incorrectly identified as fish habitat in the initial assessments. Two fishless sites (CV-176 and CV-167) were removed from the annual monitoring program since CV-176 was significantly altered during the installation of authorized infrastructure involving diversions and infills of stream reaches, where laydowns were constructed at the Port Site, and the original culvert at CV-167 was removed.

2 - NAD 83, Zone 17W

TABLE 3. ARCTIC CHAR CATCH DATA FROM FISH-BEARING STREAM CROSSINGS ALONG THE TOTE ROAD, SPRING 2020

Location ID	Transect [1]	Electrofishing Duration (s)	Total Catch [2]	CPUE (# fish/minute) [3]	Fork Length (mm) [4]				
					n	Mean	SD	Min	Max
CV-114	DS	288	2	0.42	2	109.0	36.80	83	135
	US	274	1	0.22	1	157.0	-	157	157
	Total	671	3	0.27	3	125.0	38.00	83	157
CV-112	DS	228	2	0.53	2	133.0	25.50	115	151
	US	284	0	0.00	-	-	-	-	-
	Total	512	2	0.23	2	133.0	25.50	115	151
CV-102	DS	196	1	0.31	1	116.0	-	116	116
	US	231	0	0.00	-	-	-	-	-
	Total	427	1	0.14	1	116.0	-	116	116
CV-060	DS	308	3	0.58	2	84.5	13.40	75	94
	US	264	1	0.23	1	89.0	-	89	89
	Total	572	4	0.42	3	86.0	9.80	75	94
BG-50 [5]	DS	889	41	2.77	41	103.4	17.93	55	155
	US	-	-	-	-	-	-	-	-
	Total	889	41	2.77	41	103.4	17.93	55	155
CV-216	DS	432	4	0.56	1	60.0	-	60	60
	US	510	0	0.00	-	-	-	-	-
	Total	942	4	0.25	1	60.0	-	60	60
BG-30	DS	209	10	2.87	10	176.5	23.30	145	220
	US	326	0	0.00	-	-	-	-	-
	Total	535	10	1.12	10	176.5	23.30	145	220
BG-29	DS	260	3	0.69	2	120.0	28.30	100	140
	US	181	1	0.33	2	61.5	0.70	61	62
	Total	441	4	0.54	4	90.8	37.50	61	140
BG-27	DS	173	1	0.35	-	-	-	-	-
	US	175	0	0.00	-	-	-	-	-
	Total	348	1	0.17	-	-	-	-	-
BG-17	DS	445	10	1.35	6	101.3	39.80	49	170
	US	399	0	0.00	-	-	-	-	-
	Total	844	10	0.71	6	101.3	39.80	49	170
BG-04	DS	383	0	0.00	-	-	-	-	-
	US	374	1	0.16	1	118.0	-	118	118
	Total	757	1	0.08	1	118.0	-	118	118

Location ID	Transect [1]	Electrofishing Duration (s)	Total Catch [2]	CPUE (# fish/minute) [3]	Fork Length (mm) [4]				
					n	Mean	SD	Min	Max
CV-186	DS	350	22	3.77	22	112.0	19.00	76	155
	US	344	0	0.00	-	-	-	-	-
	Total	694	22	1.90	22	112.0	19.00	76	155
CV-187	DS	372	1	0.16	-	-	-	-	-
	US	229	2	0.52	-	-	-	-	-
	Total	601	3	0.30	-	-	-	-	-

Notes: Table includes sites at which char were captured in spring 2020. Fish were not captured or observed at all remaining fish-bearing streams in spring 2020

1 - DS = 50-m transect downstream of the Tote Road crossing; US = 50-m transect upstream of the Tote Road crossing

2 - Includes fish that were shocked, but not netted before they escaped

3 - CPUE = Catch-per-unit-effort (# fish/minute)

4 - n = number of fish measured for fork length (may not equal total catch); SD = standard deviation

5 - Data are from a Phase 2 fall survey of the same stream that was conducted downstream of the Tote Road

TABLE 4. NINESPINE STICKLEBACK CATCH DATA FROM FISH-BEARING STREAM CROSSINGS ALONG THE TOTE ROAD, SPRING 2020

Location ID	Transect [1]	Electrofishing Duration (s)	Total Catch [2]	CPUE (# fish/minute) [3]	Fork Length (mm) [4]				
					n	Mean	SD	Min	Max
BG-50 [5]	DS	889	3	0.20	3	59.0	11.14	47	69
	US	-	-	-	-	-	-	-	-
	Total	889	3	0.20	3	59.0	11.14	47	69
CV-216	DS	432	2	0.28	1	30.0	-	30	30
	US	510	1	0.12	0	-	-	-	-
	Total	942	3	0.19	1	30.0	-	30	30
BG-29	DS	260	5	1.15	1	45.0	-	45	45
	US	181	8	2.65	7	44.6	10.10	33	62
	Total	441	13	1.77	8	44.6	9.40	33	62
BG-04	DS	383	2	0.31	2	64.0	2.80	62	66
	US	374	0	0.00	0	-	-	-	-
	Total	757	2	0.16	2	64.0	2.80	62	66

Notes: Table includes sites at which char were captured in spring 2020. Fish were not captured or observed at all remaining fish-bearing streams in spring 2020.

1 - DS = 50-m transect downstream of the Tote Road crossing; US = 50-m transect upstream of the Tote Road crossing

2 - Includes fish that were shocked, but not netted before they escaped

3 - CPUE = Catch-per-unit-effort (# fish/minute)

4 - n = number of fish measured for fork length (may not equal total catch); SD = standard deviation

5 - Data are from a Phase 2 fall survey of the same stream that was conducted downstream of the Tote Road

TABLE 5. SUMMARY OF FISH HABITAT STATUS, FISH PASSAGE, AND REMEDIATION WORK ALONG THE TOTE ROAD IN 2020

Location ID	Fish Habitat at Crossing (Y/N)	Fish Captured / Observed DS in 2020	Fish Captured / Observed US in 2020	Potential Project-Related Fish Passage or Habitat Issues in Spring 2020	Fall 2020 Remediation Actions
CV-170	N	N	N	NONE - No natural access to crossing.	N/A
CV-166	N	N	N	NONE - No natural access to crossing.	N/A
CV-159	N	N	N	NONE - No natural access to crossing.	N/A
CV-157	N	N	N	NONE - No natural access to crossing.	N/A
CV-156	N	N	N	NONE - No natural access to crossing.	N/A
CV-154	N	N	N	NONE - No natural access to crossing.	N/A
CV-153	N	N	N	NONE - No natural access to crossing.	N/A
CV-152	N	N	N	NONE - No natural access to crossing.	N/A
CV-151	N	N	N	NONE - No natural access to crossing.	N/A
CV-129	Y	N	N	YES - The downstream end of the ramp needs minor repairs and the damaged culvert requires repair.	Repairs to ramp completed. Repairs to culvert pending.
CV-128	Y	N	N	NONE	N/A
CV-125	N	N	N	NONE - No natural access to crossing.	N/A
CV-120	N	N	N	NONE - No natural access to crossing.	N/A
CV-119	N	N	N	NONE - No natural access to crossing.	N/A
CV-115	Y	N	N	NONE - Stream almost dry in 2020.	N/A
CV-114	Y	Y	Y	YES - Adjustments and reinforcement of the ramp and armouring of the banks should be undertaken.	Repairs to ramp completed.
CV-113	N	N	N	NONE - Always dry.	N/A
CV-112	Y	Y	N	NONE	N/A
CV-111	Y	N	N	YES - Culvert is perched and remediation is needed to achieve backwatering necessary to compensate for the height of the perch.	None completed. Remediation to eliminate the perch is pending.
CV-202	N	N	N	NONE - No natural access to crossing.	N/A

Location ID	Fish Habitat at Crossing (Y/N)	Fish Captured / Observed DS in 2020	Fish Captured / Observed US in 2020	Potential Project-Related Fish Passage or Habitat Issues in Spring 2020	Fall 2020 Remediation Actions
CV-106	Y	N	N	YES - Ramp installed in 2018 to mitigate a slight perch inadequate to maintain surface flows during periods of low water, resulting in intermittent access to the culvert.	Some repairs completed. Flows too low in fall 2020 to assess effectiveness.
CV-203	N	N	N	NONE - Always dry.	N/A
CV-102	Y	Y	N	NONE	N/A
CV-099	Y	N	N	NONE	N/A
CV-094	N	N	N	NONE - No natural access to crossing.	N/A
CV-086	N	N	N	NONE - Always dry.	N/A
CV-082	N	N	N	NONE - No natural access to crossing.	N/A
CV-079	Y	N	N	NONE	N/A
CV-078	Y	N	N	NONE	N/A
CV-076	Y	N	N	YES - Locate and plug upstream leak found in spring. Diminished flow in summer/fall may cause leakage to stop.	To be completed during winter.
CV-072	Y	N	N	NONE	N/A
CV-060	Y	Y	Y	NONE	N/A
CV-059	Y	N	N	NONE	N/A
CV-058	Y	N	N	NONE	N/A
CV-057	Y	N	N	YES - Excavate sediment blocking majority of culvert flow and/or reduce upstream sediment input to stream.	To be completed during winter.
BG-50 [1]	Y	N	N	YES - Culverts remain perched and rocky ramp installed in 2019 was washed away by high flows during spring freshet. Electrofishing results indicate fish use south channel.	Remediation to eliminate the perch is pending.
CV-049	Y	N	N	NONE	N/A
CV-048	N	N	N	NONE - No natural access to crossing.	N/A
CV-046	N	N	N	NONE - No natural access to crossing.	N/A
CV-040	N	N	N	NONE - No natural access to crossing.	N/A

Location ID	Fish Habitat at Crossing (Y/N)	Fish Captured / Observed DS in 2020	Fish Captured / Observed US in 2020	Potential Project-Related Fish Passage or Habitat Issues in Spring 2020	Fall 2020 Remediation Actions
CV-030	Y	N	N	YES - Water was diverted from CV-031 to this stream, resulting in sedimentation/erosion of habitat. Diversion was done as a safety and environmental measure to prevent the washing out of the road embankment and greater sedimentation to fish-bearing waters downstream.	Diversion was ceased following peak freshet. If diversion undertaken in the future, sedimentation and erosion control measures may be required.
BG-32	Y	N	N	NONE	N/A
CV-217	Y	N	N	NONE	N/A
CV-216	Y	Y	Y	YES - Remediation implemented in fall 2019 successful but in need of minor repairs.	Repairs to structure completed.
BG-30	Y	Y	N	NONE	N/A
BG-29	Y	Y	Y	NONE	N/A
BG-27	Y	Y	N	NONE	N/A
BG-24	Y	N	N	NONE	N/A
BG-17	Y	Y	N	NONE	N/A
BG-04	Y	Y	Y	NONE	N/A
CV-001	Y	N	N	NONE	N/A
CV-223	Y	N	N	NONE	N/A
CV-224	Y	N	N	NONE	N/A
CV-225	Y	N	N	YES – Spring 2020: Assess culvert backwater structure under lower flows in summer/fall and adjust as needed. Monitor locations where water flowed under road for additional leakage and erosion. Remove more of old road crossing to allow flow to other channel (which remains blocked).	Remediation completed in early spring 2020 reduced the perch and improved access. No damage from leakage noted during fall. Recommend monitoring of leakage locations in spring 2021. Removal of old road still to be completed.
BG-01	Y	N	N	YES - Steam frozen culverts.	Completed in spring 2020
CV-186	Y	Y	N	NONE	NONE
CV-187	Y	Y	Y	NONE	None

1 - Fish continue to use habitat in the south channel of the river at the BG-50 crossing even with the perched culverts.

