

TECHNICAL MEMORANDUM

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Jackie Boruch and Ryan Schucroft (Woodfibre LNG) **Date:** 23 Nov 2024

From: Cheng Kuang, Holly Pelletier and Patrick Mueller (Lorax) **Project #:** A633-8

Subject: PE-111578 Weekly Discharge and Compliance Report #40 for November 10 – 16

Waste Discharge Authorization (WDA) Effluent Permit PE-111578 was issued by the British Columbia Energy Regulator (BCER) to Woodfibre LNG on February 9, 2024. The associated WDA discharge and compliance monitoring program is conducted by on-site Environmental Monitors (Roe Environmental) that are sub-contracted to the civil works contractor (LB LNG). Analytical samples are submitted by Roe Environmental to ALS Environmental in Burnaby, BC, for testing. Lorax Environmental provides water quality database management and WDA compliance reporting services to Woodfibre LNG.

This technical memorandum (Report #40) was prepared by Lorax Environmental and summarizes WDA monitoring conducted the week of November 10 – 16. Monitoring data and pending results from prior monitoring periods available at the time of reporting are tabulated and included as appendices to this memorandum. Report #40 has been prepared to meet the requirements specified in Condition 4.2 of 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.”

Site layout and water management figures, and site images are included in Appendix A. Monitoring results are tabulated in Appendix B through Appendix H for contact water, treated water and receiving environment samples.

1. Current Conditions

1.1 Water Management Infrastructure

The Construction Phase of the Woodfibre LNG Export Facility commenced in October 2023. Early stage civil works are ongoing, and these include site grading, levelling, overburden and bedrock excavation, and construction of contact water management facilities. Shoring works along the foreshore areas were initiated in December 2023, and in early 2024 construction of water management infrastructure commenced and has continued through the November 10 – 16 monitoring period. The East Wastewater Treatment Plant (WWTP), East Sedimentation Pond and West Sedimentation Pond are commissioned for operation. The East WWTP treatment process was upgraded on October 14 to enhance treatment for copper, vanadium and zinc.

Pilot testing of the West WWTP was suspended September 25. The suspension was implemented for the temporary reconfiguration of the plant to conduct pilot-scale evaluation of alternative treatment processes for improving treatment outcomes. Any process modifications that may result from the pilot-scale evaluation will be submitted to BCER for approval prior to full-scale implementation. Site waters that require treatment will continue to be directed to the East WWTP while the operation of the West WWTP is suspended.

The East and West catchments conveyance ditches described in PE- 111578 were designed to transport non-contaminated contact water (*i.e.*, stormwater) to the East and West sedimentation ponds and will be constructed following completion of site preparation activities (*e.g.*, site grading, bedrock excavation) along the ditch lines. Until the ditches are operational, contact waters within the catchments are managed to remain on site using a system of sumps, ditches and baker tanks for intermediate storage and are then directed to the East and West Sedimentation Ponds.

A flocculant-based TSS settling system (ESC system) is used at the West Sedimentation Pond to remove TSS from non-contaminated contact water stored in the pond prior to discharge. Some of the TSS clarified water is recirculated to the West Sedimentation Pond. Similarly, water from the East Sedimentation Pond, and concrete contact water are directed to the East WWTP for treatment prior to discharge to Howe Sound, or recirculation back to the pond.

The East and West Catchment permanent outfall structures have not been constructed. Temporary discharge systems (*i.e.*, pumps, hosing and diffusors) are used to convey effluent to the discharge locations authorized for the East and West Catchments, when necessary for the discharge of excess water. Each of the authorized discharge locations has an initial dilution zone (IDZ) where discharged water mixes with Howe Sound surface waters. The IDZ is defined in PE-111578 and extends 150 m from each point of discharge into Howe Sound.

A non-contact water diversion ditch west of Mill Creek has been upgraded and discharges to Mill Creek at station OUT-06 (Figure 1). Other pre-existing diversion ditches west of Mill Creek have been partially upgraded and discharge at station OUT-02. During heavy precipitation these ditches also convey non-contact water to station OUT-01. Non-contact water flows to the East Catchment are diverted along pre-existing road ditches that flow to East Creek or Mill Creek. To facilitate the replacement of the East Creek discharge culvert, the lower reach of East Creek was temporarily diverted to the adjacent culvert, OUT-11, on September 17 (Figure 1).

