



TECHNICAL MEMORANDUM

To: Ashleigh Crompton, Mike Champion, Jackie Boruch, Ryan Schucroft, Jamie Maxwell (Woodfibre LNG) **Date:** 6 April 2024
From: Patrick Mueller and Holly Pelletier (Lorax) **Project #:** A633-7
Subject: PE-111578 Weekly Discharge and Compliance Report #7 for March 24 – 30

Waste Discharge Authorization Effluent Permit PE-111578 was issued by the British Columbia Energy Regulator (BCER) to Woodfibre LNG on February 9, 2024. The permit specifies monitoring and reporting requirements that are required to be met by Woodfibre LNG during construction of the LNG Export Facility. Reporting is required on a weekly basis.

This technical memorandum (Report #7) summarizes the results of PE-111578 discharge and compliance monitoring conducted March 24 – 30. Figures referenced in the report discussion are included at the end of this report. Report #7 has been prepared to meet the reporting requirements specified in Condition 4.2 of WDA Effluent Permit PE-111578:

“The Permittee shall summarize the results of the discharge and compliance monitoring program in a report that shall be submitted to the BCER weekly over the term of this permit. Reports must include suitable tabulated data. The table must include any applicable regulatory limits/guidelines e.g. permit limits, BC Water Quality Guidelines etc. Any exceedances of respective regulatory limits/guidelines must be clearly highlighted. Any missed sampling events/missing data must be identified with an explanation provided. Reporting frequency may be reduced upon a history of compliance and by written confirmation from the BCER. These reports shall be submitted to Waste.Management@bc-er.ca. A copy of the reports shall be provided to each First Nation consulted with regarding this subject permit, and also made publicly available on the Woodfibre LNG Environmental Reporting webpage.”

1. Current Conditions

The Construction Phase of the Woodfibre LNG Export Facility commenced in October 2023. Early stage civil works have been commenced including site grading, levelling, and sedimentation pond and wastewater treatment plant (WWTP) construction. Shoring works along the shoreline and foreshore areas were initiated in December 2023, and in early 2024 construction of water management infrastructure was initiated and has continued through the March 24 – 30 monitoring period. The water management facilities that were completed or under construction during the reporting period are shown in Figure 1.

During the reporting period (March 24 – 30) assembly of the East WWTP was completed, and the system was prepared for pilot testing. Figure 2 shows an areal view of the East Sedimentation Pond and the East WWTP on March 29. No discharges of contact water to the environment were reported during the reporting period. Commissioning of the East WWTP began on March 29 with system priming and the pilot scale testing program. Following commissioning, construction of the remaining East Catchment water management infrastructure will commence (*i.e.*, conveyance ditches, outfall structures).

Construction of the West Sedimentation Pond continued March 24 – 30 with placement of the pond berms and preparation for liner installation (Figure 3). Construction of the pond is scheduled to be completed mid-April. Commissioning of the West WWTP is anticipated to follow shortly thereafter. The construction of a non-contact water diversion ditch was completed along the northern ditch line shown in Figure 1. Water that accumulated in non-contact water ditches that were under construction or completed was contained and managed on-site as non-contaminated contact water. Site reports indicate there were no contact water discharges to the environment during the reporting period.

2. Monitoring Summary

The authorized works were under construction during the March 24 – 30 monitoring period. Compliance monitoring stations will be progressively established as water management infrastructure is completed. The receiving environment stations for creek water and Howe Sound reference locations have been established (Figure 1). The WDA monitoring program for established receiving environment and contact water stations will be conducted by Roe Environmental beginning in April, at the frequency specified in PE-111578.

3. Water Quality Results

3.1 Overview

Receiving environment background stations were monitored by Keystone Environmental from March 19 to 21. Analytical results received at the time of reporting are summarized in this report, except methyl mercury for freshwater samples, and dioxin and furan results for all samples, due to a 4-week turnaround time at the lab. The Keystone program is for background stations of freshwater and marine water, and the samples that overlap with the PE- 111578 monitoring requirements are listed below in Table 1.

Table 1: Summary of Analytical Results Included in Weekly Discharge and Compliance Report #7.

Sample	Description	Sampling Date	Parameters Tested
SW-01	Woodfibre Creek	19 March 2024	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total Dissolved and Speciated Metals, VOCs, methyl mercury, dioxins and furans
SW-02	Mill Creek Estuary		
SW-03	Mill Creek Upstream		
SW-07	Mill Creek Background		
SW-04	East Creek	20 March 2024	
WQR1-1	Reference Station 1 – deep water (2m above seafloor)		
WQR1-2	Reference Station 1 – surface water (2m below surface)		
WQR1-3	Reference Station 1 – surface water (0.5m below surface)	21 March 2024	
WQR2-1	Reference Station 2 – deep water (2m above seafloor)		
WQR2-2	Reference Station 2 – surface water (2m below surface)		
WQR2-3	Reference Station 2 – surface water (0.5m below surface)		

Water quality results are screened against the lowest of the applicable British Columbia Water Quality Guidelines (WQG), and Canadian WQG developed by the Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC), for the protection of freshwater, estuarine and marine water aquatic life (FWAL, EWAL and MWAL, respectively).