TABLE 6. INSTALLATION SUMMARY OF REMAINING HADD AND HABITAT COMPENSATION SITES ALONG THE TOTE ROAD

Crossing ID	UTM [1]		Crossing Size Classification	Authorization (HADD or Compensation) [2]	Initial Work Completion Date [3]	Additional Work Completion Date [4]	Years Monitored	Additional Monitoring Required
	Easting	Northing						
CV-129	512381	7966783	Large	HADD	17-Sep-07	July 2011 Winter 2014/15 September 2019 September 2020	2008-2020	Continue monitoring of rocky ramp for successful passage
CV-128	513556	7965889	Extra-large	HADD	23-Sep-07	Winter 2013/14 March 2017	2009-2020	Routine Only
CV-114	520278	7956528	Medium	HADD	29-Sep-07	July 2011 September 2019 September 2020	2009-2020	Continue monitoring of rocky ramp for successful passage
CV-111	521355	7954524	Medium	HADD	28-Sep-07	Winter 2018/19 September 2019	2009-2020	Routine only until remediation completed
CV-104	521732	7952788	Medium	HADD	01-Oct-07	November 2016	2009-2020	Routine Only
CV-099	521886	7948843	Large	HADD	04-Oct-07	Winter 2014/15 December 2017	2008-2020	Routine Only
CV-079	525538	7937314	Large	HADD	08-Jul-08	June 2018	2008-2020	Routine Only
CV-078	525852	7936787	Large	HADD	09-Jul-08	N/A	2008-2020	Routine Only
CV-072	526897	7934576	Large	HADD	05-Mar-08	N/A	2009-2020	Routine Only
CV-060	527622	7930342	Medium	HADD	27-Feb-08	N/A	2009-2020	Routine Only
BG-50	529294	7926852	Extra-large	HADD	30-Oct-07	Winter 2013/14 Winter 2014/15 November 2016 September 2019	2008-2020	Routine only until remediation completed.
CV-049	529654	7926545	Large	HADD	10-Mar-08	N/A	2009-2020	Routine Only
BG-32	540729	7921597	Large	HADD	04-Apr-08	August 2012 September 2017	2009-2020	Routine Only
CV-217	542321	7922189	Extra-large	HADD	17-Apr-08	Winter 2013/14 Winter 2014/15 March 2017	2009-2020	Routine Only
CV-216	542764	7921724	Large	HADD	08-Jun-08	October 2017 September 2019 September 2020	2009-2020	Continue monitoring backwatering structure for effectiveness and fish passage

Crossing ID	UTM [1]		Crossing Size Classification	Authorization (HADD or Compensation) [2]	Initial Work Completion Date [3]	Additional Work Completion Date [4]	Years Monitored	Additional Monitoring Required
	Easting	Northing						
BG-30	546070	7919844	Small	Compensation - RA	2012	August 2012	2010-2020	Routine monitoring and maintenance of constructed fishway
BG-24	548766	7918878	Medium	HADD	15-May-08	N/A	2008-2020	Routine Only
BG-17	550703	7917643	Large	HADD	09-May-08	N/A	2009-2020	Routine Only
BG-04	553250	7915100	Medium	HADD	05-May-08	August 2012 February 2018 June 2018	2009-2020	Routine Only
CV-001	553544	7914897	Small	Compensation - RH	08-May-08	Winter 2014/15	2009-2020	Routine Only
CV-223	555705	7914676	Extra-large	HADD	03-May-08	Winter 2013/14	2008-2020	Routine Only
CV-224	556238	7915044	Medium	HADD	04-May-08	January 2018	2008-2020	Routine Only
CV-225	557421	7915187	Large	HADD	21-Sep-07	August 2010 Winter 2014/15 Spring 2020	2008-2020	Continue monitoring of rocky ramp for successful passage
BG-01	558000	7914928	Medium	HADD	20-Sep-07	August 2010 October 2017 September 2019	2008-2020	Continue monitoring for passage in high culvert water velocity and monitor for instream deposition of road aggregate
CV-187	560957	7913414	Small	Compensation - RH	14-Jun-08	N/A	2008-2020	Routine Only

1 - NAD 83, Zone 17W

2 - Includes current HADD and compensation sites and not those eliminated from calculations following 2010 surveys; RA = restored access, RH = restored habitat

3 - Includes work outlined during the initial planning and construction phase

4 - Includes repair work, installation of fish access improvement structures, and ERP upgrades

FIGURE 1. MAP OF TOTE ROAD SITES SURVEYED DURING SPRING 2020 FISH AND FISH HABITAT ASSESSMENT SURVEYS

MILNE PORT
CV-170
CV-166
CV-159
CV-157
CV-156
CV-154
CV-151 to CV-153
Phillips Creek
CV-129
CV-128
CV-125
CV-120
CV-119
CV-115
CV-114
CV-113
CV-112
CV-111
CV-202
CV-106
CV-104
CV-203
KM 32 Lake
CV-102
CV-099
Phillips Ck.
CV-094
CV-086
CV-082
CV-079
CV-078
CV-076
CV-072
Katiktok Lake
CV-060
CV-059
CV-058
CV-057
BG-50
CV-049
CV-048
CV-046
BG-32
CV-030
CV-040
Muriel Lake
CV-217
CV-216
BG-29
BG-30
David Lake
BG-27
BG-24
BG-17
BG-04
CV-001
CV-225
CV-223
BG-01
MINE SITE
CV-224
CV-186
CV-187
0 2.5 5 10 Kilometres

FISH HABITAT

- YES
- NO

TOTE ROAD

NOTES:

1. BASE DATA SOURCE: CANVEC 1:250 000
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

TOTE ROAD 2020 LOCATIONS OVERVIEW

North/South Consultants Inc.
Aquatic Environment Specialists

DATE CREATED:
12/11/2019

Document Path: W:\PROJECTS\BIM Baffinland Iron Mine\BIM Tote Road Monitoring_short_2020\GIS\MXD\20201123_2020ToteRdSites_Overview_cp.mxd

APPENDIX A

DFO AUTHORIZATIONS AND AMENDMENTS

Fisheries and Oceans Canada | Pêches et Océans Canada

301-5204 50th Avenue
Yellowknife, NT
X1A 1E2

our file *Votre référence*

September 20, 2013

Our file *Notre référence*
07-HCAA-CA7-00050

Oliver Curran
Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, ON
L6H 0C3

Dear Mr. Curran:

Subject: Proposal not likely to result in impacts to fish and fish habitat.

Fisheries and Oceans Canada – Fisheries Protection Program (DFO) received your proposal on August 29, 2013. Please refer to the file number and title below:

DFO File No.: **07-HCAA-CA7-00050**
Title: **Mary River Iron Ore Project, Baffin Island (Baffinland), Nunavut**

You may be aware of changes to the *Fisheries Act*, however these have not affected the review of your project at this time. For more information on current changes to the *Fisheries Act* please refer to the DFO website at www.dfo-mpo.gc.ca/media/infocus-alaune/2012/habitat-eng.htm.

Your proposal has been reviewed to determine whether it is likely to result in impacts to fish and fish habitat which are prohibited by the habitat protection provisions of the *Fisheries Act* or those prohibitions of the *Species at Risk Act* that apply to aquatic species.*

Our review consisted of:

Changes to Culverts along the Tote Road, Submission dated August 29, 2013 from Oliver Curran - Baffinland Iron Mines Corporation

Freshwater Aquatic Baseline Synthesis Report 2005-2011 (January 2012), Baffinland Iron Mines Corporation, Mary River Project, Prepared by North/South Consultants Inc.

*Those sections most relevant to the review of development proposals include 20, 22, 32 and 35 of the *Fisheries Act* and sections 32, 33 and 58 of the *Species at Risk Act*. For more information please visit www.dfo-mpo.gc.ca.

We understand that you propose to carry out the following culvert upgrades along the Tote Road:

Culvert ID	Proposed Culvert Diameter (m)	Proposed Culvert Length (m)	Area of Rip Rap (m2)	Proposed Culvert Upgrate
BG31A	1.2	19.5	24.96	Extend 1m left & 2.5m right
BG30	1	22	17.33	Extend 7m right
BG29	1	31	0	Extend 7.5m left & 8.5m right
BG27B	0.5	31	4.33	Extend 5m left & 8m right
BG27C	0.5	31	0	Extend 5m left & 8m right
BG27A	0.5	31	0	Extend 4.5m left & 8.5m right
BG17A	1.2	36.5	24.96	Extend 8m left & 13.5m right
BG17B	1.2	37.5	24.96	Extend 15.5m left & 7m right
BG04A	1.2	24	0	Extend 5.5m left & 3.5m right
BG04B	1.2	24	0	Extend 5m left & 4m right
CV224A	1	26	0	Extend 6m left & 5m right
CV224B	1	26.5	0	Extend 6.5m left & 5m right
CV225B	1.2	18	0	Replace with new length of 18m
CV225A	1	18.5	17.33	Replace with new length of 18.5m
BG01C	1.2	37	24.96	Extend 11m left & 8m right
BG01A	1.2	36.5	24.96	Extend 11.5m left & 7m right
BG01B	1.2	37	24.96	Extend 12m left & 7m right
BG01D	0.5	10	0	New Culvert
BG01F	0.5	18	0	New Culvert
BG01E	1.0	10	0	New Culvert
BG01G	0.5	23	0	New Culvert
CV186	1	27	0	Extend 6m left
CV187A	0.5	20.5	0	Extend 6m left & 4.5m right
CV187B	0.5	16	0	New Culvert
CV166A	1	23.5	17.33	Extend 8.5m right
CV166B	0.5	22.5	0	Extent 7.5m right
CV115A	0.5	17.5	0	Extend 2.5m left
CV115B	1	17	0	Extend 2m left

Provided that your plans are implemented as described DFO has concluded that your proposal is not likely to result in impacts to fish and fish habitat.

You will not need to obtain a formal approval from DFO in order to proceed with your proposal.

.../3

If the plans have changed or if the description of your proposal is incomplete you should contact this office to determine if the advice in this letter still applies.

Please be advised that any unauthorized impacts to fish and fish habitat which result from a failure to implement this proposal as described could lead to corrective action such as enforcement.

If you have any questions please contact the undersigned at (867) 669-4927 or by email at Georgina.Williston@dfo-mpo.gc.ca.

Yours sincerely,

Georgina Williston

Georgina Williston
Fisheries Protection Biologist

cc. Stuart Niven- Fisheries and Oceans Canada
Jim Millard- Baffinland Iron Mines Corporation
Bevin LeDrew- Sikumiut Environmental Management Ltd.

Fisheries and Oceans Canada | Pêches et Océans Canada

301-5204 50th Ave
Yellowknife, NT
X1A 1E2

Our file *Notre référence*
NU-07-0050

December 16, 2013

Baffinland Iron Mines Corp.
275 Upper Middle Road East Suite 300
Oakville, ON L6H 0C3

Dear Mr. Curran:

Subject: Implementation of mitigation measures to avoid and mitigate serious harm to fish.

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received your proposal on August 28, 2013.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act*.

Our review consisted of:

Baffinland Submission: Tote Road Upgrade-Four Seacan Bridge Replacements, Tote Road Upgrade- Fish Bearing Culvert submission, Attachments 1 &2, August 2013.

We understand that you propose to: Upgrade the following crossings along the Tote Road.