Construction phase water management facilities that are completed or were under construction during the reporting period are shown in Figure 1. Contact water collection and dewatering locations and photographs of the sedimentation ponds are shown in Figure 2 through Figure 5.

1.2 Weather and Water Management Activities

Variable weather was observed during the monitoring period (November 10 – 16), with precipitation recorded each day except November 15. Heavy rainfall events occurred on November 11, 13, and 16 (39.6, 60.4, and 28.0 mm, respectively). The total weekly precipitation amount was 178.4 mm. The daily weather conditions are summarized in Table 1.

Table 1: Summary of Certified Project Area (CPA) Daily Weather Conditions.

Date	Precipitation (mm)	Max. Temp (°C)	Min. Temp (°C)	Weather Description
11-10-2024	15.4	9.4	7.1	Rain
11-11-2024	39.6	11.3	7.3	Heavy rain
11-12-2024	18.2	9.0	6.6	Rain
11-13-2024	60.4	7.7	6.3	Heavy rain
11-14-2024	16.8	9.7	4.7	Rain
11-15-2024	0.0	10.1	4.0	Mix of sun and cloud
11-16-2024	28.0	4.8	2.3	Heavy Rain

Note: Data retrieved from the Stantec Woodfibre site weather station.

On October 28 water management was rearranged to store contact water in the sedimentation ponds and to discharge treated water from the East WWTP treatment system and clarified water from the West Sedimentation Pond TSS settling system to Howe Sound through the authorized discharge locations. The discharge pathway rearrangement continued through the November 10 – 16 monitoring period and is intended to ensure that effluent discharged to Howe Sound meets PE-111578 discharge limits.

During the November 10 – 16 monitoring period, the East Sedimentation Pond received contact water from the 1100 collection area, dewatering tanks and contact water sump, the 1200C contact water sump and dewatering tanks, and the 1300 contact water sump (Appendix A, Figure 2).

Routine operation of the East WWTP continued during the monitoring period (November 10 – 16). Contaminated and potentially contaminated contact waters from the batch plant contact water

ditch were directed to the East WWTP for treatment, as well as water stored in the East Sedimentation Pond (Appendix A, Figure 2). Intermittent direct discharge of treated effluent from the East WWTP to Howe Sound occurred each day during the monitoring period except on November 14. A total of 3,227 m³ of treated WWTP effluent was discharged to Howe Sound from station SP-E-OUT.

Discharge of contact water stored in the East Sedimentation Pond to Howe Sound via SP-E-OUT was initiated at 17:18 on November 13 to regain pond storage capacity following heavy rains on site; and discharge continued until 3:04 on November 15. A total of 4,193 m³ of contact water routed through the East Sedimentation Pond was discharged to Howe Sound from November 13 to 15 from station SP-E-OUT. Total daily discharge volumes to Howe Sound from station SP-E-OUT (combined discharges from East WWTP and East Sedimentation Pond) are provided in Appendix B (Table B-5) and the total daily volumes treated by the East WWTP are provided in Appendix C (Table C-4).

During the November 10 – 16 monitoring period, contact waters from the 4100 collection sump, dewatering tanks, 4100 road runoff collection area, the 4200 collection sump and dewatering tanks, the surge pond, the wash bay and fuel farm collection sumps, and the 8-plex parking area (Figure 3) were directed to the West Sedimentation Pond. Intermittent discharge from the West Sedimentation Pond via the West TSS settling system to Howe Sound occurred each day during the monitoring period (November 10 – 16) except November 14. A total of 3,206 m³ of clarified West TSS settling system effluent was discharged from the authorized discharge location (SP-W-OUT) during the monitoring period. Direct discharge of contact water stored in the West Sedimentation Pond to Howe Sound at SP-W-OUT was initiated at 17:05 on November 13 to regain pond storage capacity following heavy rains on site and discharge continued until 6:12 on November 15. A total of 7,940 m³ of contact water was routed through the West Sedimentation Pond and discharged to Howe Sound from November 13 to 15 from station SP-W-OUT. Daily discharge volumes from station SP-W-OUT are provided in Appendix D (Table D-5).