3.2 Freshwater and Estuarine Water Exceedance Summary

The WQG screening results for Woodfibre Creek (Station SW-01), Mill Creek (Stations SW-02, SW-03 and SW-07) and East Creek (Station SW-04) are summarized in Table 2 for parameters that exceed a guideline. The analytical results for each sample are summarized in Appendix B for freshwater and Appendix C for estuarine water. Lower Mill Creek (Station SW-03) is an estuarine environment due to tidal influence from Howe Sound marine waters. In contrast, the other creek stations are located above tidal influence and are freshwater stations. Consequently, the water quality at Station SW-03 is compared to EWAL WQG while all other stations (SW-01, SW-02, SW-04 and SW-07) are screened against the FWAL WQG.

Parameter concentrations are within WQG limits for the protection of FWAL and EWAL, except field pH, total aluminum (T-Al), and dissolved copper (D-Cu) in some or all freshwater samples. Field pH was below the lower limit of the FWAL WQG (pH 6.5) in samples from Woodfibre Creek (SW-01) and Mill Creek (SW-02 and SW-07). The concentrations of field pH, T-Al, and D-Cu are within the concentration ranges observed in the baseline monitoring program. Additional details are provided in Table 2.

Previously unavailable methyl mercury results for samples collected in February from Mill Creek (Stations SW-02, SW-03 and SW-07) and East Creek (Station SW-04) ranged from <0.020 to 0.024 ng/L and are within the concentration ranges observed in the baseline monitoring program. The samples with methyl mercury results met the WQG for total mercury. Methyl mercury results were received for all February samples except SW-01. The lab (ALS) indicates SW-01 was not

tested for methyl mercury due to an internal scheduling error and is proceeding with the missed test on a rush basis. Methyl mercury results were not available at the time of reporting for the March freshwater samples but were available for the estuarine sample from Mill Creek (SW-03; <0.020 ng/L). The sample from Mill Creek (SW-03) met the WQG for total mercury.

**Table 2:
Summary of WQG Exceedances for Freshwater and Estuarine Analytical Samples Collected February 15, 2024.**

Parameter	Units	WQG (LT)	N	N > WQG	Commentary
Field pH	s.u.	6.5 – 9.0	5	3	Field pH measured in freshwater samples from Woodfibre Creek (SW-01) and Mill Creek (SW-02 and SW-07), at pH 6.16, 6.39 and 5.53, respectively, were below the lower limit of the FWAL guidelines. The observed pH values are within the ranges observed in pre-construction baseline samples at these stations.
Total Aluminum	mg/L	0.013-0.075 ¹	5	4	Total aluminum concentrations were above the long-term WQG in samples from Woodfibre Creek (SW-01), Mill Creek (SW-02 and SW-07) and East Creek (SW-04). The observed total aluminum values are within the ranges observed in pre-construction baseline samples at these stations.
Dissolved Copper	mg/L	0.00020-0.00030 ¹	5	2	Dissolved copper concentrations were above the long-term WQG in samples from Mill Creek (SW-02) and East Creek (SW-04), ranging from 0.00021 to 0.00047 mg/L in freshwater. The observed dissolved copper values are within the ranges observed in pre-construction baseline samples at these stations.

WQG = British Columbia or Canadian Water Quality Guideline for the Protection of Aquatic Life. LT = long-term freshwater or estuarine aquatic life guideline. Variable dependant guidelines were calculated for each sample using sample specific parameter values. The nearest boundary value was used if a variable was outside the formula range.

N = number of samples.

Non-detect results are screened using the detection limit value.

¹ A range for long-term WQGs is provided since guidelines were calculated on a sample specific basis.

3.3 Marine Water Receiving Environment

The WQG screening results for two marine water reference sites located approximately 500 m northeast (WQR1) and south (WQR2) of the Certified Project Area (CPA) are summarized in Table 3 for parameters that exceed a guideline. The analytical results for each sample are summarized in Appendix D. The water quality at all stations is screened against the MWAL WQGs. Samples were collected at each station from the water column 0.5 and 2 m below the water surface and 2 m above the seafloor.

Results for all samples are within WQG values for the protection of FWAL and EWAL, with the exception of dissolved oxygen (DO) and total boron. The concentration of DO was below the lower limit of the MWAL WQG (8.0 mg/L) in deep water samples from each station (7.33 and 7.12 mg/L at station WQR1 and WQR2, respectively). The concentration of total boron ranged from 1.02 to 3.66 mg/L in all samples. The concentrations of DO and total boron observed in the WQR1 and WQR2 samples are within the concentration ranges observed in the baseline monitoring program. Additional details are provided in Table 3.

Previously unavailable methyl mercury results for samples collected in February from stations WQR1 and WQR2 ranged from <0.020 to 0.060 ng/L and are within the concentration ranges observed in the baseline monitoring program.

**Table 3:
Summary of WQG Exceedances for Marine Water Analytical Samples Collected February 13 and 14, 2024**

Parameter	Units	WQG (LT)	Location	N	N > WQG	Commentary
Field Dissolved Oxygen (DO)	mg/L	≥ 8.0	Surface	4	0	Field DO levels are below the lower limit of the WQG in deep-water samples (7.33 and 7.12 mg/L at WQR1 and WQR2, respectively). Depletion of DO has been documented for the deep waters of Howe Sound and the observed DO values are within the ranges observed in deep water pre-construction baseline samples at these stations.
			Deep	2	2	
Total Boron	mg/L	1.2	Surface	4	3	Total boron exceeded the WQG in the deep waters and in all but one surface water sample at station WQR1 and WQR2. Total boron concentrations range from 1.02 to 3.66 mg/L. This is due to the influence of oceanic marine water in Howe Sound. The observed total boron values are within the ranges observed in pre-construction baseline samples at these stations.
			Deep	2	2	

WQG = British Columbia or Canadian Water Quality Guideline for the Protection of Aquatic Life. LT = long-term marine aquatic life guideline.