The following seacan crossings will be removed and replaced with clear span bridges

- STA 17 (CV 128)
- STA 62 (BG50)
- STA 80 (CV 217)
- STA 97 (CV223)

The following culvert crossings will be upgraded as follows:

Culvert ID	Proposed Culvert Diameter (m)	Proposed Culvert Length (m)	Area of Rip Rap (m2)	Proposed works to be completed
CV217B	1.2	16	24.96	Extend 1m right
CV217C	1.2	16	24.96	Extend 1m right
CV217A	1.2	16	24.96	Extend 1m right
CV217D	0.15		0	Abandon
CV216B	1.2	17.5	0	Extend 1.5m left & 1m right
CV216C	1.2	16.5	0	Extend 1.5m left
CV216A	1.2	18.5	0	Extend 1.5m left & 2m right
CV216D	0.5	14.5	0	Replace with new length of 14.5m
CV216E	0.5	14	0	Abandon and replace with new length of 14m
CV216F	0.5	12	0	Replace with new length of 12m
CV223B	1.2	28	24.96	Extend 13m left
CV223C	1.2	28	24.96	Extend 13m left
CV223D	1.2	29	24.96	Extend 14m left
CV223A	2	24	69.33	Extend 14m left
CV223E	1.2	19.5	0	Extend 4.5m left
CV223F	1.2	19	0	Extend 4m left
CV115C	0.5	15.5	0	Extend 3.5m right
CV115D	0.5	17	4.33	Extend 8m left
CV114A	1	15.5	17.33	Extend 0.5m right
CV114B	0.5	14	0	Extend 5m left
CV114C	0.5	11	4.33	Replace with new length of 11m
CV114D	0.5	11.5	4.33	Extend 2m left & 0.5m right
CV112A	1.2	17.5	24.96	Extend 2.5m right
CV112B	0.5	24	0	Extend 9m right
CV112C	0.5	21	4.33	Extend 9m left
CV111	1	24	17.33	Extend 4.5m left & 1.5m right
CV106	1	19	17.33	Extend 4m left
CV104A	1.2	19	24.96	Extend 4m left
CV104B	1.2	19	24.96	Extend 4m left
CV102A	1	22.5	17.33	Extend 7.5m left
CV102B	0.5	21.5	0	Extend 6.5m left
CV102C	0.5	21.5	0	Extend 6.5m left
CV102D	0.5	20.5	0	Extend 5.5m left
CV099B	1.2	17	24.96	Replace with new length of 17m

.../3

Culvert ID	Proposed Culvert Diameter (m)	Proposed Culvert Length (m)	Area of rip rap (m2)	Proposed works to be completed
CV099A	1.2		0	Remove culvert
CV099C	2	18.5	69.33	Replace with new length of 18.5m
CV099D	0.5		0	Remove culvert
CV099E	0.5		0	Remove culvert
CV099F	0.5	14	0	Extend 2m right
CV087B	1.2	19	24.96	Extend 6.5m left & 0.5m right
CV087A	1.2	18.5	24.96	Extend 6m left & 0.5m right
CV087C	0.5	18	0	Extend 6m right
CV079B	1.2	16.5	0	Extend 1.5m left
CV079A	1.2	16.5	0	Extend 1.5m left
CV079C	0.15		0	Remove culvert
CV079D	0.15		0	Remove culvert
CV078A	1.2	16.5	0	Extend 1.5m left
CV078B	1	19.5	0	Extend 1.5m left
CV078C	1	19.5	0	Extend 1.5m left
CV078D	2	22	0	Extend 2m right
CV076	1	11.5	0	Replace with new length of 11.5m
CV072B	1.2	17.5	0	Replace with new length of 17.5m
CV072C	1.2	17.5	0	Replace with new length of 17.5m
CV072A	1.2	17.5	0	Replace with new length of 17.5m
CV060A	1	16.5	0	Extend 1.5m left
CV060B	1	16.5	0	Extend 1.5m left
CV059B	0.5	16.5	0	Extend 3.5m left & 1m right
CV059A	0.5	16	0	Extend 3m left & 1m right
CV059C	0.5	16.5	0	Extend 4m left & 0.5m right
CV059D	0.5	16.5	0	Extend 4m left & 0.5m right
CV057B	0.5	16.5	0	Extend 1.5m left
CV057C	0.5	16.5	0	Extend 1.5m left
CV057A	0.5	16.5	0	Extend 1.5m left
BG50A	1.2	33.5	24.96	Extend 15.5m left
BG50B	1.2	32	24.96	Extend 14m left
CV049A	1.2	24.5	24.96	Extend 5.5m left & 4m right
CV049B	1.2	24.5	24.96	Extend 4.5m left & 5m right
CV030A	1	16	0	Extend 1m left
CV030B	0.5	16	0	Extend 1m left

.../4

To avoid the potential of serious harm to fish and their habitat, we are recommending that the following mitigation measures be included into your plans.

- If in-stream work is required during the open water season it should be completed in the dry by de-watering the work area and diverting and/or pumping flows around cofferdams placed at the limits of the work area.
- Existing stream flows should be maintained downstream of the de-watered work area without interruption, during all stages of the work.
- A fish stranding program should be implemented if necessary by a qualified fisheries person , who is experienced in this area, immediately following isolation and prior to de-watering to ensure that fish are removed from any dewatered area and released alive immediately downstream of the work area.
- Flow dissipaters and/or filter bags, or equivalent, should be placed at water discharge points to prevent erosion and sediment release.
- Silt or debris that has accumulated around the temporary cofferdams should be removed prior to their withdrawal.

Provided that these mitigation measures are incorporated into your plans, the Program is of the view that your proposal will not result in serious harm to fish. No formal approval is required from the Program under the *Fisheries Act* in order to proceed with your proposal.

If your plans have changed or if the description of your proposal is incomplete, or changes in the future, you should consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review is required by the Program.

Please notify this office at least 10 days before starting your project. A copy of this letter should be kept on site while the work is in progress.

If you have any questions, please contact Georgina Williston at our Yellowknife office at 867-669-4927, by fax at 867-669-4940 or by email at geogina.williston@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Stu Niven
Senior Fisheries Protection Biologist
Fisheries and Oceans Canada

Georgina Williston- Fisheries and Oceans Canada
Bevin LeDrew- Sikumiut Environmental Management Ltd.
Tessa Mackay- Hatch

Fisheries and Oceans Canada | Pêches et Océans Canada

Suite 301 – 5204 59th Ave.
Yellowknife NT, X1A 1E2

Our file *Notre référence*
NU-07-0050

February 20, 2015

James Millard
Environmental Manager
Baffinland Iron Mines Corp.
275 Upper Middle Road East Suite 300
Oakville, ON L6H 0C3

Dear Mr. Millard:

Subject: Implementation of mitigation measures to avoid and mitigate serious harm to fish – Mary River Project, Tote Road Realignment.

The Fisheries Protection Program of Fisheries and Oceans Canada received your proposal on February15, 2015.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act*.

Your proposal has also been reviewed to determine whether it will adversely impact listed aquatic species at risk and contravene sections 32, 33 or 58 of the *Species at Risk Act* (*SARA*).

Our review considered the following:

- Letter from Baffinland Iron Mines Re: Mary River Project – Request for Advice on Realignment of Tote Road at Culvert CV076, Km 53 Tote Road, DFO File dated February 15, 2015 and submitted by James Millard with 1 attachment.
- Attachment 1 - Mark-up of proposed field change, Drawing H349000-3000-10-012-0073

We understand that you propose to:

- Realign the existing Tote Road at Culvert CV076, 160 meters upstream from the existing crossing and install one culvert which is 1.2m in diameter and 18 m in length.
- Install culverts during the winter months when the stream is frozen to bottom.
- Remove existing culvert from the old Tote Road alignment.

Since there are no *SARA* species or their habitats identified in the project area, no additional approvals under *SARA* will be required for your proposed activities.
To avoid the potential for serious harm to fish that is prohibited under the *Fisheries Act*, the mitigation measures set out in your project plans are to be followed.

Provided that you implement the required mitigation measures for your project, and follow the guidance available on the DFO website at http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html, the Program is of the view that your proposal should not result in serious harm to fish or contravene sections 32, 33 or 58 of the *Species at Risk Act*. No formal approval is required from the Program under the *Fisheries Act* or the *Species at Risk Act* in order to proceed with your proposal.

It remains your responsibility to ensure you avoid causing serious harm to fish in compliance with the *Fisheries Act*, and that you meet the requirements under the *Species at Risk Act* as it may apply to your project. If your plans have changed or if the description of your proposal is incomplete, or changes in the future, you should consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review is required by the Program.

Please be advised that it is also your *Duty to Notify* DFO if you have caused, or are about to cause, serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. Such notifications should be directed to http://www.dfo-mpo.gc.ca/pnw-ppe/violation-infraction/index-eng.html.

A copy of this letter should be kept on site while the work is in progress. It remains your responsibility to meet all other federal or territorial requirements that apply to your project.

If you have any questions, please contact Georgina Williston at our Yellowknife office at (867) 669-4927, by fax at (867) 669-4940, or by email at georgina.williston@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Julie Dahl
Regional Manager, Regulatory Reviews
Fisheries Protection Program

cc.
Georgina Williston- Fisheries and Oceans Canada
Oliver Curran-Baffinland Iron Mines Corp.
Erik Madsen-Baffinland Iron Mines Corp.

Canada

Fisheries and Oceans Canada | Pêches et Océans Canada

5204-50th Avenue
Yellowknife, NT
X1A 1E2

Your file *Votre référence*

December 9, 2014

Our file *Notre référence*
NU-07-0050

Baffinland Iron Mines Corp.
Attention: Jim Millard, Environmental Manager
2275 Upper Middle Road, Suite 300
Oakville, ON
L6H 0C3

Dear Mr. Millard:

Subject: Implementation of mitigation measures to avoid and mitigate impacts to fish and fish habitat and listed aquatic species at risk – Mary River Project

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received your proposal on November 27, 2014.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act*.

Your proposal has also been reviewed to determine whether it will adversely impact listed aquatic species at risk and contravene sections 32, 33 or 58 of the *Species at Risk Act* (*SARA*).

Our review considered the following:

- Letter from Baffinland Iron Mines RE: Realignment of Tote Road at Culvert CV099. Dated November 27, 2014 and submitted by James Millard, with 1 attachment.
- Attachment 1- Mark up of proposed field change, Drawing H349000-3000-10-012-0052

We understand that you propose to:

- Realign the existing Tote Road and install one 2 metre diameter culvert in the stream bed and two 1.2 metre overflow culverts. Culverts will be approximately 27 metres in length.

Canada

.../2

- Install culverts during the winter months when the stream is frozen to bottom.
- Remove existing culverts along the old Tote Road alignment.

Since there are no *SARA* species or their habitats identified in the project area, no additional approvals under *SARA* will be required for your proposed activities.

To avoid the potential for serious harm to fish that is prohibited under the *Fisheries Act*, the mitigation measures set out in your project plans are to be followed.

Provided that you implement the required mitigation measures for your project, and follow the guidance available on the DFO website at http://www.dfo-mpo.gc.ca/pnw-ppe/measures/index-eng.html, the Program is of the view that your proposal should not result in serious harm to fish or contravene sections 32, 33 or 58 of the *Species at Risk Act*. No formal approval is required from the Program under the *Fisheries Act* or the *Species at Risk Act* in order to proceed with your proposal.

It remains your responsibility to ensure you avoid causing serious harm to fish in compliance with the *Fisheries Act*, and that you meet the requirements under the *Species at Risk Act* as it may apply to your project. If your plans have changed or if the description of your proposal is incomplete, or changes in the future, you should consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review is required by the Program.