2. Monitoring Summary

The PE-111578 authorized works were under construction during the November 10 – 16 monitoring period. Compliance monitoring stations are progressively established as water management infrastructure is completed. Monitoring is conducted by the on-site Environmental Monitors (Roe Environmental). Analytical samples are submitted by Roe Environmental to ALS Environmental in Burnaby, BC, for testing.

The following monitoring stations have been established (Figure 1):

- Non-contact diversion ditch outlets (OUT-01, OUT-02, OUT-06, and OUT-11). East Creek water was temporarily diverted to OUT-11 on September 17 and is monitored at the inlet to temporary diversion (station SW-04), therefore OUT-11 is not currently monitored.
- Creek water (SW-01, SW-02, SW-03, SW-04, SW-07).
- Contact water monitoring locations (WWTP-E-IN, WWTP-E-OUT, SP-E-IN, SP-E-OUT, SP-E-NE, SP-E-NW, WWTP-W-IN, WWTP-W-OUT, ESC-W-IN, ESC-W-OUT, SP-W-IN, SP-W-W, SP-W-E, and SP-W-OUT).
- Howe Sound reference and IDZ locations (WQR1, WQR2, IDZ-E1, IDZ-E2, IDZ-W1, and IDZ-W2).

East Sedimentation Pond influent and effluent stations SP-E-NW and SP-E-NE, respectively, are in-pond stations that may be monitored when there is no influent to, or discharge from the East Sedimentation Pond, for water management purposes. Similarly, in-pond monitoring stations are established for the West Sedimentation Pond at locations SP-W-W and SP-W-E and may be used for pond water quality monitoring when there is no influent to or discharge from the pond.

The influent culverts for influent stations as defined in PE-111578 (SP-E-IN-1, SP-E-IN-2, SP-W-IN-1 and SP-W-IN-2) are not yet operational. Hence, temporary monitoring stations have been established to characterize influent quality reporting to the East Sedimentation Pond (SP-E-IN) and the West Sedimentation Pond (SP-W-IN). A flocculant-based TSS settling system (the ESC system) has been in use at the West Sedimentation Pond since September 25. Station ESC-W-IN is established to characterize influent quality reporting to the ESC system.

Water quality was monitored at stations OUT-01, OUT-02, OUT-06, SW-01, SW-02, SW-03, SW-07, IDZ-E1, IDZ-E2, IDZ-W1, IDZ-W2, WQR1, WQR2, WWTP-E-IN, WWTP-E-OUT, SP-E-NE, SP-E-IN, SP-E-OUT, ESC-W-IN, SP-W-IN, SP-W-E, and SP-W-OUT during the monitoring period (November 10 – 16). Sampling dates and parameters tested are summarized in Table 2.

Overall, the PE-111578 monitoring requirements that were applicable during the monitoring period (November 10 – 16) were met except for weekly monitoring for physical parameters at stations IDZ-W1 and IDZ-W2 at 2 m below the water surface and at 2 m above the seafloor.

Daily field parameters were not collected at the influent stations SP-E-IN (November 10 and 16) and SP-W-IN (November 15 and 16) since there was no influent reporting to the East Sedimentation Pond and no safe access to the West Sedimentation Pond influent hose at the time of monitoring, respectively. Daily field parameters were not collected from the East Catchment discharge location (station SP-E-OUT) on November 11 as there was no discharge at the time of monitoring.

Daily field parameters and a weekly analytical sample were not collected at the influent and effluent stations of the West WWTP (WWTP-W-IN and WWTP-W-OUT, respectively) as the West WWTP was not operational during the monitoring period.

Table 2: Summary of PE-111578 Monitoring Samples Collected November 10 – 16.