N = number of samples.

Non-detect results are screened using the detection limit value.

4. Quality Control

This section summarizes the results of the quality control (QC) evaluation for the PE-111578 monitoring program. The evaluation includes a review of field and lab QC, and completeness of the weekly report. Any items flagged for follow-up will be carried forward in future reports until they are resolved or closed.

**Table 4-1:
Summary of the Weekly QA/QC Evaluations and Ongoing Investigations**

QA/QC Procedure	Observation	Investigation/Resolution
Reporting Period (March 24 – 30, Report #7)		
Result QA/QC Screening	Chloroform was detected at two to three times the detection limit in field blanks collected March 19, 20 and 21.	Chloroform was not detected (<0.0005) in all March monitoring samples. Investigation of the chloroform results reported for the March field blanks is underway.
Pending Data	Methyl mercury results for freshwater samples, and dioxin and furan data for all samples from the March round of water quality monitoring were not reported.	Methyl mercury, dioxin and furan testing typically requires up to 4 weeks to complete. The pending results are expected late April.
Ongoing Items		
Report #2: Result QA/QC Screening	The concentration reported for D-Zn in sample SW-07 (Mill Creek background) was greater than the value reported for T-Zn.	A dissolved metals sample was reprepared from the general parameters bottle and the D-Zn result was confirmed. Keystone field staff indicate there are no known sources of zinc (<i>i.e.</i> , galvanized metal) at the sampling location. T-Zn and D-Zn were not detected in field and lab QC blanks. The Zn results from the March round of sampling pass the total and dissolved metal QC screen. The cause of the discrepancy between T-Zn and D-Zn has not been identified and appears to be an isolated occurrence. This item is closed.
Report #2: Result QA/QC Screening	D-Cu detection limit raised above WQG value for sample SW-03 (Mill Creek estuary)	The total copper detection limit was raised in sample SW-03 (Mill Creek estuary). The sample was collected and analyzed as freshwater. However, due to elevated conductivity (>1000 uS/cm) the sample was diluted prior to analysis for metals. This yielded elevated detection limits for many metals reported for this sample. Beginning with the March round of sampling, if the field conductivity of the SW-03 sample is >1000 uS/cm, the sample will be collected and tested as a seawater to achieve the typically reported detection limits for metals at this station. This item is closed.
Report #2: Pending Data	The methyl mercury for the February round of water quality monitoring have not been reported.	Methyl mercury results were received at the time of preparing Report #7. All February results were received except for sample SW-01. The lab indicates SW-01 was not tested for methyl mercury due to an internal scheduling error and is proceeding with the missed test on a rush basis. Results are expected for the next weekly report (Report #8). This item remains open.

Notes:



Result QA/QC screening includes the evaluation of field and lab QC results, comparison of total and dissolved metal results and review of modified detection limits.
Pending data are outstanding results from monitoring samples for which some data has been reported in the current or previous weekly reports.

5. Closure

This weekly report is a desktop review by Lorax of the PE-111578 discharge and compliance monitoring program records, reports and results provided by Woodfibre LNG. The records reviewed and analyzed by Lorax include ALS Environmental laboratory test reports, LB LNG site reports and Keystone Environmental field reports. Verbal or electronic communications between Lorax, and LB LNG and Keystone Environmental staff are conducted as needed to confirm the information presented in this report.

