

Appendix G

2022 Hope Bay Mine Phase 1 Environmental Effects
Monitoring Interpretive Report



AGNICO EAGLE



**Agnico Eagle – Hope Bay Mine Phase 1
Environmental Effects Monitoring
Interpretive Report (2022)**

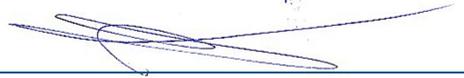
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January 2023

**Agnico Eagle – Hope Bay Mine Phase 1
Environmental Effects Monitoring
Interpretive Report (2022)**

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EXECUTIVE SUMMARY

The Hope Bay Mine, owned by Agnico Eagle Mines Limited, is located within the Hope Bay greenstone belt, on the south shore of Melville Sound of the West Kitikmeot region of mainland Nunavut. It is situated on an 80 by 20 km property that consists of three main gold deposits: Doris, Madrid, and Boston. The Doris gold deposit is currently the only deposit that is actively mined.

Roberts Bay is the receiving environment for effluent discharge associated with the Doris Mine, covering an area of approximately 1,430 hectares (ha) on the south shore of Melville Sound, to the east of Hope Bay. Discharge from the Hope Bay Mine includes groundwater and freshwater sources, including from the underground workings, the tailings impoundment area, or a combination of both. Effluent is discharged into Roberts Bay via an insulated pipeline to a multi-port diffuser. The Hope Bay Mine began discharging effluent into Roberts Bay at a rate in excess of 50 cubic metres (m³) per day, becoming subject to the Metal and Diamond Mining Effluent Regulations (MDMER) under the federal Fisheries Act on February 1st, 2020. The objective of EEM (Environmental Effects Monitoring) is to determine whether mine effluent is causing an effect on the fish population, the use of fisheries resources (e.g., mercury accumulation in fish tissues), and/or fish habitat (benthic invertebrate communities).

Effluent quality met all MDMER monthly mean and grab sample concentration limits and showed no acute toxicity to test organisms. Annual mean and grab sample mercury and selenium concentrations throughout the Phase 1 EEM were below the triggers for fish tissue sampling under EEM. Sublethal toxicity results showed that effects were observed to Giant Kelp in 2020 and 2021 but not in 2022. Rapid dilution of effluent within Roberts Bay and the concentrations at which effects were observed poses low risk to aquatic life within the receiving environment.

The influence of the Hope Bay Mine discharge on Roberts Bay is nearly undetectable. Mean concentrations of ammonia, nitrate, and manganese were slightly elevated at the effluent-exposed area compared to the reference area for mid-depth samples in 2021, indicating the presence of effluent, however no observable difference was present for other years, or for any other parameters over the duration of Phase 1. Phosphorus mean annual concentrations exceeded chronic CWQG (Canadian Water Quality Guidelines) during one sample year, however concentrations were elevated at both the effluent-exposed and reference areas, indicating a natural influence within Roberts Bay, rather than a mine-related influence.

Within Roberts Bay, effluent mixing occurs rapidly, resulting in a limited effluent plume and negligible concentrations of mine-indicator parameters in receiving environment samples. Based on this, no sublethal toxicity to test organisms in 2022, and no impairment to water quality



within the receiving environment, the Hope Bay Mine discharge is likely not having an impact on Roberts Bay.



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ACRONYMS AND ABBREVIATIONS

AEM – Agnico Eagle Mines

CWQG – Canadian Water Quality Guidelines

CCME – Canadian Council of Ministers of the Environment

CIRNAC - Crown-Indigenous Relations and Northern Affairs Canada

CETIS - Comprehensive Environmental Toxicity Information System

DQR – Data Quality Review

ECCC – Environment and Climate Change Canada

EC – Electrical Conductance

EEM – Environmental Effects Monitoring

HITS - Harris Industrial Testing Service

IC25 – Inhibition Concentration 25 Percent

LC25 – Lethal Concentration 25 Percent

LRL – Laboratory Reporting Limit

MDMER – Metal and Diamond Mining Effluent Regulations

MOD – Magnitude of Difference

NWB – Nunavut Water Board

NIRB – Nunavut Impact Review Board

ORP – Oxidation Reduction Potential

PPT – Parts Per Thousand

QA/QC – Quality Assurance / Quality Control

RBDS – Roberts Bay Discharge System

RBD1 – Roberts Bay Discharge 1

RISS - Regulatory Information Submission System

TAP – Technical Advisory Panel

TIA – Tailings Impoundment Area

TSS – Total Suspended Solids

TDS – Total Dissolved Solids

WTP – Water Treatment Plant



1 INTRODUCTION

1.1 Background

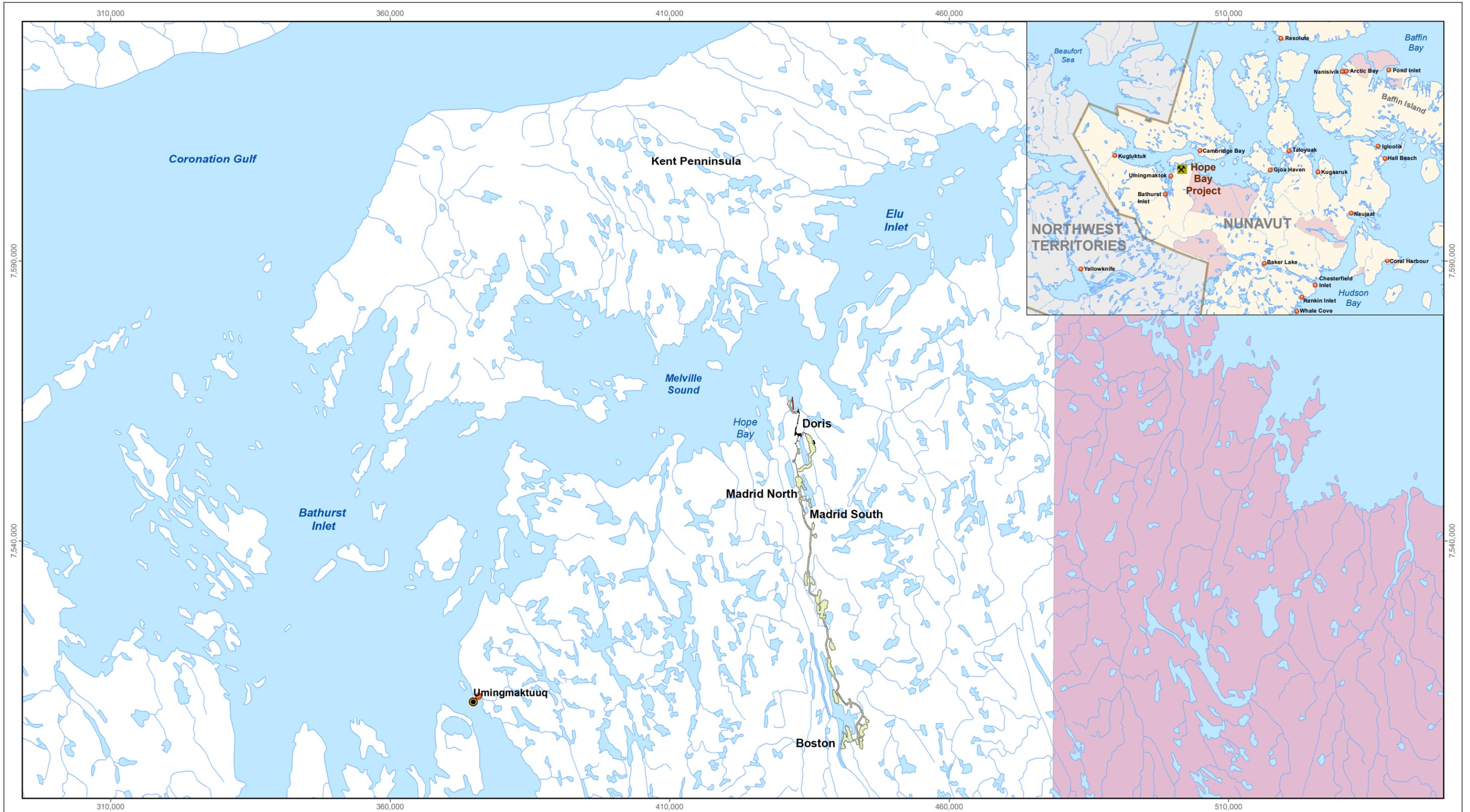
Agnico Eagle Mines Ltd. (AEM) Hope Bay Mine is located within the Hope Bay greenstone belt, along the south shore of Melville Sound in the West Kitikmeot region of mainland Nunavut (Figure 1.1). The Hope Bay Project is situated on an 80 by 20 km property that encompasses three main gold deposits: Doris, Madrid, and Boston. The Doris gold deposit is the northernmost deposit and is currently mined by AEM. The Madrid deposit is also located in the northern region of the property, just south of the Doris Mine. The Boston deposit is at the south end of the property near Aimaokatalok Lake (Figure 1.1). Nearby communities include Cambridge Bay (Iqaluktuttiaq), Bay Chimo (Umingmaktok), and Bathurst Inlet (Kingaok).

Exploration and mine development activities within the Hope Bay greenstone belt began in the late 1980s. Development of mining infrastructure continued until 2011 when the Hope Bay Project was placed into care and maintenance. In 2013, TMAC finalized the purchase of the Hope Bay Project from Newmont Corporation, which included all exploration and mineral rights associated with the Hope Bay Project, as well as the Doris Gold Mine and its existing permits, authorizations, and licenses. In March 2013, TMAC resumed exploration and baseline environmental monitoring activities at the Doris Gold Mine. Mine development resumed in the summer of 2015 and commercial gold production officially began in 2017. In 2021, Agnico Eagle Mines Ltd. finalized the purchase of the Hope Bay Mine from TMAC Resources. Doris Gold Mine operations ceased production in February 2022, while advanced exploration activities at the site continue.

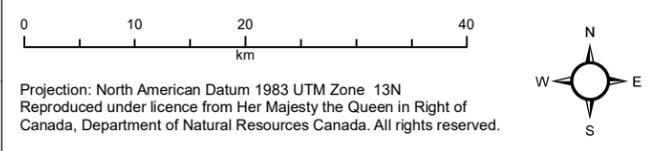
1.2 Discharge Infrastructure Overview

Roberts Bay is the receiving environment for effluent discharge associated with the Doris Mine and is also the location of a marine cargo dock constructed to facilitate shipments to and from site. Roberts Bay covers approximately 1,430 hectares (ha) on the south shore of Melville Sound, to the east of Hope Bay (Figure 1.2). Freshwater enters Roberts Bay from a number of tributaries, with the two largest being Little Roberts Lake Outflow and Glenn Lake Outflow. Water within Roberts Bay exchanges freely with the water in Melville Sound. Ice cover is present on Roberts Bay from late September through late June, with open water present through the remaining months (ERM 2016a). During ice covered months, 1 to 2 m of ice forms on Roberts Bay, sheltering it from atmospheric winds and reducing circulation. Through warming, wind, and freshwater inputs during the open water season, circulation within the bay increases, resulting in a ten-fold increase in the exchange rate with Melville Sound (ERM 2016a). Tidal ebb and flow currents are weak within the bay. The south shore of Roberts Bay is adjacent to infrastructure and activities associated with the Hope Bay Project.





- LEGEND**
- Community
 - Phase 2 Project Development Area
 - Permitted Infrastructure
 - Proposed Madrid-Boston Infrastructure and Facilities
 - Permanent Protected Area



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Location of the Agnico Eagle Mines Ltd. Hope Bay Project

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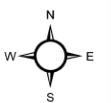
Figure 1.1



LEGEND

- Tundra Discharge Point
- Final Discharge Point
- Effluent Discharge Pipeline
- Watershed Boundary
- Infrastructure
- Infrastructure
- Bathymetry (5 meter interval)
- Road
- Contour (10m interval)

Hope Bay Mine Site Infrastructure



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Figure 1.2

The Hope Bay Project began depositing effluent into Roberts Bay at a rate in excess of 50 cubic metres (m³) per day on February 1, 2020 (Appendix A). Notification of the Final Discharge Point was provided to Environment and Climate Change Canada (ECCC) on March 16, 2020, as required under Section 9 of the Metal and Diamond Mining Effluent Regulations (MDMER; Government of Canada 2022).

Discharge from the Hope Bay Project includes saline groundwater from the underground workings (up to 25 ppt salinity) and freshwater from the Tailings Impoundment Area (TIA, 0.2 ppt salinity; ERM 2016b). During discharge, effluent released would be either from a combination of the two sources or from one of the sources depending on water management needs at the site. Under the original discharge conditions, effluent was initially pumped from the outfall berm through a single 2.4 km insulated pipeline to a multi-port diffuser located at a depth of 40 m and 575 m from the nearest shoreline. The diffuser is approximately 35 m long and includes four pairs of 4" ports (eight total) situated 8.2 m apart and 1.2 m above the sea floor, discharging horizontally. Effluent salinity would fluctuate based on the source of water but would be expected to be more buoyant than the receiving environment and would therefore rise in the water column before becoming fully mixed at a trapping depth¹. Initial modelling results indicated effluent would be quickly diluted, with concentrations 15 m from the diffuser reaching effluent dilution ratios of 160:1 (0.6%) at trapping depth when the most saline and coldest groundwater is discharged under ice² (ERM 2016b). Under the original discharge conditions, the predicted trapping depth would fluctuate, ranging from 28 to 35 m depth under ice, and 34 to 36 m during the open water season, based on effluent source and season.

During maintenance of the Roberts Bay Discharge System (RBDS) in fall 2020, portions of the submerged discharge line in Roberts Bay became buoyant and rose to the underside of the sea ice. To resolve the issue, the discharge line was cut at 1.4 km from shore to release the trapped air and enable both sections of the line to be laid back down to the ocean bottom. This resulted in the need to modify the discharge location of the RBDS, which now ended at 20 m depth, 1.4 km from shore, rather than 40 m depth, 2.4 km from shore. Information in the form of a self-assessment was provided to the NIRB on February 19, 2021 (Agnico Eagle, 2021), including the plan for the installation of a diffuser at the new location, updated modelling (with and without a diffuser) and an assessment of monitoring that had been conducted (Minnow 2020; 2021a,b). The NIRB subsequently confirmed that the new discharge location did not constitute a significant project modification.

¹ The depth at which effluent will no longer rise in the water column after mixing.

² This represents worst-case conditions based on modelled effluent mixing scenarios.



In order to maintain water balance within the TIA and water from the underground mine, Hope Bay Mine discharged effluent through the 2021 season from the modified discharge location, with planned installation of a diffuser during the open water season, as outlined during previous communications with the NIRB (Appendix A). In July 2021, the cut section of the pipe was successfully removed from the seabed as planned. However, due to troubleshooting of some air entrainment in the pipeline, the reattachment of the diffuser was postponed to September. The diffuser reattachment team was mobilized to site in mid-September, however, during this time the boats planned to be used for this work had engine failures and/or were taking in water, rendering the work unsafe to be completed. Repairs to the boats could not be completed before the freezing of Roberts Bay. Consequently, the diffuser could not be installed as planned. Reinstallation of the diffuser was completed in August 2022, with discharge of effluent through the diffuser commencing on August 22nd, 2022.

1.3 Pertinent Regulations

Discharge of effluent at a rate greater than 50 m³ per day on February 1, 2020, triggered the Metal and Diamond Mining Effluent Regulations (Government of Canada, 2022; MDMER; SOR/2002-222) under the federal *Fisheries Act*. As part of the MDMER, Environmental Effects Monitoring (EEM) is required. This includes conducting effluent characterization, sublethal toxicity testing, receiving environment water quality monitoring, and biological monitoring (if required) of fish health, benthic invertebrate community health, and/or fish tissue concentrations of mercury and selenium. An overview of MDMER monitoring requirements is presented in Table 1.1.

In accordance with the MDMER, a study design for the first EEM phase (herein referred to as the Phase 1 EEM) was submitted to ECCC in January 2021, within one year of Hope Bay Mine becoming subject to the regulations (Minnow 2021c). Upon review of the study design, seven action items were identified by a technical advisory panel (TAP) consisting of representatives from ECCC, Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), and the Nunavut Water Board (NWB) in a letter dated March 31st, 2022 (Appendix A). . An addendum to the Study Design was prepared that included a detailed response to address each of these action items, which was submitted to ECCC on May 17th, 2022 (Minnow 2022; Appendix A). Subsequent approval of the Study Design (and associated addendum) was received from ECCC on May 31st, 2022 (Appendix A).

Based on the requirements stipulated within the MDMER, the Hope Bay Mine Phase 1 EEM Interpretive Report includes an assessment of effluent quality, acute and sublethal toxicity test results, and receiving environment monitoring. No biological monitoring was required for the Phase 1 EEM as effluent concentrations 100 and 250 m from the discharge were below 1%



(benthic invertebrate and fish health triggers, respectively) and mercury and selenium concentrations were below trigger concentrations in effluent (Table 1.1).



Table 1.1: MDMER Monitoring Requirements, Hope Bay Mine

Component	Timeframe	MDMER Requirement	Trigger	Frequency ^c
Effluent Monitoring and Characterization	Continuous	Reporting discharge volumes, chemistry, acute toxicity, sublethal toxicity	Triggered when Hope Bay Mine commenced effluent discharge into Roberts Bay	Discharge volume monitoring, weekly sampling for deleterious substances, temperature, salinity, and pH as per MDMER ^a , monthly acute toxicity, and quarterly effluent chemistry sampling ^b
Sublethal Toxicity Testing	Continuous	Sublethal toxicity testing of effluent using fish species, invertebrate species, and algal species	Triggered when Hope Bay Mine commenced effluent discharge into Roberts Bay	Twice per year for the first EEM phase, 4 times per year after the first 3 years on the most sensitive species
Receiving Environmental Water Quality	Continuous	Routine monitoring at reference and exposed areas	Triggered when Hope Bay Mine commenced effluent discharge into Roberts Bay	Three times per year, in-situ water quality, salinity, water chemistry ^d , percent effluent concentration calculations using effluent indicator parameters
Benthic Invertebrate Community Health	3 year cycle	To be completed if effluent concentrations are >1% 100 m from the discharge during the 3-year period between study design submissions, unless no effects have been observed over the previous two studies	Not triggered , effluent concentrations were less than 1% at 100 m from the discharge in the receiving environment	If triggered, benthic invertebrate sampling at both the effluent-exposed and reference sites in Roberts Bay, including statistical comparisons, to be completed once per cycle
Sediment Quality	3 year cycle	Required if sampling benthic invertebrates	Not triggered , effluent concentrations were less than 1% at 100 m from the discharge in the receiving environment	If triggered, sediment chemistry, particle size, and statistical comparisons across effluent-exposed and reference sites, to be completed once per cycle
Fish Health	3 year cycle	To be completed if effluent concentrations are >1% 250 m from the discharge during the 3-year period between study design submissions, unless no effects have been observed over the two previous studies	Not triggered , effluent concentrations were less than 1% at 250 m from the discharge in the receiving environment	If triggered, fish health and fish populations studies, statistical comparisons of endpoints across effluent-exposed and reference stations, to be completed once per cycle
Fish Tissue Chemistry Selenium	3 year cycle	To be completed if concentrations of total selenium in effluent are equal to or greater than 10 µg/L at any time during the previous three years, or if effluent characterization reveals an annual mean concentration of total selenium which is equal to or greater than 5 µg/L, based on a calendar year	Not triggered , due to low levels of selenium concentrations in effluent during monthly sampling, and as an annual mean concentration	If triggered, fish tissue sampling to be completed, assessing selenium concentrations in muscle and/or ovary tissues
Fish Tissue Chemistry Mercury	3 year cycle	To be completed if effluent characterization reveals an annual mean concentration that is equal to greater than 0.10 µg/L, based on a calendar year, or unless the results of the previous two monitoring studies indicate no effect on fish tissue from mercury	Not triggered , due to low levels of mercury concentrations in effluent during monthly sampling, and as an annual mean concentration	If triggered, fish tissue sampling to be completed, assessing mercury concentrations in muscle tissue

Notes: MDMER - Metal and Diamond Mining Effluent Regulations

^a Deleterious substances include arsenic, copper, cyanide, lead, nickel, zinc, total suspended solids, radium-226, and un-ionized ammonia.

^b Effluent characterization includes hardness, alkalinity, electrical conductivity, temperature, and concentrations of aluminum, cadmium, iron, mercury, molybdenum, selenium, nitrate, chloride, chromium, cobalt, sulphate, thallium, uranium, phosphorus, manganese

^c Frequency of sampling in the receiving environment was dependent on ice-free conditions. Sampling usually occurred a maximum three times per year. Effluent was sampled only during times of discharge.

^d Included effluent indicator parameters (ammonia, copper, and manganese), as well as *in-situ* water quality and water chemistry (metals, nutrients, and anions).

^e If laboratory reporting limits (LRL) are equal to or above these concentration values four or more times in a calendar year, a fish tissue chemistry study must also be conducted.

2 METHODS

2.1 Overview

The Hope Bay Mine Phase 1 EEM Interpretive Report presents the results of effluent quality monitoring, toxicity testing, and receiving environment water quality monitoring completed by the mine from 2020 through 2022. As effluent concentrations in the receiving environment were below the triggers for biological monitoring during the period assessed for the study design (Appendix A, Minnow 2022), these components are not included within the report.

Water quality monitoring in Roberts Bay is conducted directly over the diffuser (effluent-exposed) and at a reference area located on the east side of Roberts Bay (Figure 2.1). A description of the methods used for collection effluent and receiving water samples and data analysis are provided in the sections below.

Effluent monitoring for the Roberts Bay Discharge (RBD1; effluent volume, quality, and acute/sublethal toxicity testing) and receiving environment water quality monitoring was conducted in accordance with MDMER requirements. As part of these requirements, AEM provided an annual effluent and water quality monitoring report to ECCC by March 31st of the following year that included sampling locations, dates, methods, and results together with information on quality assurance and quality control (QA/QC) (Government of Canada 2022).

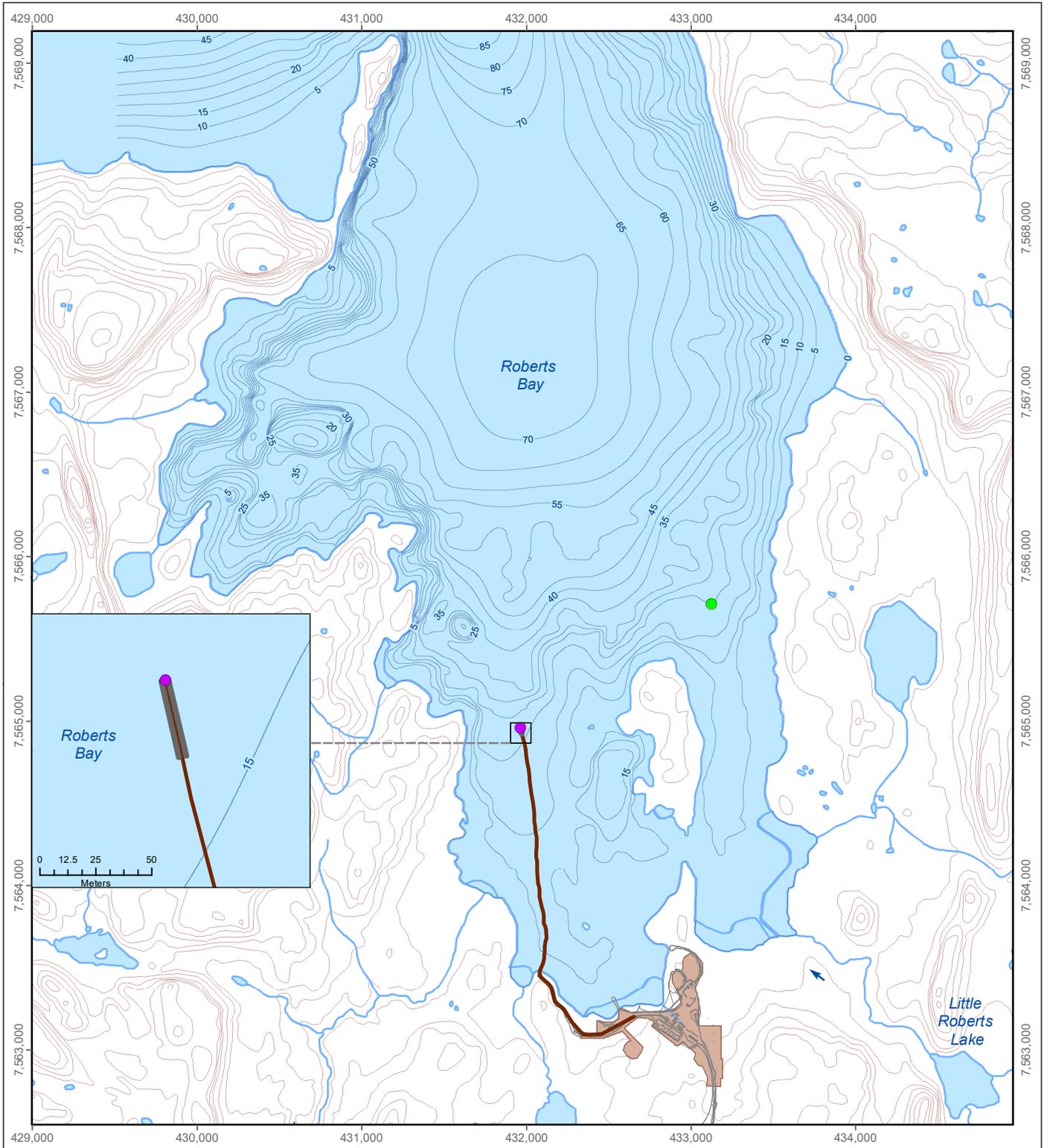
2.2 Effluent Volume and Quality

Effluent quantity and quality monitoring included routine MDMER monitoring (volume, deleterious substances, and acute toxicity), effluent characterization, and effluent sublethal toxicity testing. The volume of treated effluent discharged from the TIA to Roberts Bay is monitored continuously in units of cubic meters (m³) discharged daily at the final effluent discharge location, referred to as Station RBD1 (i.e., “Roberts Bay Discharge”). Deleterious substances (arsenic, copper, lead, nickel, zinc, total suspended solids, total cyanide, radium-226, and un-ionized ammonia), were monitored at least once per week during periods of effluent discharge.

Effluent characterization, including temperature (field), analysis of electrical conductivity (EC, field), pH (field), hardness, alkalinity, total suspended solids (TSS), total dissolved solids (TDS), salinity, oxidation reduction potential (ORP), anions and nutrients, and total metals/metalloids³, was conducted at least once per week during periods of effluent discharge in

³ The list of total metals/metalloids analyzed for effluent characterization included all metals, nutrients, and anions required under the MDMER (aluminum, cadmium, chromium, cobalt, iron, manganese, mercury, molybdenum, phosphorus, selenium, thallium, and uranium) plus other metal/metalloids, nutrients, and anions .





LEGEND

- Mine-exposed
- Reference
- Diffuser
- Effluent Discharge Pipeline
- Bathymetry (5 meter interval)
- Contour (10 meter interval)
- Road
- Infrastructure
- Infrastructure

2022 Receiving Environment Water Quality Monitoring Stations, TMAC Hope Bay Project

0 0.5 1 2 km

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Figure 2.1

accordance with MDMER requirements.⁴ Effluent samples were collected by Hope Bay Mine personnel as grab samples directly from the discharge pipe and were sent to various labs for analysis (ALS Vancouver, BC and Bureau Veritas Burnaby, BC). Concentrations of deleterious substances were compared to applicable MDMER limits and annual means were calculated to assess changes in effluent quality over time. Mercury and selenium concentrations in mine effluent were compared to the EEM fish tissue survey triggers based on individual values, annual means, and laboratory reporting limits (LRL) as specified under the MDMER (Schedule 5, Part 2, Sections 9(1)[c] and 9(1)[d]) to verify that a fish tissue survey was not required for the Phase 1 interpretive report.

Acute lethality testing was conducted at a minimum frequency of monthly, and sublethal toxicity testing was conducted twice per calendar year, using TIA effluent collected at Station RBD1 during periods of effluent discharge over the Phase 1 EEM period (i.e., 2020 to 2022). Final effluent samples for acute and sublethal toxicity testing were collected into labelled plastic containers (20 litre [L] and 10 L containers, respectively) provided by the toxicity laboratory, and placed into coolers packaged with ice packs. The effluent samples were shipped to various labs, (Nautilus Environmental in Burnaby, BC; Harris Industrial Testing Service Ltd. (HITS) in Waverley, NS; and Bureau Veritas in Burnaby, BC) for testing, ensuring appropriate hold times were met. Acute toxicity tests were conducted using the planktonic invertebrate *Acartia tonsa*, rainbow trout (*Oncorhynchus mykiss*), and/or the threespine stickleback (*Gasterosteus aculeatus*) in accordance with MDMER⁵ requirements and procedures (Environment Canada 2000a,b,; Environment Canada 2019; Government of Canada 2022). Following MDMER requirements, salinity concentrations exceeded 10 parts per thousand several times in 2021 and 2022 (Figure 2.2, which resulted in conducting acute toxicity testing on the threespine stickleback for these months during effluent discharge rather than rainbow trout.

Due to RBD1 effluent discharging into a marine environment, sublethal toxicity testing was conducted using Giant Kelp (*Macrocystis pyrifera*; 48-hour germination and germ tube growth test), an echinoderm (*Strongylocentrotus purpuratus*; 10-minute fertilization/reproduction test), and Pacific Topsmelt (*Atherinops affinis*; 7-day survival and growth test) using standard test methods (i.e., Environment Canada 2001; 2011; USEPA 1994; 1995)

⁴ Effluent characterization monitoring for Hope Bay final effluent (Station RBD1) was conducted at a frequency greater than that required under the MDMER (i.e., more frequently than once per calendar quarter) to better track effluent treatment performance.

⁵ As per MDMER regulations, if the salinity value of effluent is greater than four parts per thousand (ppt) and the effluent is deposited into marine waters, the mine shall conduct acute lethality testing on *Acartia tonsa*, replacing *Daphnia magna* as the test species. (Government of Canada, 2022). Salinity in effluent at Hope Bay Mine exceeded four ppt for most of the duration of the Phase 1 EEM (Figure 2.2).