Sampling Date	Sample	Description	Parameters Tested	Monitoring Frequency
November 10, 2024	SP-E-OUT/ WWTP-E-OUT ²	East WWTP effluent discharged at station SP-E-OUT	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	D, W ₁ , W ₂
	WWTP-E-IN	East WWTP influent		
	SP-W-IN	West Sedimentation Pond influent entering the pond at cell 1	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	D, W ₁ , W ₂
	ESC-W-IN	Influent to the West Sedimentation Pond TSS settling system.	Field Parameters.	D
	SP-W-OUT/ ESC-W-OUT ³	West TSS settling system effluent discharged at station SP-W-OUT	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	D, W ₁ , W ₂
	IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	M, W ₃
	IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface		
IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor			
November 11, 2024	SP-E-IN	East Sedimentation Pond influent entering the pond at cell 1	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	D, W ₁ , W ₂
	WWTP-E-OUT	East WWTP effluent at the meter box	Field Parameters.	D
	WWTP-E-IN	East WWTP influent		
	SP-W-IN	West Sedimentation Pond influent entering the pond at cell 1		
	ESC-W-IN	Influent to the West Sedimentation Pond TSS settling system.		
	SP-W-OUT/ ESC-W-OUT ³	West TSS settling system effluent discharged at station SP-W-OUT		
OUT-06	Non-contact water diversion ditch outlet	Field, Physical & General Parameters, Total and Dissolved Metals, Methylmercury, Oil and Grease.	M	
November 12, 2024	SP-E-IN	East Sedimentation Pond influent entering the pond at cell 1	Field Parameters.	D
	SP-E-OUT/ WWTP-E-OUT ²	East WWTP effluent discharged at station SP-E-OUT	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Glycols, Oil and Grease.	D, W ₁
	WWTP-E-IN	East WWTP influent	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Glycols, Oil and Grease.	D, W ₁
	SP-W-IN	West Sedimentation Pond influent entering the pond at cell 1	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Glycols, Oil and Grease.	D, W ₁
	SP-W-OUT/ ESC-W-OUT ³	West TSS settling system effluent discharged at station SP-W-OUT	Field, Physical & General Parameters, Total and Dissolved Metals, Methylmercury, Oil and Grease.	M
	OUT-01	Non-contact water diversion ditch outlet	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	M
	OUT-02	Non-contact water diversion ditch outlet		
	SW-01	Lower Reach of Woodfibre Creek (near the mouth)	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	M
	IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins & Furans, Glycols, Oil and Grease.	M, W ₃
	IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor			
November 13, 2024	SP-E-IN	East Sedimentation Pond influent entering the pond at cell 1	Field Parameters.	D
	SP-E-NE ¹	East Sedimentation Pond, in-pond sample, may represent effluent quality	Field Parameters.	P
	SP-E-OUT/ WWTP-E-OUT ²	East WWTP effluent discharged at station SP-E-OUT	Field Parameters.	D
	WWTP-E-IN	East WWTP influent	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins and Furans.	D, W ₁ , W ₂
	SP-E-OUT	East Sedimentation Pond effluent		
	SP-W-IN	West Sedimentation Pond influent entering the pond at cell 1	Field Parameters.	D
	ESC-W-IN	Influent to the West Sedimentation Pond TSS settling system.	Field Parameters.	P
	SP-W-E ¹	West Sedimentation Pond, in-pond sample, may represent effluent quality	Field Parameters.	D
	SP-W-OUT/ ESC-W-OUT ³	West TSS settling system effluent discharged at station SP-W-OUT	Field Parameters.	D
	SP-W-OUT	West Sedimentation Pond effluent	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins and Furans.	D, W ₁ , W ₂
November 14, 2024	SP-E-IN	East Sedimentation Pond influent entering the pond at cell 1	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Dioxins and Furans.	D, W ₁ , W ₂
	SP-E-NE ¹	East Sedimentation Pond, in-pond sample, may represent effluent quality	Field Parameters.	P
	WWTP-E-OUT	East WWTP effluent at the meter box	Field Parameters.	D
	WWTP-E-IN	East WWTP influent	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, and Methylmercury.	D, W ₁
	SP-E-OUT	East Sedimentation Pond effluent		
	SP-W-IN	West Sedimentation Pond influent entering the pond at cell 1	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins and Furans.	D, W ₁ , W ₂
	ESC-W-IN	Influent to the West Sedimentation Pond TSS settling system.	Field Parameters.	D
	SP-W-OUT	West Sedimentation Pond effluent	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, and Methylmercury.	D, W ₁

Table 2 (Continued): Summary of PE-111578 Monitoring Samples Collected November 10 – 16.