Please be advised that it is also your *Duty to Notify* DFO if you have caused, or are about to cause, serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. Such notifications should be directed to http://www.dfo-mpo.gc.ca/pnw-ppe/violation-infraction/index-eng.html.

A copy of this letter should be kept on site while the work is in progress. It remains your responsibility to meet all other federal or territorial requirements that apply to your project.

If you have any questions, please contact Georgina Williston at our Yellowknife office at 867-669-4927 or by email at Georgina.Williston@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Julie Dahl
Regional Manager, Regulatory Reviews
Fisheries Protection Program

cc. Oliver Curran- Baffinland Iron Mines
Erik Madsen – Baffinland Iron Mines

Fisheries and Oceans Canada | Pêches et Océans Canada

5204-50th Avenue
Yellowknife, NT
X1A 1E2

Your file *Votre référence*

October 27, 2014

Our file *Notre référence*
NU-07-0050

Baffinland Iron Mines Corp.
Attention : Jim Millard, Environmental Manager
2275 Upper Middle Road, Suite 300
Oakville, ON
L6H 0C3

Dear Mr. Millard:

Subject: Implementation of mitigation measures to avoid and mitigate impacts to fish and fish habitat and listed aquatic species at risk – Mary River Project

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received your proposal on October 17, 2014.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act*.

Your proposal has also been reviewed to determine whether it will adversely impact listed aquatic species at risk and contravene sections 32, 33 or 58 of the *Species at Risk Act* (*SARA*).

Our review considered the following:

- Letter from Baffinland Iron Mines RE: Realignment of Tote Road at Culvert CV225B. Dated October 16, 2014 and submitted by James Millard, with 2 attachments.
- Attachment 1- Mark of proposed field change, Drawing H349000-3000-10-012-0139
- Attachment 2- Project Wide, Civil Standard Drawing, Typical Culvert Detail, H349000-1000-10-041-0003

We understand that you propose to:

- Realign the existing Tote Road and install two new 1.2 metre culverts in the stream bed and one 1.0 metre culvert 45 m away as an overflow. Culverts will be approximately 27metres in length.

- Install culverts during the winter months when the stream is frozen to bottom.
- Remove the two existing 1.2m culverts along the old Tote Road alignment.

Since there are no *SARA* species or their habitats identified in the project area, no additional approvals under *SARA* will be required for your proposed activities.

To avoid the potential for serious harm to fish that is prohibited under the *Fisheries Act*, the mitigation measures set out in your project plans are to be followed.

Provided that you implement the required mitigation measures for your project, and follow the guidance available on the DFO website at http://www.dfo-mpo.gc.ca/pnw-ppe/measures/index-eng.html, the Program is of the view that your proposal should not result in serious harm to fish or contravene sections 32, 33 or 58 of the *Species at Risk Act*. No formal approval is required from the Program under the *Fisheries Act* or the *Species at Risk Act* in order to proceed with your proposal.

It remains your responsibility to ensure you avoid causing serious harm to fish in compliance with the *Fisheries Act*, and that you meet the requirements under the *Species at Risk Act* as it may apply to your project. If your plans have changed or if the description of your proposal is incomplete, or changes in the future, you should consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review is required by the Program.

Please be advised that it is also your *Duty to Notify* DFO if you have caused, or are about to cause, serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. Such notifications should be directed to http://www.dfo-mpo.gc.ca/pnw-ppe/violation-infraction/index-eng.html.

A copy of this letter should be kept on site while the work is in progress. It remains your responsibility to meet all other federal or territorial requirements that apply to your project.

If you have any questions, please contact Georgina Williston at our Yellowknife office at 867-669-4927 or by email at Georgina.Williston@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Julie Dahl
Regional Manager, Regulatory Reviews
Fisheries Protection Program

cc. Oliver Curran- Baffinland Iron Mines
Erik Madsen – Baffinland Iron Mines
Stu Niven – Fisheries and Oceans Canada

APPENDIX B

PHOTOGRAPHIC LOG OF HABITAT ASSESSMENTS AT TOTE ROAD CROSSINGS, SPRING 2020

Tote Road Site CV-170

UTM Coordinates: 17W 505015 E 7972930 N **Date Surveyed:** 19-Jun-20

Summary: This small stream has several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek. There is no upstream overwintering habitat.

A

B

C

D

E

Photos 1. Photographs of the barriers downstream from the Tote Road crossing CV-170 (A,B); and photographs of habitat downstream of the Tote Road: (C) looking upstream; (D) looking downstream; and (E) across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

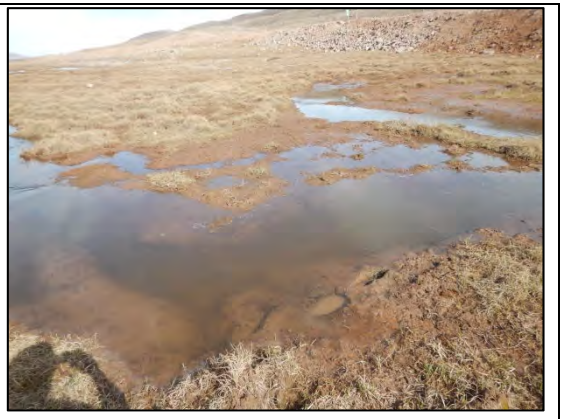
Tote Road Site CV-166

UTM Coordinates: 17W 505538 E 7972370 N **Date Surveyed:** 19-Jun-20

Summary: This small stream has a rocky berm barrier downstream that prevents fish access to the crossing area from a fish-bearing stream that flows parallel to the road. There is no habitat at the crossing due to this barrier. There is also no upstream overwintering habitat.

A

B



C

Photos 1. Photographs downstream of the Tote Road crossing CV-166: (A) looking upstream; (B) looking downstream; and (C) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

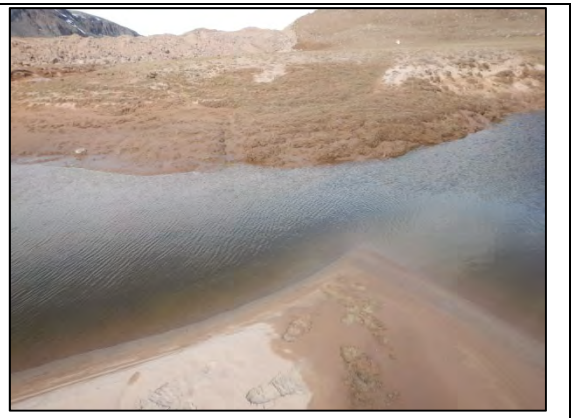
Tote Road Site CV-159

UTM Coordinates: 17W 506920 E 7970839 N **Date Surveyed:** 19-Jun-20

Summary: This small stream has several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek. There is no upstream overwintering habitat.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-159: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-157

UTM Coordinates: 17W 507367 E 7970512 N **Date Surveyed:** 19-Jun-20

Summary: This small stream has several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek. There is no upstream overwintering habitat.

A

B

C

D

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-157: (A,C) looking upstream; and (B,D) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-156

UTM Coordinates: 17W 507531 E 7970286 N **Date Surveyed:** 19-Jun-20

Summary: This small runoff stream is typically dry and has several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek. There is no upstream overwintering habitat.

Photos 1. Photograph of the dry, steep channel downstream of the Tote Road crossing CV-156.

Tote Road Site CV-154

UTM Coordinates: 17W 507629 E 7970074 N **Date Surveyed:** 19-Jun-20

Summary: This small stream typically has low water levels and lacks connectivity at the confluence with Phillips Creek, preventing fish access to the crossing. There is no upstream overwintering habitat.

A

B

C

D

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-154: (A,C) looking upstream; and (B,D) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-153

UTM Coordinates: 17W 508173 E 7969723 N **Date Surveyed:** 19-Jun-20

Summary: This small runoff area has no channel and is typically dry with several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek. There is no longer a culvert at this location on the Tote Road.

Photos 1. Photograph of the Tote Road crossing CV-153 from downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-152

UTM Coordinates: 17W 508231 E 7969686 N **Date Surveyed:** 19-Jun-20

Summary: This small runoff area has no channel and is typically dry with several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek. There is no longer a culvert at this location on the Tote Road.

Photos 1. Photograph of the Tote Road crossing CV-152 from downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-151

UTM Coordinates: 17W 508295 E 7969583N **Date Surveyed:** 19-Jun-20

Summary: This small runoff area has a poorly defined channel and is typically dry with several natural steep gradient and vertical drop barriers downstream that prevent fish access to the crossing area from Phillips Creek.

Photos 1. Photograph of the Tote Road crossing CV-151 from downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-129

UTM Coordinates: 17W 512381 E 7966783 N **Date Surveyed:** 19-Jun-20

Summary: This site has consistently provided good quality summer rearing habitat for juvenile Arctic Char and is the first large tributary upstream of the impassable falls on Phillips Creek (i.e., fish use is restricted to land-locked Arctic Char). A small culvert perch was remediated in fall 2019 and minor repairs to the remediation works were conducted in fall 2020. An upstream overwintering lake provides additional habitat.

A

B

C

D

E

F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-129: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-128

UTM Coordinates: 17W 513556 E 7965889 N **Date Surveyed:** 19-Jun-20

Summary: A bridge crossing of a major river that has consistently provided abundant fish habitat with no passage issues identified.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-128: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – Yes

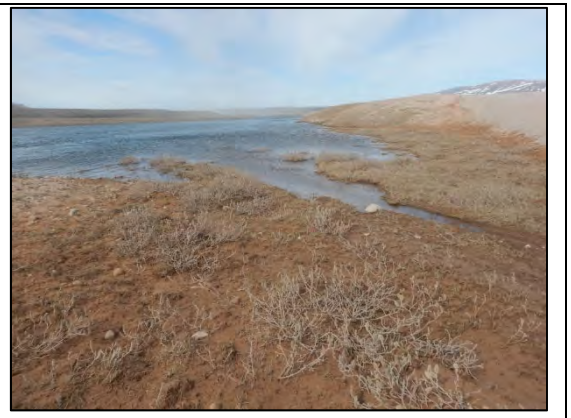
Tote Road Site CV-125

UTM Coordinates: 17W 515296 E 7963851 N **Date Surveyed:** 19-Jun-20

Summary: Some ponding occurs upstream of the Tote Road culvert, but there is no channel or surface water downstream of the road. There is no fish access to the site from Phillips Creek.

A

B



C

Photos 1. Photograph upstream of the Tote Road crossing CV-125 looking downstream (A); and photographs downstream of the Tote Road crossing CV-125 (B) looking upstream; and (C) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-120

UTM Coordinates: 17W 517355 E 7961693 N **Date Surveyed:** 19-Jun-20

Summary: Some ponding occurs upstream of the Tote Road culvert, but there is no channel or surface water downstream of the road. There is no connection to or access from Phillips Creek for fish.

A

B

C

D

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-120; (A,C) looking upstream; and (B,D) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-119

UTM Coordinates: 17W 517762 E 7961153 N **Date Surveyed:** 19-Jun-20

Summary: There is a shallow pond immediately downstream from the Tote Road culvert. Downstream from the pond, the channel disappears and surface water becomes patchy, shallow, and dispersed over terrestrial grasses as it flows towards the crossing at CV-120. There is no natural connectivity to Phillips Creek.