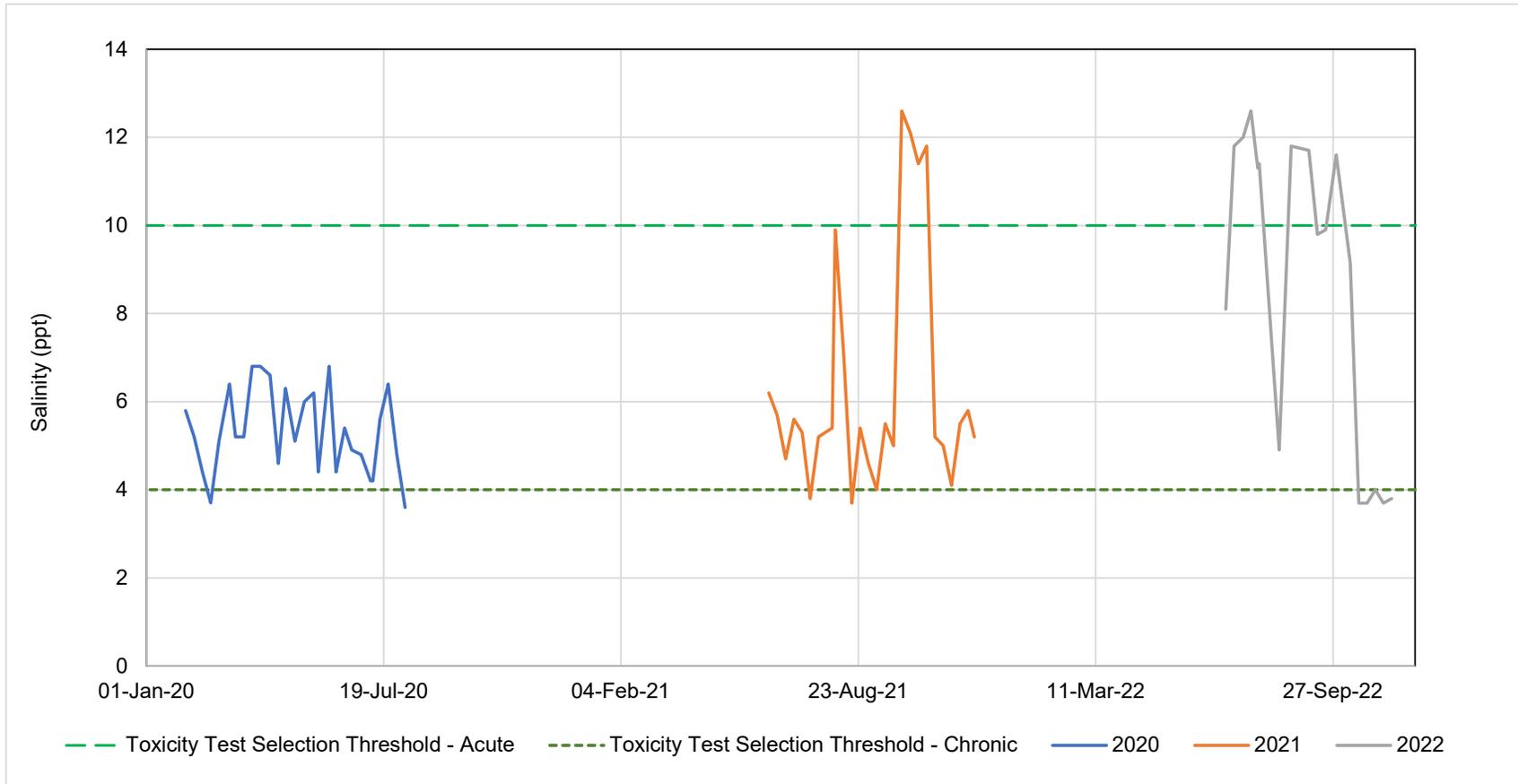


Figure 2.2: Salinity Concentrations of Hope Bay Mine Effluent (RBD1), 2020 to 2022

for 2020 through to 2022⁶. For all sublethal tests conducted, chronic toxicity test IC₂₅ (representing the concentration at which a 25% inhibition was observed relative to laboratory controls) was calculated from the corresponding survival, growth, or reproduction data. The IC₂₅ data were derived by the toxicity laboratory using non-linear regression models or linear interpolation models, as appropriate, aided by Comprehensive Environmental Toxicity Information System (CETIS) software (Tidepool Scientific Software, McKinleyville, CA). Effluent acute lethality and sublethal toxicity test results were reported to ECCC as part of quarterly/annual reporting requirements for the Hope Bay TIA effluent discharge and have been summarized for discussion in this Phase 1 EEM report.

Results of sublethal toxicity testing were evaluated relative to predicted effluent concentrations in the receiving environment, based on modelled results, to assess the potential for *in situ* effects to organisms living in Roberts Bay.

2.3 Receiving Environment Water Quality

2.3.1 Sampling Locations and Frequency

Based on modelling results, effluent exposed water quality monitoring in Roberts Bay focused on the area in the immediate vicinity of the effluent discharge diffuser (Figure 2.1). Three samples were collected corresponding to near surface, trapping depth, and near bottom. However, as conditions during sampling varied from year to year due to diffuser location and configuration, sampling depth corresponding to the trapping depth fluctuated over time, and near surface and near bottom depths varied based on change in location. Samples were collected at similar depths on the same day at the reference station located on the east side of Roberts Bay (Figure 2.1). The distance from shore and depth for the reference station were similar to the conditions near the diffuser.

Under MDMER, water quality monitoring is required four times per year at least one month apart, while the mine is depositing effluent (Schedule 4, Section 7(2)). However, as mentioned previously, Roberts Bay remains ice covered during a large portion of the year, with ice-out occurring in late June or early July, and ice cover returning in late September or early October. Water quality sampling in Roberts Bay commenced as soon as conditions were safe following ice-out, with subsequent samples collected a minimum of one month apart. As a result, only a maximum of three sampling events occurred during the ice-free periods for each year. Three sampling events occurred in 2020 and 2021, and only two sampling events occurred in 2022. Water quality monitoring results were reported annually by March 31 of the following

⁶ Only one sublethal toxicity sample was collected in 2020 due to the maintenance and repair issues with the submerged discharge line.



year to the Regulatory Information Submission System (RISS; per MDMER Schedule 5, Section 8).

2.3.2 Sample Collection and Analysis

At each sampling location, *in situ* water quality measurements were recorded using water collected from a Beta Bottle (used to collect the water sample) corresponding to each sample depth. Measurements included temperature (°C), dissolved oxygen (% and mg/L), pH, specific conductance (µS/cm), and salinity (ppt) using a calibrated water quality meter. Water samples at both the effluent-exposed and reference stations were collected using a beta bottle sampled at each of three depths at each station. Collecting samples at multiple depths helped to characterize conditions within the receiving environment, as well as aid in validating effluent mixing predictions. Quality control procedures associated with the sampling events included the collection of one duplicate sample and the submission of field and travel blank samples. Water samples were shipped to ALS Laboratories in Edmonton, Alberta, or Vancouver, British Columbia for analysis. Analyses included MDMER required substances, including metals, anions, and nutrients.

Receiving environment water quality was evaluated relative to guidelines protective of aquatic life, between effluent-exposed and reference sampling areas, and among depths. Water quality guidelines used for the EEM study included the CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines (CWQG, chronic and acute marine values; CCME 2022, including updates). Water chemistry data were summarized using annual means, with results assessed using the magnitude of difference between areas (i.e., exposed concentration divided by reference concentration).



3 EFFLUENT CHARACTERIZATION

3.1 Effluent Volume

Effluent from the Hope Bay Doris WTP and TIA (Station RBD1) was discharged at an average rate of approximately 6,150 m³/day in 2020, 5,980 m³/day in 2021, and 2,200 m³/day in 2022 (Figure 3.1). The total monthly volume of effluent discharged ranged from 4,504 to 225,270 m³ during the 2020 to 2022 period (Appendix Table B.1). Monthly discharge rates were generally comparable between 2020 and 2021, however, effluent was discharged at lower rates for most of 2022 (Figure 3.1). Lower rates of discharge in 2022 were due to recurring issues with toxicity to *Acartia tonsa* during pre-discharge toxicity testing, which prevented the mine from discharging effluent from the TIA. For those days in which effluent was discharged, total daily volume deposited ranged between 699 to 7,169 m³ in 2020, 12 to 8,922 m³ in 2021, and 4 to 5,877 m³ in 2022 (Appendix Table B.1). Intermittent low volumes of discharge occurred from the underground mine workings or during maintenance and testing procedures, but overall discharge to Roberts Bay was mainly sourced from the TIA, representing an average proportion of approximately 85% of effluent (Minnow 2021a,b). The cumulative volume of effluent discharged annually from the Doris Mine WTP and TIA at Station RBD1 in 2020 to 2022 ranged between 314,203 to 1,286,399 m³ (Appendix Table B.1).

3.2 Effluent Quality

Final effluent at Station RBD1 met all MDMER monthly mean and grab sample concentration limits (Table 3.1; Appendix Tables B.2 to B.4). Effluent characterization indicated that annual mean and grab sample mercury and selenium concentrations in effluent throughout the Phase 1 EEM period were well below the triggers for fish tissue monitoring (Tables 1.1 and 3.1; Appendix Tables B.2 to B.4). Effluent acute toxicity testing showed no toxicity to rainbow trout (2020 to 2022), threespine stickleback (2021 to 2022), or the copepod *Acartia tonsa* (2022) during the Phase 1 EEM period (Table 3.2).

Although effluent is not required to meet water quality guidelines, concentrations were evaluated to identify parameters that could potentially be used as an indicators within the receiving environment. Chromium and phosphorous were the only parameters with annual mean and maximum concentrations (all years for phosphorous; 2021 and 2022 for chromium) that exceeded an acute or chronic toxicity guideline (Table 3.1; Appendix Tables B.2 to B.4). Annual mean and maximum concentrations for all other parameters were below acute and chronic toxicity CWQG (Table 3.1; Appendix Tables B.2 to B.4).



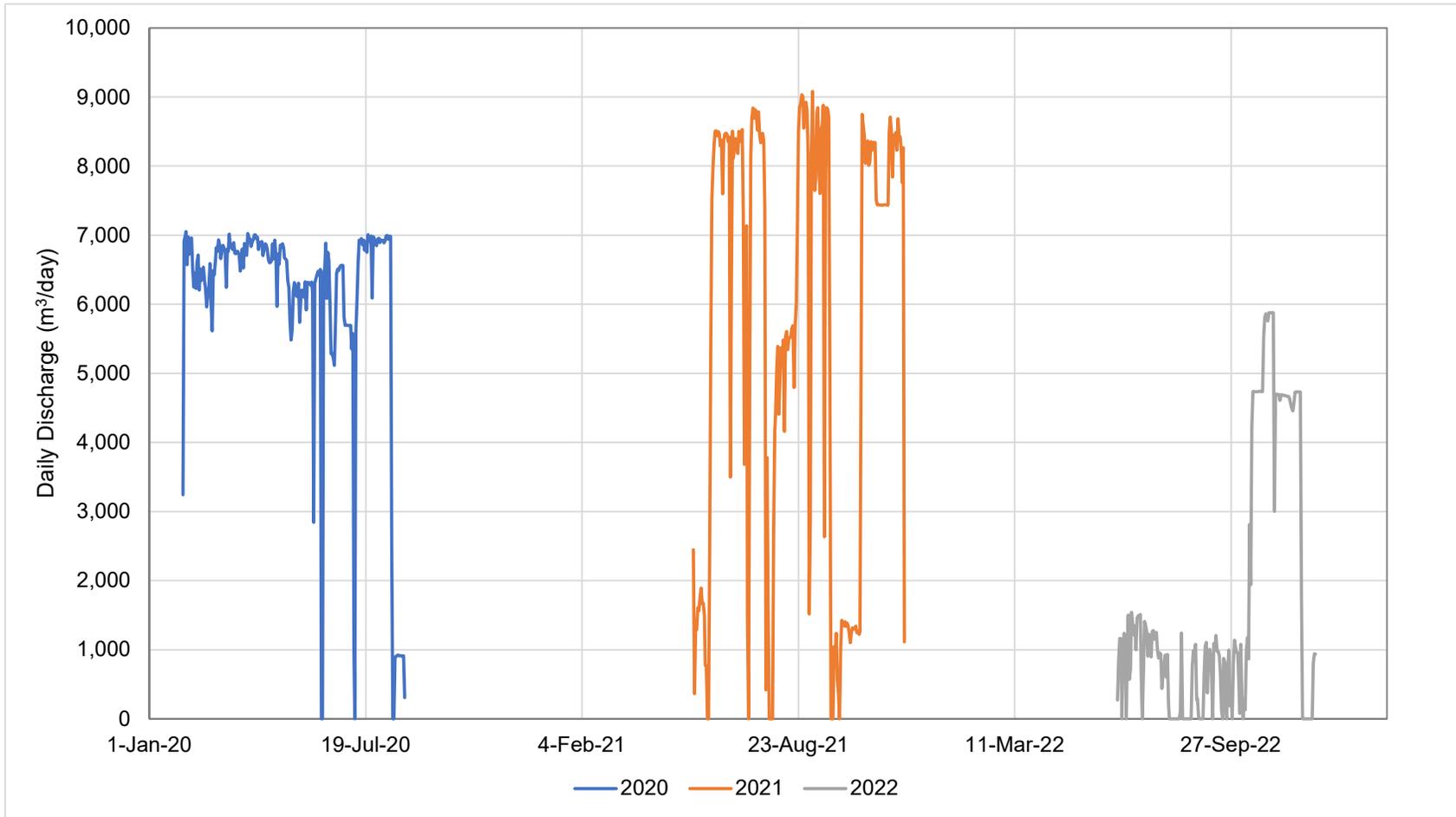


Figure 3.1: Hope Bay Mine Daily Effluent (RBD1) Discharge Rates, 2020 to 2022

Table 3.1: Mean Annual Effluent (RBD1) Chemistry Relative to Applicable Discharge Limits, 2020 to 2022

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		2020		2021		2022	
			Acute	Chronic	Average	Grab Sample	Mean	Max	Mean	Max	Mean	Max
In Situ Measurements												
pH	-	pH	-	-	-	-	7.65	8.17	7.18	7.46	7.45	8.00
EC (uS/cm)	-	uS/cm	-	-	-	-	12,380	18,970	-	-	12,912	19,790
Temp	-	C	-	-	-	-	4.29	11.5	6.47	11.8	7.97	11.5
ORP	-	mV	-	-	-	-	212	306	-	-	143	239
Salinity ^b	-	ppm	-	-	-	-	5.32	6.80	6.37	12.6	8.61	12.6
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	6,230	6,230	11,652	20,500	17,885	20,600
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.90	8.15	7.92	8.30	7.74	7.99
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	9.38	22.5	10.0	16.5	10.3	18.5
Total Dissolved Solids	0.1	mg/L	-	-	-	-	6,796	19,800	7,638	17,900	8,990	13,400
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	173	199	138	182	127	152
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	7.65	14.8	6.35	12.7	2.92	7.38
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1.0	0.0678	0.102	0.0718	0.286	0.0125	0.0355
Bromide (Br)	0.050	mg/L	-	-	-	-	10.7	35.8	12.9	34.5	21.2	27.4
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	3,005	9,650	3,660	9,070	-	-
Fluoride (F)	0.020	mg/L	-	NRG	-	-	1.10	2.00	1.16	2.00	1.66	2.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.67	6.93	5.55	15.4	4.91	9.55
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.145	0.346	0.251	1.06	0.249	0.434
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0949	1.00	0.346	1.00	0.663	1.00
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	669	690	731	1,030	-	-
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.164	0.658	0.033	0.100	0.017	0.034
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.362	7.41	0.371	2.03	1.12	3.06
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.00085	0.0034	0.00086	0.002	0.00143	0.002
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.002	0.0044	0.00198	0.00311	0.00176	0.00294
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0331	0.045	0.0377	0.0644	0.0432	0.0543
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	0.0007	0.002	0.00078	0.002	0.00057	0.002
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	0.00036	0.001	0.00039	0.001	0.0007	0.001
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.877	2.57	1.07	2.42	1.61	2.02
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	0.00037	0.0001	0.00004	0.0001	0.000075	0.0001
Calcium (Ca)-Total	0.0001	mg/L	-	-	-	-	266	710	268	538	425	506
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.00011	0.00039	0.00017	0.00058	0.00066	0.00104
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	0.0011	0.003	0.0039	0.01	0.0041	0.01
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.0049	0.0073	0.0042	0.0061	0.005	0.011
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0878	0.237	0.0424	0.0988	0.0117	0.0417
Iron (Fe)-Total	0.000050	mg/L	-	-	-	-	0.59	2.06	0.360	0.748	0.523	1.54
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.00051	0.001	0.00057	0.00132	0.00142	0.00602
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0435	0.091	0.0427	0.0849	0.0672	0.0856
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	192	588	233	549	342	424
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.737	1.36	0.653	1.13	0.755	0.860
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	0.000006	0.000011	<0.000005	<0.000005	0.000005	0.000005
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.0092	0.0123	0.0084	0.0117	0.0053	0.0079
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0161	0.0273	0.0119	0.0187	0.0106	0.0146
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	66.7	140	71.9	144	95.1	124
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	0.0104	0.0180	0.0123	0.0560	0.0189	0.0330
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0275	0.0688	0.0291	0.0664	0.0542	0.0762
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.00051	0.001	0.00059	0.00263	0.00076	0.001
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	3.53	4.60	3.19	4.51	4.72	7.15
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	0.000088	0.00020	0.00009	0.00042	0.00014	0.00020
Sodium (Na)-Total	0.0001	mg/L	-	-	-	-	1,783	4,970	2,128	4,690	3,061	3,790
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	2.93	7.72	3.15	7.62	5.29	6.98
Sulfur (S)-Total	5.0	mg/L	-	-	-	-	306	361	279	359	255	297
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	0.0014	0.0040	0.0016	0.0040	0.0028	0.0040
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	0.00007	0.00020	0.00008	0.00020	0.00014	0.00020
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	0.00071	0.0020	0.00078	0.0020	0.0014	0.0020
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	0.0007	0.002	0.0008	0.002	0.0014	0.002
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.0099	0.054	0.0033	0.0129	0.0075	0.0166
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.0018	0.0049	0.0028	0.0098	0.0025	0.0039
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.00031	0.00098	0.0002	0.00028	0.00018	0.00026
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	0.004	0.01	0.004	0.01	0.007	0.01
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0278	0.130	0.0245	0.060	0.0552	0.148
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	0.0014	0.004	0.0016	0.004	0.0028	0.004

Concentration exceeds a maximum discharge criteria limit.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit. °C = degrees Celsius. µS/cm - micro Siemens per centimetre. mg/L = milligrams per litre. Bq/L = Becquerels per litre. "-" indicates no data. CCME = Canadian Council of Ministers of the Environment. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table 3.2: Acute Toxicity Test Results (LC50 %v/v, % Survival), Hope Bay Mine Effluent (RBD1), 2020 to 2022

2020		2021			2022			
Date	Rainbow Trout	Date	Threespine Stickleback	Rainbow Trout	Date	Threespine Stickleback	Rainbow Trout	<i>Acartia tonsa</i>
3-Feb-20	>100	1-Jun-21	-	>100	15-Jun-22	>100	-	>100
2-Mar-20	>100	13-Jul-21	-	>100	5-Jul-22	>100	-	>100
14-Apr-20	>100	3-Aug-21	>100	-	12-Aug-22	-	>100	>100
13-May-20	>100	7-Sep-21	-	>100	22-Aug-22	>100	-	>100
4-Jun-20	>100	5-Oct-21	>100	-	6-Sep-22	>100	-	>100
8-Jul-20	>100	2-Nov-21	-	>100	-	-	-	-
7-Aug-20	>100	-	-	-	-	-	-	-
Mean	100.0	Mean	100	100	Mean	100	100	100

Notes: **Bold** - indicates test failed based on <100% survival requirement for MDMER discharge criteria, "-" indicates no data.

3.3 Sublethal Toxicity

Sublethal toxicity testing of RBD1 effluent was conducted once in 2020 and twice in both 2021 and 2022. During each of these tests, no effects were observed to Pacific Topsmelt (*Atherinops affinis*) survival or growth or to sea urchin (*Strongylocentrotus purpuratus*) fertilization (Table 3.3). Effects to giant kelp (*Macrocystis pyrifera*) were observed during tests conducted in 2020 and 2021 but not during those conducted in 2022 (Table 3.3). Effect concentrations measured in 2020 (2.8% and 10.4% for germination and tube length, respectively) were lower than those observed in 2021 (Table 3.3).

3.3.1 Effluent Mixing In Roberts Bay

Under the original discharge configuration (40 m depth in 2020), modelling showed that effluent mixed rapidly in Roberts Bay, and the effluent plume would be buoyant in both open water and ice-covered conditions. The plume would be trapped 28.3 to 35.7 m below the surface of Roberts Bay, roughly 11.7 to 4.3 m above the diffuser, with horizontal boundaries of the plume ranging from 5.8 m to 14.8 m (ERM, 2016a,b). Rapid dilution to low concentrations (0.62% to 0.18%) were observed within the vertical (trapping depth) and horizontal plume boundaries for each of the open water and ice covered scenarios (ERM, 2016a,b). Modelled conditions indicated that effluent would be diluted to <1% within 8.7 m of the diffuser under worst case, under-ice conditions (ERM 2016a,b).

For the End of Pipe discharge configuration (20 m depth in 2021), the effluent plume was predicted to rise vertically in the water column for both open water and ice-covered conditions (Minnow 2021a). Due to the density of the effluent, and depending on seasonal conditions, the effluent plume would impinge at different water depths before spreading out horizontally. During ice-covered conditions, the plume was predicted to rise to the underside of the ice cover, while in open water conditions, it was predicted to be impinged at an intermediate water depth between 9 m and 13 m before spreading horizontally. Under these conditions effluent would be diluted to 2.8% within 9 m of the outfall during ice-covered conditions and 4.3% within 13 m of the outfall during open-water conditions. Under average open-water conditions, effluent was predicted to be diluted 1.8% within 30 m of the discharge and the 1% effluent plume could extend to 208 m (Minnow 2021a).

Modelled results of the installation of the diffuser at 20 m depth predicted effluent would rise in the water column and greater dilution of effluent would occur (Minnow 2021b). Under all discharge scenarios modelled with the diffuser located at 20 m depth, effluent would be diluted to less than 3% within 14 m of the discharge. Beyond this distance, further dilution is influenced by effluent salinity, discharge rate, season, and ambient currents in Roberts Bay (Minnow 2021b).



Table 3.3: Sublethal Toxicity Test Results (% v/v, 95% Confidence Limits) for Hope Bay Mine Effluent (RBD1), 2020 to 2022

Date	Giant Kelp (<i>Macrocystis pyrifera</i>)		Echinoderm (<i>Strongylocentrotus purpuratus</i>)		Pacific Topsmelt (<i>Atherinops affinis</i>)		
	Germination	Tube Length	Fertilization		Survival	Growth	
	IC25 ^a	IC25 ^a	IC25 ^a	IC50 ^b	LC25 ^c	Dry Weight (IC25) ^a	Dry Biomass (IC25) ^a
10-Jul-20	2.8 (0.4-4.5)	10.4 (5.9-70.5)	100	100	100	100	100
22-Jun-21	26.1 (4.0-28.5)	27.1 (1.3-49.2)	100	100	100	100	100
24-Aug-21	>6.25	28.9 (20.2-66.6)	100	100	100	100	100
28-Jun-22	100	100	100	100	100	100	100
13-Sep-22	100	100	100	100	100	100	100
2020 to 2022 geomean	21	38	100	100	100	100	100

^a IC25 refers to the effluent concentration at which a 25% inhibition/reduction in endpoint was observed for test organisms relative to control.

^b IC50 refers to the effluent concentration at which a 50% inhibition/reduction in endpoint was observed for test organisms relative to control.

^c LC25 refers to the effluent concentration that resulted in 25% mortality of test organisms.

The maximum effluent concentration predicted 100 m from the diffuser was 1.25%, reaching 1% 151 m from the diffuser, based on average effluent salinity and conservative conditions in Roberts Bay (Minnow 2021b).

3.4 Predicted Receiving Environment Influence

Sublethal toxicity testing results indicated that effects were observed at low effluent concentrations for giant kelp in 2020 (2.8%) although recent tests have indicated no effect (Table 3.3). Effluent within Roberts Bay is diluted rapidly (i.e., effluent dilution of 4.3% within 13 m of the outfall for the End of Pipe configuration). Therefore, the spatial extent of effluent concentrations within Roberts Bay where effects could be observed would be very small and would be unlikely to cause any harm to aquatic life. Additionally, all discharge configurations indicate that effluent would be impinged at a trapping depth during the open water season, not exposing the more biologically productive surface layer (to 10 m depth) or the sediment-water interface to influence of effluent.



4 RECEIVING ENVIRONMENT WATER QUALITY

4.1 Water Chemistry

Annual mean measurements of *in situ* water quality parameters collected at mid-depth were similar at the effluent-exposed station of Roberts Bay and the reference station (Table 4.1). Sample depths changed across years due to the relocation of the diffuser, influencing temperature, conductivity, and salinity. However dissolved oxygen and pH were more comparable among years despite the variation in depth (Table 4.1; Appendix Tables B.5 to B.12). Salinity and pH measurements met applicable CWQG protective of aquatic life.

Three water sampling events in Roberts Bay were completed in both 2020 and 2021 (July, August, September⁷; Appendix Tables B.5 to B.10) and two sampling events were completed in 2022 (August, September; Appendix Tables B.11 and B.12). Effluent indicators were identified in the study design based on a comparison of effluent quality to receiving environment reference water quality (Minnow 2021c), and included ammonia, copper and manganese, which had concentrations in effluent that were more than 100 times the concentration measured at the reference area. Based on mean annual concentrations in the receiving environment for these parameters, concentrations of copper were comparable between areas during each year, while manganese and ammonia were slightly elevated at the mid depth samples in 2021 (2-fold and 4-fold, respectively), but not in 2020 or 2022 (Table 4.1). Nitrate concentrations were also slightly elevated (2-fold) at the mid-depth in 2021 but not the other years (Table 4.1). While the slight elevations help indicate the presence of effluent, estimated percent effluent concentrations were still low when comparing the effluent-exposed area to the reference area of Roberts Bay (i.e., less than 1%; Table 4.2). Mean annual concentrations of all other parameters at the mid-depth sample point were nearly identical between effluent-exposed and reference stations for each year (Table 4.1), as were results for the surface and bottom samples (Appendix Tables B.5 to B.12).

Of nutrients and anions assessed, only phosphorous exceeded the CWQG in 2020 (Table 4.1), however, this occurred at both the effluent-exposed and reference areas. Elevated concentrations at both the effluent-exposed and reference areas suggest there are natural fluctuations in water quality within Roberts Bay, indicating that the source is not effluent related.

⁷ In September 2020, effluent was not being discharged into Roberts Bay due to maintenance, but a sample was collected to evaluate non-discharge conditions at the exposed site.



Table 4.1: Summary of Water Quality Data from Reference and Exposed Stations, Roberts Bay, Mid Depth Stations, 2020 to 2022

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	2020	2021	2022	2020	2021	2022
				RB-REF-35M	RB-REF-15M	RB-REF-15M/13M	RB-EXP-35M	RB-EXP-15M	RB-EXP-8M/5M
Sample Size (n)	-	-	-	3	3	2	3	3	2
In situ Water Quality									
Station Depth	m	-	-	43	22	18	49	16	15
Temperature	C	-	-	0.5	2.9	5.8	0.7	2.9	6.6
Dissolved Oxygen	mg/L	-	-	9.48	11.38	34.98	9.56	11.24	33.46
Dissolved Oxygen Saturation	%	-	-	79.3	98.5	101.3	78.9	103.2	104.1
pH	pH	7.0-8.7	7.0-8.7	7.65	7.80	7.93	7.73	7.79	7.98
Conductivity	uS/cm	-	-	39,093	26,563	24,041	38,051	27,397	24,156
Specific Conductance	uS/cm	-	-	67,489	46,322	37,495	69,493	48,012	36,635
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	43.4	29.4	23.1	45.8	30.6	23.5
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	41,233	36,233	37,900	41,267	37,067	37,200
Hardness (as CaCO ₃)	mg/L	-	-	5,010	4,177	4,495	5,087	4,457	4,545
pH	pH	7.0-8.7	7.0-8.7	7.71	7.85	7.81	7.71	7.87	7.81
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	27.2	23.5	24.7	27.3	24.1	24.3
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	3.1	<2.0	2.4	2.7	3.0	4.6
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	100.1	89.5	89.5	98.4	92.1	89.3
Ammonia, Total (as N)	mg/L	-	-	0.0061	0.0051	<0.0050	0.0053	0.0196	<0.0050
Un-ionized Ammonia (as N) ^d	mg/L	-	1.9	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromide (Br)	mg/L	-	-	53.5	38.4	45.0	53.8	39.3	44.7
Chloride (Cl)	mg/L	NRG	NRG	15,100	11,083	13,350	14,833	11,333	13,400
Fluoride (F)	mg/L	-	NRG	0.96	0.65	<1.0	0.98	0.64	<1.0
Nitrate (as N)	mg/L	339	45	0.062	0.011	<0.50	0.065	0.025	<0.50
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.10	<0.010	<0.010	<0.10
Phosphorous (P) - Total	mg/L	0.05 ^e	0.05 ^e	0.06	0.04	0.03	0.05	0.04	0.03
Sulfate (SO ₄)	mg/L	-	-	2,187	1,780	1,825	2,200	1,763	1,830
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	0.0040	0.0056
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	<0.0050	0.0098	0.0275	<0.0050	0.0098	0.0275
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	0.0020	<0.010	<0.0010	0.0020
Arsenic (As)-Total	mg/L	-	0.0125	0.00139	0.00108	0.00203	0.00132	0.00108	0.00200
Barium (Ba)-Total	mg/L	-	-	0.0105	0.0096	0.0091	0.0107	0.0108	0.0083
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	0.0013	<0.00050	<0.00050	0.0013
Boron (B)-Total	mg/L	NRG	NRG	3.12	2.67	2.66	3.12	2.55	2.75
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.000055	0.000041	0.000117	0.000053	0.000044	0.000118
Calcium (Ca)-Total	mg/L	-	-	350	286	302	357	295	302
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^f	<0.00050	<0.00050	<0.0028	<0.00050	<0.00050	<0.0028
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	0.000053	<0.000050	0.000058	0.000053
Copper (Cu)-Total	mg/L	-	-	0.00051	<0.00050	0.0028	<0.00050	0.00063	0.0028
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	0.014	0.11	<0.010	0.012	0.11
Lead (Pb)-Total	mg/L	-	-	<0.000050	0.000057	0.00103	<0.000050	<0.000050	0.00103
Lithium (Li)-Total	mg/L	-	-	0.130	0.104	0.107	0.131	0.095	0.109
Magnesium (Mg)-Total	mg/L	-	-	1,003	841	909	1,022	903	922
Manganese (Mn)-Total	mg/L	-	-	0.00184	0.00163	0.00198	0.00242	0.00327	0.00213
Mercury (Hg)-Total	mg/L	-	0.000016	<0.0000050	0.0000051	0.00000335	<0.0000050	0.0000054	0.0000033
Molybdenum (Mo)-Total	mg/L	-	-	0.00878	0.00744	0.00819	0.00868	0.00765	0.00836
Nickel (Ni)-Total	mg/L	-	-	0.00053	<0.00050	0.0028	0.00052	0.000503	0.0028
Phosphorus (P)-Total	mg/L	-	-	0.0703	0.0293	0.0236	0.064	0.0334	0.0226
Potassium (K)-Total	mg/L	-	-	331	304	301	339	326	305
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0943	0.0845	0.0830	0.0946	0.0901	0.0814
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	0.0013	<0.00050	<0.00050	0.0013
Silicon (Si)-Total	mg/L	-	-	<1.0	1.0	0.75	<1.0	1.0	0.75
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	0.00018
Sodium (Na)-Total	mg/L	-	-	9,093	8,003	7,870	8,760	7,947	7,755
Strontium (Sr)-Total	mg/L	-	-	6.43	5.30	5.94	6.39	5.46	6.00
Sulfur (S)-Total	mg/L	-	-	917	807	735	936	827	745
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	0.0053	<0.00050	<0.00050	0.0053
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	0.00028	<0.000050	<0.000050	0.00028
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	0.0028	<0.00050	<0.00050	0.0028
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	0.0018
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030
Uranium (U)-Total	mg/L	NRG	NRG	0.00233	0.00205	0.00215	0.00231	0.00204	0.00212
Vanadium (V)-Total	mg/L	-	-	0.0011	0.00073	0.00287	0.0011	0.00077	0.00286
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	0.0037	0.014	<0.0030	0.0044	0.014
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	0.0053	<0.00050	<0.00050	0.0053

Mean concentration exceeds a CCME chronic marine value.
Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit or both chronic and acute CCME guidelines. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Calculated Un-ionized Ammonia concentrations were low (<0.001) and providing such values would be inaccurate when using available calculation methods.

^e Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^f CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table 4.2: Ammonia Concentrations and Percent Effluent Estimates at the Effluent-Exposed area of Roberts Bay at Trapping Depth, Hope Bay Mine EEM, 2021

Location ^a	Coordinates (UTM - NAD83, Zone 13W)	Ammonia Concentration		Percent Effluent Estimate	
		(mg/L)		Mean	Max
		Mean	Max		
Effluent	-	6.35	12.7	-	-
Reference	431940	0.0051	0.0099	-	-
	7564932				
Effluent-Exposed	433128	0.0196	0.0489	0.23%	0.31%
	7565717				

Note: "-" indicates not applicable/no data.