Sampling Date	Sample	Description	Parameters Tested	Monitoring Frequency
November 14, 2024 (continued)	IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins and Furans.	P
	IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
	IDZ-W1-0.5	Howe Sound IDZ station W1; 0.5 m below surface		
	IDZ-W2-0.5	Howe Sound IDZ station W2; 0.5 m below surface		
	WQR1-0.5	Reference site 1; 0.5 m below surface		
	WQR2-0.5	Reference site 2; 0.5 m below surface		
	IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface	Field Parameters.	P
	IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor		
	IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
	IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		
	IDZ-W1-2m	Howe Sound IDZ station W1; 2 m below surface		
	IDZ-W1-SF	Howe Sound IDZ station W1; 2 m above the seafloor		
	IDZ-W2-2m	Howe Sound IDZ station W2; 2 m below surface		
	IDZ-W2-SF	Howe Sound IDZ station W2; 2 m above the seafloor		
	WQR1-2m	Reference site 1; 2 m below surface		
	WQR1-SF	Reference site 1; 2 m above the seafloor		
WQR2-2m	Reference site 2; 2 m below surface			
WQR2-SF	Reference site 2; 2 m above the seafloor			
November 15, 2024	SP-E-IN	East Sedimentation Pond influent entering the pond at cell 1	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs.	D, W ₁
	WWTP-E-OUT	East WWTP effluent at the meter box discharged to holding tanks	Field Parameters.	D
	WWTP-E-IN	East WWTP influent	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs.	D, W ₁
	SP-E-OUT/ WWTP-E-OUT ²	East WWTP effluent discharged at station SP-E-OUT	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, and Methylmercury.	D, W ₁
	ESC-W-IN	Influent to the West Sedimentation Pond TSS settling system.	Field Parameters.	D
	SP-W-OUT/ ESC-W-OUT ³	West TSS settling system effluent discharged at station SP-W-OUT	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, and Methylmercury.	D, W ₁
	IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, and Methylmercury.	P
	IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
	IDZ-W1-0.5	Howe Sound IDZ station W1; 0.5 m below surface		
	IDZ-W2-0.5	Howe Sound IDZ station W2; 0.5 m below surface		
	WQR1-0.5	Reference site 1; 0.5 m below surface		
	WQR2-0.5	Reference site 2; 0.5 m below surface		
	IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface	Field Parameters.	P
	IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor		
	IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
	IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		
	IDZ-W1-2m	Howe Sound IDZ station W1; 2 m below surface		
	IDZ-W1-SF	Howe Sound IDZ station W1; 2 m above the seafloor		
IDZ-W2-2m	Howe Sound IDZ station W2; 2 m below surface			
IDZ-W2-SF	Howe Sound IDZ station W2; 2 m above the seafloor			
WQR1-2m	Reference site 1; 2 m below surface			
WQR1-SF	Reference site 1; 2 m above the seafloor			
WQR2-2m	Reference site 2; 2 m below surface			
WQR2-SF	Reference site 2; 2 m above the seafloor			
November 16, 2024	WWTP-E-OUT	East WWTP effluent at the meter box discharged to holding tanks	Field Parameters.	D
	WWTP-E-IN	East WWTP influent	Field Parameters.	D
	SP-E-OUT/ WWTP-E-OUT ²	East WWTP effluent discharged at station SP-E-OUT	Field Parameters.	D
	ESC-W-IN	Influent to the West Sedimentation Pond TSS settling system.	Field Parameters.	D
	SP-W-OUT/ ESC-W-OUT ³	West TSS settling system effluent discharged at station SP-W-OUT	Field Parameters.	D
	SW-02	Upper Reach of Mill Creek (upstream of the third bridge)	Field, Physical & General Parameters, VH & BTEX, EPHs & PAHs, Total, Dissolved and Speciated Metals, VOCs, Methylmercury, Dioxins and Furans.	M
	SW-03	Lower Reach of Mill Creek (near the mouth, in the estuarine zone)		
SW-07	Upstream Mill Creek (at the diversion inlet)			

Notes:

Monitoring frequency requirements under PE-111578 are indicated as follows:

D – daily monitoring of field parameters at WWTP and sedimentation pond influent and effluent stations.

M – monthly monitoring for all parameters at WWTP, sedimentation pond and receiving environment stations.

W₁ – initial high frequency monitoring for physical parameters at WWTP and sedimentation pond influent and effluent stations.

W₂ – initial high frequency monitoring for all parameters at WWTP and sedimentation pond influent and effluent stations.