A

B

C

D

Photos 1. Photographs upstream of the Tote Road crossing CV-119: (A) looking upstream; (B) looking downstream; and photographs downstream of the Tote Road: (C) looking upstream; and (D) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-115

UTM Coordinates: 17W 519222 E 7958135 N **Date Surveyed:** 19-Jun-20

Summary: Stream has been regularly surveyed and is dry most years. There was very shallow surface water present during the freshet in 2020, but no fish were present.

A

B

C

D

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-115: (A,C) looking upstream; and (B,D) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-114

UTM Coordinates: 17W 520278 E 7956528 N **Date Surveyed:** 19-Jun-20

Summary: This stream provides habitat for juvenile Arctic Char. Perched culverts that may affect upstream access were remediated in fall 2019 and minor repairs to the works were completed in fall 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-114: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-113

UTM Coordinates: 17W 520747 E 7955659 N **Date Surveyed:** 19-Jun-20

Summary: Site is dry most of the open-water season and lacks a defined channel and connectivity with Phillips Creek. Some surface melt was present during the freshet in spring 2020, but flows were dispersed over the tundra downstream of the road. The stream typically dries shortly after freshet.


A


B


C


D


E


F

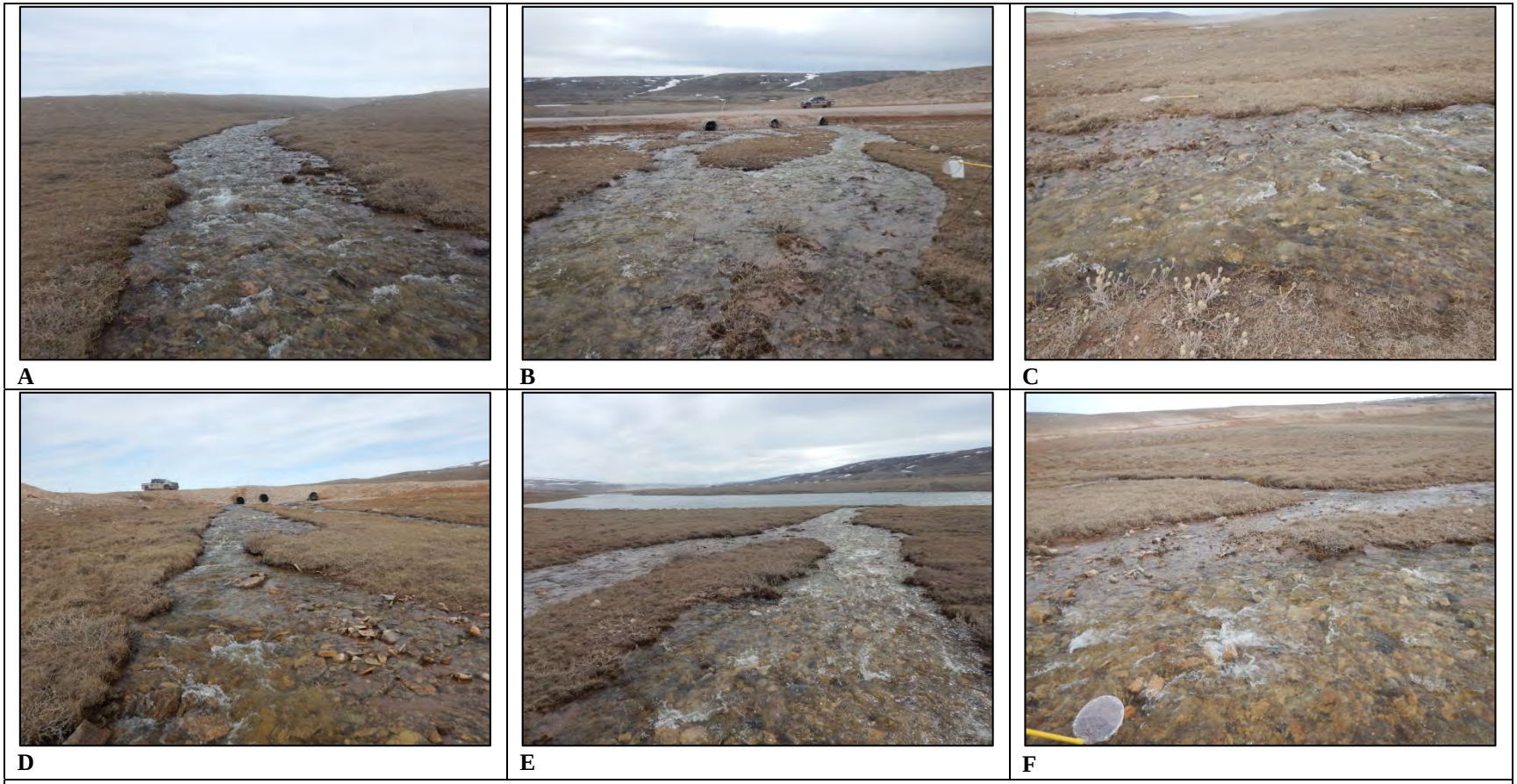
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-113: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-112

UTM Coordinates: 17W 521033 E 7954935 N **Date Surveyed:** 19-Jun-20

Summary: This stream provides summer rearing habitat for juvenile Arctic Char. There are no fish passage issues.



A **B** **C**

D **E** **F**

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-112: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – No

Tote Road Site CV-111

UTM Coordinates: 17W 521355 E 7954524 N **Date Surveyed:** 19-Jun-20

Summary: This stream provides summer rearing habitat for juvenile Arctic Char. Culvert was recently reinstalled and is perched. Remediation measures in 2019 were insufficient to improve fish access. Additional remediation required. See remediation Appendix C for details.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-111: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – No

Tote Road Site CV-202

UTM Coordinates: 17W 521603 E 7953731 N **Date Surveyed:** 19-Jun-20

Summary: Site has no natural channel downstream, little surface flow, particularly following completion of freshet, and is not connected to Phillips Creek.

A

B

Photos 1. Photographs of the Tote Road crossing CV-202: (A) looking upstream from culvert; and (B) looking upstream towards culvert.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No**
			Ninespine Stickleback – No

Tote Road Site CV-106

UTM Coordinates: 17W 521663 E 7953392 N **Date Surveyed:** 19-Jun-20

Summary: Stream provides summer rearing habitat for juvenile Arctic Char, though it frequently becomes dry following freshet without additional inputs of precipitation. An existing ramp (2018) designed to improve access received additional modifications in 2019 and 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-106: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

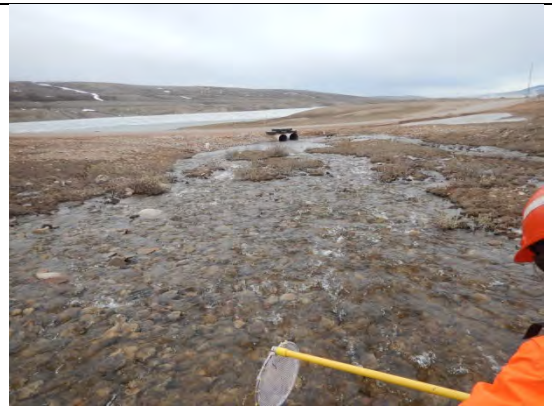
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-104

UTM Coordinates: 17W 521732 E 7952788 N **Date Surveyed:** 19-Jun-20

Summary: Though water levels are occasionally low (as in 2019), this stream typically provides summer rearing habitat for juvenile Arctic Char. There were no passage issues identified in 2020.


A


B


C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Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-104: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – No

Tote Road Site CV-203

UTM Coordinates: 17W 521741 E 7952440 N **Date Surveyed:** 19-Jun-20

Summary: Stream is typically dry immediately after the freshet. Downstream of the crossing, the channel disappears over a steep gradient. There is no sustained connectivity to Phillips Creek.

A

B

Photos 1. Photographs downstream of the Tote Road crossing CV-203: (A) looking upstream; and (B) looking downstream towards Phillips Creek.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-102

UTM Coordinates: 17W 521934 E 7950591 N **Date Surveyed:** 20-Jun-20

Summary: This stream typically provides summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-102: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-099

UTM Coordinates: 17W 521886 E 7945397 N **Date Surveyed:** 20-Jun-20

Summary: A large stream with abundant fish habitat. During high flows, water velocities in the culverts can be sufficiently high to restrict upstream access to larger juvenile char. Electrofishing could not be safely conducted in this stream during peak freshet in 2020 due to high flows. Fish use was not assessed for CV-099, but other streams in the study area showed minimal fish use during this period.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-099: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-094

UTM Coordinates: 17W 522805 E 7945397 N **Date Surveyed:** 20-Jun-20

Summary: Site provides good quality summer rearing habitat for juvenile Arctic Char, but a natural downstream vertical barrier prevents access from overwintering habitat. Fish cannot naturally access the crossing or farther upstream habitat.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-094: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

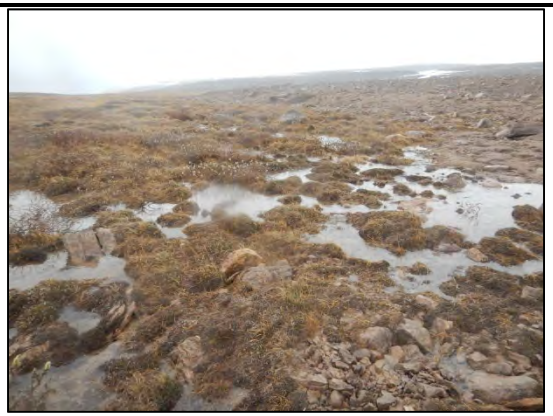
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-086

UTM Coordinates: 17W 523746 E 7940983 N **Date Surveyed:** 20-Jun-20

Summary: No natural channel and surface water dries up shortly after peak freshet. There is also a steep gradient downstream from the road that prevents fish access to the area and the crossing lacks connectivity to overwintering habitat.

A



B

C

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F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-086: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-082

UTM Coordinates: 17W 525254 E 7938131 N **Date Surveyed:** 20-Jun-20

Summary: No natural channel upstream from the road where meltwater pools on terrestrial habitat and subsequently dries up shortly after peak freshet. There is also a steep gradient downstream from the road and the crossing lacks connectivity to overwintering habitat.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-082: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-079

UTM Coordinates: 17W 525538 E 7937314 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.

A B C D E F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-079: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-078

UTM Coordinates: 17W 525852 E 7936787 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.