^a Effluent-exposed and reference water samples were collected at comparable depths in which models have shown effluent would be trapped.

5 SUMMARY AND RECOMMENDATIONS

5.1 Summary

Agnico Eagle Hope Bay Mine became subject to the Metal and Diamond Mining Effluent Regulations (MDMER) under the federal Fisheries Act, February 1st, 2020, when the mine began discharging effluent into Roberts Bay. The MDMER outline requirements for routine effluent and water quality monitoring, and if triggered biological monitoring, collectively referred to as Environmental Effects Monitoring (EEM) studies. In accordance with MDMER requirements, this interpretive report provided a summary of effluent and water quality monitoring data. This is the first EEM Interpretive Report (Phase 1) submitted for the Hope Bay Mine.

As part of the Phase 1 EEM, effluent quality, toxicity test results, and receiving environment water quality for the 2020 to 2022 period was assessed. Due to the limited spatial extent of the effluent plume in Roberts Bay, biological monitoring studies were not required under MDMER as part of EEM for the Hope Bay Project (i.e., effluent concentrations 100 and 250 m from the discharge were less than 1%).

Effluent quality met all MDMER monthly mean and grab sample concentration limits and showed no acute toxicity to test organisms. Sublethal toxicity testing results show that effects were observed to Giant Kelp in 2020 and 2021 but not in 2022. Based on the rapid dilution of effluent within Roberts Bay and the concentrations at which effects were observed during those years, the risk to aquatic life within the receiving environment is very low

The influence of the Hope Bay Mine discharge (RBD1) on water quality of Roberts Bay is negligible. Mean concentrations of ammonia, nitrate, and manganese were slightly elevated at the effluent-exposed area compared to the reference area for mid-depth samples in 2021, indicative of the presence of effluent, however no discernable difference was present for other years for these parameters, or for any other parameters over the three years of sampling. Phosphorus mean annual concentrations exceeded CCME chronic Canadian Water Quality Guidelines (CWQG) during one sample year, however elevated concentrations were observed at both the effluent-exposed and reference areas, indicating a natural influence within Roberts Bay rather than a mine-related influence.

Overall, the influence of the Hope Bay Mine discharge on Roberts Bay is nearly undetectable. Effluent mixing occurs rapidly, resulting in a spatially limited effluent plume and very low concentrations of mine-indicator parameters in receiving environment samples. Based on this rapid mixing of effluent, no sublethal toxicity to test organisms during recent tests, and no impairment to water quality within the receiving environment, the Hope Bay Mine effluent discharge is not having an impact on aquatic life within Roberts Bay.



5.2 Recommendations

Based on the findings of the Hope Bay Mine Phase 1 Interpretive Report, the following recommendations have been identified for the Phase 2 EEM (to be completed in three years):

- Based on the prescribed frequency under the MDMER, continue with periodic monitoring for the federal EEM. This includes sampling for effluent quality, characterization, acute toxicity, and sublethal toxicity, and sampling the receiving environment at the effluent-exposed and reference stations in Roberts Bay.
- As per the MDMER, after three years sublethal toxicity testing, the mine shall identify the most sensitive test organism and subsequently conduct tests once per calendar quarter. Giant kelp (*Macrocystis pyrifera*) produced the lowest geometric mean during sublethal toxicity tests over the past three years, and is therefore recommended as the test species moving forward.
- Based on modeled results of the effluent dilution within Roberts Bay with the diffuser installed at 20 m depth, there are several conditions under which effluent concentrations could exceed 1% 100 m from the discharge⁸. Therefore, it is recommended that a control-impact benthic invertebrate study be implemented for the next EEM phase and future EEM phases to determine if effects from effluent are occurring to the benthic invertebrate community.
- The Study Design for the next phase of the EEM must be submitted to ECCC (Environment and Climate Change Canada) no later than six months prior to implementing the next study in 2025. The Interpretive Report for the Phase 2 EEM must be submitted to ECCC on or before February 1st 2026.

⁸ Effluent concentrations at 250 m are predicted to be < 1%.



6 REFERENCES

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- ERM (Environmental Resource Management). 2016a. Roberts Bay Hydrodynamic Modelling Report: Numerical Simulation of Effluent and Chromium Predictions. Prepared for TMAC Resources Limited, Toronto, Ontario. March 11, 2016.
- ERM. 2016b. Near-field Plume Mixing Modelling for Phase 2 Discharges to Roberts Bay. Memorandum prepared for TMAC Resources Ltd. December 13, 2016.
- Government of Canada. 2022. Metal and Diamond Mining Effluent Regulations. SOR/2002-222. Current to June 24, 2022.
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- Minnow. 2021a. Near-field Mixing Modelling for the Planned Effluent Discharge from the Hope Bay Project into Roberts Bay. Memo prepared for TMAC Resources Inc. January 2021.
- Minnow. 2021b. Roberts Bay Discharge – Supporting Information for the NIRB. Memo prepared for Hope Bay Mine. February 2021.
- Minnow. 2021c. TMAC Resources Hope Bay Mine Phase 1 Environmental Effects Monitoring Program Study Design. Prepared for Hope Bay Mine. January 2021.



Minnow. 2022. Hope Bay Mine Phase 1 EEM Study Design Comments Response. Prepared for Agnico Eagle Mines Ltd. May 2022.

USEPA (United States Environmental Protection Agency).1994 Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms (Second Edition), 483 p., Report EPA/600/4-91/003, July 1994, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, OH.

USEPA. 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, 661 p., Report EPA/600/R-95/136, August 1995, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC.



APPENDIX A
ECCC CORRESPONDENCE

Prairie and Northern Region
Environmental Protection Operations Directorate
Environment and Climate Change Canada
9250 – 49th Street NW
Edmonton, AB T6B 1K5

File #: MM3112

March 31, 2022

via email to: Nancy.Harvey@agnicoeagle.com

Nancy Duquet-Harvey
Environmental Superintendent
Hope Bay Project
Agnico Eagle Mines Limited
145 King Street East, Suite 400
Toronto, Ontario
M5C 2Y7

Dear Nancy Duquet-Harvey:

Subject: Hope Bay Project 1st EEM Study Design – action items identified

Environment and Climate Change Canada (ECCC) has reviewed your “TMAC Resources Hope Bay Mine Phase 1 Environmental Effects Monitoring Program Study Design”, submitted January 27, 2021 and the addendum submitted March 18, 2021 . Our review took into account requirements of the *Metal and Diamond Mining Effluent Regulations* (MDMER) of the *Fisheries Act*, information in the EEM Technical Guidance Document as well as generally accepted standards of good scientific practice. This review is not a substitute for reading the MDMER and does not in any way supersede or modify the *Fisheries Act* or the MDMER. In the event of an inconsistency between this review and the Act and/or the MDMER, the Act and the Regulations prevail.

The compiled review comments are attached. Comments in bold indicate where further information is required to meet regulatory requirements. Your response should be submitted, as an addendum, to the Environmental Effects Monitoring Electronic Reporting (EEMER) system (<https://ec.ss.ec.gc.ca/>).



If you have any questions or concerns about the EEM program or if you wish to discuss the study design, please contact Regional Coordinator Erik Allen at 780-717-4884 or at erik.allen@ec.gc.ca. For questions regarding EEMER, please contact EEM-ESEE@ec.gc.ca.

Sincerely,



Margaret Fairbairn
A/ Regional Director

Enclosure: Review comments and recommendations on “TMAC Resources Hope Bay Mine Phase 1 Environmental Effects Monitoring Program Study Design”, January 2021 submission

cc:	Cristina Ruiu	Environment and Climate Change Canada
	Erik Allen	Environment and Climate Change Canada
	Curtis Didham	Environment and Climate Change Canada
	Ali Shaikh	Nunavut Water Board
	Karén Kharatyan	Nunavut Water Board
	David Zhong	Crown-Indigenous Relations and Northern Affairs Canada
	Andrew Keim	Crown-Indigenous Relations and Northern Affairs Canada
	Guillaume Dumont-Vandewinkel	Agnico Eagle Mines Limited

Review comments and recommendations on “TMAC Resources Hope Bay Mine Phase 1 Environmental Effects Monitoring Program Study Design”, January 2021 submission

The following comments and recommendations are based on the review of the report by members of a Technical Advisory Panel (TAP) consisting of representatives from Environment and Climate Change Canada (ECCC), Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and Nunavut Water Board (NWB).

Action items

1. pp. 19, 25. CIRNAC. Parameters such as ammonia, copper, and manganese are reactive (i.e., non-conservative parameters) in the marine environment such as Roberts Bay and might be partially removed from the water column during the mixing of effluent and seawater, for example, by chemical reactions (e.g. adsorption, precipitation, coprecipitation) and settling of particles in the water column. Consequently, if these parameters are used as indicators to validate model predictions and quantify spatial extent of effluent mixing, it would result in a substantial under-estimation of the spatial extent of effluent mixing, depending on the relative reactivity of the parameters and the extent of particle settling in Roberts Bay.
 - a) Please either provide further justifications on applying non-conservative parameters such as ammonia, copper, and manganese as indicators for effluent mixing; or,
 - b) apply appropriate parameters as indicators to validate model prediction and/or quantify spatial extent of effluent mixing.
2. p. 30. ECCC. Your study design tentatively proposes a benthic invertebrate community study, subject to subsequent effluent modelling for the repaired diffuser configuration (repairs planned for August 2021). The proposal to conduct a benthic invertebrate study was based on effluent modelling for the temporary configuration (no diffuser), which began effluent discharge in April 2021. Modelling for the temporary configuration predicted an effluent concentration greater than 1% at 100 m, but less than 1% at 208 m from the discharge point. Your study design does not propose a fish population study, presumably based on the predicted effluent concentrations under the temporary configuration. Modelling results for the repaired configuration, submitted as an addendum to the study design in March 2021 (Table 2, Minnow 2021), predict that the 1% effluent plume could exceed 100 m, and in one scenario, may exceed 250 m from the diffuser.

Please note that the timeframe to evaluate effluent information, for the purpose of determining biological study requirements under Schedule 5, subsection 9(1), ends on the day before your study design was required to be submitted (subsection 9(3)). For the purposes of applying subsection 9(3), the day your study design was submitted (January 27, 2021) would be considered as the day the study design was required to be submitted. As a result, the timeframe to evaluate effluent information to determine biological monitoring requirements for your Phase 1 study is February 1, 2020 to January 26, 2021. Please also note that paragraphs 9(1)(a) and (b) specify that the *highest* effluent concentration within this timeframe is used to determine biological monitoring requirements.

Effluent information from the period after January 26, 2021, up until the day before the next study design (Phase 2) is required to be submitted, must be used to determine biological monitoring requirements for your Phase 2 study, in accordance with subsections 9(1) and 9(3).

Effluent modelling for the original diffuser configuration (2.2 km pipeline with diffuser), which deposited effluent from February 1, 2020 to mid-August 2020, predicted <1% effluent within 8.7 m of the diffuser, for worst case, under ice conditions (p. 22). Water sampling at the ‘effluent exposed

sampling area' indicated effluent concentrations of 0.04% and 0.13% in July and August 2020, respectively. Please address the following questions related to effluent deposit during the period of February 1, 2020 to January 26, 2021, and provide updates to your study design as needed, based on application of the effluent information from this period to determine any biological monitoring requirements under paragraphs 9(1)(a) and (b).

- a) Please provide more information on the location of the 'effluent exposed sampling area' sampled for water quality in July and August 2020. How far was the sampling area from the diffuser? Were samples collected at multiple depths?
 - b) Was effluent discharged during the period after mid-August 2020, when discharge was suspended for maintenance, to January 26, 2021? (see also comment #3)
 - c) Modelling results for the original diffuser configuration (2020 effluent deposit) predicted the extent of the 1% plume at <8.7 m from the diffuser, for worst-case conditions (lowest dilution), under ice. What is the predicted extent of the 1% plume under worst case conditions for open water? Based on the modelling and water quality sampling for the 2020 effluent discharge, is it possible that the highest concentration of effluent during a period of deposit between February 1, 2020 and January 26, 2021 exceeded 1% at 100 m or 250 m from the diffuser?
 - d) **For the period of effluent deposit between February 1, 2020 and January 26, 2021, please provide estimates of effluent concentration at 100 m and 250 m from the point at which effluent enters the exposure area, and any additional supporting information, in accordance with Schedule 5, subparagraph 10(a)(i).**
3. p. 12. NWB. It was stated that the discharge pipe had floated to the sea ice bottom and became entrapped in the ice. However it is unclear if discharge occurred while the pipe was in surface waters and above the density gradient, and if this was included in the plume modeling.

Recommendation: Clarify if discharge occurred while the pipe was in surface waters and above the halocline, and if this was included in the plume modeling.

Other items

4. p. 13. NWB. Effluent discharge is to the marine environment, and as such the EEM is exclusive to the marine environment. However, the freshwater environment may also be impacted from mining activities, such as seepage from water containment facilities, surface runoff, dust generation, water discharged to tundra, etc. For example, the document states that "a total of 322m³ of contact water was discharged from the Madrid North Contact Water Pond to the tundra," and although there are no water bodies directly impacted by this activity, freshwater environmental monitoring should be considered to confirm impacts are not occurring.
Recommendation: Provide discussion on any considerations for freshwater environmental monitoring.
5. p. 27. ECCC. Table 2.2 and Table B.1 (Appendix B) report salinity concentrations in mg/L; however, according to descriptions in the text and model inputs, the units for salinity should be ppt rather than mg/L (ppm). Please confirm the units of measurement for salinity values in these tables.
6. p. 30. CIRNAC. Although the predicted buoyancy of the effluent plume might suggest that benthic organisms would not be exposed directly to the effluent plume, this does not necessarily mean that there is no indirect impact. For example, chemical reactions (e.g. adsorption, precipitation, coprecipitation) in the effluent plume as a result of mixing of effluent and seawater and the settling of particles in the water column could result in the partial removal of certain chemicals from the water column to the sediments below, which would potentially affect benthic organisms.

- a) Please either further clarify the assessment that benthic organisms in bottom sediments would likely not be exposed to effluent; or
 - b) consider and include both direct and potential indirect effects of effluent in any proposed biological monitoring plans
7. ECCC. As of June 1, 2021, un-ionized ammonia is included in the list of prescribed deleterious substances in section 3 of the MDMER. As a result, un-ionized ammonia must be included in the parameters required for EEM water quality monitoring, in accordance with Schedule 5, paragraph 7(1)(d). Un-ionized ammonia may be calculated from total ammonia, pH and temperature, using the formulas provided in subsection 12(4) of the MDMER.

Reference

Minnow Environmental Inc. (Minnow) 2021. Addendum to the Hope Bay Mine Phase 1 EEM Study Design – Roberts Bay Discharge – Modelling Results for Discharge from a Multi-port Diffuser at 20m Depth. Prepared for: TMAC Resources – Hope Bay. 21 p.



A Trinity Consultants Company
2 Lamb Street
Georgetown, Ontario
L7G 3M9
Tel: (905) 873-3371

May 17, 2022

Nancy Duquet Harvey
Environmental Superintendent
Hope Bay Mine
Agnico Eagle Mines Ltd.

Re: Hope Bay Mine Phase 1 EEM Study Design Comments Response

Dear Ms. Duquet Harvey,

On March 31st, 2022, Environment and Climate Change Canada (ECCC) provided comments related to their review of the Phase 1 Environmental Effects Monitoring (EEM) study design for the Hope Bay Mine, which also included reviews by the Nunavut Water Board (NWB) and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). The comments include requests for clarification and/or additional information to support the review and approval of the study design, and information for consideration within the EEM Interpretive Report. The following responses have been prepared to address the comments provided by ECCC.

Sincerely,

Minnow Environmental Inc.

Kevin Martens, B.Sc., R.P.Bio

Senior Aquatic Ecologist

cc: Pierre Stecko, M.Sc., EP, R.P.Bio., Principal Aquatic Scientist

Action Item 1: CIRNAC – Non-Conservative Tracer Parameters

Response: Minnow acknowledges that the identified parameters may reflect non-conservative effluent tracer parameters upon mixing within Roberts Bay. Ideally, an effluent tracer should behave conservatively in the receiving environment, but also must be elevated in effluent relative to the receiving environment in order to be detectable. Effluent quality was compared to reference water quality to identify potential parameters that could be used as tracers within the receiving environment (Table 2.2 of the study design). Ammonia, copper, and manganese were the only three parameters with concentrations in effluent greater than 100 times those observed in the receiving environment, and therefore may possibly be detectable at the discharge location at a level that might approach 1%. Based on the rapid dilution that occurs, parameters with minimal difference between effluent and receiver quality would have no detectable difference even in close proximity to the diffuser. Effluent and receiving environment chemistry will be reevaluated in the future to determine if other parameters may be suitable for use as a tracer. The deep discharge location and saline environment conditions present difficult conditions for conducting field based confirmation of modelled results.

Action Item 2: ECCC – Effluent Mixing and Benthic Invertebrate Survey Trigger

Response: Minnow acknowledges that the period for determining benthic invertebrate and fish health studies reflects information up to the date of study design submission (for the first EEM) and the period between study design submissions (for subsequent EEMs), per the MDMER Schedule 5, subparagraph 9(3)(a).

Effluent discharge dates and volumes prior to submission of the EEM study design were provided in Figure 2.7 of the study design, with no discharge occurring after August 22, 2020 (through study design submission). The information is presented in tabular form in Table 1 attached to this response.

Receiving environment water quality monitoring was conducted according to the Water Quality Monitoring Plan that was submitted to ECCC in May 2020 (Minnow 2020; attached), and subsequently revised for the 2021 sampling following the relocation of the discharge (outlined in the study design; Minnow 2021). Sampling at the effluent exposed area is conducted at the effluent diffuser at depths of 2 m, 11 m, and 19 m. This location was selected based on the small effluent mixing zone and the challenges associated with maintaining position in Roberts Bay to collect samples at multiple depths and multiple locations. Samples are collected at the same depths at the reference station.

Predicted effluent concentrations for both under ice and open water conditions were presented in Table 2.3 of the EEM study design (also attached). Due to reduced vertical mixing during winter

months, the effluent concentration was predicted to be <1% within 8.7 m of the diffuser (118:1 dilution ratio), which represented the worst-case conditions for the under-ice condition. Conversely, during summer months, effluent would be diluted to <0.4% within 14.8 m of the diffuser (270:1 dilution ratio). Therefore, per MDMER Schedule 5, subparagraph 10(a)(i), effluent concentrations at 100 m and 250 m from the diffuser would be << 1%. This conclusion is supported by the estimates obtained through receiving environment water quality monitoring (i.e., 0.13% at the diffuser; Table 2.4). Based on the information presented herein and within the submitted study design, and application of MDMER Schedule 5, subparagraph 9(3)(a), the Hope Bay Mine is not required to conduct a benthic invertebrate survey during the Phase 1 EEM, and the benthic invertebrate sampling program outlined within the study design will not be completed in 2022 for the Phase 1 EEM.

Action Item 3: NWB – Floating Discharge Line and Effluent Discharge

Response: Effluent was not being discharged at the time when the discharge line floated to the surface or after the line was cut to remove trapped air and allow the line segments to fall back to the ocean floor. Dates of effluent discharge prior to submission of the EEM study design are provided in Table 1.

Action Item 4: NWB – Freshwater Environmental Monitoring

Response: Routine water quality monitoring is conducted by the Hope Bay Mine within the freshwater receiving environments adjacent to the mine as outlined in the Aquatics Effects Monitoring Plan (AEMP; TMAC 2018) that was developed in consultation with and approved by NWB, the Kitikmeot Inuit Association, the NIRB, ECCC, CIRNAC and DFO. The AEMP includes biological monitoring programs within adjacent waterbodies designed to assess the potential effects of Project activities on the freshwater environment, assess predictions of the Madrid-Boston FEIS (TMAC 2017), and comply with requirements set forth in the Project permitting and licensing processes (TMAC 2019). This reporting is submitted annually to the NWB and provided to ECCC for comments through the review process.

Action Item 5: ECCC – Salinity Units Error

Response: Minnow confirms that the units for salinity should be parts per thousand (ppt) and has corrected Appendix Table B.1 to reflect the proper units (attached).

Action Item 6: CIRNAC – Buoyant Effluent and Benthic Invertebrate Survey

Response: Minnow acknowledges that dissolution and settling can occur for some effluent constituents upon mixing within Roberts Bay. Following MDMER criteria, Hope Bay will conduct benthic invertebrate community and sediment quality sampling if or when required within the

immediate area surrounding the effluent discharge to assess potential effects associated with discharge of effluent to the Roberts Bay receiving environment.

Action Item 7: Un-Ionized Ammonia

Response: Hope Bay acknowledges the required analysis of un-ionized ammonia in effluent and the receiving environment and has been conducting this analysis since June 1, 2021.

References

- Minnow Environmental Inc. (Minnow). 2020. TMAC Hope Bay Project Water Quality Monitoring Plan. Technical memo prepared for TMAC Resources Inc.. May 2020.
- Minnow. 2021. TMAC Resources Hope Bay Mine Phase 1 Environmental Effects Monitoring Program Study Design. Report prepared for TMAC Resources Inc. January 2021.
- TMAC Resources Inc.. (TMAC). 2017. Madrid-Boston Project Final Environmental Impact Statement. TMAC Resources Inc. Toronto, ON.
- TMAC. 2018. Hope Bay Project Aquatic Effects Monitoring Program. TMAC Resources Inc October 2018.

Table 1: Hope Bay Mine Effluent Discharge Volumes, February 2020 to January 2021

Date	Outfall volume (m ³)						
2/1/2020	3,241	3/15/2020	7,015	4/27/2020	6,704	6/9/2020	0
2/2/2020	6,915	3/16/2020	6,818	4/28/2020	5,968	6/10/2020	6,454
2/3/2020	6,986	3/17/2020	6,844	4/29/2020	6,726	6/11/2020	6,511
2/4/2020	7,053	3/18/2020	6,791	4/30/2020	6,580	6/12/2020	6,882
2/5/2020	6,573	3/19/2020	6,889	5/1/2020	6,856	6/13/2020	6,083
2/6/2020	6,974	3/20/2020	6,739	5/2/2020	6,823	6/14/2020	6,750
2/7/2020	6,724	3/21/2020	6,730	5/3/2020	6,874	6/15/2020	6,639
2/8/2020	6,885	3/22/2020	6,769	5/4/2020	6,815	6/16/2020	6,020
2/9/2020	6,958	3/23/2020	6,758	5/5/2020	6,669	6/17/2020	5,283
2/10/2020	6,527	3/24/2020	6,709	5/6/2020	6,654	6/18/2020	5,290
2/11/2020	6,248	3/25/2020	6,482	5/7/2020	6,632	6/19/2020	5,222
2/12/2020	6,452	3/26/2020	6,605	5/8/2020	6,339	6/20/2020	5,113
2/13/2020	6,230	3/27/2020	6,798	5/9/2020	6,245	6/21/2020	5,720
2/14/2020	6,608	3/28/2020	6,524	5/10/2020	5,750	6/22/2020	6,446
2/15/2020	6,712	3/29/2020	6,879	5/11/2020	5,480	6/23/2020	6,506
2/16/2020	6,204	3/30/2020	6,741	5/12/2020	5,628	6/24/2020	6,488
2/17/2020	6,512	3/31/2020	6,705	5/13/2020	6,178	6/25/2020	6,544
2/18/2020	6,338	4/1/2020	7,021	5/14/2020	6,313	6/26/2020	6,555
2/19/2020	6,441	4/2/2020	6,967	5/15/2020	6,179	6/27/2020	6,563
2/20/2020	6,535	4/3/2020	6,942	5/16/2020	6,113	6/28/2020	6,561
2/21/2020	6,348	4/4/2020	6,834	5/17/2020	6,195	6/29/2020	5,811
2/22/2020	6,215	4/5/2020	6,900	5/18/2020	6,302	6/30/2020	5,693
2/23/2020	5,959	4/6/2020	6,935	5/19/2020	5,737	7/1/2020	5,696
2/24/2020	6,124	4/7/2020	7,001	5/20/2020	6,062	7/2/2020	5,693
2/25/2020	6,260	4/8/2020	7,003	5/21/2020	6,203	7/3/2020	5,693
2/26/2020	6,589	4/9/2020	6,951	5/22/2020	6,151	7/4/2020	5,693
2/27/2020	5,995	4/10/2020	6,971	5/23/2020	6,099	7/5/2020	5,694
2/28/2020	5,612	4/11/2020	6,792	5/24/2020	6,325	7/6/2020	5,350
2/29/2020	6,488	4/12/2020	6,895	5/25/2020	5,915	7/7/2020	5,574
3/1/2020	6,425	4/13/2020	6,861	5/26/2020	6,314	7/8/2020	1,011
3/2/2020	6,586	4/14/2020	6,906	5/27/2020	6,311	7/9/2020	0
3/3/2020	6,817	4/15/2020	6,702	5/28/2020	6,307	7/10/2020	5,607
3/4/2020	6,766	4/16/2020	6,782	5/29/2020	6,276	7/11/2020	6,050
3/5/2020	6,931	4/17/2020	6,874	5/30/2020	6,318	7/12/2020	6,583
3/6/2020	6,858	4/18/2020	6,861	5/31/2020	6,163	7/13/2020	6,926
3/7/2020	6,658	4/19/2020	6,783	6/1/2020	2,842	7/14/2020	6,900
3/8/2020	6,759	4/20/2020	6,640	6/2/2020	6,307	7/15/2020	6,952
3/9/2020	6,849	4/21/2020	6,599	6/3/2020	6,369	7/16/2020	6,858
3/10/2020	6,813	4/22/2020	6,602	6/4/2020	6,428	7/17/2020	6,927
3/11/2020	6,762	4/23/2020	6,632	6/5/2020	6,476	7/18/2020	6,780
3/12/2020	6,245	4/24/2020	6,874	6/6/2020	6,416	7/19/2020	6,909
3/13/2020	6,796	4/25/2020	6,656	6/7/2020	6,505	7/20/2020	6,749
3/14/2020	6,761	4/26/2020	6,928	6/8/2020	0	7/21/2020	7,006

Table 1: Hope Bay Mine Effluent Discharge Volumes, February 2020 to January 2021

Date	Outfall volume (m ³)	Date	Outfall volume (m ³)	Date	Outfall volume (m ³)	Date	Outfall volume (m ³)
7/22/2020	6,924	9/3/2020	0	10/16/2020	0	11/28/2020	0
7/23/2020	6,912	9/4/2020	0	10/17/2020	0	11/29/2020	0
7/24/2020	6,988	9/5/2020	0	10/18/2020	0	11/30/2020	0
7/25/2020	6,087	9/6/2020	0	10/19/2020	0	12/1/2020	0
7/26/2020	6,980	9/7/2020	0	10/20/2020	0	12/2/2020	0
7/27/2020	6,946	9/8/2020	0	10/21/2020	0	12/3/2020	0
7/28/2020	6,865	9/9/2020	0	10/22/2020	0	12/4/2020	0
7/29/2020	6,847	9/10/2020	0	10/23/2020	0	12/5/2020	0
7/30/2020	6,940	9/11/2020	0	10/24/2020	0	12/6/2020	0
7/31/2020	6,954	9/12/2020	0	10/25/2020	0	12/7/2020	0
8/1/2020	6,890	9/13/2020	0	10/26/2020	0	12/8/2020	0
8/2/2020	6,932	9/14/2020	0	10/27/2020	0	12/9/2020	0
8/3/2020	6,919	9/15/2020	0	10/28/2020	0	12/10/2020	0
8/4/2020	6,924	9/16/2020	0	10/29/2020	0	12/11/2020	0
8/5/2020	6,889	9/17/2020	0	10/30/2020	0	12/12/2020	0
8/6/2020	6,921	9/18/2020	0	10/31/2020	0	12/13/2020	0
8/7/2020	6,991	9/19/2020	0	11/1/2020	0	12/14/2020	0
8/8/2020	6,994	9/20/2020	0	11/2/2020	0	12/15/2020	0
8/9/2020	6,940	9/21/2020	0	11/3/2020	0	12/16/2020	0
8/10/2020	6,982	9/22/2020	0	11/4/2020	0	12/17/2020	0
8/11/2020	6,981	9/23/2020	0	11/5/2020	0	12/18/2020	0
8/12/2020	2,503	9/24/2020	0	11/6/2020	0	12/19/2020	0
8/13/2020	0	9/25/2020	0	11/7/2020	0	12/20/2020	0
8/14/2020	0	9/26/2020	0	11/8/2020	0	12/21/2020	0
8/15/2020	894	9/27/2020	0	11/9/2020	0	12/22/2020	0
8/16/2020	904	9/28/2020	0	11/10/2020	0	12/23/2020	0
8/17/2020	914	9/29/2020	0	11/11/2020	0	12/24/2020	0
8/18/2020	921	9/30/2020	0	11/12/2020	0	12/25/2020	0
8/19/2020	909	10/1/2020	0	11/13/2020	0	12/26/2020	0
8/20/2020	914	10/2/2020	0	11/14/2020	0	12/27/2020	0
8/21/2020	909	10/3/2020	0	11/15/2020	0	12/28/2020	0
8/22/2020	904	10/4/2020	0	11/16/2020	0	12/29/2020	0
8/23/2020	909	10/5/2020	0	11/17/2020	0	12/30/2020	0
8/24/2020	308	10/6/2020	0	11/18/2020	0	12/31/2020	0
8/25/2020	0	10/7/2020	0	11/19/2020	0	1/1/2021	0
8/26/2020	0	10/8/2020	0	11/20/2020	0	1/2/2021	0
8/27/2020	0	10/9/2020	0	11/21/2020	0	1/3/2021	0
8/28/2020	0	10/10/2020	0	11/22/2020	0	1/4/2021	0
8/29/2020	0	10/11/2020	0	11/23/2020	0	1/5/2021	0
8/30/2020	0	10/12/2020	0	11/24/2020	0	1/6/2021	0
8/31/2020	0	10/13/2020	0	11/25/2020	0	1/7/2021	0
9/1/2020	0	10/14/2020	0	11/26/2020	0	1/8/2021	0
9/2/2020	0	10/15/2020	0	11/27/2020	0	1/9/2021	0

Table 1: Hope Bay Mine Effluent Discharge Volumes, February 2020 to January 2021

Date	Outfall volume (m³)
1/10/2021	0
1/11/2021	0
1/12/2021	0
1/13/2021	0
1/14/2021	0
1/15/2021	0
1/16/2021	0
1/17/2021	0
1/18/2021	0
1/19/2021	0
1/20/2021	0
1/21/2021	0
1/22/2021	0
1/23/2021	0
1/24/2021	0
1/25/2021	0
1/26/2021	0

Table 2.3: Summary of Modelled Plume Mixing Zone Results for Under-Ice and Open-Water Discharge Scenarios (from ERM 2016)

Source of Water		Effluent Flow Rate (m ³ /d)	Effluent Salinity (ppt)	Trapping Depth (m)	Horizontal Distance from Diffuser Port at Trapping Depth (m)	Minimum Average (Centreline) Dilution At Trapping Depth (m)
Under-ice Cases						
1a	Groundwater only (high salinity)	3,000	25.3	34.7	8.7	160 (118)
1b	Groundwater only (low salinity)	3,000	15.5	30.7	5.8	245 (194)
1c	GW + TIA	8,000	5.0	28.3	10.2	303 (248)
Open-water Cases						
2a	GW + TIA (high salinity)	8,000	15.5	35.7	14.8	369 (270)
2b	GW + TIA (low salinity)	8,000	2.0	33.8	13.0	437 (342)
2c	TIA only (de-watering)	5,000	0.3	33.9	10.7	542 (426)

Notes: GW - Groundwater, TIA - Tailings Impoundment Area water.