W₃ – initial high frequency monitoring for physical parameters at IDZ stations.

W₄ – spring and fall high frequency sampling for all parameters at receiving environment stations (5 samples collected over a 30-day period).

P - periodic monitoring for targeted parameters that is supplementary to PE-111578 requirements.

¹ In-Pond East Sedimentation Pond stations SP-E-NW and SP-E-NE, and West Sedimentation Pond stations, SP-W-W and SP-W-E are monitored for water management purposes. The monitoring of in-pond stations is not a PE- 111578 requirement and is conducted at the discretion of field staff.

² As a result of the reconfigured pathway for effluent discharge at station SP-E-OUT effective October 28, contact water was stored in the East Sedimentation Pond and directed to the East WWTP for treatment. East WWTP effluent was discharged at station SP-E-OUT during the monitoring period on November 10 to 13 and November 15 to 16. From November 13 at 17:17 to November 15 at 03:00, East Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-E-OUT). On November 10, 12, 13, 15, and 16 field measurements and analytical samples were collected at station SP-E-OUT and fulfill the water quality monitoring requirements for station WWTP-E-OUT. Field measurements and analytical samples were collected at the East WWTP effluent station (WWTP-E-OUT) on November 11 since no active discharge was observed by site staff at the time of monitoring at station SP-E-OUT.

³ As a result of the reconfigured pathway for effluent discharge at station SP-W-OUT effective October 28, the West Sedimentation Pond discharged through the TSS settling system (ESC system) during the monitoring period on November 10 to November 13 and on November 15 to November 16. From November 13 at 17:05 through November 15 at 06:12, West Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-W-OUT). From November 10 to November 16, field measurements and analytical samples were collected at station SP-W-OUT. There are no PE-111578 monitoring requirements established for station ESC-W-OUT; however, this station is monitored to evaluate the performance of the TSS settling system (ESC).

3. Water Quality Results

3.1 Screening and Reporting Overview

Water quality and flow monitoring results are screened against field quality control (QC) criteria, benchmark values, operational minimum discharge objectives (MDOs) that the WWTPs are currently being operated to meet, PE-111578 discharge limits, as well as Canadian, Federal and BC water quality guidelines (WQGs). All water quality data are recorded in the Woodfibre LNG environmental monitoring database. However, for brevity, a sub-set of the results are presented in the weekly report appendices. Results are reported for parameters with a freshwater, estuarine or marine water quality guideline for the protection of aquatic life, parameters with a discharge limit, parameters of potential concern (*i.e.*, dioxins and furans) as well as other parameters that are relevant for water quality interpretation.

Canadian, Federal and BC WQGs are not specified for dioxins and furans. The general term “dioxins and furans” refers to chlorinated dibenzo-*p*-dioxins and chlorinated dibenzofurans. A sub-set of 17 polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) are typically evaluated for toxicity and the individual parameter concentrations are converted to toxic equivalent (TEQ) values that are summed and reported as a single PCDD/F TEQ parameter. To address uncertainties for results reported as not detected, two PCDD/F TEQ values are reported. A “lower-bound PCDD/F TEQ” is calculated assuming a concentration of zero for results reported as not detected, therefore, if all 17 of the individual compounds in the sub-set are not detected the lower-bound PCDD/F TEQ will equal zero. An “upper-bound PCDD/F TEQ” is calculated assuming a concentration equal to the detection limit for results reported as not detected. These two parameters span the range of possible TEQs if one or more of the sub-set of 17 individual PCDDs and PCDFs are reported as not detected.

The BC WQG for total mercury is a sample-specific calculated value that is based on the concentration of methylmercury in a sample. Although an approved BC WQG for the protection of aquatic life for methylmercury has not been explicitly established, the BC Ambient Water Quality Guidelines for Mercury Overview Report indicates the total mercury WQG is derived from a methylmercury concentration threshold of 0.0001 µg/L (0.1 ng/L) that is set at a concentration that protects fish from mercury bioaccumulation to a level that may harm wildlife that consumes fish. Therefore, if methylmercury results are reported, the 0.0001 µg/L value is presented as a methylmercury WQG to support the interpretation of total mercury concentrations that exceed the total mercury guideline.