Regards,

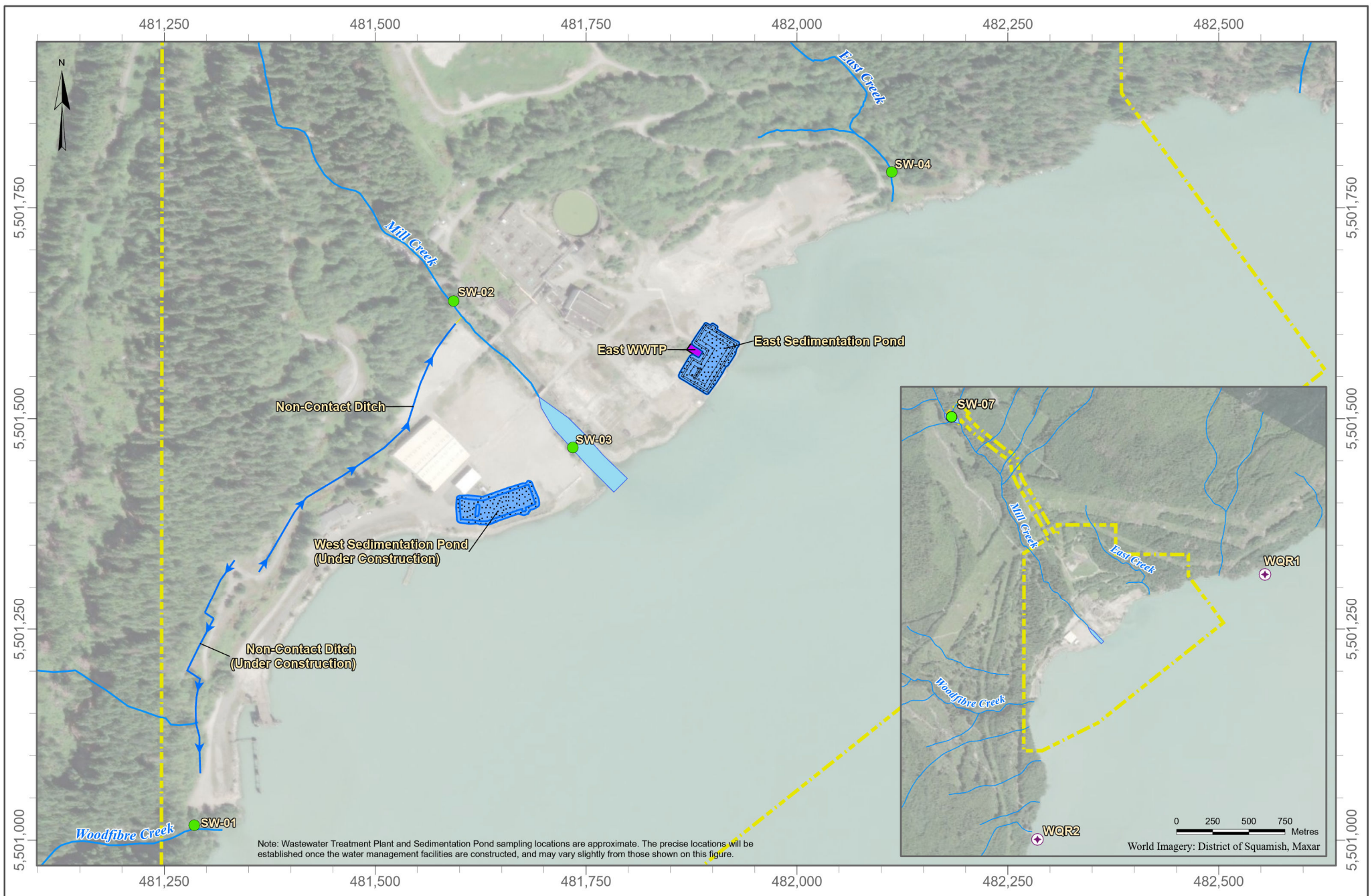
LORAX ENVIRONMENTAL SERVICES LTD.



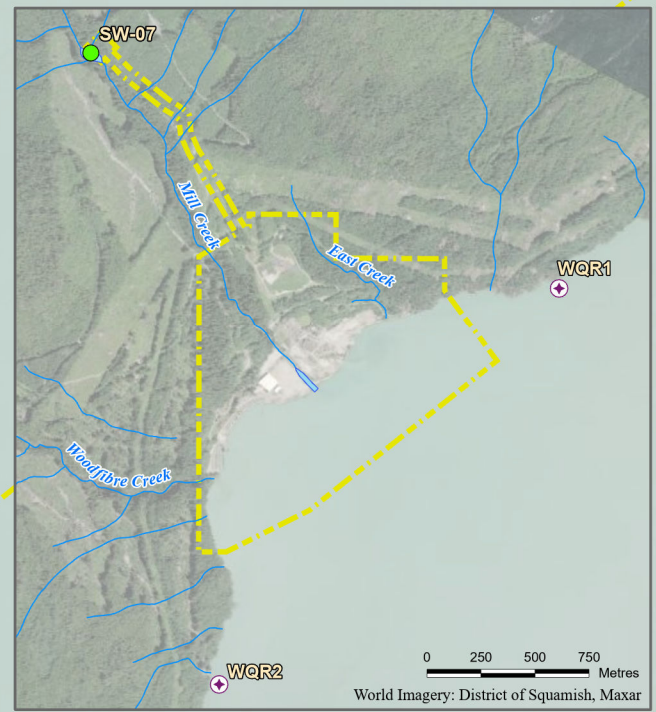
Patrick Mueller, B.Sc., P.Chem.
Environmental Chemist



Holly Pelletier, B.Sc., GIT
Environmental Geoscientist



Note: Wastewater Treatment Plant and Sedimentation Pond sampling locations are approximate. The precise locations will be established once the water management facilities are established, and may vary slightly from those shown on this figure.



LEGEND

Freshwater Monitoring Station	Sediment Pond
Marine Water Monitoring Station	WWTP
Certified Project Area	
Waterbody	
Watercourse	
Non-Contact Diversion Ditch	

DATE SAVED: Apr 04, 2024
 DRAWN BY: DM
 REVIEWED: PM
 VERSION: 1

Coordinate System: NAD 1983 UTM Zone 10N
 Projection: Transverse Mercator
 Datum: North American 1983
 Units: Metre
 1:6,000



PROJECT:

**Woodfibre LNG Project
 Construction Phase**

TITLE:
 Completed or Under Construction Water Management Facilities
 and Established PE-111578 Monitoring Stations (March 30, 2024)

PROJECT #: A633-7

FIGURE: 1

Appendix A: East and West Catchment Photographs



Figure 2. Areal View of the East Sedimentation Pond and Wastewater Treatment Plant (29 March 2024)



Figure 3: Areal view of the West Sedimentation Pond Construction Progress (29 March 2024)