Table B.1: Hope Bay Effluent Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	3-Feb-20	10-Feb-20	17-Feb-20	24-Feb-20	2-Mar-20	9-Mar-20
In Situ Measurements												
pH	-	pH	-	-	-	-	8.11	8.06	7.67	7.59	7.48	7.57
EC (uS/cm)	-	uS/cm	-	-	-	-	10850	9690	8300	6740	9280	11720
Temp	-	C	-	-	-	-	2.1	3.0	4.6	2.9	1.0	4.3
ORP	-	mV	-	-	-	-	195	234	228	306	193	208
Salinity	-	ppt	-	-	-	-	5.8	5.2	4.4	3.7	5.1	OR
Physical Tests (Seawater)												
Conductivity		uS/cm	-	-	-	-	-	-	-	6,230	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.88	8.06	8.04	7.93	8.02	7.96
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	7.30	20.00	10.90	6.90	7.80	10.70
Total Dissolved Solids	0.1	mg/L			-	-	6,170	5,790	5,810	5,440	4,290	7,350
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO3)	1.0	mg/L	-	-	-	-	167	161	166	153	167	177
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	8.21	6.51	6.32	6.51	6.27	6.60
Bromide (Br)	0.050	mg/L	-	-	-	-	10.70	9.10	8.30	5.60	6.30	12.90
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	3,030	2,670	2,320	1,600	1,820	3,620
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
Nitrate (as N)	0.00	mg/L	339	45	-	-	6.93	4.54	4.28	4.15	4.21	4.83
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.3460	0.2490	0.1750	0.1400	0.1560	0.2500
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0377	0.0378	0.0402	-	0.0508	0.0390
Sulfate (SO4)	0.3	mg/L	-	-	-	-	690.0	690.0	627.0	661.0	686.0	754.0
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.09	0.10	0.09	0.13	0.10	0.09
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.09	0.13	0.15	0.10	0.08	0.13
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.0010	0.00052	0.00056	0.00055	<0.00050	<0.0010
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00160	0.00152	0.00142	0.00137	0.00134	0.00160
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0320	0.0280	0.0290	0.0280	0.0280	0.0350
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.99	0.78	0.69	0.47	0.59	1.02
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.000050	<0.000025	0.00004	<0.000025	<0.000025	<0.000050
Calcium (Ca)-Total	0.0	mg/L	-	-	-	-	263	225	217	165	182	281
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00440	0.00403	0.00427	0.00421	0.00407	0.00390
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.058	0.060	0.067	0.064	0.063	0.056
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.4000	0.5420	0.5560	0.5430	0.4710	0.4300
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0420	0.0387	0.0348	0.0294	0.0320	0.0460
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	193	164	142	99	116	234
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.626	0.651	0.661	0.57	0.614	0.733
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	0.0000104	0.000009	<0.0000050	0.0000073	<0.000005	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.0080	0.0076	0.0085	0.009	0.0080	0.0080
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0117	0.0103	0.0108	0.0107	0.0109	0.0108
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	65.0	58.3	57.0	45.7	51.3	74.0
Radium 226		Bq/L			0.37	1.11	0.0150	-	-	-	<0.0083	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	<0.00050	0.00034	0.00037	0.00039	0.00042	<0.00050
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010
Sodium (Na)-Total	0.0	mg/L	-	-	-	-	1,790	1,520	1,330	972	1,140	2,090
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.00028	0.00025	0.00026	0.00023	0.00024	0.00032
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0050
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	<0.0300	0.0330	0.0190	<0.0150	<0.0150	<0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-

Mean concentration exceeds a CCME chronic marine value.
Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment; " - " = no data available, "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.1: Hope Bay Effluent Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	11-Mar-20	16-Mar-20	23-Mar-20	30-Mar-20	6-Apr-20	14-Apr-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.56	7.65	7.74	7.62	7.73	7.67
EC (uS/cm)	-	uS/cm	-	-	-	-	10990	9080	8960	11530	12180	12,270
Temp	-	C	-	-	-	-	2.9	3.2	2.1	3.5	3.8	6.7
ORP	-	mV	-	-	-	-	195	213	179	189	213	201
Salinity	-	ppt	-	-	-	-	6.4	5.2	5.2	6.8	6.8	6.6
Physical Tests (Seawater)												
Conductivity		uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5	-	-	7.70	7.87	7.67	8.15	7.97
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	-	5.30	5.00	6.70	8.00	12.60
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	5,910	5,650	7,120	7,180	6,640
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO3)	1.0	mg/L	-	-	-	-	-	173	164	175	176	179
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	-	6.12	6.53	7.27	7.02	7.54
Bromide (Br)	0.050	mg/L	-	-	-	-	-	9.10	8.60	12.30	11.10	11.9
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	-	2,650	2,460	3,450	3,310	3,410
Fluoride (F)	0.020	mg/L	-	NRG	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	0.00	mg/L	339	45	-	-	-	4.41	3.95	4.53	4.21	4.63
Nitrite (as N)	0.0010	mg/L	-	-	-	-	-	0.1750	0.1070	0.1150	0.1480	0.155
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	-	0.0412	0.0428	0.0348	0.0340	0.0356
Sulfate (SO4)	0.3	mg/L	-	-	-	-	-	727	714	736	722	773
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	-	0.08	0.09	0.08	0.07	0.0957
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	-	0.09	0.06	0.09	0.10	0.0610
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	-	0.00052	<0.00050	0.00061	0.00053	<0.0010
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	-	0.00147	0.00138	0.00130	0.00153	0.00440
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	-	0.0300	0.0290	0.0340	0.0320	0.0340
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	-	0.75	0.66	0.93	0.90	1.03
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	-	<0.000025	<0.000025	0.00003	<0.000025	<0.000050
Calcium (Ca)-Total	0.0	mg/L	-	-	-	-	-	237	219	290	276	302
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	-	0.00450	0.00399	0.00469	0.00425	0.00530
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	-	0.059	0.056	0.058	0.054	0.0507
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	-	0.3830	0.3610	0.3980	0.3190	0.290
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	-	0.0369	0.0379	0.0457	0.0456	0.0580
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	-	170	150	208	204	194
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	-	0.693	0.668	0.733	0.752	0.778
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	-	0.0083	0.0081	0.008	0.0083	0.00850
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	-	0.0109	0.0096	0.0110	0.0107	0.0134
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	-	63.5	55.7	69.6	65.5	75.0
Radium 226		Bq/L	-	-	0.37	1.11	0.0100	<0.0075	0.0130	0.0130	0.0180	0.0120
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	-	0.00042	0.00042	0.00054	0.00046	<0.00050
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	-	<0.000050	<0.000050	0.0	<0.000050	<0.00010
Sodium (Na)-Total	0.0	mg/L	-	-	-	-	-	1,550	1,410	1,860	1,850	2,060
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	-	0.00025	0.00026	0.00027	0.00028	0.000390
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	-	<0.0025	<0.0025	<0.0025	<0.0025	<0.0050
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	-	0.0160	0.0160	0.0340	0.0180	<0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-

Mean concentration exceeds a CCME chronic marine value.
 Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment; "-" = no data available, "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.1: Hope Bay Effluent Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	21-Apr-20	27-Apr-20	5-May-20	13-May-20	21-May-20	25-May-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.54	7.5	7.55	7.68	7.59	7.55
EC (uS/cm)	-	uS/cm	-	-	-	-	13,170	17,370	14,330	16,830	16,750	12,110
Temp	-	C	-	-	-	-	4.0	4.4	4.6	4.1	4.6	3.9
ORP	-	mV	-	-	-	-	210	182	198	211	176	240
Salinity	-	ppt	-	-	-	-	4.6	6.3	5.1	6	6.2	4.4
Physical Tests (Seawater)												
Conductivity		uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		8.11	8.11	7.47	7.94	7.86	7.89
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	<3.0	20.20	4.00	4.30	5.40	6.10
Total Dissolved Solids	0.1	mg/L			-	-	4,640	6,590	5,080	6,740	6,890	4,980
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO3)	1.0	mg/L	-	-	-	-	182	179	179	180	174	179
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	7.28	6.57	6.82	8.19	8.20	9.11
Bromide (Br)	0.050	mg/L	-	-	-	-	7.40	9.30	8.00	10.8	11.4	7.10
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	2,050	2,810	2,260	3,020	3,120	2,010
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	0.00	mg/L	339	45	-	-	4.44	4.06	4.60	5.48	5.75	5.54
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.103	<0.050	0.0610	0.143	0.164	0.157
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0457	0.0384	0.0453	0.0417	0.0487	0.0779
Sulfate (SO4)	0.3	mg/L	-	-	-	-	762	721	792	798	818	822
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0737	0.0798	0.0593	0.130	0.206	0.400
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.0490	0.0950	0.0860	0.0620	0.0940	7.41
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.0010	0.000540	0.000540	0.000630	<0.0010	0.000840
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00160	0.00154	0.00155	0.00157	0.00140	0.00256
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0360	0.0300	0.0330	0.0320	0.0340	0.0450
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.670	0.840	0.670	0.830	0.830	0.530
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.000050	<0.000035	<0.000025	0.0000280	<0.000050	0.0000260
Calcium (Ca)-Total	0.0	mg/L	-	-	-	-	237	244	229	256	262	186
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00300
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00520	0.00452	0.00473	0.00491	0.00600	0.00729
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0637	0.0591	0.0531	0.0628	0.128	0.237
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.340	0.319	0.398	0.400	0.470	2.06
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000910
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0390	0.0451	0.0386	0.0465	0.0480	0.0334
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	138	178	158	183	201	112
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.766	0.755	0.727	0.746	0.785	0.696
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	0.0000112	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00960	0.00810	0.00940	0.00930	0.00920	0.0116
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0135	0.0116	0.0120	0.0136	0.0182	0.0272
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	59.2	62.8	61.1	67.2	67.2	50.5
Radium 226		Bq/L			0.37	1.11	<0.0080	0.0120	<0.0064	0.00950	0.0110	<0.0071
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000500	0.000430	0.000560	0.000290	<0.00050	0.000470
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	<0.00010	<0.000050	<0.000050	<0.000050	0.000110	0.000194
Sodium (Na)-Total	0.0	mg/L	-	-	-	-	1,570	1,720	1,570	1,810	1,860	1,160
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0540
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000290	0.000260	0.000250	0.000280	0.000280	0.000980
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0050	<0.0025	<0.0025	<0.0025	<0.0050	0.00320
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	<0.0300	0.0300	<0.0150	0.0310	0.0310	<0.0150
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-

Mean concentration exceeds a CCME chronic marine value.
 Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment; " - " = no data available, "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.1: Hope Bay Effluent Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	3-Jun-20	9-Jun-20	16-Jun-20	22-Jun-20	30-Jun-20	8-Jul-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.65	7.72	7.42	7.52	7.42	7.61
EC (uS/cm)	-	uS/cm	-	-	-	-	18,970	12,590	11,290	13,730	13,540	8,990
Temp	-	C	-	-	-	-	3.5	2.9	4.4	4.8	3.3	2.8
ORP	-	mV	-	-	-	-	225	220	213	243	211	270
Salinity	-	ppt	-	-	-	-	6.8	4.4	5.4	4.9	4.8	4.2
Physical Tests (Seawater)												
Conductivity		uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.95	8.03	7.79	7.83	7.87	7.75
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	11.10	9.40	11.10	9.20	8.50	8.80
Total Dissolved Solids	0.1	mg/L			-	-	7,560	4,820	6,690	5,600	5,210	4,850
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO3)	1.0	mg/L	-	-	-	-	174	180	178	197	173	199
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	7.85	9.26	8.44	8.56	9.50	8.93
Bromide (Br)	0.050	mg/L	-	-	-	-	12.3	6.10	9.30	9.10	8.00	8.30
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	3,440	1,960	2,690	2,410	2,320	2,000
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	0.00	mg/L	339	45	-	-	4.69	5.38	5.30	5.30	5.32	5.41
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.215	0.108	0.130	0.170	0.152	0.105
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0518	0.0703	0.0514	0.0615	0.0645	0.0535
Sulfate (SO4)	0.3	mg/L	-	-	-	-	863	775	799	838	781	791
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.283	0.362	0.274	0.292	0.230	0.240
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.147	0.237	0.141	0.176	0.0910	0.100
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.0010	0.000800	0.000800	0.000750	0.000900	0.000760
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00200	0.00259	0.00253	0.00255	0.00214	0.00249
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0350	0.0340	0.0320	0.0340	0.0370	0.0308
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	<0.00025
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.810	0.660	0.720	0.730	0.710	0.646
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.000050	<0.000025	0.0000290	0.0000280	<0.000025	0.0000290
Calcium (Ca)-Total	0.0	mg/L	-	-	-	-	286	214	233	221	231	230
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	<0.000050
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0010	0.00160	<0.0010	<0.0010	<0.0010	<0.00050
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00510	0.00615	0.00580	0.00553	0.00569	0.00552
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.164	0.196	0.157	0.169	0.160	0.104
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.650	0.775	0.618	0.675	0.840	0.565
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0440	0.0372	0.0375	0.0387	0.0396	0.0376
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	212	134	172	159	149	144
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.780	0.662	0.715	0.698	0.734	0.648
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00940	0.0123	0.0106	0.0105	0.0116	0.0115
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0227	0.0273	0.0232	0.0246	0.0235	0.0230
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	72.0	60.6	64.7	62.9	58.9	59.2
Radium 226		Bq/L			0.37	1.11	<0.0076	-	-	-	-	<0.0085
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	0.0170
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000570	0.000440	0.000630	0.000560	0.000560	0.000650
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	3.31
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	0.000100	0.000108	0.000118	0.000126	0.000174	0.0000620
Sodium (Na)-Total	0.0	mg/L	-	-	-	-	1,940	1,360	1,540	1,460	1,470	1,430
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	1.91
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	<0.0010
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	<0.00050
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0015
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	0.000970
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000290	0.000300	0.000300	0.000300	0.000320	0.000302
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0430	<0.0150	<0.0150	0.0190	0.0170	<0.0150
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	<0.0010

Mean concentration exceeds a CCME chronic marine value.
 Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment; "-" = no data available, "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.1: Hope Bay Effluent Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	10-Jul-20	16-Jul-20	23-Jul-20	30-Jul-20	6-Aug-20	14-Aug-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.49	7.66	7.63	7.61	8.17	-
EC (uS/cm)	-	uS/cm	-	-	-	-	12,140	15,660	17,480	OR	10,100	-
Temp	-	C	-	-	-	-	3.1	5.0	5.9	7.0	11.5	-
ORP	-	mV	-	-	-	-	192	210	202	194	181	-
Salinity	-	ppt	-	-	-	-	4.2	5.6	6.4	4.8	3.6	-
Physical Tests (Seawater)												
Conductivity		uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.74	7.77	7.69	7.80	8.12	7.94
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	20.80	3.80	6.50	9.50	22.50	12.40
Total Dissolved Solids	0.1	mg/L			-	-	4,580	6,040	6,990	5,480	4,380	19,600
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO3)	1.0	mg/L	-	-	-	-	179	179	176	177	126	170
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	9.15	9.38	7.63	8.82	14.8	3.38
Bromide (Br)	0.050	mg/L	-	-	-	-	7.40	9.10	11.2	9.20	5.70	30.8
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	1,980	2,590	3,040	2,530	1,810	8,110
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
Nitrate (as N)	0.00	mg/L	339	45	-	-	6.07	5.12	4.53	5.32	3.85	1.78
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.110	0.136	0.114	0.0880	0.115	<0.10
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0816	0.0535	<0.25	<0.25	0.0643	<1.0
Sulfate (SO4)	0.3	mg/L	-	-	-	-	798	834	766	871	602	824
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.198	0.171	0.658	0.122	0.0659	0.0313
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.330	0.0760	0.0810	0.130	0.125	0.237
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.000740	0.000810	0.000610	0.000640	0.000560	<0.0020
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00280	0.00233	0.00225	0.00224	0.00202	0.00320
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0312	0.0331	0.0356	0.0332	0.0243	0.0423
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.0010
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.754	0.711	1.05	0.781	0.707	2.28
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	0.0000390	0.0000340	<0.000025	<0.000025	0.0000310	<0.00010
Calcium (Ca)-Total	0.0	mg/L	-	-	-	-	199	248	305	220	202	600
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	<0.000050	<0.000050	0.0000750	<0.000050	0.0000790	0.000390
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	0.000820	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00581	0.00548	0.00552	0.00542	0.00458	0.00370
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.100	0.0845	0.0672	0.0742	0.0606	0.0340
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	1.71	0.488	0.468	0.456	0.474	0.780
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.000480	0.000310	<0.00025	0.000260	0.000360	<0.0010
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0345	0.0362	0.0532	0.0360	0.0340	0.0870
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	134	155	212	165	152	549
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.693	0.689	0.801	0.703	0.566	1.11
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.0106	0.0113	0.0107	0.0102	0.00956	0.00520
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0212	0.0215	0.0188	0.0202	0.0167	0.0140
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	53.8	62.1	74.9	59.8	52.2	131
Radium 226		Bq/L			0.37	1.11	-	-	-	-	-	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0163	0.0193	0.0285	0.0216	0.0210	0.0688
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000500	0.000380	0.000450	0.000430	0.000370	<0.0010
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	3.73	3.12	3.95	3.31	2.72	4.60
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	0.0000680	0.0000740	<0.000050	0.0000530	0.0000570	<0.00020
Sodium (Na)-Total	0.0	mg/L	-	-	-	-	1,260	1,440	2,030	1,450	1,470	4,410
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	1.56	2.15	3.03	2.01	2.16	7.72
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00020
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.00740	<0.0015	<0.0015	0.00280	0.00210	<0.0060
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.000920	0.00133	0.00139	0.00176	0.00142	0.00490
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000292	0.000264	0.000312	0.000290	0.000236	0.000320
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.010
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	<0.0150	0.0200	0.0160	<0.0150	0.0420	0.130
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040

Mean concentration exceeds a CCME chronic marine value.
Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment; " - " = no data available, "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.1: Hope Bay Effluent Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1
			Acute	Chronic	Average	Grab Sample	19-Aug-20
In Situ Measurements							
pH	-	pH	-	-	-	-	7.71
EC (uS/cm)	-	uS/cm	-	-	-	-	OR
Temp	-	C	-	-	-	-	8.7
ORP	-	mV	-	-	-	-	238
Salinity	-	ppt	-	-	-	-	OR
Physical Tests (Seawater)							
Conductivity		uS/cm	-	-	-	-	
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.94
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	3.70
Total Dissolved Solids	0.1	mg/L			-	-	19,800
Anions and Nutrients (Seawater)							
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	154
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	2.66
Bromide (Br)	0.050	mg/L	-	-	-	-	35.8
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	9,650
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<2.0
Nitrate (as N)	0.00	mg/L	339	45	-	-	1.43
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.100
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.00860
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	969
Cyanides (Seawater)							
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0206
Total Metals (Seawater)							
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.100
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.00340
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	<0.0020
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0420
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0020
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	2.57
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.00010
Calcium (Ca)-Total	0.0	mg/L	-	-	-	-	710
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0020
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	<0.0020
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0160
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.450
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.0010
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0910
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	588
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	1.36
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00390
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	<0.010
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	140
Radium 226		Bq/L			0.37	1.11	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	<0.0010
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	<0.00020
Sodium (Na)-Total	0.0	mg/L	-	-	-	-	4,970
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00020
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0020
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000260
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.010
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0630
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment; "-" = no data available, "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

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^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Technical Memo

Date: May 6, 2020

To: Oliver Curran, Vice President, Environmental Affairs, TMAC Resources

From: Kevin Martens, B.Sc., R.P.Bio., Minnow Environmental Inc.

Cc: Kim Connors, M.Sc., Minnow Environmental Inc.

RE: TMAC Hope Bay Project Water Quality Monitoring Plan

TMAC Resources (TMAC) Hope Bay Project is located within the Hope Bay greenstone belt, along the south shore of Melville Sound in the West Kitikmeot region of mainland Nunavut (Figure 1). The Hope Bay Project is situated on an 80 by 20 km property that encompasses three main gold deposits: Doris, Madrid, and Boston. The Doris gold deposit is the northernmost deposit and is actively mined by TMAC. The Madrid deposit is also located in the northern region of the property, just south of the Doris Mine. The Boston deposit is at the south end of the property, near Aimaokatalok Lake (Figure 1). Nearby communities include Cambridge Bay (Iqaluktuttiaq), Bay Chimo (Umingmaktok), and Bathurst Inlet (Kingaok).

TMAC commenced discharging to Roberts Bay on February 1, 2020. Notification of the Final Discharge Point (FDP) was provided to Environment and Climate Change Canada on March 16, 2020, as required under Section 9 of the Metal and Diamond Mining Effluent Regulations (MDMER; Government of Canada 2018). This memo provides an overview of the effluent diffuser, the receiving environment into which effluent is discharged, and the water monitoring program to be implemented by TMAC to meet Section 7 of Schedule 5 in the MDMER.

Roberts Bay is a 1,430 hectare estuary on the south shore of Melville Sound, to the east of Hope Bay (Figure 1). Freshwater enters Roberts Bay from a number of tributaries, with the two largest being Little Roberts Outflow and Glenn Outflow. Water within Roberts Bay exchanges freely with the water in Melville Sound. Ice cover is present on Roberts Bay from late September or early October through late June, with open water present through the remaining months (ERM 2016a). During ice covered months, 1 to 2 m of ice forms on Roberts Bay, sheltering it from atmospheric winds and reducing circulation. Through warming, wind, and freshwater inputs during the open water season, circulation within the bay increases, resulting in a ten-fold increase in the exchange rate with Melville Sound (ERM 2016a). Tidal ebb and flow currents are weak within the bay. The

south and west shores of Roberts Bay are adjacent to infrastructure and activities associated with the Hope Bay Project (Figure 1).

Discharge from the Hope Bay Project will include saline groundwater from the underground workings (up to 25 ppt salinity) and freshwater from the Tailings Impoundment Area (0.2 ppt salinity; ERM 2016b). During discharge, effluent released will be either a combination of the two sources or one of the sources, depending on water management needs at the site. From the outfall berm, effluent is pumped and discharged to Roberts Bay through a single 2.2 km insulated pipeline to a multi-port diffuser located at a depth of 40 m and 575 m from the nearest shoreline (Figure 2). The diffuser is 95 m long and has 20 ports spaced at 5 m intervals that are 30 mm in diameter and is raised 0.6 m above the sea floor, discharging horizontally into Roberts Bay (Figure 3). Effluent salinity will fluctuate based on the source of water but is expected to be more buoyant than the receiving environment, and will therefore rise in the water column before becoming fully mixed at a trapping depth¹. Modelling results indicate effluent will be quickly diluted, with concentrations 15 m from the diffuser reaching effluent dilution ratios of 160:1 (0.6%) at trapping depth when the most saline and coldest groundwater is discharged under ice² (ERM 2016b). The predicted trapping depth will fluctuate based on effluent source and season, ranging from 28 to 35 m depth under ice, and 34 to 36 m during the open water season.

Based on modelling results, water quality monitoring in Roberts Bay will focus on the area in the immediate vicinity of the effluent discharge diffuser. Effluent-exposed water samples will be collected at one location mid-length along the diffuser (Figure 2). Three samples will be collected, corresponding to near surface (5 m depth), trapping depth (estimated to be 35 m depth), and near bottom (39 m depth). Prior to collecting the trapping depth sample, an *in situ* profile of conductivity and salinity will be conducted to determine the presence of the effluent plume, if possible. Collecting samples at multiple depths will characterize conditions within the receiving environment, as well as aid in validating effluent mixing predictions. Samples will be collected at a reference station on the same day located on the opposite side of Roberts Bay (Figure 2). The distance from shore and depth will be similar to the conditions near the diffuser (e.g., approximately 575 m from the shore, 40 m deep). Samples will be collected at the same depths as the effluent-exposed station (i.e., 5 m, 35 m, 39 m). This will allow for direct comparison of water quality at each depth. Quality control procedures associated with the sampling events will include the collection of one duplicate sample and the submission of field and travel blank samples. Water samples will be shipped to ALS Laboratories in Edmonton, Alberta for analysis. Analyses will include parameters shown in Table 1.

¹ The depth at which effluent will no longer rise in the water column after mixing.

² This represents worst-case conditions based on modelled effluent mixing scenarios.



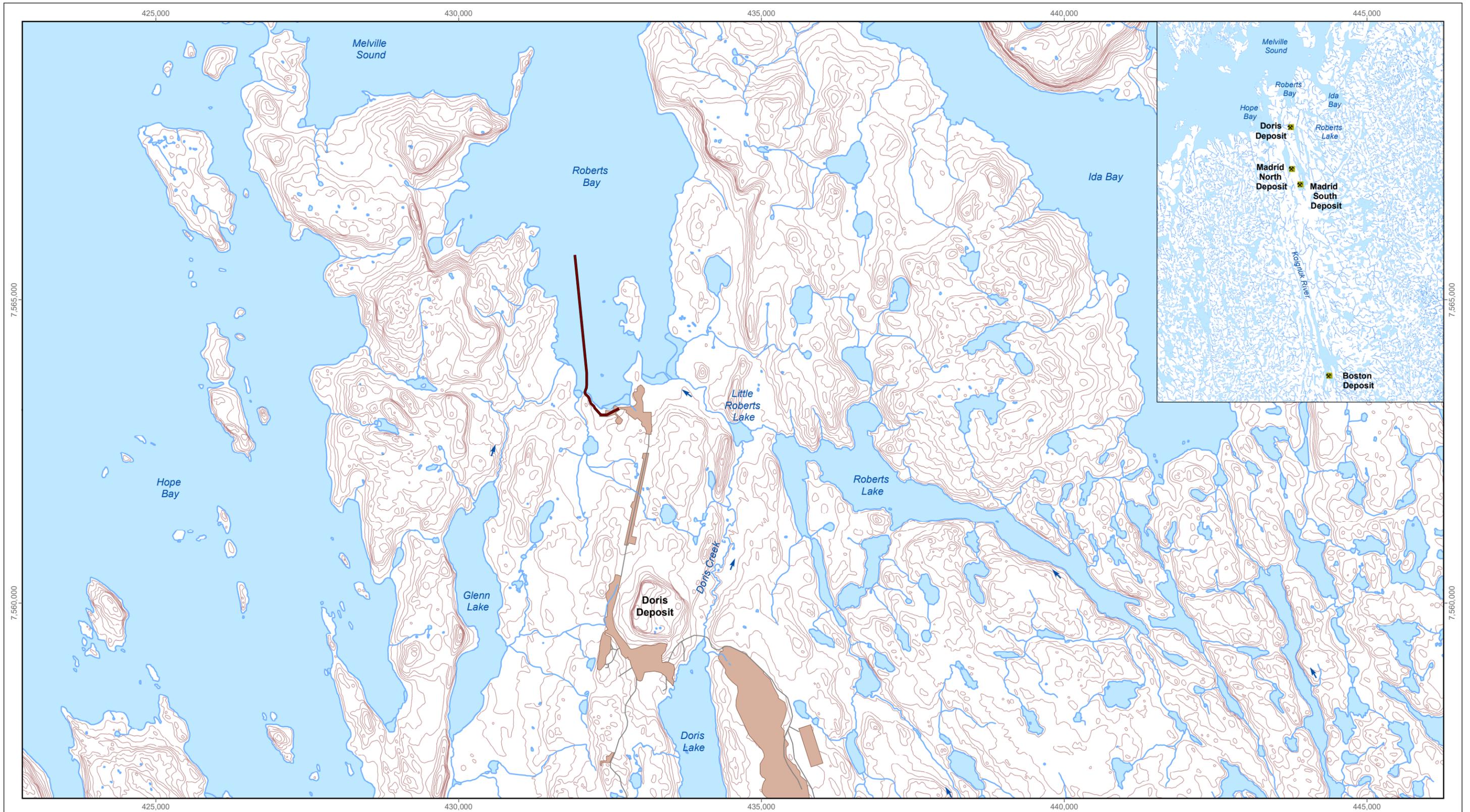
At each sampling location, *in-situ* water quality measurements will be recorded using water from the Beta Bottle (used to collect the water sample) corresponding to each sample. Measurements will include temperature (°C), dissolved oxygen (% and mg/L), pH, specific conductance (µS/cm), and salinity (ppt; Table 1) using a calibrated water quality meter.

Under MDMER, water quality monitoring is required four times per year at least one month apart, while the mine is depositing effluent (Schedule 4, Section 7(2)). However, as mentioned previously, Roberts Bay remains ice covered during a large portion of the year, with ice-out occurring in late June or early July, and ice cover returning in late September or early October. Water quality sampling in Roberts Bay will commence as soon as conditions are safe following ice-out, with subsequent samples collected a minimum of one month apart. As a result, it is anticipated that only three sampling events may occur during the ice-free period. If conditions remain safe, a fourth sampling event will occur prior to ice forming on the bay. Water quality monitoring results will be reported annually by March 31 of the following year to the Regulatory Information Submission System (RISS; per MDMER Schedule 5, Section 8).

References

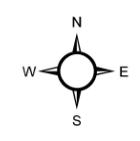
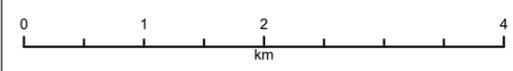
- Environmental Resources Management (ERM). 2016a. 2016 Roberts Bay Hydrodynamic Modelling Report: Numerical Simulation of Effluent and Chromium Predictions. Report prepared for TMAC Resources Ltd. March 2016.
- ERM. 2016b. Near-field Plume Mixing Modelling for Phase 2 Discharges to Roberts Bay. Memorandum prepared for TMAC Resources Ltd. December 2016.
- Government of Canada. 2018. Metal and Diamond Mining Effluent Regulations, Consolidation. SOR/2002-222. Current to November 20, 2018. Last amended on October 29, 2018.