3.2 Summary of Reported Results

Field measurements and analytical results available at the time of reporting for samples collected during the monitoring period (November 10 – 16) and for other samples that have not been previously reported are listed below in Table 3. Testing for methylmercury, dioxins and furans typically requires up to four weeks to complete. Analytical results not available at the time of reporting will be included in future weekly reports when testing is completed. Reporting of results is pending for the following samples and parameters:

- SW-02, SW-03, and SW-07 collected October 25 (methylmercury, dioxins and furans)
- SW-01 and SW-04 collected October 26 (methylmercury, dioxins and furans)
- WWTP-E-IN collected November 3 (dioxins and furans)
- SP-E-OUT/WWTP-E-OUT collected November 3 (methylmercury, dioxins and furans)
- SP-E-OUT/WWTP-E-OUT, SP-W-OUT/ESC-W-OUT, SP-W-IN and WWTP-E-IN collected November 10 (methylmercury, dioxins and furans)
- IDZ-E1 collected November 10 (field parameters and all analytical parameters)
- SP-E-IN collected November 11 (methylmercury, dioxins and furans)
- OUT-06 collected November 11 (field parameters and all analytical parameters)
- SP-E-OUT/WWTP-E-OUT, SP-W-OUT/ESC-W-OUT, SP-W-IN and WWTP-E-IN collected November 12 (methylmercury)
- OUT-01 and OUT-02 collected November 12 (field parameters and all analytical parameters)
- IDZ-E2 collected November 12 (methylmercury, dioxins and furans)
- SW-01 collected November 12 (field parameters and all analytical parameters)
- SP-E-OUT and SP-W-OUT collected November 13 (methylmercury, dioxins and furans)
- SP-E-IN collected November 14 (dioxins and furans)
- SP-E-OUT and SP-W-OUT collected November 13 (methylmercury)
- SP-W-IN collected November 14 (methylmercury, dioxins and furans)
- IDZ-E1, IDZ-E2, IDZ-W1, IDZ-W2, WQR1, and WQR2 collected November 14 (field parameters and all analytical parameters)
- SP-E-OUT/WWTP-E-OUT collected November 15 (methylmercury)

- SP-W-OUT/ESC-W-OUT collected November 15 (all analytical parameters)
- IDZ-E1, IDZ-E2, IDZ-W1, IDZ-W2, WQR1, and WQR2 collected November 15 (field parameters and all analytical parameters)
- SW-02, SW-03, and SW-07 collected November 12 (field parameters and all analytical parameters)

Table 3: Summary of Analytical Results Included in Weekly Discharge and Compliance Report #40.