A


B


C


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F

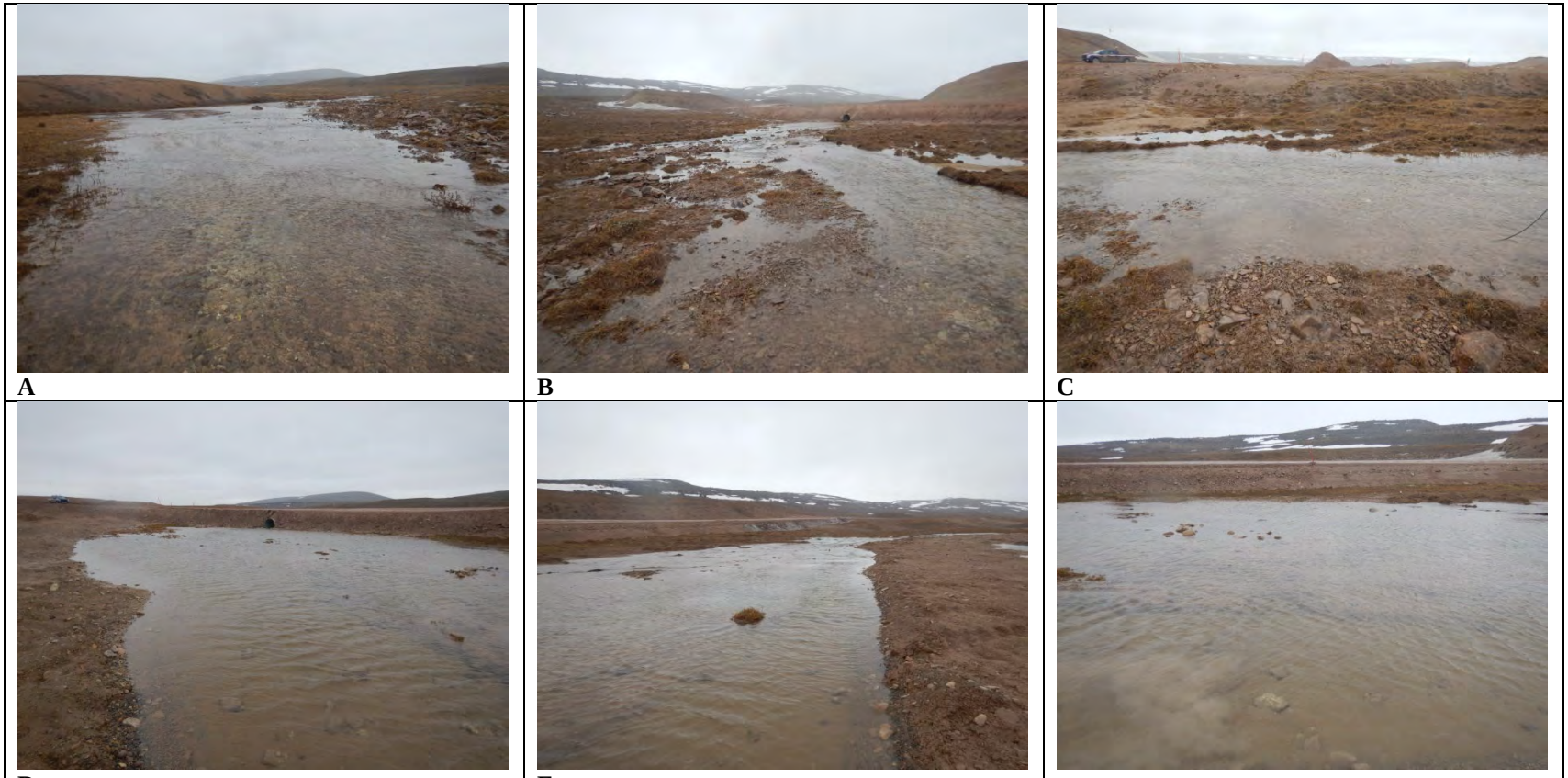
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-078: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-076

UTM Coordinates: 17W 526586 E 7935498 N **Date Surveyed:** 20-Jun-20

Summary: Small stream providing summer rearing habitat for juvenile Arctic Char. There was some flow observed underneath the road 5 m south of the culvert. This has not been previously observed and likely only occurs during peak freshet. There were no issues affecting fish passage in 2020.



A B C D E F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-076: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – No

Tote Road Site CV-072

UTM Coordinates: 17W 526897 E 7934576 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-072: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – No

Tote Road Site CV-060

UTM Coordinates: 17W 527622 E 7930342 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-060: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

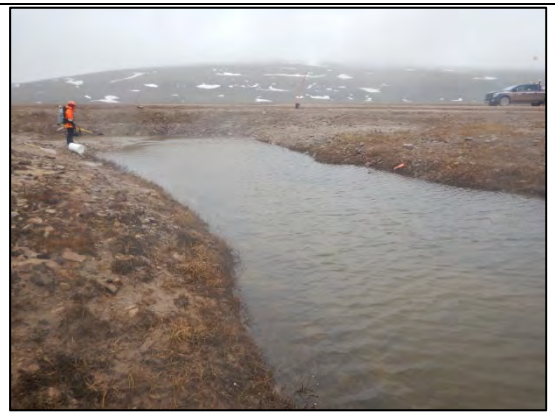
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-059

UTM Coordinates: 17W 528094 E 7929347 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.


A


B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F

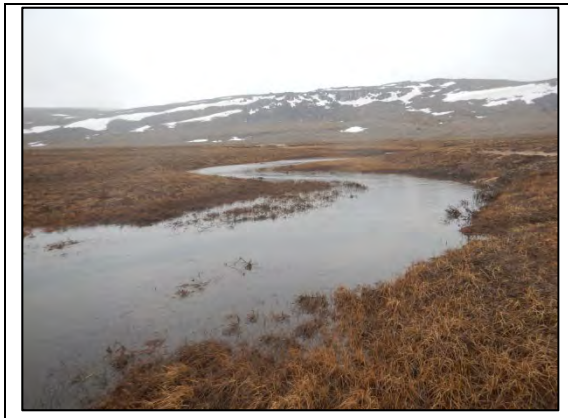
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-059: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site CV-058

UTM Coordinates: 17W 528322 E 7928839 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.


A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E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-058: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Tote Road Site CV-057

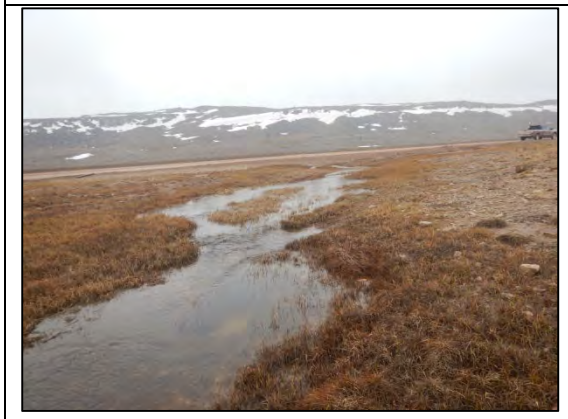
UTM Coordinates: 17W 528379 E 7928657 N **Date Surveyed:** 20-Jun-20

Summary: Site provides some summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020; however, culverts are becoming increasingly filled with sediment, which may create a blockage to fish movements if not remediated. Remediation recommended for winter months.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-057: (A,D) looking upstream; (B,E) looking downstream; (C) looking across; and (F) sediment-filled culverts.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site BG-50

UTM Coordinates: 17W 529294 E 7926852 N **Date Surveyed:** 20-Jun-20

Summary: Large river with abundant habitat for both species. One channel is crossed by a bridge and the other with two culverts. Culverts were perched, blocking fish movements in spring 2019; remediation work was conducted in fall 2019 but the structures were destroyed by high flows during the 2020 freshet. Alternative remediation will be required going forward.

A

B

C

D

E

F

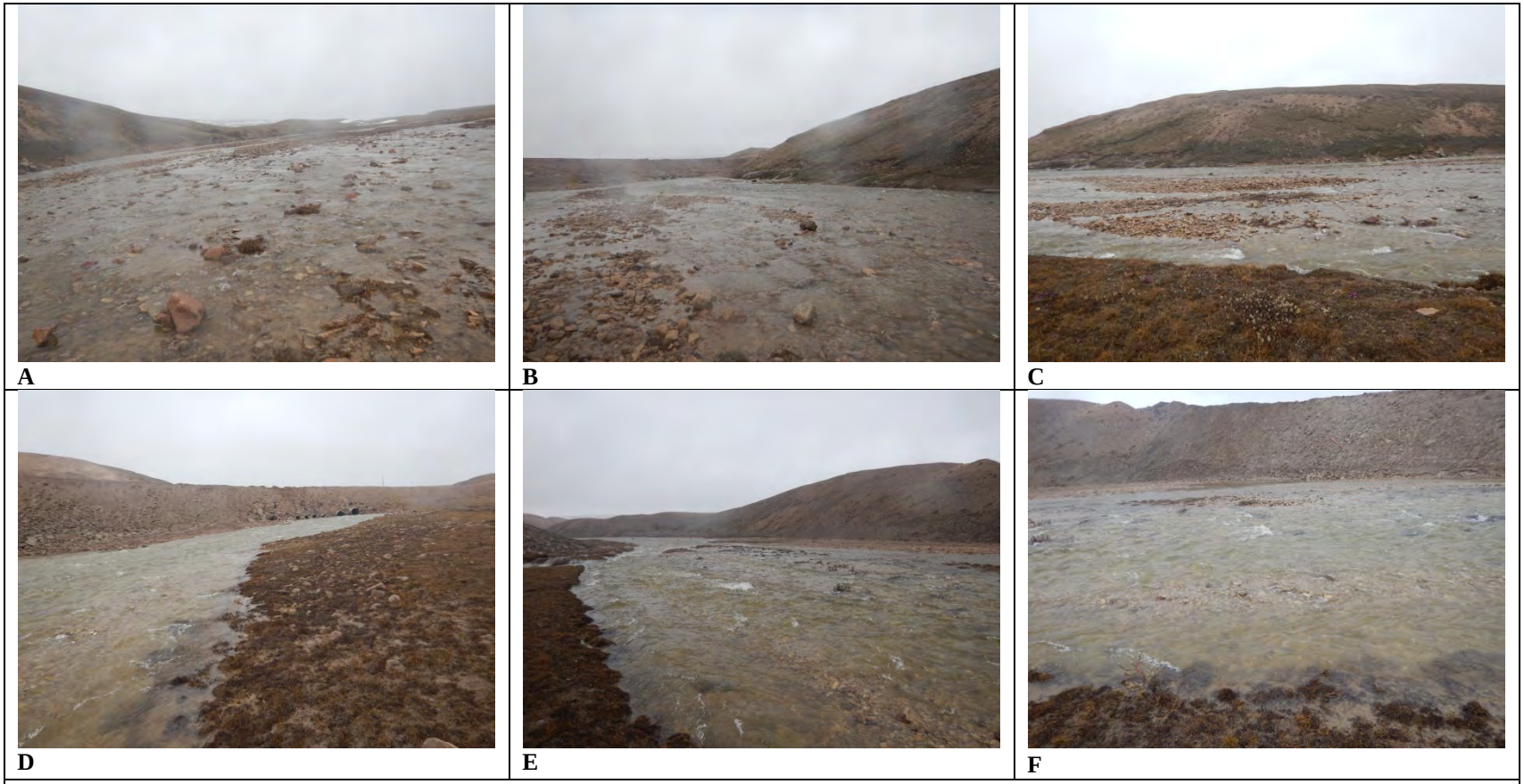
Photos 1. Photographs upstream (top) downstream (bottom) of the Tote Road crossing BG-50: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-049

UTM Coordinates: 17W 529654 E 7926545 N **Date Surveyed:** 20-Jun-20

Summary: Site provides abundant summer rearing habitat for juvenile Arctic Char. There were no fish passage issues identified in 2020.