LEGEND

- Effluent Discharge Pipeline
- Infrastructure
- Road
- Contour

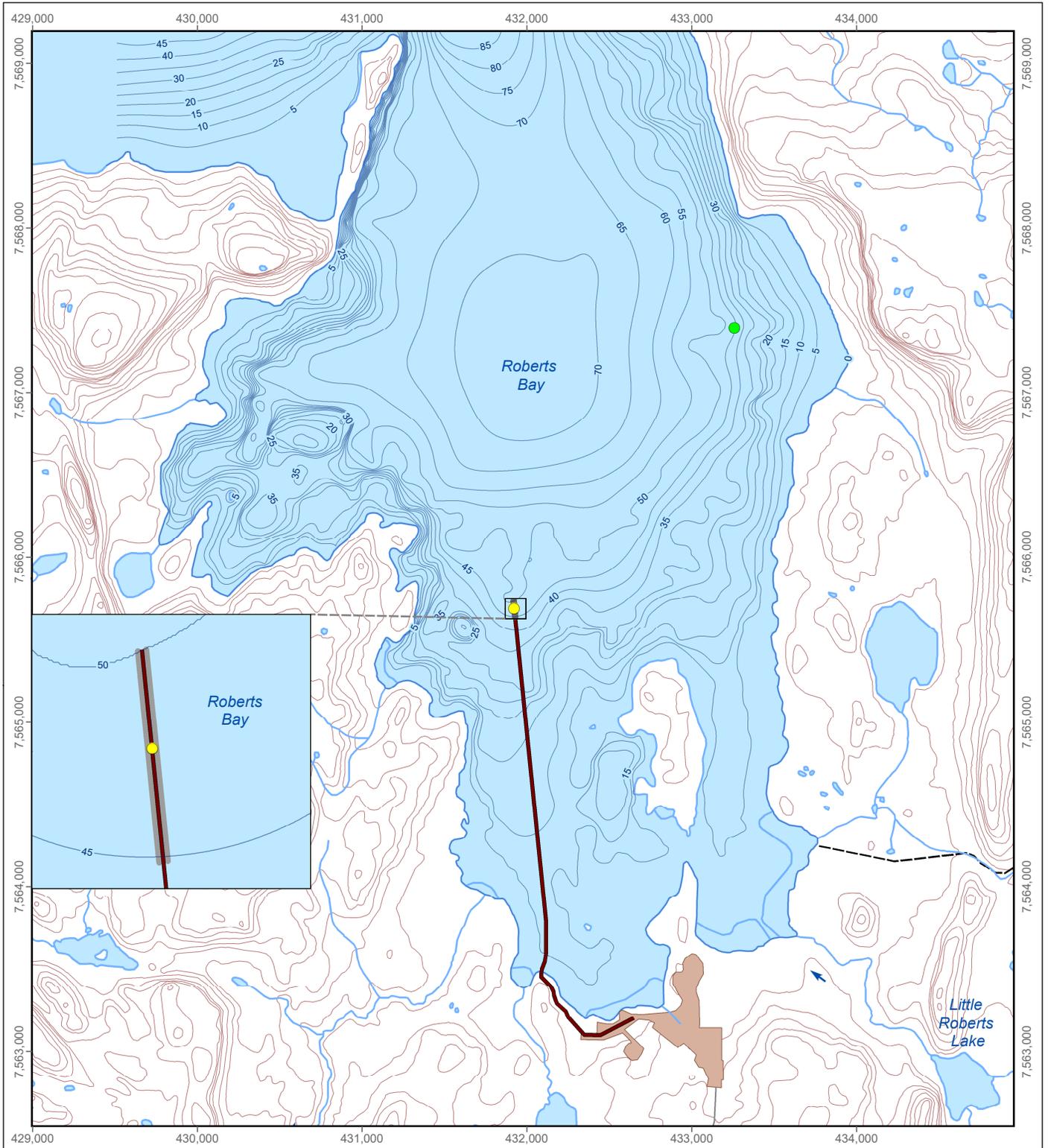


Location of the Hope Bay Project, TMAC Resources

Date: May 2020
Project: 207202.0020



Figure 1



- LEGEND**
- Water Quality Monitoring Station**
- Effluent-exposed
 - Reference
 - Bathymetry (5 meter interval)
 - Diffuser
 - Effluent Discharge Pipeline
 - Infrastructure
 - Road
 - Contour

Proposed Receiving Environment Water Quality Monitoring Stations, TMAC Hope Bay Project



Projection: North American Datum 1983 UTM Zone 13N
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Date: May 2020
 Project: 207202.0020



Figure 2

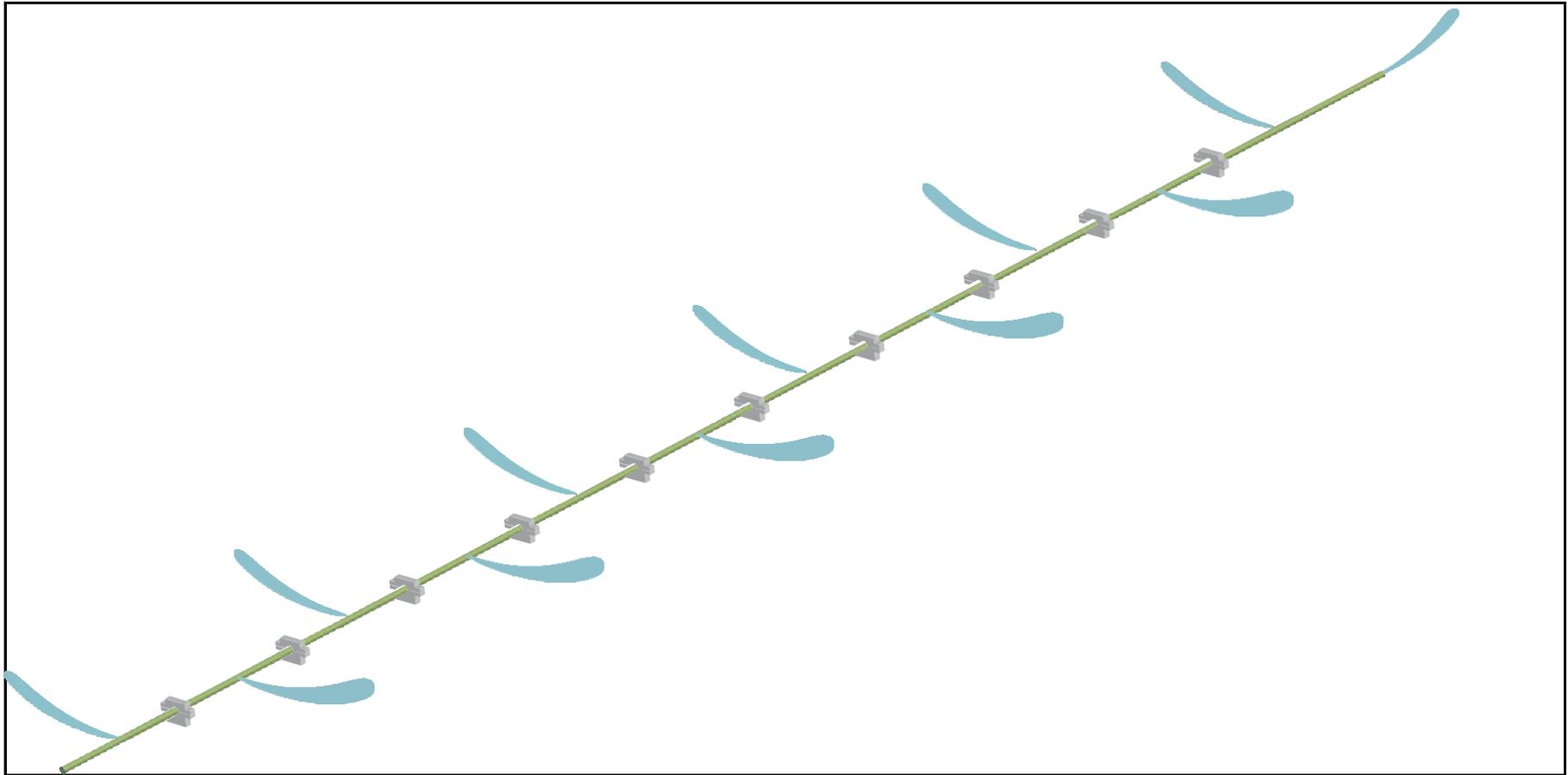


Figure 3: Schematic of the Roberts Bay Effluent Diffuser Showing Discharge Ports^a

Note: Drawing not to scale.

^aERM 2016b.

Table 1: Parameters to Measure During Routine Water Quality Monitoring

	Parameter	Units	<i>In Situ</i> Resolution or Preferred Laboratory Reporting Limit	MDMER Analytical Requirements
<i>In-Situ</i> Mesures	Temperature	°C	0.1	
	pH	pH units	0.1	
	Dissolved Oxygen	mg/L	0.1	
	Conductivity and Specific Conductance	µS/cm	1	1
	Salinity	ppt	0.1	
Non-Metals	Alkalinity	mg/L	2	2
	Hardness	mg/L	1	1
	Dissolved Sulphate	mg/L	0.3	0.06
	Phosphorus	mg/L	0.003	0.05
	Radium-226	Bq/L	0.01	0.01
	Chloride	mg/L	0.5	60
	Cyanide ^a	mg/L	0.005	0.005
	Ammonia	mg/L	0.01	0.05
	Nitrate	mg/L	0.02	1.46835
	Nitrite	mg/L	0.01	
	Nitrate+Nitrite	mg/L	0.1	
	Total Suspended Solids	mg/L	2	2
Metals	Total Aluminium	mg/L	0.005	0.005
	Total Antimony	mg/L	0.0001	
	Total Arsenic	mg/L	0.0001	0.0025
	Total Barium	mg/L	0.0001	
	Total Beryllium	mg/L	0.0001	
	Total Bismuth	mg/L	0.00005	
	Total Boron	mg/L	0.01	
	Total Cadmium	mg/L	0.000005	0.000045
	Total Calcium	mg/L	0.05	
	Total Chromium	mg/L	0.0005	0.00445
	Total Cobalt	mg/L	0.0001	0.00125
	Total Copper	mg/L	0.001	0.001
	Total Iron	mg/L	0.01	0.15
	Total Lead	mg/L	0.00005	0.0005
	Total Lithium	mg/L	0.001	
	Total Magnesium	mg/L	0.005	
	Total Manganese	mg/L	0.0005	0.005
	Total Mercury	mg/L	0.000005	0.00001
	Total Molybdenum	mg/L	0.00005	0.0365
	Total Nickel	mg/L	0.0005	0.0125
	Total Potassium	mg/L	0.05	
	Total Selenium	mg/L	0.00005	0.0005
	Total Silicon	mg/L	0.1	
	Total Silver	mg/L	0.00005	
	Total Sodium	mg/L	0.05	
	Total Strontium	mg/L	0.001	
	Total Thallium	mg/L	0.00001	0.0004
	Total Titanium	mg/L	0.0003	
	Total Uranium	mg/L	0.00001	0.0075
	Total Vanadium	mg/L	0.0005	
Total Zinc	mg/L	0.003	0.01	

^a Monitoring of cyanide is not required if it is not used during processing.

Prairie and Northern Region
Environmental Protection Operations Directorate
Environment and Climate Change Canada
9250 – 49th Street NW
Edmonton, AB T6B 1K5

File #: MM3112

May 31, 2022

via email to: Nancy.Harvey@agnicoeagle.com

Nancy Duquet-Harvey
Environmental Superintendent
Hope Bay Project
Agnico Eagle Mines Limited
145 King Street East, Suite 400
Toronto, Ontario
M5C 2Y7

Dear Nancy Duquet-Harvey:

Subject: Hope Bay Project 1st EEM Study Design

Environment and Climate Change Canada (ECCC) has reviewed your “TMAC Resources Hope Bay Mine Phase 1 Environmental Effects Monitoring Program Study Design”, submitted January 27, 2021 and the addenda submitted March 18, 2021 and May 17, 2022. Our review took into account requirements of the *Metal and Diamond Mining Effluent Regulations* (MDMER) of the *Fisheries Act*, information in the EEM Technical Guidance Document as well as generally accepted standards of good scientific practice. This review is not a substitute for reading the MDMER and does not in any way supersede or modify the *Fisheries Act* or the MDMER. In the event of an inconsistency between this review and the Act and/or the MDMER, the Act and the Regulations prevail.

A review comment for the mine to consider is attached. No further response to the review comment is required.

ECCC anticipates receiving your 1st interpretive report no later than February 1, 2023. Although you have not proposed biological monitoring studies, any applicable information required under Schedule 5, section 12 of the MDMER must be provided in the report (e.g., paragraphs 12(1)(o), (q) and (r)). Regulated facilities are required to



submit EEM reports to the Environmental Effects Monitoring Electronic Reporting system (EEMER) at <https://ec.ss.ec.gc.ca/>.

If you have any questions or concerns about the EEM program or if you wish to discuss the study design, please contact Regional Coordinator Erik Allen at 780-717-4884 or at erik.allen@ec.gc.ca. For questions regarding EEMER, please contact EEM-ESEE@ec.gc.ca.

Sincerely,



Margaret Fairbairn
A/ Regional Director

Enclosure: Review comment on “Hope Bay Mine Phase 1 EEM Study Design Comments Response”, May 2022 submission

cc:	Cristina Ruiu	Environment and Climate Change Canada
	Erik Allen	Environment and Climate Change Canada
	Curtis Didham	Environment and Climate Change Canada
	Ali Shaikh	Nunavut Water Board
	Karén Kharatyan	Nunavut Water Board
	David Zhong	Crown-Indigenous Relations and Northern Affairs Canada
	Andrew Keim	Crown-Indigenous Relations and Northern Affairs Canada
	Guillaume Dumont-Vandewinkel	Agnico Eagle Mines Limited

Review comment on “Hope Bay Mine Phase 1 EEM Study Design Comments Response”, May 2022 submission

The following comment is based on the review of the report by members of a Technical Advisory Panel (TAP) consisting of representatives from Environment and Climate Change Canada (ECCC), Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and Nunavut Water Board (NWB).

1. CIRNAC. In your response you state: *“Minnow acknowledges that the identified parameters may reflect non-conservative effluent tracer parameters upon mixing within Roberts Bay. Ideally, an effluent tracer should behave conservatively in the receiving environment, but also must be elevated in effluent relative to the receiving environment in order to be detectable.”*

Please note that effective tracer parameters do not have to be elevated in the effluent relative to the receiving environment in order to be detectable. They only need to be sufficiently different in the effluent from the receiving environment, i.e., they can be either elevated or depleted in the effluent relative to the receiving environment in order to be detectable.

APPENDIX B
EFFLUENT AND RECEIVING
ENVIRONMENT WATER QUALITY
DATA

Table B.1: Monthly Effluent Discharge Rates for the Hope Bay Mine (RBD1)

Month	Year		
	2020	2021	2022
January	0	0	0
February	0	0	0
March	208,823	0	0
April	215,081	0	0
May	199,320	18,566	0
June	176,550	225,270	15,821
July	189,095	175,444	30,824
August	112,831	195,892	5,735
September	0	158,279	19,597
October	0	120,933	93,429
November	0	223,896	144,291
December	0	0	4,504
Total	1,101,700	1,118,280	314,201

Table B.2: Hope Bay Effluent (RBD1) Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	3-Feb-20	10-Feb-20	17-Feb-20	24-Feb-20	2-Mar-20	9-Mar-20
In Situ Measurements												
pH	-	pH	-	-	-	-	8.11	8.06	7.67	7.59	7.48	7.57
EC (uS/cm)	-	uS/cm	-	-	-	-	10,850	9,690	8,300	6,740	9,280	11,720
Temp	-	C	-	-	-	-	2.1	3.0	4.6	2.9	1.0	4.3
ORP	-	mV	-	-	-	-	195	234	228	306	193	208
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	5.8	5.2	4.4	3.7	5.1	OR
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	-	-	-	6,230	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.88	8.06	8.04	7.93	8.02	7.96
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	7.30	20.0	10.9	6.90	7.80	10.70
Total Dissolved Solids	0.1	mg/L	-	-	-	-	6,170	5,790	5,810	5,440	4,290	7,350
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	167	161	166	153	167	177
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	8.21	6.51	6.32	6.51	6.27	6.60
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.102	0.0918	0.0354	0.0265	0.0169	0.0287
Bromide (Br)	0.050	mg/L	-	-	-	-	10.70	9.10	8.30	5.60	6.30	12.90
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	3,030	2,670	2,320	1,600	1,820	3,620
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
Nitrate (as N)	0.003	mg/L	339	45	-	-	6.93	4.54	4.28	4.15	4.21	4.83
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.3460	0.2490	0.1750	0.1400	0.1560	0.2500
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0377	0.0378	0.0402	-	0.0508	0.0390
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	690	690	627	661	686	754
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.09	0.10	0.09	0.13	0.10	0.09
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.09	0.13	0.15	0.10	0.08	0.13
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.0010	0.00052	0.00056	0.00055	<0.00050	<0.0010
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00160	0.00152	0.00142	0.00137	0.00134	0.00160
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0320	0.0280	0.0290	0.0280	0.0280	0.0350
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.99	0.78	0.69	0.47	0.59	1.02
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.000050	<0.000025	0.00004	<0.000025	<0.000025	<0.000050
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	263	225	217	165	182	281
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00440	0.00403	0.00427	0.00421	0.00407	0.00390
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.058	0.060	0.067	0.064	0.063	0.056
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.4000	0.5420	0.5560	0.5430	0.4710	0.4300
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0420	0.0387	0.0348	0.0294	0.0320	0.0460
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	193	164	142	99	116	234
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.626	0.651	0.661	0.57	0.614	0.733
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	0.0000104	0.000009	<0.0000050	0.0000073	<0.000005	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.0080	0.0076	0.0085	0.009	0.0080	0.0080
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0117	0.0103	0.0108	0.0107	0.0109	0.0108
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	65.0	58.3	57.0	45.7	51.3	74.0
Radium 226	0.00830	Bq/L	-	-	0.37	1.11	0.0150	-	-	-	<0.0083	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	<0.00050	0.00034	0.00037	0.00039	0.00042	<0.00050
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,790	1,520	1,330	972	1,140	2,090
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.00028	0.00025	0.00026	0.00023	0.00024	0.00032
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0050
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	<0.0300	0.0330	0.0190	<0.0150	<0.0150	<0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.2: Hope Bay Effluent (RBD1) Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	11-Mar-20	16-Mar-20	23-Mar-20	30-Mar-20	6-Apr-20	14-Apr-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.56	7.65	7.74	7.62	7.73	7.67
EC (uS/cm)	-	uS/cm	-	-	-	-	10,990	9,080	8,960	11,530	12,180	12,270
Temp	-	C	-	-	-	-	2.9	3.2	2.1	3.5	3.8	6.7
ORP	-	mV	-	-	-	-	195	213	179	189	213	201
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	6.4	5.2	5.2	6.8	6.8	6.6
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		-	7.70	7.87	7.67	8.15	7.97
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	-	5.30	5.00	6.70	8.00	12.60
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	5,910	5,650	7,120	7,180	6,640
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	-	173	164	175	176	179
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	-	6.12	6.53	7.27	7.02	7.54
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	-	0.0292	0.035	0.034	0.0423	0.05
Bromide (Br)	0.050	mg/L	-	-	-	-	-	9.10	8.60	12.30	11.10	11.9
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	-	2,650	2,460	3,450	3,310	3,410
Fluoride (F)	0.020	mg/L	-	NRG	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	0.003	mg/L	339	45	-	-	-	4.41	3.95	4.53	4.21	4.63
Nitrite (as N)	0.0010	mg/L	-	-	-	-	-	0.1750	0.1070	0.1150	0.1480	0.155
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	-	0.0412	0.0428	0.0348	0.0340	0.0356
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	-	727	714	736	722	773
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	-	0.08	0.09	0.08	0.07	0.0957
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	-	0.09	0.06	0.09	0.10	0.0610
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	-	0.00052	<0.00050	0.00061	0.00053	<0.0010
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	-	0.00147	0.00138	0.00130	0.00153	0.00440
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	-	0.0300	0.0290	0.0340	0.0320	0.0340
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	-	0.75	0.66	0.93	0.90	1.03
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	-	<0.000025	<0.000025	0.00003	<0.000025	<0.000050
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	-	237	219	290	276	302
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	-	0.00450	0.00399	0.00469	0.00425	0.00530
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	-	0.059	0.056	0.058	0.054	0.0507
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	-	0.3830	0.3610	0.3980	0.3190	0.290
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	-	0.0369	0.0379	0.0457	0.0456	0.0580
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	-	170	150	208	204	194
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	-	0.693	0.668	0.733	0.752	0.778
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	-	0.0083	0.0081	0.008	0.0083	0.00850
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	-	0.0109	0.0096	0.0110	0.0107	0.0134
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	-	63.5	55.7	69.6	65.5	75.0
Radium 226	0.00830	Bq/L	-	-	0.37	1.11	0.0100	<0.0075	0.0130	0.0130	0.0180	0.0120
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	-	0.00042	0.00042	0.00054	0.00046	<0.00050
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	-	<0.000050	<0.000050	0.00006	<0.000050	<0.00010
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	-	1,550	1,410	1,860	1,850	2,060
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	-	0.00025	0.00026	0.00027	0.00028	0.000390
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	-	<0.0025	<0.0025	<0.0025	<0.0025	<0.0050
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	-	0.0160	0.0160	0.0340	0.0180	<0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.2: Hope Bay Effluent (RBD1) Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	21-Apr-20	27-Apr-20	5-May-20	13-May-20	21-May-20	25-May-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.54	7.5	7.55	7.68	7.59	7.55
EC (uS/cm)	-	uS/cm	-	-	-	-	13,170	17,370	14,330	16,830	16,750	12,110
Temp	-	C	-	-	-	-	4.0	4.4	4.6	4.1	4.6	3.9
ORP	-	mV	-	-	-	-	210	182	198	211	176	240
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	4.6	6.3	5.1	6	6.2	4.4
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		8.11	8.11	7.47	7.94	7.86	7.89
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	<3.0	20.20	4.00	4.30	5.40	6.10
Total Dissolved Solids	0.1	mg/L	-	-	-	-	4,640	6,590	5,080	6,740	6,890	4,980
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	182	179	179	180	174	179
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	7.28	6.57	6.82	8.19	8.20	9.11
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.0289	0.0246	0.029	0.0451	0.0481	0.0366
Bromide (Br)	0.050	mg/L	-	-	-	-	7.40	9.30	8.00	10.8	11.4	7.10
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	2,050	2,810	2,260	3,020	3,120	2,010
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.44	4.06	4.60	5.48	5.75	5.54
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.103	<0.050	0.0610	0.143	0.164	0.157
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0457	0.0384	0.0453	0.0417	0.0487	0.0779
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	762	721	792	798	818	822
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0737	0.0798	0.0593	0.130	0.206	0.400
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.0490	0.0950	0.0860	0.0620	0.0940	7.41
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.0010	0.000540	0.000540	0.000630	<0.0010	0.000840
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00160	0.00154	0.00155	0.00157	0.00140	0.00256
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0360	0.0300	0.0330	0.0320	0.0340	0.0450
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.670	0.840	0.670	0.830	0.830	0.530
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.000050	<0.000035	<0.000025	0.0000280	<0.000050	0.0000260
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	237	244	229	256	262	186
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00300
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00520	0.00452	0.00473	0.00491	0.00600	0.00729
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0637	0.0591	0.0531	0.0628	0.128	0.237
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.340	0.319	0.398	0.400	0.470	2.06
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000910
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0390	0.0451	0.0386	0.0465	0.0480	0.0334
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	138	178	158	183	201	112
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.766	0.755	0.727	0.746	0.785	0.696
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	0.0000112	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00960	0.00810	0.00940	0.00930	0.00920	0.0116
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0135	0.0116	0.0120	0.0136	0.0182	0.0272
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	59.2	62.8	61.1	67.2	67.2	50.5
Radium 226	0.00830	Bq/L	-	-	0.37	1.11	<0.0080	0.0120	<0.0064	0.00950	0.0110	<0.0071
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000500	0.000430	0.000560	0.000290	<0.00050	0.000470
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	<0.00010	<0.000050	<0.000050	<0.000050	0.000110	0.000194
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,570	1,720	1,570	1,810	1,860	1,160
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	-
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	-	-	-	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0540
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000290	0.000260	0.000250	0.000280	0.000280	0.000980
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0050	<0.0025	<0.0025	<0.0025	<0.0050	0.00320
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	<0.0300	0.0300	<0.0150	0.0310	0.0310	<0.0150
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	-

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.2: Hope Bay Effluent (RBD1) Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	3-Jun-20	9-Jun-20	16-Jun-20	22-Jun-20	30-Jun-20	8-Jul-20
In Situ Measurements												
pH	-	pH	-	-	-	-	7.65	7.72	7.42	7.52	7.42	7.61
EC (uS/cm)	-	uS/cm	-	-	-	-	18,970	12,590	11,290	13,730	13,540	8,990
Temp	-	C	-	-	-	-	3.5	2.9	4.4	4.8	3.3	2.8
ORP	-	mV	-	-	-	-	225	220	213	243	211	270
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	6.8	4.4	5.4	4.9	4.8	4.2
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.95	8.03	7.79	7.83	7.87	7.75
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	11.10	9.40	11.10	9.20	8.50	8.80
Total Dissolved Solids	0.1	mg/L	-	-	-	-	7,560	4,820	6,690	5,600	5,210	4,850
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	174	180	178	197	173	199
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	7.85	9.26	8.44	8.56	9.50	8.93
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.0384	0.0507	0.0262	0.0346	0.027	0.0377
Bromide (Br)	0.050	mg/L	-	-	-	-	12.3	6.10	9.30	9.10	8.00	8.30
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	3,440	1,960	2,690	2,410	2,320	2,000
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.69	5.38	5.30	5.30	5.32	5.41
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.215	0.108	0.130	0.170	0.152	0.105
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0518	0.0703	0.0514	0.0615	0.0645	0.0535
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	863	775	799	838	781	791
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.283	0.362	0.274	0.292	0.230	0.240
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.147	0.237	0.141	0.176	0.0910	0.100
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.0010	0.000800	0.000800	0.000750	0.000900	0.000760
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00200	0.00259	0.00253	0.00255	0.00214	0.00249
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0350	0.0340	0.0320	0.0340	0.0370	0.0308
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	<0.00025
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.810	0.660	0.720	0.730	0.710	0.646
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	<0.000050	<0.000025	0.0000290	0.0000280	<0.000025	0.0000290
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	286	214	233	221	231	230
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	<0.000050
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	<0.0010	0.00160	<0.0010	<0.0010	<0.0010	<0.00050
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00510	0.00615	0.00580	0.00553	0.00569	0.00552
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.164	0.196	0.157	0.169	0.160	0.104
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.650	0.775	0.618	0.675	0.840	0.565
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00025
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0440	0.0372	0.0375	0.0387	0.0396	0.0376
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	212	134	172	159	149	144
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.780	0.662	0.715	0.698	0.734	0.648
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00940	0.0123	0.0106	0.0105	0.0116	0.0115
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0227	0.0273	0.0232	0.0246	0.0235	0.0230
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	72.0	60.6	64.7	62.9	58.9	59.2
Radium 226	0.00830	Bq/L	-	-	0.37	1.11	<0.0076	-	-	-	-	<0.0085
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	0.0170
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000570	0.000440	0.000630	0.000560	0.000560	0.000650
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	-	-	-	-	-	3.31
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	0.000100	0.000108	0.000118	0.000126	0.000174	0.0000620
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,940	1,360	1,540	1,460	1,470	1,430
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	-	-	-	-	-	1.91
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	-	-	-	-	-	294
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	-	-	-	-	-	<0.0010
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	<0.00050
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0015
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	-	-	-	-	-	0.000970
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000290	0.000300	0.000300	0.000300	0.000320	0.000302
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0430	<0.0150	<0.0150	0.0190	0.0170	<0.0150
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	-	-	-	-	-	<0.0010

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand ‰) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.2: Hope Bay Effluent (RBD1) Quality Data, 2020

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1						
			Acute	Chronic	Average	Grab Sample	10-Jul-20	16-Jul-20	23-Jul-20	30-Jul-20	6-Aug-20	14-Aug-20	19-Aug-20
In Situ Measurements													
pH	-	pH	-	-	-	-	7.49	7.66	7.63	7.61	8.17	-	7.71
EC (uS/cm)	-	uS/cm	-	-	-	-	12,140	15,660	17,480	OR	10,100	-	OR
Temp	-	C	-	-	-	-	3.1	5.0	5.9	7.0	11.5	-	8.7
ORP	-	mV	-	-	-	-	192	210	202	194	181	-	238
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	4.2	5.6	6.4	4.8	3.6	-	OR
Physical Tests (Seawater)													
Conductivity	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.74	7.77	7.69	7.80	8.12	7.94	7.94
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	20.80	3.80	6.50	9.50	22.50	12.40	3.70
Total Dissolved Solids	0.1	mg/L	-	-	-	-	4,580	6,040	6,990	5,480	4,380	19,600	19,800
Anions and Nutrients (Seawater)													
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	179	179	176	177	126	170	154
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	9.15	9.38	7.63	8.82	14.8	3.38	2.66
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.03	0.0531	0.0433	0.0523	0.444	0.0199	0.0227
Bromide (Br)	0.050	mg/L	-	-	-	-	7.40	9.10	11.2	9.20	5.70	30.8	35.8
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	1,980	2,590	3,040	2,530	1,810	8,110	9,650
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0
Nitrate (as N)	0.003	mg/L	339	45	-	-	6.07	5.12	4.53	5.32	3.85	1.78	1.43
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.110	0.136	0.114	0.0880	0.115	<0.10	0.100
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	0.0816	0.0535	<0.25	<0.25	0.0643	<1.0	0.00860
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	798	834	766	871	602	824	969
Cyanides (Seawater)													
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.198	0.171	0.658	0.122	0.0659	0.0313	0.0206
Total Metals (Seawater)													
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.330	0.0760	0.0810	0.130	0.125	0.237	0.100
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.000740	0.000810	0.000610	0.000640	0.000560	<0.0020	0.00340
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00280	0.00233	0.00225	0.00224	0.00202	0.00320	<0.0020
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0312	0.0331	0.0356	0.0332	0.0243	0.0423	0.0420
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020	<0.0020
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.0010	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.754	0.711	1.05	0.781	0.707	2.28	2.57
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	0.0000390	0.0000340	<0.000025	<0.000025	0.0000310	<0.00010	<0.00010
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	199	248	305	220	202	600	710
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	<0.000050	<0.000050	0.0000750	<0.000050	0.0000790	0.000390	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	0.000820	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020	<0.0020
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00581	0.00548	0.00552	0.00542	0.00458	0.00370	<0.0020
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.100	0.0845	0.0672	0.0742	0.0606	0.0340	0.0160
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	1.71	0.488	0.468	0.456	0.474	0.780	0.450
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.000480	0.000310	<0.00025	0.000260	0.000360	<0.0010	<0.0010
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0345	0.0362	0.0532	0.0360	0.0340	0.0870	0.0910
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	134	155	212	165	152	549	588
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.693	0.689	0.801	0.703	0.566	1.11	1.36
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.0106	0.0113	0.0107	0.0102	0.00956	0.00520	0.00390
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0212	0.0215	0.0188	0.0202	0.0167	0.0140	<0.010
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	53.8	62.1	74.9	59.8	52.2	131	140
Radium 226	0.00830	Bq/L	-	-	0.37	1.11	-	-	-	-	-	-	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0163	0.0193	0.0285	0.0216	0.0210	0.0688	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000500	0.000380	0.000450	0.000430	0.000370	<0.0010	<0.0010
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	3.73	3.12	3.95	3.31	2.72	4.60	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	0.0000680	0.0000740	<0.000050	0.0000530	0.0000570	<0.00020	<0.00020
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,260	1,440	2,030	1,450	1,470	4,410	4,970
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	1.56	2.15	3.03	2.01	2.16	7.72	-
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	292	300	361	296	252	349	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00020	<0.00020
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0020	<0.0020
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.00740	<0.0015	<0.0015	0.00280	0.00210	<0.0060	<0.0100
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.000920	0.00133	0.00139	0.00176	0.00142	0.00490	-
Uranium (U)-Total	0.1	mg/L	NRG	NRG	-	-	0.000292	0.000264	0.000312	0.000290	0.000236	0.000320	0.000260
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.010	<0.010
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	<0.0150	0.0200	0.0160	<0.0150	0.0420	0.130	0.0630
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040	-

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand ‰) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.3: Hope Bay Effluent (RBD1) Quality Data, 2021