Appendix B: Freshwater Receiving Environment Results

Table B-1: Summary of Freshwater Water Quality Results Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ^{1,2}		SW-01	SW-02	SW-04	SW-07
		Long Term	Short Term	Woodfibre Creek - Lower Reach	Mill Creek - Mid Reach	East Creek - Lower Reach	Mill Creek - Upstream at Diversion Inlet
Sampling Date				2024-02-	2024-02-	2024-02-	2024-02-15
General Parameters							
pH - Field	pH units	6.5 - 9.0	-	<u>6.16</u>	<u>6.39</u>	7.32	<u>5.53</u>
Specific Conductivity - Field	µS/cm	-	-	7.3	11.3	32.5	10.8
Temperature - Field	°C	-	-	4.3	4.5	7.6	3.5
Salinity - Field	ppt	-	-	<1	<1	<1	<1
Turbidity - Field	NTU	-	-	0.51	0.46	1.71	0.34
TSS	mg/L	-	-	<3	<3	<3	<3
Dissolved Oxygen - Field	mg/L	>=8	>=5	13.4	13.4	12.1	13.3
Anions and Nutrients							
Sulphate	mg/L	128 ⁵	-	0.46	1.79	2.03	1.75
Chloride	mg/L	120	600	<0.5	<0.5	0.58	<0.5
Fluoride	mg/L	-	0.4 - 0.63 ⁵	<0.02	<0.02	0.021	<0.02
Ammonia (N-NH ₃)	mg/L	1.97 - 2.02 ⁵	18.8 - 27.9 ⁵	<0.005	<0.005	<0.005	<0.005
Nitrite (N-NO ₂)	mg/L	0.02 ⁵	0.06 ⁵	<0.001	<0.001	<0.001	<0.001
Nitrate (N-NO ₃)	mg/L	3	32.8	0.0278	0.0512	0.0861	0.0533
Total Metals							
Aluminum, total (T-Al)	mg/L	0.011 - 0.079 ⁵	-	<u>0.162</u>	<u>0.108</u>	<u>0.109</u>	<u>0.105</u>
Antimony, total (T-Sb)	mg/L	0.009 ³	-	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic, total (T-As)	mg/L	0.005	-	0.00011	<0.0001	0.00014	<0.0001
Barium, total (T-Ba)	mg/L	1	-	0.00156	0.00206	0.00380	0.00192
Beryllium, total (T-Be)	mg/L	0.00013	-	<0.0001	<0.0001	<0.0001	<0.0001
Boron, total (T-B)	mg/L	1.2	29	<0.01	<0.01	<0.01	<0.01
Cadmium, total (T-Cd)	mg/L	0.000036 - 0.000037 ⁵	0.00011 - 0.00035 ⁵	<0.000005	0.0000057	0.0000095	<0.000005
Chromium, total (T-Cr)	mg/L	0.001 ⁴	-	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt, total (T-Co)	mg/L	0.001	0.11	<0.0001	<0.0001	<0.0001	<0.0001
Copper, total (T-Cu)	mg/L	-	-	<0.0005	<0.0005	0.00064	<0.0005
Iron, total (T-Fe)	mg/L	0.3	1	0.030	0.015	0.084	0.014
Lead, total (T-Pb)	mg/L	0.0034 - 0.0036 ⁵	0.0030 - 0.0087 ⁵	0.000054	<0.00005	0.000085	<0.00005
Manganese, total (T-Mn)	mg/L	0.77 ⁵	0.82 ⁵	0.00094	0.00066	0.00407	0.00063
Mercury, total (T-Hg)	mg/L	0.00002 ⁶	-	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum, total (T-Mo)	mg/L	0.073	46	0.000184	0.000329	0.000490	0.000308
Nickel, total (T-Ni)	mg/L	0.025 ⁵	-	<0.0005	<0.0005	<0.0005	<0.0005
Selenium, total (T-Se)	mg/L	0.001	-	0.000050	<0.00005	<0.00005	<0.00005
Silver, total (T-Ag)	mg/L	0.00005 ⁵	0.0001 ⁵	<0.00001	<0.00001	<0.00001	<0.00001