A B C D E F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-049: (A,D) looking upstream; (B,E) looking downstream; (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-048

UTM Coordinates: 17W 530415 E 7925875 N **Date Surveyed:** 20-Jun-20

Summary: A persistent natural downstream subsurface flow barrier near the confluence with crossing CV-049 prevents fish access from downstream overwintering lakes.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-048: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

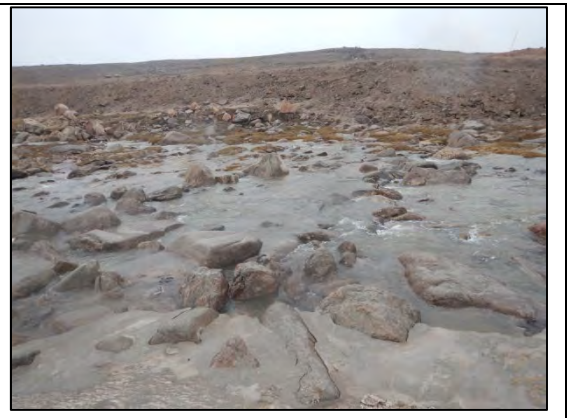
Tote Road Site CV-046

UTM Coordinates: 17W 531686 E 7924265 N **Date Surveyed:** 20-Jun-20

Summary: A persistent natural downstream subsurface flow barrier near the confluence with crossing CV-049 prevents fish access from downstream overwintering lakes.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-046: (A,D) looking upstream; (B,E) looking downstream; (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-040

UTM Coordinates: 17W 535168 E 7920326 N **Date Surveyed:** 20-Jun-20

Summary: There is consistent surface flow at the crossing, but natural seasonal subsurface flows (during spring) several hundred metres downstream combined with great distance to overwintering habitat prevent fish access to the crossing.


A


B


C


D


E


F

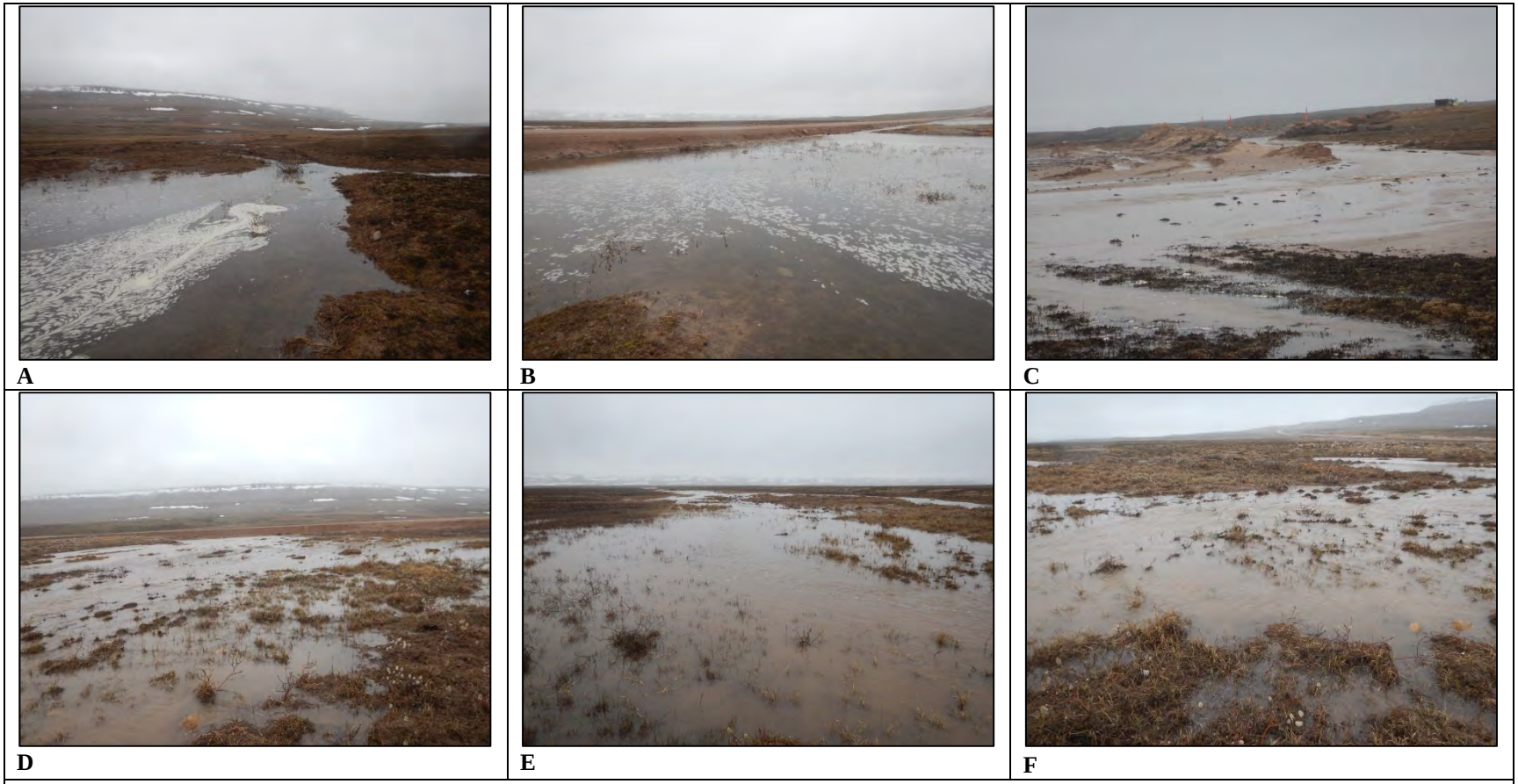
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-040: (A,D) looking upstream; (B,E) looking downstream; (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - No** **Ninespine Stickleback – No**

Tote Road Site CV-030

UTM Coordinates: 17W 540123 E 7921310 N **Date Surveyed:** 30-Jun-19

Summary: Arctic Char use of this stream is minimal due to consistently low water levels and lack of a defined channel, but Ninespine Stickleback are typically abundant. No culvert fish passage issues were identified in 2020; however a large amount of flow was diverted from CV-031 into CV-030 during freshet due to ice blockage of a culvert that increased sedimentation and erosion of riparian habitat.



A B C D E F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-030: (A,D) looking upstream; (B,E) looking downstream; (C) diversion flow from CV-031; and (F) looking across flooded terrestrial vegetation downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site BG-32

UTM Coordinates: 17W 540729 E 7921597 N **Date Surveyed:** 20-Jun-20

Summary: Consistently provides abundant, good quality rearing habitat for both species. No fish passage issues identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing BG-32 (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-217

UTM Coordinates: 17W 524321 E 7922189 N **Date Surveyed:** 20-Jun-20

Summary: A bridge and culvert crossing with abundant habitat for both species and no passage issues identified in 2020.

A

B

C

D

Photos 1. Photograph upstream of the Tote Road crossing CV-217: (A) showing Muriel Lake; and photographs downstream of the Tote Road: (B) looking upstream; (C) looking downstream; and (D) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-216

UTM Coordinates: 17W 542764 E 7921724 N **Date Surveyed:** 18-Jun-20

Summary: A small stream that provides habitat for Ninespine Stickleback and small juvenile Arctic Char (particularly young-of-the-year from Muriel Lake). A slight perch was remediated in 2019 and small repairs to the structure were completed in fall 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream of the Tote Road crossing CV-216: (A) looking upstream; (B) looking downstream; (C) looking across; and photographs downstream of the Tote Road: (D) looking upstream; (E) looking downstream; and (F) looking across (with snow stockpile visible in the channel).

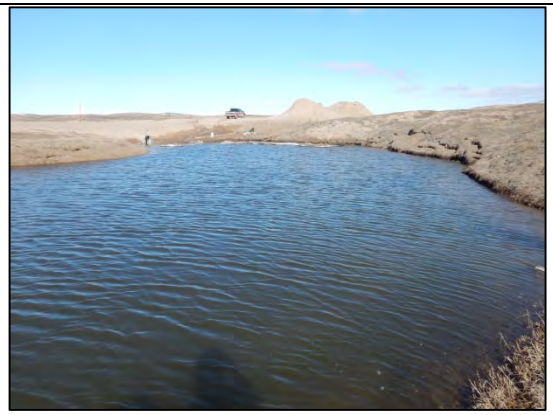
Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – Yes

Tote Road Site BG-30

UTM Coordinates: 17W 546070 E 7919844 N **Date Surveyed:** 18-Jun-20

Summary: Stream provides abundant rearing habitat, particularly upstream of the road in a large pond. Access to the upstream pond was created with a rocky ramp as part of the Tote Road Compensation Plan. There were no fish access issues identified in 2020.

A



B

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Photos 1. Photographs upstream of the Tote Road crossing BG-30: (A) looking upstream; (B) looking downstream; (C) looking across; and photographs downstream of the Tote Road: (D) looking upstream; (E) looking downstream; and (F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site BG-29

UTM Coordinates: 17W 546229 E 7919877 N **Date Surveyed:** 18-Jun-20

Summary: Stream provides abundant summer rearing habitat for both species. There were no fish access issues identified in 2020.

A B C D E F

Photos 1. Photographs upstream of the Tote Road crossing BG-29: (A) looking upstream; (B) looking downstream; (C) looking across; and photographs downstream of the Tote Road: (D) looking upstream; (E) looking downstream; and (F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site BG-27

UTM Coordinates: 17W 547876 E 7919355 N **Date Surveyed:** 21-Jun-20

Summary: Site provides summer rearing habitat for juvenile Arctic Char. No fish passage issues were identified in 2020.


A


B


C


D


E


F

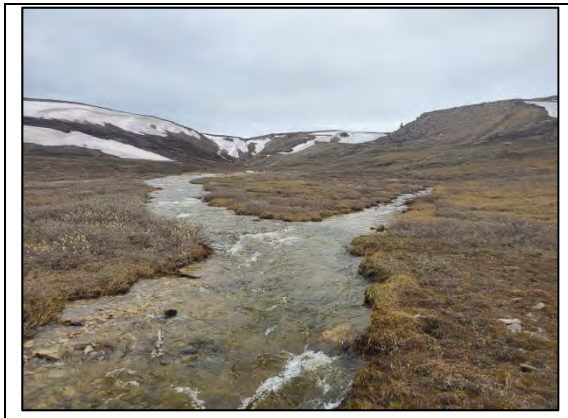
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing BG-27: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site BG-24

UTM Coordinates: 17W 548766 E 7918878 N **Date Surveyed:** 21-Jun-20

Summary: Site provides summer rearing habitat for juvenile Arctic Char. No fish passage issues were identified in 2020.


A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Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing BG-24: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – No**

Tote Road Site BG-17

UTM Coordinates: 17W 550703 E 7917643 N **Date Surveyed:** 21-Jun-20

Summary: Site provides summer rearing habitat for both species. No fish passage issues were identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing BG-17: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site BG-04

UTM Coordinates: 17W 553250 E 7915100 N **Date Surveyed:** 21-Jun-20

Summary: Site provides summer rearing habitat for both species. No fish passage issues were identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing BG-04: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Tote Road Site CV-001

UTM Coordinates: 17W 553544 E 7914897 N **Date Surveyed:** 20-Jun-20

Summary: This stream typically provides summer rearing habitat for both species. No fish passage issues were identified in 2020.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-001: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-223

UTM Coordinates: 17W 555705 E 7914676 N **Date Surveyed:** 20-Jun-20

Summary: This large river (Tom River) includes both bridge and culvert crossings. All channels crossed by the road provide abundant summer rearing habitat for Arctic Char. No fish passage issues were identified in 2020.

A

B

Photos 1. Photographs upstream (A) and downstream (B) of the Tote Road crossing CV-223 culverts.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – No

Tote Road Site CV-224

UTM Coordinates: 17W 556238 E 7915044 N **Date Surveyed:** 20-Jul-20

Summary: Site provides summer rearing habitat for both species. No fish passage issues were identified in 2020.