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	22-May-21	26-May-21	8-Jun-21	15-Jun-21	22-Jun-21	29-Jun-21
In Situ Measurements												
pH	-	pH	-	-	-	-	6.58	6.93	7.39	7.27	7.42	7.46
EC (uS/cm)	-	uS/cm	-	-	-	-	-	-	-	-	-	-
Temp	-	C	-	-	-	-	8.1	8	4.4	3.8	2.6	4.7
ORP	-	mV	-	-	-	-	-	-	-	-	-	-
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	-	-	6.2	5.7	4.7	5.6
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	-	-	10,800	-	8,540	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.81	7.81	7.98	7.39	7.95	7.72
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	< 2.0	< 3.0	7.5	4.2	3.7	4.9
Total Dissolved Solids	0.1	mg/L	-	-	-	-	17,900	15,100	7,320	6,370	5,490	6,070
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	120	128	175	147	164	128
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	6.54	7.12	8.77	6.74	8.15	6.77
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.004	0.0096	0.0254	0.0141	0.0219	0.0236
Bromide (Br)	0.050	mg/L	-	-	-	-	-	34.5	12.2	10.4	9.58	10.1
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	-	9,070	3,470	3,070	2,870	2,900
Fluoride (F)	0.020	mg/L	-	NRG	-	-	-	< 2.00	< 1.00	< 1.00	< 1.00	< 1.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	-	8	6.06	4.44	5.89	5
Nitrite (as N)	0.0010	mg/L	-	-	-	-	-	0.889	0.175	0.137	0.123	0.277
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	< 0.500	< 0.500	< 0.250	0.034	0.0513	< 0.500
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	-	955	965	759	1030	660
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0172	0.0135	0.0272	0.0442	0.0879	0.0494
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.0796	0.107	0.198	0.111	0.0869	0.128
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00100	0.00095	0.00063	0.00077	< 0.00100
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	< 0.00100	0.00123	0.00256	0.00212	0.00239	0.00194
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0644	0.0534	0.041	0.0331	0.0322	0.0309
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.000500	< 0.000500	< 0.000500	< 0.00100
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	< 0.000500	< 0.000500	< 0.000250	< 0.000250	< 0.000250	< 0.000500
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	2.42	2.25	0.986	0.859	0.778	0.778
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	< 0.0000500	0.0000657	0.0000316	0.0000282	< 0.0000250	< 0.0000500
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	538	457	257	239	198	222
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.000227	< 0.000100	0.000098	0.000107	0.000062	0.000105
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	< 0.00500	< 0.00500	< 0.00250	< 0.00250	< 0.00250	< 0.00500
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00212	0.00491	0.0054	0.00446	0.00508	0.00424
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0129	0.0318	0.0881	0.0713	0.0764	0.0607
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	< 0.100	< 0.100	0.414	0.299	0.264	0.309
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.00124	0.00101	0.000444	0.000366	< 0.000250	< 0.000500
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0849	0.0731	0.0406	0.0385	0.0354	0.034
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	549	472	198	200	154	197
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	1.13	1.04	0.718	0.669	0.594	0.587
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00712	0.00783	0.0116	0.00856	0.0113	0.00768
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.00704	0.0115	0.0167	0.013	0.0155	0.0134
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	144	124	72.4	61.4	60.7	58.7
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	0.03	0.025	-	-	< 0.0048	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0664	0.0286	0.0255	0.0231	0.0185	0.0228
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	< 0.000500	< 0.000500	0.000444	0.000517	0.000424	0.000567
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	4.12	3.4	3.87	3.2	3.26	2.96
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	< 0.000100	0.000415	0.000062	< 0.000050	0.000054	< 0.000100
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	4,690	4,010	1,950	1,720	1,550	1,680
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	7.62	6.42	2.77	2.47	1.94	2.31
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	352	321	346	298	340	246
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	< 0.00200	< 0.00200	< 0.00100	< 0.00100	< 0.00100	< 0.00200
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	< 0.000100	< 0.000100	< 0.000050	< 0.000050	< 0.000050	< 0.000100
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00050	< 0.00050	< 0.00050	< 0.00100
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00050	< 0.00050	< 0.00050	< 0.00100
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	< 0.00300	< 0.00300	< 0.00180	< 0.00150	< 0.00150	< 0.00300
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00447	0.00463	0.0024	0.00139	0.00137	0.00338
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	< 0.000100	< 0.000100	0.000282	0.000202	0.000242	0.000172
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	< 0.00500	< 0.00500	< 0.00250	< 0.00250	< 0.00250	< 0.00500
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0378	0.0409	< 0.0150	0.0205	< 0.0150	< 0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	< 0.00200	< 0.00200	< 0.00100	< 0.00100	< 0.00100	< 0.00200

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.3: Hope Bay Effluent (RBD1) Quality Data, 2021

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	6-Jul-21	13-Jul-21	20-Jul-21	31-Jul-21	3-Aug-21	10-Aug-21
In Situ Measurements												
pH	-	pH	-	-	-	-	7.66	7.54	7.83	7.42	7.31	8.02
EC (uS/cm)	-	uS/cm	-	-	-	-	-	-	-	-	-	-
Temp	-	C	-	-	-	-	2.5	9.4	10.3	6.5	6.9	9.5
ORP	-	mV	-	-	-	-	-	-	-	-	-	-
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	5.3	3.8	5.2	5.4	9.9	7
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	-	-	-	-	17,100	12,000
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.95	7.86	7.96	7.66	7.93	8
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	7.9	9.3	6.8	15.7	8.2	11.8
Total Dissolved Solids	0.1	mg/L	-	-	-	-	1,500	4,440	5,860	6,330	-	-
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	182	94.1	113	182	-	-
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	8.72	4.86	6.31	9.32	9.68	6.24
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.0402	0.0296	0.08	0.0343	0.0286	0.114
Bromide (Br)	0.050	mg/L	-	-	-	-	8.96	7.42	9.69	9.73	18.8	13.3
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	2,510	2,090	2,790	2,780	5,410	3,710
Fluoride (F)	0.020	mg/L	-	NRG	-	-	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.86	3.49	4.6	5	6.18	4.62
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.0554	0.199	0.173	0.112	0.26	0.238
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	< 0.500	0.033	0.0199	0.0586	< 0.500	< 0.500
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	887	489	565	911	935	713
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0884	0.0287	0.0273	0.1	0.0665	0.0389
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.174	0.2	0.122	0.178	0.196	0.152
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	0.00044	0.0005	< 0.00100	< 0.00100	< 0.00100
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00311	0.00163	0.00161	0.00305	0.00206	0.00194
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0413	0.0217	0.026	0.0379	0.0484	0.0451
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	< 0.00100	< 0.000200	< 0.000500	< 0.00100	< 0.00100	< 0.00100
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	< 0.000500	< 0.000100	< 0.000250	< 0.000500	< 0.000500	< 0.000500
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.682	0.563	0.688	0.823	1.47	0.973
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	< 0.0000500	0.0000151	< 0.0000250	< 0.0000500	< 0.0000500	< 0.0000500
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	218	147	192	222	365	263
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	< 0.000100	0.000095	0.000098	< 0.000100	0.00032	0.000209
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	< 0.00500	< 0.00100	< 0.00250	< 0.00500	< 0.00500	< 0.00500
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00581	0.00282	0.00319	0.00557	0.00378	0.00318
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0988	0.0375	0.0399	0.0846	0.0637	0.0456
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.511	0.643	0.379	0.748	0.662	0.438
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	< 0.000500	0.000442	0.000373	< 0.000500	< 0.000500	0.00132
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0358	0.0253	0.028	0.0363	0.0598	0.0417
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	160	133	174	182	329	222
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.721	0.42	0.531	0.7	0.841	0.487
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.0115	0.00614	0.00708	0.0117	0.0104	0.00974
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0187	0.00839	0.00979	0.0167	0.0121	0.0102
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	65.9	41.2	54.2	65.4	95.3	72.4
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	< 0.0086	< 0.005	< 0.0045	< 0.0073	0.013	0.0099
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0194	0.0168	0.0221	0.0205	0.0444	0.0338
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	< 0.000500	0.000268	0.000357	0.000502	< 0.000500	< 0.000500
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	3.93	1.99	2.3	3.58	4.51	3.63
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	< 0.000100	0.000047	< 0.000050	< 0.000100	< 0.000100	< 0.000100
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,640	1,210	1,630	1,680	3,050	2,070
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	2.12	1.76	2.43	2.1	4.41	3.06
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	359	191	220	331	356	266
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	< 0.00200	< 0.00040	< 0.00100	< 0.00200	< 0.00200	< 0.00200
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	< 0.000100	< 0.000020	< 0.000050	< 0.000100	< 0.000100	< 0.000100
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	< 0.00100	< 0.00020	< 0.00050	< 0.00100	< 0.00100	< 0.00100
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00020	< 0.00050	< 0.00100	< 0.00100	< 0.00100
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	< 0.00300	< 0.00330	0.00154	< 0.00300	< 0.00300	< 0.00300
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00143	0.00232	0.00186	0.0017	0.00284	0.00356
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.000268	0.000131	0.000162	0.000267	0.00022	0.000238
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	< 0.00500	< 0.00100	< 0.00250	< 0.00500	< 0.00500	< 0.00500
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	< 0.0300	0.0152	< 0.0150	< 0.0300	< 0.0300	< 0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	< 0.00200	< 0.00040	< 0.00100	< 0.00200	< 0.00200	< 0.00200

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.3: Hope Bay Effluent (RBD1) Quality Data, 2021

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	17-Aug-21	24-Aug-21	31-Aug-21	7-Sep-21	14-Sep-21	21-Sep-21
In Situ Measurements												
pH	-	pH	-	-	-	-	8.46	8.15	8.14	8.36	8.15	8.26
EC (uS/cm)	-	uS/cm	-	-	-	-	-	-	-	-	-	-
Temp	-	C	-	-	-	-	10.7	11.8	11.2	9.7	4.3	7.6
ORP	-	mV	-	-	-	-	-	-	-	-	-	-
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	3.7	5.4	4.6	4	5.5	5
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	7,030	9,370	8,320	7,070	9,620	8,890
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		8.23	8.06	7.84	8.3	8.16	8.11
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	13.8	5.8	12.5	13.4	16.2	16.5
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	-	134	-	-	-	-
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	5.35	6.48	6.38	4.71	5.92	7.11
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.286	0.19	0.174	0.188	0.0968	0.193
Bromide (Br)	0.050	mg/L	-	-	-	-	6.28	9.77	7.68	6.54	10	11
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	1,720	2,820	2,220	1,940	2,790	2,450
Fluoride (F)	0.020	mg/L	-	NRG	-	-	< 0.400	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	3.61	4.89	4.6	4.3	5.84	6.98
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.167	0.243	0.194	0.192	0.249	0.228
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	581	668	677	638	683	633
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0251	0.0175	0.0217	0.0101	0.038	0.0198
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.165	0.187	0.366	0.103	0.294	0.187
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.00064	0.00063	0.00067	0.00057	0.00064	0.0008
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00221	0.00205	0.00223	0.00209	0.00209	0.00201
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.027	0.0316	0.0317	0.0272	0.0312	0.0309
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	< 0.000250	< 0.000250	< 0.000250	< 0.000250	< 0.000250	< 0.000250
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.578	0.761	0.753	0.556	0.772	0.783
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	< 0.0000250	< 0.0000250	< 0.0000250	< 0.0000250	< 0.0000250	< 0.0000250
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	157	210	206	162	218	213
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.00005	0.000083	0.0001	< 0.000050	0.000137	0.000115
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	< 0.00250	< 0.00250	< 0.00250	< 0.00250	< 0.00250	< 0.00250
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.0039	0.00358	0.00417	0.00377	0.00315	0.00418
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0508	0.042	0.0445	0.0436	0.0344	0.0332
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.487	0.386	0.423	0.358	0.343	0.292
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.000725	0.00112	0.0006	0.00039	0.000311	0.000495
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0254	0.0337	0.0312	0.0258	0.0323	0.0296
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	119	174	157	124	150	152
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.488	0.517	0.497	0.457	0.443	0.5
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00848	0.00863	0.00879	0.00876	0.00895	0.00885
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0112	0.0107	0.0117	0.0108	0.00937	0.0112
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	46.6	57.2	59.6	45.9	51.8	53.4
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	< 0.0052	0.0086	< 0.011	< 0.0057	< 0.0068	< 0.0059
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0148	0.0233	0.0199	0.0154	0.0219	0.0206
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000407	< 0.000250	0.000417	0.00054	0.000534	0.00263
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	2.58	2.82	2.9	2.5	3.1	2.72
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,180	1,660	1,490	1,260	1,490	1,390
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	1.52	2.34	1.9	1.56	2.33	2.16
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	242	246	256	245	241	248
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050	< 0.000050
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	< 0.00420	0.00391	0.0026	0.00237	0.00507	< 0.00210
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00128	0.00355	0.00236	0.00125	0.00231	0.00292
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.00021	0.000202	0.000199	0.000196	0.000283	0.000223
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	< 0.00250	< 0.00250	< 0.00250	< 0.00250	< 0.00250	< 0.00250
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0152	0.0153	0.0156	< 0.0150	< 0.0150	< 0.0150
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	< 0.00100	0.00272	< 0.00100	< 0.00100	< 0.00100	< 0.00100

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.3: Hope Bay Effluent (RBD1) Quality Data, 2021

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	28-Sep-21	5-Oct-21	12-Oct-21	19-Oct-21	26-Oct-21	2-Nov-21
In Situ Measurements												
pH	-	pH	-	-	-	-	7.39	7.17	7.17	6.83	8.09	8.12
EC (uS/cm)	-	uS/cm	-	-	-	-	-	-	-	-	-	-
Temp	-	C	-	-	-	-	9.4	7.7	8.4	7.8	3.5	1.9
ORP	-	mV	-	-	-	-	-	-	-	-	-	-
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	12.6	12.1	11.4	11.8	5.2	5
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	20,500	19,900	18,900	20,100	9,050	8,870
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		7.84	7.72	8	7.28	7.96	8.21
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	11.4	9.6	7.1	7	14	14.2
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	-	133	-	97.6	-	-
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	12.7	4.64	5.12	4.08	4	4
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.055	0.0106	0.0124	0.0043	0.0535	0.0502
Bromide (Br)	0.050	mg/L	-	-	-	-	25.4	24.5	21.5	23.3	9.46	8.32
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	7,230	7,430	6,390	7,000	2,710	2,470
Fluoride (F)	0.020	mg/L	-	NRG	-	-	< 2.00	< 2.00	< 2.00	< 2.00	< 1.00	< 1.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	15.4	4.82	5.97	4.87	4.46	4.68
Nitrite (as N)	0.0010	mg/L	-	-	-	-	1.06	0.368	0.551	0.304	0.0823	0.093
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	< 0.500	< 0.500	< 0.500	< 1.00	< 0.250	< 0.250
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	775	772	672	716	665	653
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0349	0.0117	0.0121	0.0525	0.0243	0.0113
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	1.05	2.03	1.5	1.48	0.166	0.188
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00100	< 0.00200	0.0006	0.0006
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00127	< 0.00100	< 0.00100	< 0.00200	0.002	0.00216
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0619	0.048	0.0421	0.0424	0.0324	0.035
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00100	< 0.00200	< 0.000500	< 0.000500
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	< 0.000500	< 0.000500	< 0.000500	< 0.00100	< 0.000250	< 0.000250
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	2.33	2.02	1.91	1.69	0.715	0.652
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	0.0000518	< 0.0000500	< 0.0000500	< 0.000100	< 0.0000250	< 0.0000250
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	476	466	424	416	197	189
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.000418	0.00058	0.000402	0.000533	0.000095	0.000073
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	< 0.00500	< 0.00500	< 0.00500	< 0.0100	< 0.00250	< 0.00250
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00332	0.00497	0.00614	0.00564	0.00377	0.00447
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0139	0.00838	0.00956	< 0.0100	0.03	0.0317
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.732	0.266	0.223	< 0.200	0.298	0.271
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	< 0.000500	< 0.000500	< 0.000500	< 0.00100	< 0.000250	< 0.000250
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0761	0.0745	0.0641	0.071	0.034	0.0296
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	421	439	382	394	166	163
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.777	0.937	0.896	0.849	0.567	0.557
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00859	0.00441	0.00507	0.00366	0.00791	0.00761
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0125	0.0121	0.0136	0.0127	0.0101	0.012
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	117	116	104	104	56.6	55.3
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	0.019	0.018	0.017	0.056	0.0069	< 0.0071
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0627	0.0595	0.0527	0.0522	0.0211	0.0199
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000628	< 0.000500	0.000638	< 0.00100	0.000524	0.000544
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	3.95	3.75	3.63	3.24	2.86	2.88
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	< 0.000100	< 0.000100	< 0.000100	< 0.000200	< 0.000050	< 0.000050
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	4,000	3,740	3,380	3,440	1,650	1,520
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	6.46	6.05	5.48	5.46	2.2	2
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	297	283	276	255	273	252
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	< 0.00200	< 0.00200	< 0.00200	< 0.00400	< 0.00100	< 0.00100
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	< 0.000100	< 0.000100	< 0.000100	< 0.000200	< 0.000050	< 0.000050
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00100	< 0.00200	< 0.00050	< 0.00050
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00100	< 0.00100	< 0.00200	< 0.00050	< 0.00050
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	< 0.0129	< 0.00300	< 0.00300	< 0.00600	< 0.00150	< 0.00420
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00984	0.00343	0.00494	0.00247	0.00143	0.00144
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.000222	0.000144	0.000134	< 0.000200	0.000178	0.00018
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	< 0.00500	< 0.00500	< 0.00500	< 0.0100	< 0.00250	< 0.00250
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	< 0.0300	< 0.0300	< 0.0300	< 0.0600	< 0.0150	< 0.0150
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	< 0.00200	< 0.00200	< 0.00200	< 0.00400	< 0.00100	< 0.00100

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.3: Hope Bay Effluent (RBD1) Quality Data, 2021

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1			
			Acute	Chronic	Average	Grab Sample	9-Nov-21	16-Nov-21	23-Nov-21	28-Nov-21
In Situ Measurements										
pH	-	pH	-	-	-	-	8.54	7.96	7.95	8.02
EC (uS/cm)	-	uS/cm	-	-	-	-	-	-	-	-
Temp	-	C	-	-	-	-	2.3	3.4	2.6	2.2
ORP	-	mV	-	-	-	-	-	-	-	-
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	4.1	5.5	5.8	5.2
Physical Tests (Seawater)										
Conductivity	-	uS/cm	-	-	-	-	7,420	10,100	10,100	9,360
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5		8.08	8.01	8.00	7.91
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	16.3	11.3	14	12.2
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	-	-	-
Anions and Nutrients (Seawater)										
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	4.14	3.82	5.42	4.58
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.138	0.0377	0.049	0.047
Bromide (Br)	0.050	mg/L	-	-	-	-	7.76	10.2	11.4	9.33
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	2,060	3,040	3,110	2,760
Fluoride (F)	0.020	mg/L	-	NRG	-	-	< 1.00	< 1.00	< 1.00	< 1.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.66	4.66	6.51	5.49
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.068	0.0775	0.143	0.112
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	< 0.250	< 0.500	< 0.500	< 0.500
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	634	708	712	685
Cyanides (Seawater)										
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0128	0.0118	0.0137	0.02
Total Metals (Seawater)										
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.0682	0.319	0.317	0.237
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.00063	< 0.00100	< 0.00100	< 0.00100
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00228	0.00213	0.00216	0.00218
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0324	0.0347	0.0349	0.0357
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	< 0.000500	< 0.00100	< 0.00100	< 0.00100
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	< 0.000250	< 0.000500	< 0.000500	< 0.000500
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.552	0.747	0.906	0.84
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	< 0.0000250	< 0.0000500	< 0.0000500	< 0.0000500
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	163	235	236	215
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	< 0.000050	0.000149	0.000166	0.000106
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	< 0.00250	< 0.00500	< 0.00500	< 0.00500
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00386	0.00352	0.00402	0.00444
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0316	0.0296	0.0315	0.0323
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.217	0.223	0.268	0.227
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	< 0.000250	< 0.000500	< 0.000500	< 0.000500
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0277	0.0367	0.0362	0.0344
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	133	184	208	189
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.517	0.591	0.624	0.617
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00868	0.00861	0.00855	0.00826
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0101	0.00995	0.0115	0.0116
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	49.7	58.4	64.7	58.2
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	< 0.0074	< 0.0067	0.01	< 0.0072
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0157	0.0238	0.0263	0.0224
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000767	< 0.000500	< 0.000500	0.000608
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	2.7	3.04	2.96	2.97
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	< 0.000050	< 0.000100	< 0.000100	< 0.000100
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,340	1,650	1,830	1,680
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	1.72	2.66	2.61	2.38
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	269	258	262	274
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	< 0.00100	< 0.00200	< 0.00200	< 0.00200
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	< 0.000050	< 0.000100	< 0.000100	< 0.000100
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	< 0.00050	< 0.00100	< 0.00100	< 0.00100
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	< 0.00050	< 0.00100	< 0.00100	< 0.00100
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.00166	< 0.00300	< 0.00300	< 0.00300
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00133	0.00263	0.00317	0.00179
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.000215	0.000201	0.000191	0.000186
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	< 0.00250	< 0.00500	< 0.00500	< 0.00500
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	< 0.0150	< 0.0300	< 0.0300	< 0.0300
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	< 0.00100	< 0.00200	< 0.00200	< 0.00200

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.4: Hope Bay Effluent (RBD1) Quality Data, 2022

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	28-Jun-22	5-Jul-22	13-Jul-22	19-Jul-22	25-Jul-22	26-Jul-22
In Situ Measurements												
pH	-	pH	-	-	-	-	7.38	7.25	7.16	7.26	7.25	7.33
EC (uS/cm)	-	uS/cm	-	-	-	-	-	-	-	-	-	-
Temp	-	C	-	-	-	-	7.3	10.4	10.2	9.5	11	11.5
ORP	-	mV	-	-	-	-	-	-	-	-	-	-
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	8.1	11.8	12	12.6	11.3	11.4
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	18,800	19,900	19,400	20,600	18,900	18,700
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5	-	7.79	7.81	7.93	7.5	7.95	7.65
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	17.7	16.2	11	8	4	18.5
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	-	-	-	13,400	-
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	-	123	137	121	152	143
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	2.77	1.68	1.63	7.38	1.67	1.64
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.0099	0.0057	0.0044	0.027	-	0.0073
Bromide (Br)	0.050	mg/L	-	-	-	-	20.6	24	27.4	24.7	23.6	24.5
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	-	-	-	-	-	-
Fluoride (F)	0.020	mg/L	-	NRG	-	-	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.25	2.43	2.74	9.55	2.89	3.05
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.195	0.208	0.274	0.282	0.329	0.326
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	< 0.500	< 1.00	< 1.00	< 1.00	0.0046	< 1.00
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	-	-	-	-	-	-
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0122	0.0112	0.0147	0.0168	0.0094	< 0.0200
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	2.1	3.06	1.47	1.42	0.362	1.3
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00200	< 0.00200	< 0.00200	< 0.00100	< 0.00200
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00104	< 0.00200	< 0.00200	< 0.00200	< 0.00100	< 0.00200
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0522	0.0486	0.0414	0.0454	0.0407	0.0417
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	< 0.000200	< 0.000400	< 0.000400	< 0.000400	< 0.00100	< 0.000400
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	< 0.000500	< 0.00100	< 0.00100	< 0.00100	< 0.000500	< 0.00100
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	1.82	1.97	1.89	1.85	1.77	2.02
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	< 0.0000500	< 0.000100	< 0.000100	< 0.000100	< 0.0000500	< 0.000100
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	492	500	506	444	443	453
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.00101	0.000729	0.000556	0.000759	0.00068	0.000677
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	0.005	0.00357	< 0.00200	< 0.00200	< 0.00500	< 0.00200
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00468	0.00514	0.00458	0.00247	0.00459	0.00486
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.00758	< 0.0100	0.0127	< 0.0100	< 0.00500	< 0.0100
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	1.14	1.54	< 0.200	0.256	0.117	0.437
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.000928	0.00268	0.00117	< 0.00100	< 0.000500	0.00148
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0768	0.0804	0.0801	0.0762	0.0768	0.0856
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	373	396	385	385	394	394
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.657	0.804	0.823	0.733	0.837	0.855
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00671	0.00515	0.00434	0.00486	0.00502	0.00486
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.00956	0.0106	< 0.0100	< 0.0100	0.01	0.0111
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	109	106	97.2	104	105	107
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	0.03	0.023	0.022	0.033	< 0.0064	0.028
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0762	0.0643	0.0536	0.0588	0.06	0.0613
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000622	< 0.00100	< 0.00100	< 0.00100	< 0.000500	< 0.00100
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	7.15	6.84	4.44	4.63	4.47	4.44
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	< 0.000100	< 0.000200	< 0.000200	< 0.000200	< 0.000100	< 0.000200
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	3,470	3,770	3,380	3,450	3,430	3,430
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	6.3	6.71	6.98	6.04	5.97	5.62
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	276	264	262	243	276	271
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	< 0.00200	< 0.00400	< 0.00400	< 0.00400	< 0.00200	< 0.00400
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	< 0.000100	< 0.000200	< 0.000200	< 0.000200	< 0.000100	< 0.000200
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	< 0.00100	< 0.00200	< 0.00200	< 0.00200	< 0.00100	< 0.00200
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	< 0.00100	< 0.00200	< 0.00200	< 0.00200	< 0.00100	< 0.00200
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.0154	0.0162	< 0.00600	< 0.00600	< 0.00300	< 0.00600
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00254	0.00215	0.00237	0.00386	0.00212	0.0021
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.000155	< 0.000200	< 0.000200	< 0.000200	0.000158	< 0.000200
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	< 0.00500	< 0.0100	< 0.0100	< 0.0100	< 0.00500	< 0.0100
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	< 0.0300	< 0.0600	< 0.0600	< 0.0600	< 0.0300	< 0.0600
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	< 0.00200	< 0.00400	< 0.00400	< 0.00400	< 0.00200	< 0.00400

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.4: Hope Bay Effluent (RBD1) Quality Data, 2022

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	12-Aug-22	22-Aug-22	6-Sep-22	13-Sep-22	20-Sep-22	29-Sep-22
In Situ Measurements												
pH	-	pH	-	-	-	-	7.75	7.33	7.32	6.86	7.16	7.2
EC (uS/cm)	-	uS/cm	-	-	-	-	10,520	19,050	13,930	17,450	16,770	19,790
Temp	-	C	-	-	-	-	10.1	11.1	10.3	8.7	10	8.4
ORP	-	mV	-	-	-	-	103	117	122	153	120	239
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	4.9	11.8	11.7	9.8	9.9	11.6
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	8,410	19,500	19,000	16,400	17,500	19,000
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5	-	7.81	7.84	7.4	7.12	7.95	7.76
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	14.7	5.8	6.9	4.8	3.6	18.1
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	1.0	mg/L	-	-	-	-	138	139	134	95.8	122	113
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	3.41	2.18	2.53	3.61	1.71	5.63
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.0355	0.0094	0.01	0.004	0.0046	0.0146
Bromide (Br)	0.050	mg/L	-	-	-	-	8.77	24.6	22.9	19.2	21.8	24
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	-	-	-	-	-	-
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<1.00	<2.00	<1.00	<1.00	<2.00	<2.00
Nitrate (as N)	0.003	mg/L	339	45	-	-	4.43	3.85	4.35	6.46	3.68	8.77
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.118	0.208	0.237	0.236	0.218	0.434
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	<0.250	<1.00	<0.500	<0.500	<1.00	<1.00
Sulfate (SO ₄)	0.3	mg/L	-	-	-	-	-	-	-	-	-	-
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0226	<0.0200	0.0343	0.0059	0.0177	0.024
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	0.244	0.644	0.791	0.588	0.54	1.55
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	0.00051	<0.00200	<0.00100	<0.00100	<0.00200	<0.00200
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	0.00294	<0.00200	<0.00100	<0.00100	<0.00200	<0.00200
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0362	0.0543	0.0414	0.04	0.0406	0.0457
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.000100	<0.000400	<0.00100	<0.00100	<0.00200	<0.000400
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	<0.000250	<0.00100	<0.000500	<0.000500	<0.00100	<0.00100
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	0.603	1.9	2.01	1.68	1.62	1.5
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	0.0000309	<0.000100	<0.0000500	0.0000594	<0.000100	<0.000100
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	192	477	469	474	457	483
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.000138	0.000711	0.000783	0.000641	0.000662	0.00104
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	0.00082	0.00973	<0.00500	<0.00500	<0.0100	0.0041
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.00371	0.00462	0.0037	0.00478	0.00622	0.0072
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.0417	<0.0100	<0.00500	<0.00500	<0.0100	<0.0100
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.646	0.396	0.246	<0.100	<0.200	1.19
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	0.00602	<0.00100	<0.000500	<0.000500	0.0023	<0.00100
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0306	0.0754	0.0701	0.0654	0.0603	0.0718
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	146	424	396	330	349	358
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.613	0.834	0.738	0.796	0.71	0.763
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00705	0.00794	0.00495	0.00366	0.00435	0.00517
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.00998	0.0109	0.00929	0.0101	0.0138	0.0106
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	50.4	124	109	89.7	94.9	99.2
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	0.007	0.01	<0.006	0.02	0.02	0.02
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0183	0.0709	0.0574	0.0488	0.058	0.0661
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.000405	<0.00100	<0.000500	0.000533	<0.00100	<0.00100
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	3.06	4.72	4.63	3.82	4.87	5.36
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	0.000084	<0.000200	<0.000100	<0.000100	<0.000200	<0.000200
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	1,390	3,790	3,610	2,840	3,120	3,200
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	1.98	6.17	6.38	4.96	4.94	5.64
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	226	297	280	225	246	248
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	<0.00100	<0.00400	<0.00200	<0.00200	<0.00400	<0.00400
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.000050	<0.000200	<0.000100	<0.000100	<0.000200	<0.000200
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	<0.00050	<0.00200	<0.00100	<0.00100	<0.00200	<0.00200
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.00050	<0.00200	<0.00100	<0.00100	<0.00200	<0.00200
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.0046	<0.00600	<0.00300	<0.00300	<0.00600	0.0166
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00152	0.00242	0.00279	0.00177	0.00302	0.00368
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.000191	<0.000200	0.000134	<0.000100	<0.000200	<0.000200
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.00250	<0.0100	<0.00500	<0.00500	<0.0100	<0.0100
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0487	<0.0600	<0.0300	0.0527	0.148	<0.0600
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	<0.00100	<0.00400	<0.00200	<0.00200	<0.00400	<0.00400

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.4: Hope Bay Effluent (RBD1) Quality Data, 2022

Parameter	Laboratory Reporting Limit	Units	CCME ^a		MDMER ^f		RBD-1					
			Acute	Chronic	Average	Grab Sample	11-Oct-22	18-Oct-22	25-Oct-22	1-Nov-22	8-Nov-22	15-Nov-22
In Situ Measurements												
pH	-	pH	-	-	-	-	7.25	7.94	8	7.97	7.79	7.84
EC (uS/cm)	-	uS/cm	-	-	-	-	16,070	7,920	8,270	8,310	8,440	8,420
Temp	-	C	-	-	-	-	11	3.2	1.8	3.5	3	2.4
ORP	-	mV	-	-	-	-	153	105	200	108	174	117
Salinity	-	ppt	Background +/- 10% ^b	Background +/- 10% ^b	-	-	9.15	3.7	3.7	4	3.7	3.8
Physical Tests (Seawater)												
Conductivity	-	uS/cm	-	-	-	-	16,400	-	-	-	-	-
pH	0.10	pH	7.0-8.7	7.0-8.7	6.0 to 9.5	-	7.85	-	7.99	-	-	-
Total Suspended Solids	0.10	mg/L	Background + 25 ^c	Background + 5 ^c	15	30	9.9	-	4.6	-	-	-
Total Dissolved Solids	0.1	mg/L	-	-	-	-	-	-	4,580	-	-	-
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO3)	1.0	mg/L	-	-	-	-	113	-	125	-	-	-
Ammonia, Total (as N)	0.0050	mg/L	-	-	-	-	2.98	-	2.06	-	-	-
Un-ionized Ammonia (as N)	0.0050	mg/L	-	1.9	0.5	1	0.0106	-	0.0195	-	-	-
Bromide (Br)	0.050	mg/L	-	-	-	-	21.2	-	9	-	-	-
Chloride (Cl)	0.50	mg/L	NRG	NRG	-	-	-	-	-	-	-	-
Fluoride (F)	0.020	mg/L	-	NRG	-	-	<2.00	-	0.18	-	-	-
Nitrate (as N)	0.003	mg/L	339	45	-	-	7.04	-	5.22	-	-	-
Nitrite (as N)	0.0010	mg/L	-	-	-	-	0.346	-	0.0681	-	-	-
Phosphorous (P) - Total	0.0010	mg/L	0.05 ^d	0.05 ^d	-	-	<0.500	-	0.0214	-	-	-
Sulfate (SO4)	0.3	mg/L	-	-	-	-	-	-	-	-	-	-
Cyanides (Seawater)												
Cyanide, Total	0.0030	mg/L	-	-	1.00	2.00	0.0258	-	<0.0050	-	-	-
Total Metals (Seawater)												
Aluminum (Al)-Total	0.0030	mg/L	-	-	-	-	1.51	-	0.14	-	-	-
Antimony (Sb)-Total	0.00010	mg/L	-	-	-	-	<0.00100	-	0.00049	-	-	-
Arsenic (As)-Total	0.00010	mg/L	-	0.0125	0.5	1	<0.00100	-	0.00271	-	-	-
Barium (Ba)-Total	0.00010	mg/L	-	-	-	-	0.0416	-	0.035	-	-	-
Beryllium (Be)-Total	0.010	mg/L	-	-	-	-	<0.000200	-	<0.000100	-	-	-
Bismuth (Bi)-Total	0.0000050	mg/L	-	-	-	-	<0.000500	-	<0.000050	-	-	-
Boron (B)-Total	0.050	mg/L	NRG	NRG	-	-	1.41	-	0.543	-	-	-
Cadmium (Cd)-Total	0.00010	mg/L	NRG	0.00012	-	-	0.0000895	-	0.0000201	-	-	-
Calcium (Ca)-Total	0.00010	mg/L	-	-	-	-	385	-	168	-	-	-
Cesium (Cs)-Total	0.00050	mg/L	-	-	-	-	0.000788	-	0.000046	-	-	-
Chromium (Cr)-Total	0.010	mg/L	-	0.0015 ^e	-	-	0.00203	-	0.00111	-	-	-
Cobalt (Co)-Total	0.000050	mg/L	-	-	-	-	0.011	-	0.0031	-	-	-
Copper (Cu)-Total	0.0050	mg/L	-	-	0.3	0.6	0.00624	-	0.0212	-	-	-
Iron (Fe)-Total	0.0000050	mg/L	-	-	-	-	0.621	-	0.233	-	-	-
Lead (Pb)-Total	0.000050	mg/L	-	-	0.2	0.4	<0.000500	-	0.00034	-	-	-
Lithium (Li)-Total	0.00050	mg/L	-	-	-	-	0.0617	-	0.0292	-	-	-
Magnesium (Mg)-Total	0.05	mg/L	-	-	-	-	327	-	125	-	-	-
Manganese (Mn)-Total	0.00010	mg/L	-	-	-	-	0.86	-	0.54	-	-	-
Mercury (Hg)-Total	2.0	mg/L	-	0.000016	-	-	<0.0000050	-	<0.0000050	-	-	-
Molybdenum (Mo)-Total	0.00020	mg/L	-	-	-	-	0.00414	-	0.00635	-	-	-
Nickel (Ni)-Total	0.0050	mg/L	-	-	0.5	1	0.0146	-	0.0083	-	-	-
Potassium (K)-Total	0.00010	mg/L	-	-	-	-	89.1	-	46.9	-	-	-
Radium 226	0.0083	Bq/L	-	-	0.37	1.11	0.02	-	-	-	-	-
Rubidium (Rb)-Total	0.00010	mg/L	-	-	-	-	0.0499	-	0.0153	-	-	-
Selenium (Se)-Total	0.010	mg/L	-	-	-	-	0.00079	-	0.000354	-	-	-
Silicon (Si)-Total	0.0000050	mg/L	-	-	-	-	4.37	-	3.28	-	-	-
Silver (Ag)-Total	0.050	mg/L	0.0075	NRG	-	-	<0.000100	-	0.000027	-	-	-
Sodium (Na)-Total	0.00010	mg/L	-	-	-	-	2,780	-	1,190	-	-	-
Strontium (Sr)-Total	0.00010	mg/L	-	-	-	-	4.88	-	1.55	-	-	-
Sulfur (S) - Total	5.0	mg/L	-	-	-	-	228	-	230	-	-	-
Tellurium (Te)-Total	0.010	mg/L	-	-	-	-	<0.00200	-	0.00026	-	-	-
Thallium (Tl)-Total	0.000050	mg/L	-	-	-	-	<0.000100	-	<0.000010	-	-	-
Thorium (Th)-Total	0.0050	mg/L	-	-	-	-	<0.00100	-	<0.00010	-	-	-
Tin (Sn)-Total	0.00010	mg/L	-	-	-	-	<0.00100	-	<0.00010	-	-	-
Titanium (Ti)-Total	0.000050	mg/L	-	-	-	-	0.00731	-	0.00579	-	-	-
Tungsten (W)-Total	0.00050	mg/L	-	-	-	-	0.00371	-	0.00127	-	-	-
Uranium (U)-Total	0.05	mg/L	NRG	NRG	-	-	0.000131	-	0.000256	-	-	-
Vanadium (V)-Total	0.00010	mg/L	-	-	-	-	<0.00500	-	0.00085	-	-	-
Zinc (Zn)-Total	0.00020	mg/L	-	-	0.5	1	0.0636	-	0.0103	-	-	-
Zirconium (Zr)-Total	0.0050	mg/L	-	-	-	-	<0.00200	-	<0.00020	-	-	-

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

^f Metal Diamond and Mining Effluent Regulations (SOR/2002-222).