Thallium, total (T-Tl)	mg/L	0.0008	-	<0.00001	<0.00001	<0.00001	<0.00001
Uranium, total (T-U)	mg/L	0.0085	0.033	0.000566	0.000197	0.000124	0.000201
Vanadium, total (T-V)	mg/L	0.12	-	<0.0005	<0.0005	<0.0005	<0.0005
Zinc, total (T-Zn)	mg/L	0.0075 ⁵	0.033 ⁵	<0.003	<0.003	<0.003	<0.003
Hexavalent Chromium, total	mg/L	0.001	-	<0.0005	<0.0005	<0.0005	<0.0005
Trivalent Chromium, total	mg/L	0.0089	-	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Metals							
Cadmium, dissolved (D-Cd)	mg/L	0.00002 - 0.00006 ⁵	0.00004 - 0.0001 ⁵	<0.000005	0.0000066	0.0000054	0.0000078
Copper, dissolved (D-Cu)	mg/L	0.0002 - 0.0003 ⁵	0.0002 - 0.002 ⁵	<0.0002	<u>0.00021</u>	<u>0.00047</u>	<0.0002
Iron, dissolved (D-Fe)	mg/L	-	0.35	0.020	<0.01	0.011	<0.01
Lead, dissolved (D-Pb)	mg/L	0.002 - 0.004 ⁵	-	<0.00005	<0.00005	<0.00005	<0.00005
Manganese, dissolved (D-Mn)	mg/L	0.29 - 0.38 ⁵	1.97 ⁵	0.00044	0.00041	0.00144	0.00045
Strontium, dissolved (D-Sr)	mg/L	2.5	-	0.00325	0.00531	0.0179	0.00498
Zinc, dissolved (D-Zn)	mg/L	0.0067 - 0.017 ⁵	0.015 - 0.020 ⁵	<0.001	<0.001	0.0013	<0.001
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	mg/L	0.0058	-	<0.00001	<0.00001	<0.00001	<0.00001
Acridine	mg/L	0.003	-	<0.00001	<0.00001	<0.00001	<0.00001
Anthracene	mg/L	0.000012	-	<0.00001	<0.00001	<0.00001	<0.00001
Benz(a)anthracene	mg/L	0.000018	-	<0.00001	<0.00001	<0.00001	<0.00001
Benzo(a)pyrene	mg/L	0.00001	-	<0.000005	<0.000005	<0.000005	<0.000005
Chrysene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001
Fluoranthene	mg/L	0.00004	-	<0.00001	<0.00001	<0.00001	<0.00001
Fluorene	mg/L	0.003	-	<0.00001	<0.00001	<0.00001	<0.00001
1-methylnaphthalene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001
2-methylnaphthalene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001
Naphthalene	mg/L	0.001	0.001	<0.00005	<0.00005	<0.00005	<0.00005
Phenanthrene	mg/L	0.0003	-	<0.00002	<0.00002	<0.00002	<0.00002
Pyrene	mg/L	0.00002	-	<0.00001	<0.00001	<0.00001	<0.00001
Volatile Organic Compounds (VOCs)							
Benzene	mg/L	0.04	-	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/L	0.09	-	<0.0005	<0.0005	<0.0005	<0.0005
Methyl-tert-butyl-ether	mg/L	10	3.4	<0.0005	<0.0005	<0.0005	<0.0005
Styrene	mg/L	0.072	-	<0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/L	0.0005	-	<0.0004	<0.0004	<0.0004	<0.0004
Total Xylenes	mg/L	0.03	-	<0.0005	<0.0005	<0.0005	<0.0005
Chlorobenzene	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichlorobenzene	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005