A


B


C


D


E


F

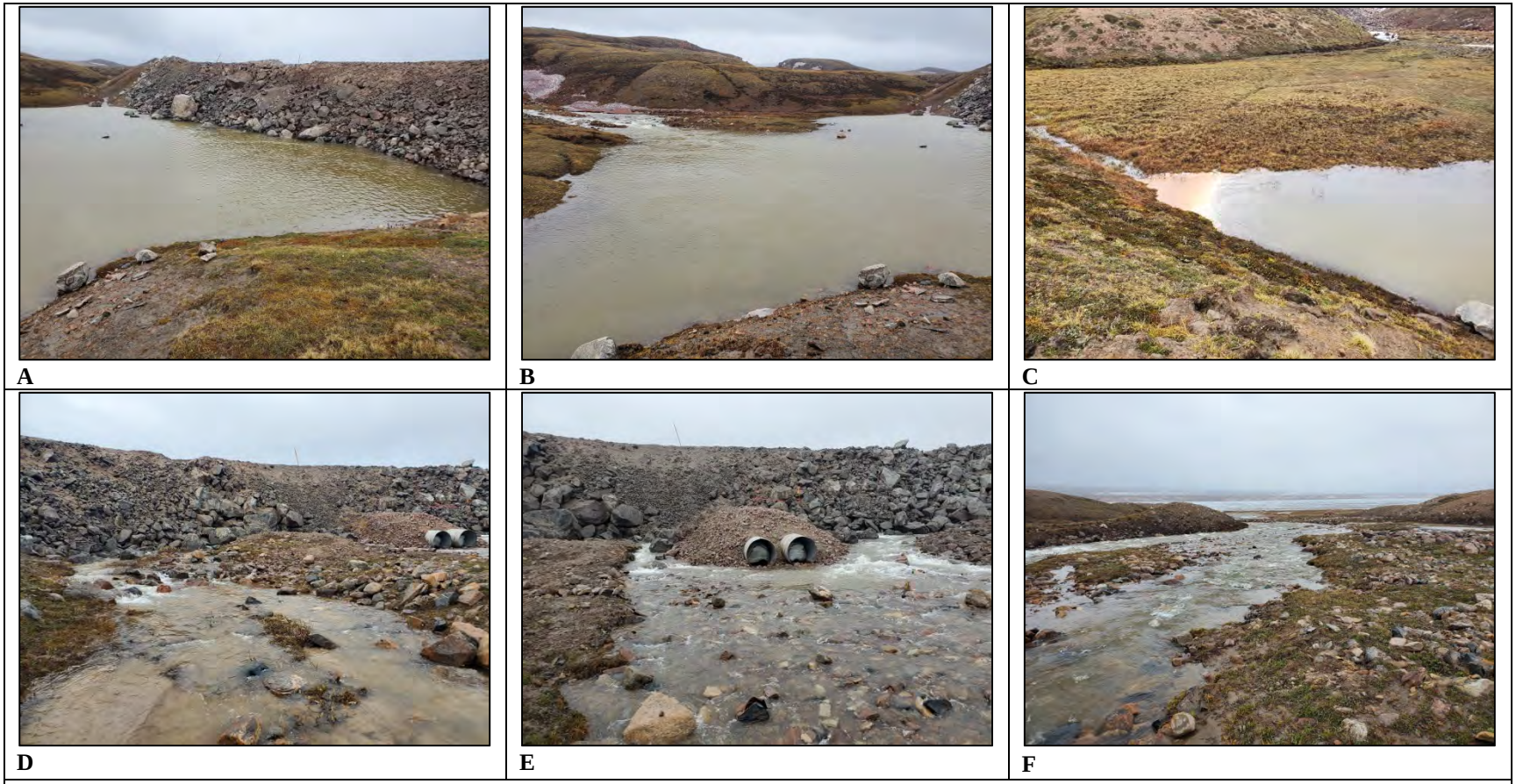
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-224: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-225

UTM Coordinates: 17W 557421 E 7915187 N **Date Surveyed:** 20-Jun-20

Summary: Site provides summer rearing habitat for both species. Remediation completed in early spring 2020 successfully reduced much of the culvert perching. However, water flow observed under the road due to frozen culverts at three locations, had caused erosion of the embankment and riparian habitat in spring 2020. Culverts were successfully cleared with steam immediately following the crossing survey. Continue monitoring of road and culverts going forward.



A B C D E F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-225 showing flooding caused by frozen culverts (A,B,C); flows underneath the road embankment (D,E); and (F) looking downstream.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site BG-01

UTM Coordinates: 17W 558000 E 7914928 N **Date Surveyed:** 20-Jun-20

Summary: This stream provides summer rearing habitat for both species. During the spring 2020 survey, two of three culverts remained frozen causing constriction of flows. Culverts were steamed free of ice immediately following site survey to restore normal flows.


A


B


C


D


E


F

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing BG-01: (A,D) looking upstream; (B,E) looking downstream; (C) looking across; and (F) looking at culverts.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-186

UTM Coordinates: 17W 560705 E 7913498 N **Date Surveyed:** 21-Jul-20

Summary: Site provides summer rearing habitat for both species. No fish passage issues were identified in 2020.


A


B


C


D


E


F

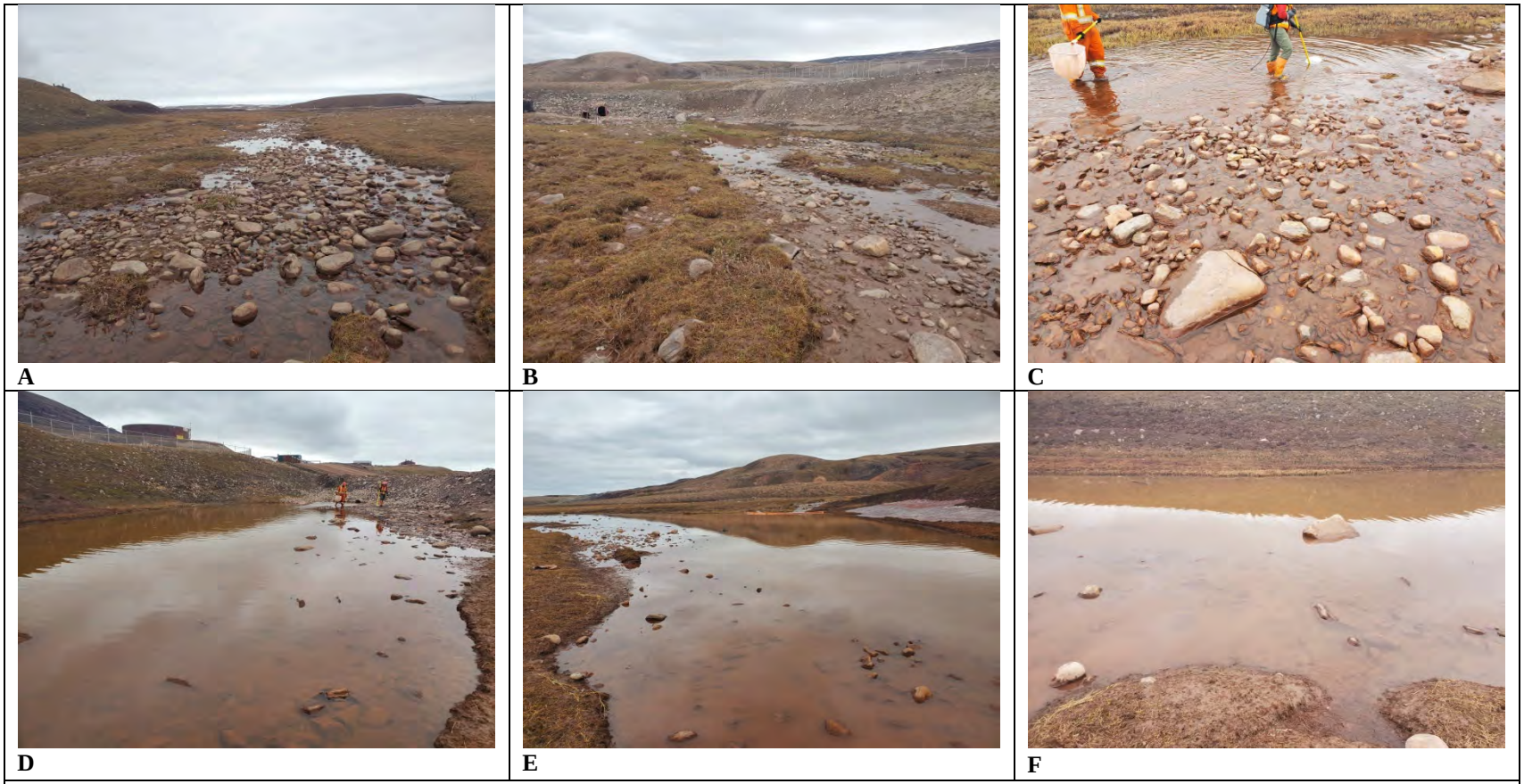
Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-186: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes** **Ninespine Stickleback – Yes**

Tote Road Site CV-187

UTM Coordinates: 17W 560957 E 7913414 N **Date Surveyed:** 21-Jul-20

Summary: Site provides summer rearing habitat for both species, though upstream reaches become dry as water levels decrease. No fish passage issues were identified in 2020.



A **B** **C**

D **E** **F**

Photos 1. Photographs upstream (top) and downstream (bottom) of the Tote Road crossing CV-187: (A,D) looking upstream; (B,E) looking downstream; and (C,F) looking across.

Baffinland Iron Mines Mary River Project	North/South Consultants Inc. Aquatic Environment Specialists	**Fish Habitat**	**Arctic Char - Yes**
			Ninespine Stickleback – Yes

APPENDIX C

PHOTOGRAPHIC LOG OF 2020 TOTE ROAD REMEDIATION WORKS

2020 Tote Road Stream Crossing Remediation – CV-129

Photos

A

B

C

Photos 1: Photographs of the downstream end of the perched culvert at CV-129 in spring 2020: (A) the damaged upstream end of the culvert in spring 2020; (B) the rocky ramp downstream of the road in spring 2020; and (C) the rocky ramp at the downstream end following repairs made in fall 2020.

2020 Tote Road Stream Crossing Remediation – CV-114

Photos

A

B

C

Photos 1: Photographs of the downstream end of the perched culvert at CV-114: (A) after remediation in fall 2019; (B) during freshet 2020; and (C) after repairs to the ramp in fall 2020.

2020 Tote Road Stream Crossing Remediation – CV-111

Photos

A

B

Photos 1: Photographs of the downstream end of the perched culvert at CV-111: (A) after remediation in fall 2019; (B) during freshet 2020, showing damage to the remediation works. A rocky ramp is unlikely to be effective at this site and a new remediation plan is required.

2020 Tote Road Stream Crossing Remediation – CV-106

Photos

A

B

C

Photos 1: Photographs of the downstream end of the perched culvert at CV-106: (A) after remediation in fall 2019 when the channel was dry; (B) during freshet 2020 when the channel was wetted, showing a slight perch; and (C) during fall 2020 when channel was dry again and some additional repairs were made to the structure. Effectiveness of measures at this site are difficult to quantify due to the short period during which there is surface flow in this stream.

2020 Tote Road Stream Crossing Remediation – CV-030

Photos

A

B

C

D

Photos 1: Photographs of the diversion of water from CV-031 to CV-030 in spring 2020: (A,B) the diversion channel from CV-031; (C,D) flooding, erosion and sedimentation at the upstream end of the CV-30 culverts.

2020 Tote Road Stream Crossing Remediation – CV-225

Photos

A

B

C

D

Photos 1: Photographs of the downstream end of the perched culvert at CV-225: (A) in spring 2019; (B) following remediation works completed in early spring 2020; and (C, D) in fall 2020 showing reduction in perching and step-pool approach to the culverts..