Table B.5: Water Quality Data from Reference and Exposed Stations, Roberts Bay, July 15, 2020

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-35M	RB-REF-39M	RB-EXP-5M	RB-EXP-35M	RB-EXP-39M
In situ Water Quality									
Station Depth	m	-	-	41	41	41	51	51	51
Sampling Time	Hh:mm	-	-	12:00	12:20	12:40	15:30	17:10	17:25
Temperature	C	-	-	1.1	-0.3	-0.3	1.2	-0.3	-0.3
Dissolved Oxygen	mg/L	-	-	14.94	10.83	10.89	15.19	10.87	10.80
Dissolved Oxygen Saturation	%	-	-	105.4	73.5	73.8	107.4	73.6	73.2
pH	pH	7.0-8.7	7.0-8.7	7.78	7.56	7.63	7.81	7.78	7.70
Conductivity	uS/cm	-	-	47,599	48,909	49,523	53,813	46,546	47,082
Specific Conductance	uS/cm	-	-	72,501	75,461	75,201	74,059	84,882	84,318
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	24.1	50.0	51.2	51.6	56.7	56.5
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	35,300	38,600	38,700	37,200	38,700	38,900
Hardness (as CaCO ₃)	mg/L	-	-	4,900	5,480	5,550	5,260	5,720	5,540
pH	pH	7.0-8.7	7.0-8.7	7.79	7.74	7.73	7.81	7.73	7.73
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	24.7	27.3	27.4	26.2	27.4	27.5
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	88.4	100.0	100.0	93.0	100.0	100.0
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	46.1	51.8	52.5	49.3	51.7	51.7
Chloride (Cl)	mg/L	NRG	NRG	13,600	15,200	15,300	14,500	15,000	15,200
Fluoride (F)	mg/L	-	NRG	1.10	1.00	1.00	<1.0	1.00	1.00
Nitrate (as N)	mg/L	339	45	<0.010	0.070	0.077	<0.010	0.075	0.076
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0472	0.0553	0.0528	0.0473	0.0482	0.0493
Sulfate (SO ₄)	mg/L	-	-	1,930	2,160	2,170	2,060	2,130	2,150
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	0.01	<0.0050	0.01	0.01	<0.0050	0.01
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	0.00114	0.00123	0.00122	0.00111	0.00124	0.00124
Barium (Ba)-Total	mg/L	-	-	0.00970	0.00940	0.01010	0.01000	0.01020	0.00970
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	2.76	2.88	2.88	2.74	2.95	2.93
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.00005	0.00004	0.00005	0.00004	0.00005	0.00007
Calcium (Ca)-Total	mg/L	-	-	304	343	342	332	367	346
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	0.00054	<0.00050	0.00052	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	0.013	<0.010	<0.010	0.010
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.115	0.123	0.122	0.118	0.126	0.123
Magnesium (Mg)-Total	mg/L	-	-	1,010	1,120	1,140	1,080	1,170	1,130
Manganese (Mn)-Total	mg/L	-	-	0.00219	0.00182	0.00266	0.00177	0.00211	0.00264
Mercury (Hg)-Total	mg/L	-	0.000016	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	-	-	0.0083	0.0087	0.0086	0.0080	0.0086	0.0084
Nickel (Ni)-Total	mg/L	-	-	0.0006	0.0005	0.0005	<0.00050	0.00053	0.00052
Potassium (K)-Total	mg/L	-	-	310	345	340	336	347	345
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0853	0.0931	0.0941	0.0900	0.0948	0.0956
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	7,740	9,270	8,630	8,530	8,910	8,750
Strontium (Sr)-Total	mg/L	-	-	5.54	6.28	5.92	5.51	6.12	6.17
Sulfur (S)-Total	mg/L	-	-	784	852	825	818	867	839
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.0023	0.0024	0.0023	0.00219	0.00228	0.00227
Vanadium (V)-Total	mg/L	-	-	0.00086	0.00093	0.00094	0.00089	0.0009	0.00093
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.
 Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.6: Water Quality Data from Reference and Exposed Stations, Roberts Bay, August 16, 2020

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-35M	RB-REF-39M	RB-EXP-5M	RB-EXP-35M	RB-EXP-39M
In situ Water Quality									
Station Depth	m	-	-	41	41	41	47	47	47
Sampling Time	Hh:mm	-	-	15:05	15:30	15:50	12:55	13:35	14:10
Temperature	C	-	-	1.9	0.7	0.8	3.4	1.4	0.7
Dissolved Oxygen	mg/L	-	-	8.56	7.98	7.46	8.43	6.97	7.24
Dissolved Oxygen Saturation	%	-	-	91.2	83.1	77.8	90.4	73.1	75.0
pH	pH	7.0-8.7	7.0-8.7	7.74	7.73	7.70	7.56	7.68	7.64
Conductivity	uS/cm	-	-	46,868	45,998	46,071	45,672	47,068	45,839
Specific Conductance	uS/cm	-	-	83,667	85,826	85,641	77,737	85,531	85,639
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	56.2	54.9	57.2	52.1	57.4	57.1
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	43,000	43,800	43,900	42,800	44,100	43,900
Hardness (as CaCO ₃)	mg/L	-	-	4,920	5,030	5,040	4,770	5,050	4,990
pH	pH	7.0-8.7	7.0-8.7	7.69	7.58	7.59	7.74	7.58	7.59
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	26.5	27.1	27.1	26.4	27.3	27.1
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	5.20	3.80	3.20	<2.0	3.60	4.40
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	99.1	104.0	100.0	96.1	97.3	98.4
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	58.1	59.8	62.2	60.6	63.7	62.6
Chloride (Cl)	mg/L	NRG	NRG	15,200	15,300	15,600	14,800	15,500	16,000
Fluoride (F)	mg/L	-	NRG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	mg/L	339	45	<0.0100	0.0690	0.0750	<0.0100	0.0710	0.0710
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0374	0.054	0.0403	0.0305	0.0455	0.06
Sulfate (SO ₄)	mg/L	-	-	2,160	2,170	2,220	2,100	2,210	2,270
Cyanides (Seawater)									
Cyanide, Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	0.0089	<0.0050	0.0068
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	0.00169	0.00167	0.00175	0.00154	0.00151	0.00162
Barium (Ba)-Total	mg/L	-	-	0.0106	0.0111	0.0115	0.011	0.0113	0.0113
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	3.42	3.26	3.21	3.11	3.21	3.34
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.00004	0.00007	0.00006	0.000038	0.000066	0.00007
Calcium (Ca)-Total	mg/L	-	-	369	365	357	345	366	366
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.013
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.136	0.135	0.131	0.129	0.132	0.135
Magnesium (Mg)-Total	mg/L	-	-	970	1,000	1,010	948	1,010	991
Manganese (Mn)-Total	mg/L	-	-	0.00127	0.00213	0.00288	0.00165	0.00361	0.00431
Mercury (Hg)-Total	mg/L	-	0.000016	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum (Mo)-Total	mg/L	-	-	0.00800	0.00833	0.00835	0.00825	0.00825	0.00858
Nickel (Ni)-Total	mg/L	-	-	<0.00050	0.00056	0.00052	<0.00050	0.00053	0.00054
Potassium (K)-Total	mg/L	-	-	344	346	351	330	355	349
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0939	0.0992	0.0970	0.0911	0.0964	0.0961
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	8,210	8,570	8,420	8,260	8,220	8,510
Strontium (Sr)-Total	mg/L	-	-	6.14	6.32	6.47	6.29	6.36	6.51
Sulfur (S)-Total	mg/L	-	-	974	1,010	1,000	1,040	1,020	1,040
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.00226	0.00237	0.00230	0.00225	0.00232	0.00232
Vanadium (V)-Total	mg/L	-	-	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit, following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.7: Water Quality Data from Reference and Exposed Stations, Roberts Bay, September 22, 2020

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-35M	RB-REF-39M	RB-EXP-5M	RB-EXP-35M	RB-EXP-39M
In situ Water Quality									
Station Depth	m	-	-	48	48	48	49	49	49
Sampling Time	Hh:mm	-	-	11:35	11:50	12:10	14:10	14:25	14:45
Temperature	C	-	-	3.8	1.1	0.9	4.3	0.9	0.6
Dissolved Oxygen	mg/L	-	-	9.02	9.63	9.45	11.74	10.85	10.83
Dissolved Oxygen Saturation	%	-	-	80.0	81.3	80.1	100.4	89.9	92.0
pH	pH	7.0-8.7	7.0-8.7	7.72	7.66	7.60	7.87	7.72	7.66
Conductivity	uS/cm	-	-	21,653	22,372	23,001	13,030	20,540	22,851
Specific Conductance	uS/cm	-	-	36,224	41,179	42,595	21,549	38,067	42,852
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	22.4	25.4	26.3	12.7	23.2	26.4
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	35,600	41,300	41,000	35,100	41,000	40,500
Hardness (as CaCO ₃)	mg/L	-	-	3,710	4,520	4,560	3,740	4,490	4,650
pH	pH	7.0-8.7	7.0-8.7	7.83	7.82	7.83	7.86	7.82	7.82
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	23.2	27.3	27.1	22.8	27.1	26.8
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	3.50	5.30	<2.0	2.50	3.10
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	83.0	96.3	96.5	82.8	97.9	96.0
Ammonia, Total (as N)	mg/L	-	-	<0.0050	0.0083	0.0080	<0.0050	0.0060	0.0058
Bromide (Br)	mg/L	-	-	35.2	48.8	51.1	43.1	45.9	46
Chloride (Cl)	mg/L	NRG	NRG	10,700	14,800	15,500	13,200	14,000	14,100
Fluoride (F)	mg/L	-	NRG	1.00	0.88	0.94	0.86	0.94	0.89
Nitrate (as N)	mg/L	339	45	<0.010	0.046	0.062	<0.010	0.048	0.058
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0376	0.0631	0.0474	0.0432	0.0591	0.0652
Sulfate (SO ₄)	mg/L	-	-	1,890	2,230	2,260	1,900	2,260	2,250
Cyanides (Seawater)									
Cyanide, Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	0.0146	<0.0050	0.0073	0.0146	<0.0050	0.0058
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	0.00102	0.00128	0.00123	0.00104	0.00122	0.00132
Barium (Ba)-Total	mg/L	-	-	0.0094	0.0109	0.0107	0.0088	0.0106	0.0113
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	2.69	3.23	3.2	2.59	3.2	3.23
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.000043	0.000053	0.000062	0.000044	0.000043	0.000048
Calcium (Ca)-Total	mg/L	-	-	272	342	339	273	338	339
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	0.016	<0.010	<0.010	0.015	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.125	0.131	0.141	0.117	0.134	0.140
Magnesium (Mg)-Total	mg/L	-	-	736	890	902	743	886	923
Manganese (Mn)-Total	mg/L	-	-	0.00179	0.00156	0.00174	0.00166	0.00154	0.00176
Mercury (Hg)-Total	mg/L	-	0.000016	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	-	-	0.00746	0.00928	0.00905	0.00741	0.00921	0.00964
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium (K)-Total	mg/L	-	-	250	303	301	256	315	316
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0766	0.0905	0.0916	0.0764	0.0926	0.0937
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	8,180	9,440	8,820	7,730	9,150	9,140
Strontium (Sr)-Total	mg/L	-	-	5.36	6.70	6.44	5.26	6.69	6.83
Sulfur (S)-Total	mg/L	-	-	689	890	878	718	920	917
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.00200	0.00226	0.00236	0.00183	0.00232	0.00230
Vanadium (V)-Total	mg/L	-	-	0.00084	0.00087	0.00088	0.00083	0.00090	0.00091
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.8: Water Quality Data from Reference and Exposed Stations, Roberts Bay, July 17, 2021

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-15M	RB-REF-19M	RB-EXP-5M	RB-EXP-15M	RB-EXP-19M
In situ Water Quality									
Station Depth	m	-	-	27	27	27	18	18	18
Sampling Time	Hh:mm	-	-	9:00	9:42	9:58	10:35	10:45	11:05
Temperature	C	-	-	4.0	2.1	1.3	3.9	1.4	1.3
Dissolved Oxygen	mg/L	-	-	13.35	13.01	13.05	13.00	11.39	13.30
Dissolved Oxygen Saturation	%	-	-	106.9	112.0	118.5	117.70	114.09	124.5
pH	pH	7.0-8.7	7.0-8.7	7.66	7.7	7.69	7.70	7.71	7.69
Conductivity	uS/cm	-	-	13,893	39,138	42,865	21,304	41,992	42,311
Specific Conductance	uS/cm	-	-	23,122	69,535	77,832	35,612	76,787	78,554
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	13.8	45.5	51.7	23.0	50.7	51.9
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	13,200	35,900	40,700	18,500	40,600	40,400
Hardness (as CaCO ₃)	mg/L	-	-	1,390	3,900	4,700	2,080	4,730	4,610
pH	pH	7.0-8.7	7.0-8.7	7.58	7.88	7.88	7.74	7.90	7.90
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	7.5	22.3	25.7	10.8	25.6	25.5
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	2.10	<2.0	252	2.7	3.5	2.1
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	34.8	87.1	98.8	45.7	98.0	98.9
Ammonia, Total (as N)	mg/L	-	-	0.0066	<0.0050	0.0074	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	15.1	32.1	37.5	17.4	35.7	33.3
Chloride (Cl)	mg/L	NRG	NRG	4,540	9,450	11,000	5,240	10,600	9,750
Fluoride (F)	mg/L	-	NRG	0.24	0.64	0.71	0.36	0.70	0.72
Nitrate (as N)	mg/L	339	45	0.0100	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0276	0.0317	0.0375	0.0308	0.0370	0.0338
Sulfate (SO ₄)	mg/L	-	-	543	1,650	1,860	816	1,870	1,920
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	<0.0060	<0.0030	<0.0060	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	0.037	0.018	0.017	0.026	0.014	0.012
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	<0.00040	0.00085	0.00096	0.00048	0.00098	0.00104
Barium (Ba)-Total	mg/L	-	-	0.0047	0.01040	0.01260	0.00610	0.01240	0.01230
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	0.85	1.47	1.49	1.02	1.5	1.46
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.000013	0.000037	0.000040	0.000017	0.000042	0.000040
Calcium (Ca)-Total	mg/L	-	-	93.8	274	327	132	315	302
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	0.048	0.0210000	0.018	0.04	0.016	0.014
Lead (Pb)-Total	mg/L	-	-	<0.000050	0.000070	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.038	0.067	0.066	0.043	0.067	0.064
Magnesium (Mg)-Total	mg/L	-	-	281	782	942	425	957	937
Manganese (Mn)-Total	mg/L	-	-	0.00355	0.00222	0.0015	0.003	0.00235	0.00146
Mercury (Hg)-Total	mg/L	-	0.000016	0.0000012	0.0000053	0.0000024	0.0000017	0.0000063	0.0000073
Molybdenum (Mo)-Total	mg/L	-	-	0.00241	0.0069	0.0080	0.0035	0.0078	0.0078
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium (K)-Total	mg/L	-	-	102	330	407	160	405	395
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0267	0.0841	0.1030	0.0399	0.102	0.0998
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	2380	7,000	8,210	3,150	8,180	8,270
Strontium (Sr)-Total	mg/L	-	-	1.74	5.17	6.08	2.48	5.87	5.78
Sulfur (S)-Total	mg/L	-	-	245	891	1,000	393	1,000	1,040
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	0.001	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.000680	0.0019	0.0022	0.000952	0.00212	0.00211
Vanadium (V)-Total	mg/L	-	-	<0.00050	0.00074	0.00087	<0.00050	0.00084	0.00088
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	0.0126	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit following MDMER. CCME = Canadian Council of Ministers of the Environment. " - " = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

Table B.9: Water Quality Data from Reference and Exposed Stations, Roberts Bay, August 21, 2021

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-15M	RB-REF-19M	RB-EXP-5M	RB-EXP-8M	RB-EXP-11M
In situ Water Quality									
Station Depth	m	-	-	20	20	20	12	12	12
Sampling Time	Hh:mm	-	-	13:40	14:00	14:16	12:40	13:00	13:15
Temperature	C	-	-	7.8	5.5	3.9	8.9	6.3	6
Dissolved Oxygen	mg/L	-	-	11.76	10.42	12.92	14.10	11.72	10.39
Dissolved Oxygen Saturation	%	-	-	98.1	94.3	111.5	118.7	106.1	95.2
pH	pH	7.0-8.7	7.0-8.7	8.02	7.89	7.79	7.92	7.88	7.87
Conductivity	uS/cm	-	-	18,619	20,728	21,405	18,522	20,070	20,357
Specific Conductance	uS/cm	-	-	26,458	33,035	35,787	26,604	31,072	31,785
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	16.2	20.4	22.1	16.2	19.0	19.6
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	28,500	33,900	36,600	27,700	31,900	33,000
Hardness (as CaCO ₃)	mg/L	-	-	2,940	3,980	4,430	3,270	3,910	3,750
pH	pH	7.0-8.7	7.0-8.7	7.78	7.82	7.83	7.85	7.84	7.84
Salinity	psu	Background +/- 10% ^b	Background +/- 10% ^b	17.9	22.0	23.9	17.6	20.5	21.3
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	< 2.0	<2.0	<2.0	< 2.0	<2.0	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	65.0	79.5	83.6	65	75.3	76
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	0.0099	0.022	0.0489	0.0054
Bromide (Br)	mg/L	-	-	33.6	42.3	45	33.8	39.9	40.7
Chloride (Cl)	mg/L	NRG	NRG	9,870	12,300	13,100	9,890	11,600	11,900
Fluoride (F)	mg/L	-	NRG	0.470	0.570	0.600	0.47	0.53	0.56
Nitrate (as N)	mg/L	339	45	<0.010	<0.010	<0.010	<0.010	0.0550	<0.010
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0362	0.0453	0.0412	0.0332	0.0474	0.0400
Sulfate (SO ₄)	mg/L	-	-	1,360	1,690	1,820	1,370	1,610	1,650
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	0.008	0.007	0.006	0.014	0.009	0.007
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	0.00087	0.00120	0.00120	0.00099	0.00107	0.00111
Barium (Ba)-Total	mg/L	-	-	0.0066	0.0087	0.0091	0.0076	0.0089	0.0082
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	2.37	2.94	3.26	2.44	2.88	2.91
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.000029	0.000036	0.000039	0.000031	0.000036	0.000033
Calcium (Ca)-Total	mg/L	-	-	214	257	291	212	253	260
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	0.000053	0.000073	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	0.00054	0.00086	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	<0.010	0.014	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.088	0.113	0.124	0.089	0.103	0.11
Magnesium (Mg)-Total	mg/L	-	-	583	811	899	666	796	754
Manganese (Mn)-Total	mg/L	-	-	0.00168	0.00146	0.00158	0.00207	0.00613	0.00168
Mercury (Hg)-Total	mg/L	-	0.000016	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	-	-	0.00532	0.00668	0.00723	0.00557	0.00653	0.00676
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050
Potassium (K)-Total	mg/L	-	-	195	286	312	228	267	254
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0599	0.0845	0.0912	0.0689	0.0804	0.0749
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	5,660	7,560	7,740	5,540	6,580	6,820
Strontium (Sr)-Total	mg/L	-	-	3.8	4.8	5.1	4.2	4.7	5.1
Sulfur (S)-Total	mg/L	-	-	495	691	758	533	676	653
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.00165	0.00192	0.00207	0.00161	0.00183	0.00189
Vanadium (V)-Total	mg/L	-	-	0.00058	0.00072	0.00072	0.00055	0.00064	0.00059
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	0.0032	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit following MDMER. CCME = Canadian Council of Ministers of the Environment. " - " = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

Table B.10: Water Quality Data from Reference and Exposed Stations, Roberts Bay, September 26, 2021

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-15M	RB-REF-20M	RB-EXP-5M	RB-EXP-15M	RB-EXP-17M
In situ Water Quality									
Station Depth	m	-	-	20	20	20	17	17	17
Sampling Time	Hh:mm	-	-	-	-	-	-	-	-
Temperature	C	-	-	2.5	1.0	0.3	2.6	1.0	0.8
Dissolved Oxygen	mg/L	-	-	10.46	10.71	10.31	11.27	10.6	11.04
Dissolved Oxygen Saturation	%	-	-	89.1	89.2	86.4	96.5	89.5	97.2
pH	pH	7.0-8.7	7.0-8.7	7.95	7.81	7.71	7.29	7.78	7.72
Conductivity	uS/cm	-	-	18,308	19,822	20,068	18,307	20,129	20,634
Specific Conductance	uS/cm	-	-	31,988	36,395	36,664	31,807	36,177	35,630
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	19.4	22.2	22.4	19.3	22.1	22.1
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	34,100	38,900	39,600	34,200	38,700	39,100
Hardness (as CaCO3)	mg/L	-	-	4,140	4,650	4,740	4,030	4,730	4,600
pH	pH	7.0-8.7	7.0-8.7	7.86	7.85	7.82	7.86	7.86	7.83
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	22.7	26.2	26.8	22.8	26.1	26.4
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	3.6	<2.0	6.40	<2.0	3.40	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO3)	mg/L	-	-	92	102	104	89.4	103	105
Ammonia, Total (as N)	mg/L	-	-	<0.0050	0.0052	0.0067	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	38	40.7	42.5	36.8	42.3	45.4
Chloride (Cl)	mg/L	NRG	NRG	11,000	11,500	12,000	10,300	11,800	12,500
Fluoride (F)	mg/L	-	NRG	0.57	0.74	0.65	0.62	0.68	0.7
Nitrate (as N)	mg/L	339	45	<0.010	0.014	0.034	<0.010	0.011	0.021
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0318	0.0352	0.0463	0.0299	0.037	0.043
Sulfate (SO4)	mg/L	-	-	1,650	2,000	1,710	1,610	1,810	1,840
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	0.0079	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	0.0078	<0.0050	0.0073	<0.0050	0.0063	<0.0050
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	0.00097	0.00119	0.00115	0.00097	0.00119	0.00119
Barium (Ba)-Total	mg/L	-	-	0.0084	0.0098	0.011	0.008	0.0112	0.0118
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	3.53	3.61	3.54	3.02	3.28	3.32
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.000048	0.00005	0.000053	0.000046	0.000055	0.00004
Calcium (Ca)-Total	mg/L	-	-	307	328	329	278	318	314
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	0.0007	<0.00050	0.0007	0.0006	0.0005	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	0.012	<0.010	0.014	<0.010	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	-	0.000052	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.114	0.132	0.125	0.108	0.114	0.113
Magnesium (Mg)-Total	mg/L	-	-	818	930	953	810	957	926
Manganese (Mn)-Total	mg/L	-	-	0.00169	0.00121	0.0014	0.00164	0.00132	0.00116
Mercury (Hg)-Total	mg/L	-	0.000016	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	-	-	0.00804	0.00875	0.00861	0.00757	0.00866	0.00857
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	0.0005	<0.00050	<0.00050	<0.00050
Potassium (K)-Total	mg/L	-	-	261	297	306	264	307	302
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0747	0.0849	0.0866	0.0761	0.088	0.0862
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	7,900	9,450	9,530	8,180	9,080	9,430
Strontium (Sr)-Total	mg/L	-	-	5.38	5.94	5.75	4.97	5.81	5.73
Sulfur (S)-Total	mg/L	-	-	714	840	819	718	805	794
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.00219	0.00231	0.00229	0.00207	0.00218	0.00222
Vanadium (V)-Total	mg/L	-	-	0.00067	0.00073	0.00069	0.00065	0.00082	0.00068
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	0.0052	0.0050	0.003	0.0071	0.0188
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater

Table B.11: Water Quality Data from Reference and Exposed Stations, Roberts Bay, July 23, 2022

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5m	RB-REF-15m	RB-REF-19m	RB-EXP-5m	RB-EXP-8m	RB-EXP-12m
In situ Water Quality									
Station Depth	m	-	-	19	19	19	12	12	12
Sampling Time	Hh:mm	-	-	17:10	16:40	16:10	11:50	12:10	12:25
Temperature	C	-	-	8.4	4.3	2.8	8.6	5.7	4.7
Dissolved Oxygen	mg/L	-	-	53.48	60.93	68.58	59.31	56.8	50.51
Dissolved Oxygen Saturation	%	-	-	104.5	113.9	126.4	122.4	110.5	96.7
pH	pH	7.0-8.7	7.0-8.7	7.89	7.88	7.9	7.85	7.8	7.89
Specific Conductance	uS/cm	-	-	34,656	38,936	40,966	34,923	37,066	38,647
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	22.6	23.5	26.8	23.1	24.4	25.6
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	35,300	39,100	41,100	36,000	37,800	39,400
Hardness (as CaCO3)	mg/L	-	-	4,050	4,500	4,860	4,140	4,380	4,610
pH	pH	7.0-8.7	7.0-8.7	7.87	7.88	7.88	7.86	7.88	7.89
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	22.6	25.3	26.8	23.1	24.4	25.6
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	2.2	<2.0	<2.0	7.1	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO3)	mg/L	-	-	84.7	94.1	99.4	86.7	91.4	95.4
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	43	47.2	50.6	43.1	46	45.6
Chloride (Cl)	mg/L	NRG	NRG	12,500	13,800	14,800	12,800	13,700	13,600
Fluoride (F)	mg/L	-	NRG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	mg/L	339	45	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nitrite (as N)	mg/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	0.0400	0.0417	0.0427	0.0400	0.0407	0.0416
Sulfate (SO4)	mg/L	-	-	1,650	1,860	2,020	1,710	1,840	1,850
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	0.0047	<0.0030	0.0075	0.0048	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	0.008	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	0.00094	0.00106	0.00114	0.00099	0.00099	0.00103
Barium (Ba)-Total	mg/L	-	-	0.0095	0.0108	0.0115	0.0097	0.01	0.0105
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	2.27	2.36	2.44	2.21	2.35	2.49
Cadmium (Cd)-Total	mg/L	NRG	0.00012	0.000032	0.000033	0.000033	0.000028	0.000036	0.000043
Calcium (Ca)-Total	mg/L	-	-	286	320	337	297	308	326
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.094	0.096	0.099	0.091	0.094	0.102
Magnesium (Mg)-Total	mg/L	-	-	810	899	976	826	878	921
Manganese (Mn)-Total	mg/L	-	-	0.00207	0.00146	0.00167	0.00202	0.00176	0.00198
Mercury (Hg)-Total	mg/L	-	0.000016	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum (Mo)-Total	mg/L	-	-	0.00713	0.00817	0.00849	0.00727	0.00771	0.00824
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium (K)-Total	mg/L	-	-	292	330	357	302	321	331
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	0.0788	0.0859	0.0922	0.0795	0.0838	0.0876
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	7,100	8,240	8,540	7,320	7,700	8,100
Strontium (Sr)-Total	mg/L	-	-	5.28	5.99	6.34	5.37	5.83	5.98
Sulfur (S)-Total	mg/L	-	-	724	827	894	755	792	814
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	0.00193	0.00204	0.00218	0.00192	0.00198	0.00207
Vanadium (V)-Total	mg/L	-	-	0.00065	0.00074	0.00079	0.00067	0.00072	0.0007
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.12: Water Quality Data from Reference and Exposed Stations, Roberts Bay, September 3, 2022