Notes:Results **underlined in bold italics** exceed the applicable long-term water quality guideline for the protection of freshwater aquatic life.

Shaded results exceed the applicable short-term water quality guideline for the protection of freshwater aquatic life.

¹ Approved British Columbia Water Quality Guidelines for the protection of freshwater aquatic life (BC ENV, 2021). Where an approved guideline is not established, the working guideline is applied.² Canadian Water Quality Guideline for the protection of freshwater aquatic life (CCME, 2021). Federal Water Quality Guidelines (FWQG) are used for total Al, Co, and V, and for dissolved Cu, Sr, and Pb (Environment and Climate Change Canada).³ The working BC WQG for trivalent antimony [SB(III)] is 0.009 mg/L and is applied to total antimony results.⁴ The approved BC WQG for hexavalent chromium [Cr(VI)] is 0.001 mg/L and 0.0089 mg/L for trivalent chromium [Cr(III)]. The more conservative criteria for Cr(VI) is applied to total chromium results.⁵ BC WQG or CWQG indicated to be variable are calculated from sample-specific measurements for temperature, field pH, total hardness and dissolved organic carbon (DOC) content.⁶ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L.

The lowest applicable guidelines are shown in the table; however, water quality data was screened to all applicable guidelines.

Appendix C: Estuarine Receiving Environment Results

Table C-1: Summary of Mill Creek Estuary Water Quality Results Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ^{1,2}		SW-03
		Long Term	Short Term	Mill Creek - Lower Reach
Sampling Date				2024-02-15
General Parameters				
pH - Field	pH units	7.0 - 8.7	-	7.99
Specific Conductivity - Field	µS/cm	-	-	5899
Temperature - Field	°C	-	-	5.2
Salinity - Field	ppt	-	-	1.0
Turbidity - Field	NTU	-	-	0.33
TSS	mg/L	-	-	<2
Dissolved Oxygen - Field	mg/L	-	-	13.2
Anions and Nutrients				
Sulphate	mg/L	-	-	57
Chloride	mg/L	-	-	536
Fluoride	mg/L	-	-	<1
Ammonia (N-NH ₃)	mg/L	-	-	<0.005
Nitrite (N-NO ₂)	mg/L	-	-	<0.1
Nitrate (N-NO ₃)	mg/L	-	-	<0.5
Total Metals				
Aluminum, total (T-Al)	mg/L	-	-	0.101
Antimony, total (T-Sb)	mg/L	-	-	<0.001
Arsenic, total (T-As)	mg/L	-	-	<0.0004
Barium, total (T-Ba)	mg/L	-	-	0.0022
Beryllium, total (T-Be)	mg/L	-	-	<0.0005
Boron, total (T-B)	mg/L	-	-	<0.3
Cadmium, total (T-Cd)	mg/L	-	-	<0.00002
Chromium, total (T-Cr)	mg/L	-	-	<0.0005
Cobalt, total (T-Co)	mg/L	-	-	0.000053
Copper, total (T-Cu)	mg/L	0.002	0.003	<0.0005
Iron, total (T-Fe)	mg/L	-	-	0.016
Lead, total (T-Pb)	mg/L	0.002	0.14	<0.0001
Manganese, total (T-Mn)	mg/L	-	-	0.00089
Mercury, total (T-Hg)	mg/L	0.00002 ³	-	<0.000005
Molybdenum, total (T-Mo)	mg/L	-	-	0.00059
Nickel, total (T-Ni)	mg/L	-	-	<0.0005
Selenium, total (T-Se)	mg/L	-	-	<0.0005
Silver, total (T-Ag)	mg/L	0.0015	0.003	<0.0001
Thallium, total (T-Tl)	mg/L	-	-	<0.00005
Uranium, total (T-U)	mg/L	-	-	0.000289
Vanadium, total (T-V)	mg/L	-	-	<0.0005
Zinc, total (T-Zn)	mg/L	-	-	<0.003
Hexavalent Chromium, total	mg/L	-	-	<0.0015
Trivalent Chromium, total	mg/L	-	-	<0.0005
Dissolved Metals				
Cadmium, dissolved (D-Cd)	mg/L	-	-	<0.00002
Copper, dissolved (D-Cu)	mg/L	-	-	<0.0005
Iron, dissolved (D-Fe)	mg/L	-	-	<0.01
Lead, dissolved (D-Pb)	mg/L	-	-	<0.0001
Manganese, dissolved (D-Mn)	mg/L	-	-	0.00062
Strontium, dissolved (D-Sr)	mg/L	-	-	0.206
Zinc, dissolved (D-Zn)	mg/L	-	-	<0.001
Organometallics				
Methyl Mercury	mg/L	-	-	<0.0000002
Polycyclic Aromatic Hydrocarbons (PAHs)				
Acenaphthene	mg/L	-	-	<0.00001
Acridine	mg/L	-	-	<0.00001
Anthracene	mg/L	-	-	<0.00001
Benz(a)anthracene	mg/L	-	-	<0.00001
Benzo(a)pyrene	mg/L	-	-	<0.000005
Chrysene	mg/L	-	-	<0.00001
Fluoranthene	mg/L	-	-	<0.00001
Fluorene	mg/L	-	-	<0.00001
1-methylnaphthalene	mg/L	-	-	<0.00001
2-methylnaphthalene	mg/L	-	-	<0.00001
Naphthalene	mg/L	-	-	<0.00005
Phenanthrene	mg/L	-	-	<0.00002
Pyrene	mg/L	-	-	<0.00001
Volatile Organic Compounds (VOCs)				
Benzene	mg/L	-	-	<0.0005
Ethylbenzene	mg/L	-	-	<0.0005
Methyl-tert-butyl-ether	mg/L	-	-	<0.0005
Styrene	mg/L	-	-	<0.0005
Toluene	mg/L	-	-	<0.0004
Total Xylenes	mg/L	-	-	<0.0005
Chlorobenzene	mg/L	-	-	<0.0005
1,2-Dichlorobenzene	mg/L	-	-	<0.0005

Notes:Results in **underlined in bold italics** exceed the applicable long-term water quality guideline for the protection of estuarine water aquatic life.**Shaded** results exceed the applicable short-term water quality guideline for the protection of estuarine water aquatic life.¹ Approved British Columbia Water Quality Guidelines for the protection of estuarine aquatic life (BC ENV, 2021). Where an approved guideline is not established, the working guideline is applied.² Canadian Water Quality Guideline for the protection of estuarine aquatic life (CCME, 2021).³ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L.

Appendix D: Marine Water Receiving Environment Results

Table D-1: Summary of Marine Water Quality Results Received at the Time of Reporting