Analyte	units	CCME ^a		Reference			Exposed		
		Acute	Chronic	RB-REF-5M	RB-REF-13M	RB-REF-17M	RB-EXP-5M	RB-EXP-13M	RB-EXP-17M
In situ Water Quality									
Station Depth	m	-	-	17	17	17	17	17	17
Sampling Time	Hh:mm	-	-	13:00	13:35	15:30	12:15	10:00	9:40
Temperature	C	-	-	7.8	7.3	6.9	7.7	7.5	7.7
Dissolved Oxygen	mg/L	-	-	9.07	9.02	9.09	9.35	10.11	9.92
Dissolved Oxygen Saturation	%	-	-	88.4	88.6	86.5	90.4	97.7	96.9
pH	pH	7.0-8.7	7.0-8.7	8.16	7.98	7.97	8.3	8.15	8.21
Conductivity	uS/cm	-	-	24,123	24,041	24,103	24,084	24,156	24,426
Specific Conductance	uS/cm	-	-	35,781	36,054	36,786	35,783	36,204	36,182
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	22.4	22.6	23.0	22.4	22.7	22.6
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	36,400	36,700	37,200	36,500	36,600	37,000
Hardness (as CaCO ₃)	mg/L	-	-	4,600	4,490	4,770	4,720	4,710	4,590
pH	pH	7.0-8.7	7.0-8.7	7.75	7.74	7.74	7.76	7.74	7.74
Salinity	ppt	Background +/- 10% ^b	Background +/- 10% ^b	23.9	24.1	24.5	24.0	24.1	24.4
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	2.6	<2.0	<2.0	<2.0	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	85.5	84.9	89.3	86.3	87.2	87.8
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	43.2	42.7	41.2	43.2	43.4	42.9
Chloride (Cl)	mg/L	NRG	NRG	13,100	12,900	12,600	12,900	13,100	13,000
Fluoride (F)	mg/L	-	NRG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	mg/L	339	45	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nitrite (as N)	mg/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	<1.0	0.0137	<1.0	<1.0	0.0139	<1.0
Sulfate (SO ₄)	mg/L	-	-	1,820	1,790	1,750	1,780	1,820	1,790
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	0.0057	<0.0030	<0.0030	<0.0030	0.0081	0.0079
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Antimony (Sb)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Arsenic (As)-Total	mg/L	-	0.0125	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Barium (Ba)-Total	mg/L	-	-	0.0064	0.0073	0.0071	0.0074	0.0065	0.0069
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Boron (B)-Total	mg/L	NRG	NRG	3.01	2.96	3.23	3.11	3.15	3.06
Cadmium (Cd)-Total	mg/L	NRG	0.00012	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Calcium (Ca)-Total	mg/L	-	-	286	284	301	296	295	291
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cobalt (Co)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Copper (Cu)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Iron (Fe)-Total	mg/L	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Lead (Pb)-Total	mg/L	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Lithium (Li)-Total	mg/L	-	-	0.118	0.117	0.126	0.124	0.124	0.122
Magnesium (Mg)-Total	mg/L	-	-	943	918	976	967	965	939
Manganese (Mn)-Total	mg/L	-	-	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Mercury (Hg)-Total	mg/L	-	0.000016	0.0000020	0.0000017	0.0000041	0.0000016	0.0000016	0.0000012
Molybdenum (Mo)-Total	mg/L	-	-	0.0084	0.0082	0.0085	0.0079	0.0090	0.0080
Nickel (Ni)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phosphorus (P)-Total	mg/L	-	-	<1.0	0.0137	<1.0	<1.0	0.014	<1.0
Potassium (K)-Total	mg/L	-	-	278	272	286	277	288	287
Rubidium (Rb)-Total	mg/L	-	-	0.074	0.080	0.081	0.077	0.079	0.076
Selenium (Se)-Total	mg/L	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silicon (Si)-Total	mg/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Sodium (Na)-Total	mg/L	-	-	7,660	7,500	7,910	7,740	7,810	7,840
Strontium (Sr)-Total	mg/L	-	-	5.79	5.88	5.95	6.02	6.16	6.09
Sulfur (S)-Total	mg/L	-	-	671	642	666	700	697	713
Tellurium (Te)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium (Tl)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thorium (Th)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tin (Sn)-Total	mg/L	-	-	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Uranium (U)-Total	mg/L	NRG	NRG	0.00214	0.00225	0.00219	0.00222	0.00226	0.00210
Vanadium (V)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zinc (Zn)-Total	mg/L	-	-	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Zirconium (Zr)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: **Bold** - Concentration exceeds an average discharge criteria limit following MDMER. CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.13: DQR Summary for Water Collected at Roberts Bay, 2020

Analytes	Units	July			August			September			
		15-Jul-20	15-Jul-20	Relative Percent Difference ^a	16-Aug-20	16-Aug-20	Relative Percent Difference ^a	22-Sep-20	22-Sep-20	Relative Percent Difference ^a	
		L2476585-6	L2476585-7		L2490489-6	L2490489-7		YL2000051-006	YL2000051-007		
		RB-REF-39M	RB-REF-39MX	RB-REF-39M	RB-REF-39MX	RB-REF-39M	RB-REF-39MX				
Physical Tests (Seawater)	Conductivity	uS/cm	38,700	38,700	0.0	43,900	43,800	0.2	41,000	40,800	0.5
	Hardness (as CaCO ₃)	mg/L	5,550	5,540	0.2	5,040	5,130	1.8	4,560	4,630	1.5
	pH, Soluble (2:1)	pH units	7.73	7.74	0.1	7.59	7.66	0.9	7.83	7.82	0.1
	Salinity	psu	27.4	27.4	0.0	27.1	27.1	0.0	27.1	27	0.4
	Total Suspended Solids	mg/L	<2.0	<2.0	-	3.2	4.8	40.0	5.3	<2.0	90.4
Anions and Nutrients (Seawater)	Alkalinity (as CaCO ₃)	mg/L	100	100	0.0	100	97.8	2.2	96.5	96.7	0.2
	Ammonia (as N)	mg/L	< 0.005	0.012	82.4	<0.0050	<0.0050	-	0.008	0.0082	2.5
	Bromide (Br)	mg/L	52.5	52.5	0.0	62.2	64.8	4.1	51.1	52.1	1.9
	Chloride (Cl)	mg/L	15,300	15,500	1.3	15,600	15,500	0.6	15500	15,700	1.3
	Fluoride (F)	mg/L	1.0	1.0	0.0	<1.0	<1.0	-	0.94	0.97	3.1
	Nitrate (N)	mg/L	0.077	0.074	4.0	0.075	0.071	5.5	0.062	0.06	3.3
	Nitrite (N)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
	Total Phosphorus (P)	mg/L	0.0406	0.0428	5.3	0.0403	0.04	0.7	0.0447	0.0428	4.3
	Sulphate (SO ₄)	mg/L	2,170	2,190	0.9	2,220	2,210	0.5	2,260	2,260	0.0
Cyanide (Free)	mg/L	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	-	
Metals (Seawater)	Total Aluminum (Al)	mg/L	0.0063	0.0067	6.2	<0.0050	<0.0050	-	0.0073	0.0063	13.7
	Total Antimony (Sb)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
	Total Arsenic (As)	mg/L	0.00122	0.00123	0.8	0.00175	0.00148	16.7	0.00123	0.00128	4.1
	Total Barium (Ba)	mg/L	0.0101	0.0098	3.0	0.0115	0.0115	0.0	0.0107	0.0106	0.9
	Total Beryllium (Be)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Bismuth (Bi)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Boron (B)	mg/L	2.88	2.85	1.0	3.21	3.24	0.9	3.2	3.25	1.6
	Total Cadmium (Cd)	mg/L	0.000054	0.000042	25.0	0.000056	0.000064	13.3	0.000062	0.000062	0.0
	Total Calcium (Ca)	mg/L	342	344	0.6	357	380	6.2	339	343	1.2
	Total Cesium (Cs)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Chromium (Cr)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Cobalt (Co)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Total Copper (Cu)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Gallium (Ga)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Iron (Fe)	mg/L	0.013	0.011	16.7	<0.010	<0.010	-	<0.010	<0.010	-
	Total Lead (Pb)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Total Lithium (Li)	mg/L	0.122	0.122	0.0	0.131	0.132	0.8	0.141	0.139	1.4
	Total Magnesium (Mg)	mg/L	1,140	1,140	0.0	1,010	1,020	1.0	902	917	1.7
	Total Manganese (Mn)	mg/L	0.00266	0.0026	2.7	0.00288	0.003	4.1	0.00174	0.00174	0.0
	Total Mercury (Hg)	µg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Molybdenum (Mo)	mg/L	0.00863	< 0.00860	0.3	0.00835	0.0085	1.8	0.00905	0.00933	3.1
	Total Nickel (Ni)	mg/L	0.00054	0.00054	0.0	0.00052	<0.0005	3.9	<0.00050	<0.00050	-
	Total Potassium (K)	mg/L	340	350	2.9	351	350	0.3	301	305	1.3
	Total Rhenium (Re)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Rubidium (Rb)	mg/L	0.0941	0.095	1.0	0.097	0.0971	0.1	0.0916	0.0923	0.8
	Total Selenium (Se)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Silicon (Si)	mg/L	<1.0	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
	Total Silver (Ag)	mg/L	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Total Sodium (Na)	mg/L	8,630	9,380	8.3	8,420	8,630	2.5	8820	9340	5.9
	Total Strontium (Sr)	mg/L	5.92	6.08	2.7	6.47	6.48	0.2	6.44	6.57	2.0
	Total Sulphur (S)	mg/L	825	902	8.9	1,000	1,020	2.0	878	932	6.2
	Total Tellurium (Te)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Thallium (Tl)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Total Thorium (Th)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
Total Tin (Sn)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	
Total Tungsten (W)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	
Total Uranium (U)	mg/L	0.00234	0.00233	0.4	0.0023	0.00235	2.2	0.00236	0.00230	2.5	
Total Vanadium (V)	mg/L	0.00094	0.00098	4.2	<0.0015	<0.0015	-	0.00088	0.00089	1.1	
Total Yttrium (Y)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	
Total Zinc (Zn)	mg/L	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	-	
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	

Values did not meet the data quality objective of ≤ 25% relative percent difference.

Note: "-" indicates no data.

^a The method detection limit (MDL) value was used in instances where values less than the MDL were reported.

Table B.14: DQR Summary for Water Collected at Roberts Bay, 2021

Analytes	Units	July			August			September			
		17-Jul-21	17-Jul-21	Relative Percent Difference ^a	21-Aug-21	21-Aug-21	Relative Percent Difference ^a	26-Sep-21	26-Sep-21	Relative Percent Difference ^a	
		YL2100803-007	YL2100803-007		YL2101089-007	YL2101089-007		YL2101407-007	YL2101407-007		
RB-REF-5M	RB-REF-5MX	RB-REF-5M	RB-REF-5MX	RB-EXP-5M	RB-EXP-5MX						
Physical Tests (Seawater)	Conductivity	uS/cm	13,200	13,200	0.0	28,500	27,900	2.1	34,200	34,100	0.3
	Hardness (as CaCO ₃)	mg/L	1,390	1,430	2.8	2,940	3,080	4.7	4,030	3,900	3.3
	pH, Soluble (2:1)	pH units	7.58	7.61	0.4	7.78	7.83	0.6	7.86	7.87	0.1
	Salinity	psu	7.5	7.5	0.0	17.9	17.7	1.1	22.8	22.7	0.4
	Total Suspended Solids	mg/L	2.1	5.4	88.0	< 2.0	<2.0	-	<2.0	2.9	36.7
Anions and Nutrients (Seawater)	Alkalinity (as CaCO ₃)	mg/L	34.8	35	1.1	65	64.4	0.9	89.4	91.8	2.6
	Ammonia (as N)	mg/L	0.0066	0.0050	27.6	<0.0050	<0.0050	-	<0.0050	<0.0050	-
	Bromide (Br)	mg/L	15.1	12.4	19.6	33.6	33.7	0.3	36.8	91.8	85.5
	Chloride (Cl)	mg/L	4,540	3,710	20.1	9,870	9,830	0.4	10,300	10,500	1.9
	Fluoride (F)	mg/L	0.2	0.3	4.1	0.47	0.47	0.0	0.62	0.61	1.6
	Nitrate (N)	mg/L	0.010	<0.010	0.0	<0.010	<0.010	-	<0.010	<0.010	-
	Nitrite (N)	mg/L	<0.010	<0.010	-	<0.010	0.022	75.0	<0.010	<0.010	-
	Total Phosphorus (P)	mg/L	0.0051	0.0047	8.2	0.0362	0.0204	55.8	0.0299	0.0329	9.6
	Sulphate (SO ₄)	mg/L	543	548	0.9	1,360	1,370	0.7	1,610	1,580	1.9
Cyanide (Total)	mg/L	<0.0030	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	-	
Metals (Seawater)	Total Aluminum (Al)	mg/L	0.0366	0.0479	26.7	0.0084	0.0094	0.0	<0.005	0.0051	2.0
	Total Antimony (Sb)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
	Total Arsenic (As)	mg/L	<0.00040	<0.00040	-	0.00087	0.00089	2.3	0.00097	0.00094	3.1
	Total Barium (Ba)	mg/L	0.0047	0.0046	2.2	0.0066	0.0068	3.0	0.008	0.0082	2.5
	Total Beryllium (Be)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Bismuth (Bi)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Boron (B)	mg/L	0.85	0.84	1.2	2.37	2.48	4.5	3.02	2.77	8.6
	Total Cadmium (Cd)	mg/L	0.000013	0.000013	0.0	0.000029	0.000029	0.0	0.000046	0.00004	14.0
	Total Calcium (Ca)	mg/L	93.8	96.8	3.1	214	218	1.9	278	264	5.2
	Total Cesium (Cs)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Chromium (Cr)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Cobalt (Co)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Total Copper (Cu)	mg/L	<0.00050	0.00052	-	<0.00050	<0.00050	-	0.00057	0.00051	11.1
	Total Gallium (Ga)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Iron (Fe)	mg/L	0.048	0.064	28.6	<0.010	0.01	0.0	<0.010	<0.010	-
	Total Lead (Pb)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
	Total Lithium (Li)	mg/L	0.038	0.034	11.1	0.088	0.086	2.3	0.108	0.1	7.7
	Total Magnesium (Mg)	mg/L	281	289	2.8	583	616	5.5	810	788	2.8
	Total Manganese (Mn)	mg/L	0.00355	0.00365	2.8	0.00168	0.00184	9.1	0.00164	0.00152	7.6
	Total Mercury (Hg)	µg/L	0.000117	0.000155	27.9	<0.00050	0.00050	0.0	<0.0005	0.0005	0.0
	Total Molybdenum (Mo)	mg/L	0.00241	0.0025	3.7	0.00532	0.00553	3.9	0.00757	0.00725	4.3
	Total Nickel (Ni)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Potassium (K)	mg/L	102	105	2.9	195	208	6.5	264	258	2.3
	Total Rhenium (Re)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Rubidium (Rb)	mg/L	0.0267	0.0274	2.6	0.0599	0.06	0.2	0.0761	0.0726	4.7
	Total Selenium (Se)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Silicon (Si)	mg/L	<1.0	<1.0	-	<1.0	<1.0	-	<1.0	<1.0	-
	Total Silver (Ag)	mg/L	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	-
	Total Sodium (Na)	mg/L	2,380	2,330	2.1	5,660	5,540	2.1	8,180	7,910	3.4
	Total Strontium (Sr)	mg/L	1.74	1.78	2.3	3.8	4.0	5.1	4.97	4.75	4.5
	Total Sulphur (S)	mg/L	245	257	4.8	495	521	5.1	718	679	5.6
	Total Tellurium (Te)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Thallium (Tl)	mg/L	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
Total Thorium (Th)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	
Total Tin (Sn)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	
Total Tungsten (W)	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	
Total Uranium (U)	mg/L	0.00068	0.000671	1.3	0.00165	0.00161	2.5	0.00207	0.00192	7.5	
Total Vanadium (V)	mg/L	<0.00050	<0.00050	-	0.00058	<0.00050	0.0	0.00065	0.0006	8.0	
Total Yttrium (Y)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	
Total Zinc (Zn)	mg/L	0.0126	0.0042	100.0	<0.0030	<0.0030	-	0.003	<0.0030	0.0	
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	-	

Values did not meet the data quality objective of ≤ 25% relative percent difference.

Note: "-" indicates no data.

^a The method detection limit (MDL) value was used in instances where values less than the MDL were reported.

Table B.15: DQR Summary for Water Collected at Roberts Bay, 2022

Analytes	Units	July			September			
		23-Jul-22	23-Jul-22	Relative Percent Difference ^a	03-Sep-22	03-Sep-22	Relative Percent Difference ^a	
		YL2201057-007	YL2201057-007		YL2201484-002	YL2201484-002		
		RB-EXP-5M	RB-EXP-5MX		RB-REF-5M	RB-REF-5M-DUP		
Physical Tests (Seawater)	Conductivity	uS/cm	36,000	36,400	1.1	36,400	36,600	0.5
	Hardness (as CaCO ₃)	mg/L	4,140	4,260	2.9	4,600	4,520	1.8
	pH, Soluble (2:1)	pH units	7.86	7.89	0.4	7.75	7.78	0.4
	Salinity	psu	23.1	23.4	1.3	23.9	24.1	0.8
	Total Suspended Solids	mg/L	<2.0	2.1	0.0	<2.0	<2.0	-
Anions and Nutrients (Seawater)	Alkalinity (as CaCO ₃)	mg/L	86.7	87	0.7	85.5	85.1	0.5
	Ammonia (as N)	mg/L	<0.0050	<0.0050	-	<0.0050	<0.0050	-
	Bromide (Br)	mg/L	43.1	43.1	0.0	43.2	39.8	8.5
	Chloride (Cl)	mg/L	12,800	13,000	1.6	13100	12,100	7.9
	Fluoride (F)	mg/L	<1.0	<1.0	-	<1.0	<1.0	-
	Nitrate (N)	mg/L	<0.50	<0.50	-	<0.50	<0.50	-
	Nitrite (N)	mg/L	<0.10	<0.10	-	<0.10	<0.10	-
	Total Phosphorus (P)	mg/L	0.0299	0.0295	1.3	<1.0	<1.0	-
	Sulphate (SO ₄)	mg/L	1,710	1,770	3.4	1,820	1,680	8.0
Cyanide (Free)	mg/L	0.0047	0.0044	6.6	<0.0030	<0.0030	-	
Metals (Seawater)	Total Aluminum (Al)	mg/L	<0.0050	<0.0050	-	<0.050	<0.050	-
	Total Antimony (Sb)	mg/L	<0.0010	<0.0010	-	<0.0030	<0.0030	-
	Total Arsenic (As)	mg/L	0.00099	0.00104	4.9	<0.0030	<0.0030	-
	Total Barium (Ba)	mg/L	0.0097	0.0099	2.0	0.0064	0.0065	1.5
	Total Beryllium (Be)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Bismuth (Bi)	mg/L	<0.00050	<0.00050	-	<0.0020	<0.0020	-
	Total Boron (B)	mg/L	2.21	2.32	4.9	3.01	2.98	1.0
	Total Cadmium (Cd)	mg/L	0.000028	0.000031	10.2	<0.00020	<0.00020	-
	Total Calcium (Ca)	mg/L	297	291	2.0	286	284	0.7
	Total Cesium (Cs)	mg/L	<0.00050	<0.00050	-	<0.00050	<0.00050	-
	Total Chromium (Cr)	mg/L	<0.00050	<0.00050	-	<0.0050	<0.0050	-
	Total Cobalt (Co)	mg/L	<0.000050	<0.000050	-	<0.0010	<0.0010	-
	Total Copper (Cu)	mg/L	<0.00050	<0.00050	-	<0.0050	<0.0050	-
	Total Gallium (Ga)	mg/L	<0.00050	<0.00050	-	-	-	-
	Total Iron (Fe)	mg/L	<0.010	<0.010	-	<0.20	<0.20	-
	Total Lead (Pb)	mg/L	<0.000050	<0.000050	-	<0.0020	<0.0020	-
	Total Lithium (Li)	mg/L	0.091	0.098	7.4	0.118	0.118	0.0
	Total Magnesium (Mg)	mg/L	826	857	3.7	943	926	1.8
	Total Manganese (Mn)	mg/L	0.00202	0.00208	2.9	<0.0025	<0.0025	-
	Total Mercury (Hg)	µg/L	<0.00050	<0.00050	-	<0.00050	0.00022	77.8
	Total Molybdenum (Mo)	mg/L	0.00727	0.00717	1.4	0.0084	0.0078	7.7
	Total Nickel (Ni)	mg/L	<0.00050	<0.00050	-	<0.0050	<0.0050	-
	Total Potassium (K)	mg/L	302	307	1.6	278	271	2.6
	Total Rhenium (Re)	mg/L	<0.00050	<0.00050	-	-	-	-
	Total Rubidium (Rb)	mg/L	0.0795	0.081	1.9	0.074	0.074	0.0
	Total Selenium (Se)	mg/L	<0.00050	<0.00050	-	<0.0020	<0.0020	-
	Total Silicon (Si)	mg/L	<1.0	<1.0	-	<0.50	<0.50	-
	Total Silver (Ag)	mg/L	<0.00010	<0.00010	-	<0.00025	<0.00025	-
	Total Sodium (Na)	mg/L	7,320	7470	2.0	7,660	7,550	1.4
	Total Strontium (Sr)	mg/L	5.37	5.4	0.6	5.79	5.79	0.0
	Total Sulphur (S)	mg/L	755	735	2.7	671	651	3.1
	Total Tellurium (Te)	mg/L	<0.00050	<0.00050	-	<0.010	<0.010	-
	Total Thallium (Tl)	mg/L	<0.000050	<0.000050	-	<0.00050	<0.00050	-
Total Thorium (Th)	mg/L	<0.00050	<0.00050	-	<0.0050	<0.0050	-	
Total Tin (Sn)	mg/L	<0.0010	<0.0010	-	<0.0025	<0.0025	-	
Total Titanium (Ti)	mg/L	<0.0050	<0.0050	-	<0.0050	<0.0050	-	
Total Tungsten (W)	mg/L	<0.0010	<0.0010	-	<0.0050	<0.0050	-	
Total Uranium (U)	mg/L	0.00192	0.00193	0.5	0.00214	0.0022	2.7	
Total Vanadium (V)	mg/L	0.00067	0.00067	0.0	<0.0050	<0.0050	-	
Total Yttrium (Y)	mg/L	<0.00050	<0.00050	-	-	-	-	
Total Zinc (Zn)	mg/L	<0.0030	<0.0030	-	<0.025	<0.025	-	
Total Zirconium (Zr)	mg/L	<0.00050	<0.00050	-	<0.010	<0.010	-	

Values did not meet the data quality objective of ≤ 25% relative percent difference.

Note: "-" indicates no data.

^a The method detection limit (MDL) value was used in instances where values less than the MDL were reported.

Table B.16: Water Quality Data from Field, Travel, and Equipment Blanks, Robert's Bay, Robert's Bay, 2020

Analyte	units	CCME ^a		July			August			September		
		Acute	Chronic	RB-FB	RB-TV-BL	RB-EQB	RB-FB	RB-TV-BL	RB-EQB	RB-FB	RB-TV-BL	RB-EQB
Physical Tests (Seawater)												
Conductivity	uS/cm	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	48.0	<2.0	<2.0	<2.0
Hardness (as CaCO ₃)	mg/L	-	-	<4.80	<4.80	<4.80	<4.80	<4.80	<4.80	<1.00	<1.00	<1.00
pH	pH	7.0-8.7	7.0-8.7	5.39	5.37	5.07	5.22	5.16	5.13	5.52	5.3	5.33
Salinity	psu	Background +/- 10% ^b	Background +/- 10% ^b	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions and Nutrients (Seawater)												
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride (Cl)	mg/L	NRG	NRG	<50	<50	<50	<50	<50	<50	<50	<50	<50
Fluoride (F)	mg/L	-	NRG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.20	<0.20	<0.20
Nitrate (as N)	mg/L	1500	200	<0.0100	<0.0100	0.0760	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0430
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Sulfate (SO ₄)	mg/L	-	-	<30	<30	<30	<30	<30	<30	<3.0	<3.0	<3.0
Cyanides (Seawater)												
Cyanide, Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)												
Aluminum (Al)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Barium (Ba)-Total	mg/L	-	-	<0.0010	<0.0010	0.0067	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium (Cd)-Total	mg/L	NRG	0.00012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Magnesium (Mg)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mercury (Hg)-Total	µg/L	-	0.000016	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	0.05 ^d	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	5.3	<2.5	<2.5	<2.5
Strontium (Sr)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfur (S)-Total	mg/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Vanadium (V)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.
 Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.17: Water Quality Data from Field, Travel, and Equipment Blanks, Robert's Bay, Robert's Bay, 2021

Analyte	units	CCME ^a		July		August		September	
		Acute	Chronic	RB-FB	RB-EQB	RB-FB	RB-EQB	RB-FB	RB-EQB
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	2.5	2.4	<2.0	<2.0	<2.0	<2.0
Hardness (as CaCO ₃)	mg/L	-	-	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
pH	pH	7.0-8.7	7.0-8.7	5.74	5.83	6.04	6.04	5.79	5.63
Salinity	psu	Background +/- 10% ^b	Background +/- 10% ^b	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	<1.0	<1.0	1.7	1.7	<1.0	<1.0
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride (Cl)	mg/L	NRG	NRG	<50	<50	<50	<50	<50	<50
Fluoride (F)	mg/L	-	NRG	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrate (as N)	mg/L	1500	200	<0.010	<0.010	<0.010	<0.010	0.013	<0.010
Nitrite (as N)	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Sulfate (SO ₄)	mg/L	-	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	-	0.0125	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Barium (Ba)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	NRG	NRG	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium (Cd)-Total	mg/L	NRG	0.00012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018
Calcium (Ca)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Magnesium (Mg)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese (Mn)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mercury (Hg)-Total	µg/L	-	0.000016	0.0000059	0.00000211	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium (K)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Strontium (Sr)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfur (S)-Total	mg/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	NRG	NRG	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Vanadium (V)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	-	<0.0030	0.0041	<0.0030	<0.0030	0.0117	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment. " - " = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.

Table B.18: Water Quality Data from Field, Travel, and Equipment Blanks, Robert's Bay, Robert's Bay, 2022

Analyte	units	CCME ^a		July			September		
		Acute	Chronic	RB-FB	RB-TV-BL	RB-EQB	RB-FB	RB-TV-BL	RB-EQB
Physical Tests (Seawater)									
Conductivity	uS/cm	-	-	<2.0	<2.0	4.2	<2.0	<2.0	<2.0
Hardness (as CaCO ₃)	mg/L	-	-	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
pH	pH	7.0-8.7	7.0-8.7	5.59	5.56	5.02	5.79	5.52	5.41
Salinity	psu	Background +/- 10% ^b	Background +/- 10% ^b	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Suspended Solids	mg/L	Background + 25 ^c	Background + 5 ^c	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Anions and Nutrients (Seawater)									
Alkalinity, Total (as CaCO ₃)	mg/L	-	-	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ammonia, Total (as N)	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	-	-	<5.0	<5.0	22.0	<5.0	<5.0	<5.0
Chloride (Cl)	mg/L	NRG	NRG	<50	<50	6420	<50	<50	<50
Fluoride (F)	mg/L	-	NRG	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate (as N)	mg/L	1500	200	<0.50	<0.50	2.84	<0.50	<0.50	<0.50
Nitrite (as N)	mg/L	-	-	<0.10	<0.10	0.25	<0.10	<0.10	<0.10
Phosphorous (P) - Total	mg/L	0.05 ^d	0.05 ^d	<0.050	<0.050	<0.050	<1.0	<1.0	<1.0
Sulfate (SO ₄)	mg/L	-	-	<30	<30	623	<30	<30	<30
Cyanides (Seawater)									
Cyanide, Free	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Total Metals (Seawater)									
Aluminum (Al)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.050	<0.050	<0.050
Antimony (Sb)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0030	<0.0030	<0.0030
Arsenic (As)-Total	mg/L	-	0.0125	<0.00040	<0.00040	<0.00040	<0.0030	<0.0030	<0.0030
Barium (Ba)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0025	<0.0025	<0.0025
Beryllium (Be)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.0020	<0.0020	<0.0020
Boron (B)-Total	mg/L	NRG	NRG	<0.30	<0.30	<0.30	<0.10	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	NRG	0.00012	<0.000010	<0.000010	<0.000010	<0.00020	<0.00020	<0.00020
Calcium (Ca)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cesium (Cs)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	-	0.0015 ^e	<0.00050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050
Cobalt (Co)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.0010	<0.0010	<0.0010
Copper (Cu)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050
Gallium (Ga)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	-	-	-
Iron (Fe)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.20	<0.20	<0.20
Lead (Pb)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.0020	<0.0020	<0.0020
Lithium (Li)-Total	mg/L	-	-	<0.020	<0.020	<0.020	<0.025	<0.025	<0.025
Magnesium (Mg)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<0.25	<0.25	<0.25
Manganese (Mn)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020	<0.0025	<0.0025	<0.0025
Mercury (Hg)-Total	µg/L	-	0.000016	<0.0000050	<0.0000050	<0.0000050	0.0000029	0.0000021	<0.0000010
Molybdenum (Mo)-Total	mg/L	-	-	<0.00010	0.00011	<0.00010	<0.0025	<0.0025	<0.0025
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050
Potassium (K)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<2.5	<2.5	<2.5
Rhenium (Re)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	-	-	-
Rubidium (Rb)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010
Selenium (Se)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.0020	<0.0020	<0.0020
Silicon (Si)-Total	mg/L	-	-	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50
Silver (Ag)-Total	mg/L	0.0075	NRG	<0.00010	<0.00010	<0.00010	<0.00025	<0.00025	<0.00025
Sodium (Na)-Total	mg/L	-	-	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Strontium (Sr)-Total	mg/L	-	-	<0.010	<0.010	<0.010	<0.0050	<0.0050	<0.0050
Sulfur (S)-Total	mg/L	-	-	<5.0	<5.0	<5.0	<25.0	<25.0	<25.0
Tellurium (Te)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.010	<0.010	<0.010
Thallium (Tl)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.00050	<0.00050	<0.00050
Thorium (Th)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050
Tin (Sn)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0025	<0.0025	<0.0025
Titanium (Ti)-Total	mg/L	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L	-	-	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	<0.0050
Uranium (U)-Total	mg/L	NRG	NRG	<0.000050	<0.000050	<0.000050	<0.00050	<0.00050	<0.00050
Vanadium (V)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.0050	<0.0050	<0.0050
Yttrium (Y)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	-	-	-
Zinc (Zn)-Total	mg/L	-	-	<0.0030	<0.0030	<0.0030	<0.025	<0.025	<0.025
Zirconium (Zr)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.010	<0.010	<0.010

Mean concentration exceeds a CCME chronic marine value.

Mean concentration exceeds a CCME acute marine value.

Notes: CCME = Canadian Council of Ministers of the Environment. "-" = no data available. "NRG" = no recommended guideline.

^a Canadian Council of Ministers of the Environment Guidelines (CCME 2017).

^b Narrative guideline: "Human activities should not cause the salinity (expressed as parts per thousand [‰]) of marine and estuarine waters to fluctuate by more than 10% of the natural level expected at that time and depth. Interim Guideline" (CCME, 1996).

^c Narrative guideline: "Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d). High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L" (CCME, 1999).

^d Narrative guideline: "In order to minimize the occurrence of hypoxic events, it is suggested that total phosphorus concentrations within the estuary not exceed 50 µg/L during the late summer-early fall period, a value that approximates the concentration representing the 25th percentile for conditions when dissolved oxygen saturation values are >50 %" (CCME, 2007). This guideline applies to nearshore estuary waters.

^e CCME guideline is for the hexavalent (Cr(VI)) form of Chromium in seawater.