Parameter	Unit	Lowest Applicable Guideline ^{1,2}		WQR1			WQR2		
		Long Term	Short Term	2.0 m above seafloor	2.0 m below water surface	0.5 m below water surface	2.0 m above seafloor	2.0 m below water surface	0.5 m below water surface
Sampling Date				2024-02-13	2024-02-13	2024-02-13	2024-02-14	2024-02-14	2024-02-14
General Parameters									
pH - Field	pH units	7.0 - 8.7	-	7.52	8.10	8.18	7.55	8.39	8.14
Conductivity - Field	µS/cm	-	-	47008	42012	17744	47491	39625	12640
Temperature - Field	°C	-	-	8.8	8.7	8.1	8.8	8.8	7.2
Salinity – Field ³	ppt	-	-	30.6	26.2	9.2	31.0	20.0	8.2
Turbidity – Field ³	NTU	-	-	0.53	1.11	1.82	0.5	1.76	1.63
TSS ³	mg/L	-	-	<2	4.0	3.3	<2	5.7	2.4
Dissolved Oxygen - Field	mg/L	>=8	-	7.3	10.9	12.7	7.1	12.9	12.9
Anions and Nutrients									
Sulphate	mg/L	-	-	2360	1980	666	2270	1340	491
Chloride	mg/L	-	-	16900	14400	5060	16900	10200	4120
Fluoride	mg/L	-	1.5	<1	<1	<1	<1	<1	<1
Ammonia (N-NH ₃)	mg/L	Variable ⁴	Variable ⁴	<0.005	<0.005	0.0077	<0.005	<0.005	<0.005
Nitrite (N-NO ₂)	mg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrate (N-NO ₃)	mg/L	3.7	339	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Metals									
Aluminum, total (T-Al)	mg/L	-	-	0.0213	0.0205	0.0925	0.0692	0.0509	0.0889
Antimony, total (T-Sb)	mg/L	-	0.27 ⁵	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic, total (T-As)	mg/L	0.0125	0.0125	0.00253	0.00239	0.00098	0.00251	0.00191	0.00081
Barium, total (T-Ba)	mg/L	-	-	0.0095	0.0094	0.0090	0.0099	0.0092	0.0090
Beryllium, total (T-Be)	mg/L	0.1	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Boron, total (T-B)	mg/L	1.2	-	3.59	3.22	1.34	3.66	2.39	1.02
Cadmium, total (T-Cd)	mg/L	0.00012	-	0.000068	0.000056	0.000026	0.000078	0.000058	0.000021
Chromium, total (T-Cr)	mg/L	0.0015 ⁶	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt, total (T-Co)	mg/L	-	-	0.000057	0.000064	0.000092	0.000086	0.000070	0.000100
Copper, total (T-Cu)	mg/L	0.002	0.003	<0.0005	<0.0005	0.00086	<0.0005	0.00071	0.00085
Iron, total (T-Fe)	mg/L	-	-	0.025	0.042	0.153	0.087	0.084	0.149
Lead, total (T-Pb)	mg/L	0.002	0.14	0.00015	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Manganese, total (T-Mn)	mg/L	-	-	0.00423	0.00391	0.0101	0.00486	0.00619	0.00945
Mercury, total (T-Hg) ⁷	mg/L	0.000016	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum, total (T-Mo)	mg/L	-	-	0.0106	0.00822	0.00338	0.0100	0.00617	0.00263
Nickel, total (T-Ni)	mg/L	0.0083	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium, total (T-Se)	mg/L	0.002	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Silver, total (T-Ag)	mg/L	0.0015	0.003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium, total (T-Tl)	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Uranium, total (T-U)	mg/L	-	-	0.00294	0.00254	0.000965	0.00307	0.00190	0.000743
Vanadium, total (T-V)	mg/L	0.005 ⁸	-	0.00170	0.00141	0.00102	0.00175	0.00129	0.00089
Zinc, total (T-Zn)	mg/L	0.01	0.055	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Hexavalent Chromium, total	mg/L	0.0015	-	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Trivalent Chromium, total	mg/L	0.0056	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Metals									
Cadmium, dissolved (D-Cd)	mg/L	-	-	0.000078	0.000057	0.000029	0.000075	0.000042	0.000022
Copper, dissolved (D-Cu)	mg/L	-	-	<0.0005	<0.0005	0.00069	<0.0005	0.00055	0.00062
Iron, dissolved (D-Fe)	mg/L	-	-	<0.01	<0.01	0.033	<0.01	0.017	0.038
Lead, dissolved (D-Pb)	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Manganese, dissolved (D-Mn)	mg/L	-	-	0.00146	0.00178	0.00808	0.00129	0.00419	0.00764
Strontium, dissolved (D-Sr)	mg/L	-	-	6.98	5.45	1.95	6.51	4.17	1.57
Zinc, dissolved (D-Zn)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Organometallics									
Methyl Mercury	mg/L	-	-	0.000000027	<0.00000002	<0.00000002	<0.00000002	<0.00000002	<0.00000002
Polycyclic Aromatic Hydrocarbons (PAHs)									
Acenaphthene	mg/L	0.006	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Acridine	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Anthracene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Benz(a)anthracene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Benzo(a)pyrene	mg/L	0.00001	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Chrysene	mg/L	0.0001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Fluoranthene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Fluorene	mg/L	0.012	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
1-methylnaphthalene	mg/L	0.001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
2-methylnaphthalene	mg/L	0.001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Naphthalene	mg/L	0.001	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Phenanthrene	mg/L	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Pyrene	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Volatile Organic Compounds (VOCs)									
Benzene	mg/L	0.11	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/L	0.25	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Methyl-tert-butyl-ether	mg/L	5	0.44	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Styrene	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/L	0.215	-	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Total Xylenes	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chlorobenzene	mg/L	0.025	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichlorobenzene	mg/L	0.042	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Notes:Results ***underlined in bold italics*** exceed the applicable long-term water quality guideline for the protection of marine water aquatic life.

Shaded results exceed the applicable short-term water quality guideline for the protection of marine water aquatic life.

¹ Approved British Columbia Water Quality Guidelines for the protection of marine aquatic life (BC ENV, 2021). Where an approved guideline is not established, the working guideline is applied.² Canadian Water Quality Guideline for the protection of marine aquatic life (CCME, 2021).³ Narrative guideline for the evaluation of change from background conditions arising from discharges to the aquatic environment. The baseline water quality data presented in the table were collected when the site was inactive and represent background conditions, therefore the guideline is not evaluated.⁴ The approved total ammonia nitrogen BC WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in BC WQG guidance document (BC ENV, 2021).⁵ The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.⁶ The approved BC WQG for hexavalent chromium [Cr(VI)] is 0.0015 mg/L and 0.0056 mg/L for trivalent chromium [Cr(III)]. The more conservative criteria for Cr(VI) is applied to total chromium results.⁷ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L.⁸ Federal Water Quality Guideline for Vanadium (Environment and Climate Change Canada).

The lowest applicable guidelines are shown in the table; however, water quality data was screened to all applicable guidelines.