Sample	Description	Sampling Date	Parameters Reported
IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface	September 9, 2024	Chronic Toxicity
IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
SW-01	Lower Reach of Woodfibre Creek (near the mouth)	September 28, 2024	Dioxins and Furans.
SW-04	Lower Reach of East Creek (near the outlet to the outfall culvert)		
SW-02	Upper Reach of Mill Creek (upstream of the third bridge)	September 29, 2024	Dioxins and Furans.
SW-03	Lower Reach of Mill Creek (near the mouth, in the estuarine zone)		
SW-07	Upstream Mill Creek (at the diversion inlet)		
SP-E-NE	East Sedimentation Pond, in-pond sample, may represent effluent quality		
WWTP-E-OUT	East WWTP effluent	October 2, 2024	Dioxins and Furans.
WWTP-E-IN	East WWTP influent		
WQR1-0.5	Reference site 1; 0.5 m below surface	October 6, 2024	Dioxins and Furans.
WQR1-2m	Reference site 1; 2 m below surface		
WQR1-SF	Reference site 1; 2 m above the seafloor		
WQR2-0.5	Reference site 2; 0.5 m below surface		
WQR2-2m	Reference site 2; 2 m below surface		
WQR2-SF	Reference site 2; 2 m above the seafloor		
SP-W-OUT	West Sedimentation Pond effluent	October 8, 2024	Dioxins and Furans.
IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface	October 10, 2024	Dioxins and Furans.
IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface		
IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor		
IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		
SW-01	Lower Reach of Woodfibre Creek (near the mouth)	October 12, 2024	Methylmercury, Dioxins and Furans.
SW-04	Lower Reach of East Creek (near the outlet to the outfall culvert)		
SW-02	Upper Reach of Mill Creek (upstream of the third bridge)		
SW-03	Lower Reach of Mill Creek (near the mouth, in the estuarine zone)		
SW-07	Upstream Mill Creek (at the diversion inlet)		
IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface		
IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface		
IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor		
IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		
WWTP-E-OUT	East WWTP effluent	October 17, 2024	Dioxins and Furans.
WWTP-E-IN	East WWTP influent		
IDZ-W2-0.5	Howe Sound IDZ station W2; 0.5 m below surface	October 18, 2024	Dioxins and Furans.
IDZ-W2-2m	Howe Sound IDZ station W2; 2 m below surface		
IDZ-W2-SF	Howe Sound IDZ station W2; 2 m above the seafloor		
SP-E-IN	East Sedimentation Pond influent	October 19, 2024	Dioxins and Furans.
SP-W-IN	West Sedimentation Pond influent		
SW-02	Upper Reach of Mill Creek (upstream of the third bridge)	October 25, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
SW-03	Lower Reach of Mill Creek (near the mouth, in the estuarine zone)		
SW-07	Upstream Mill Creek (at the diversion inlet)		
SW-01	Lower Reach of Woodfibre Creek (near the mouth)	October 26, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
SW-04	Lower Reach of East Creek (near the outlet to the outfall culvert)		
OUT-02	Non-contact water diversion ditch outlets		
OUT-01	Non-contact water diversion ditch outlets	October 27, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium.
OUT-06	Non-contact water diversion ditch outlets		
SP-E-OUT/ WWTP-E-OUT ¹	East WWTP effluent discharged at station SP-E-OUT	October 29, 2024	Methylmercury.
WWTP-E-IN	East WWTP influent		
SP-W-OUT/ ESC-W-OUT ²	West TSS settling system effluent discharged at station SP-W-OUT		
IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface	October 31, 2024	Field and Physical Parameters.
IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface		
IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor		
IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		
SP-E-OUT/ WWTP-E-OUT ¹	East WWTP effluent discharged at station SP-E-OUT	November 3, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, VOCs, and Methylmercury.
WWTP-E-IN	East WWTP influent		Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
IDZ-E1-0.5	Howe Sound IDZ station E1; 0.5 m below surface		Field and Physical Parameters.
IDZ-E1-2m	Howe Sound IDZ station E1; 2 m below surface		
IDZ-E1-SF	Howe Sound IDZ station E1; 2 m above the seafloor		
IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		

Table 3 (continued): Summary of Analytical Results Included in Weekly Discharge and Compliance Report #40.

Sample	Description	Sampling Date	Parameters Reported
SP-E-OUT/ WWTP-E-OUT ¹	East WWTP effluent discharged at station SP-E-OUT	November 10, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
WWTP-E-IN	East WWTP influent		
SP-W-IN	West Sedimentation Pond influent		
SP-W-OUT/ ESC-W-OUT ²	West TSS settling system effluent discharged at station SP-W-OUT	November 11, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
SP-E-IN	East Sedimentation Pond influent		
SP-E-OUT/ WWTP-E-OUT ¹	East WWTP effluent discharged at station SP-E-OUT	November 12, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
WWTP-E-IN	East WWTP influent		
SP-W-IN	West Sedimentation Pond influent		
SP-W-OUT/ ESC-W-OUT ²	West TSS settling system effluent discharged at station SP-W-OUT		
IDZ-E2-0.5	Howe Sound IDZ station E2; 0.5 m below surface		
IDZ-E2-2m	Howe Sound IDZ station E2; 2 m below surface		
IDZ-E2-SF	Howe Sound IDZ station E2; 2 m above the seafloor		
SP-E-OUT ¹	East Sedimentation Pond effluent discharged at station SP-E-OUT	November 13, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
SP-W-OUT ²	West Sedimentation Pond effluent discharged at station SP-W-OUT		
SP-E-IN	East Sedimentation Pond influent	November 14, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.
SP-E-OUT ¹	East Sedimentation Pond effluent discharged at station SP-E-OUT		
SP-W-IN	West Sedimentation Pond influent		
SP-W-OUT ²	West Sedimentation Pond effluent discharged at station SP-W-OUT		
SP-E-OUT/ WWTP-E-OUT ¹	East WWTP effluent discharged at station SP-E-OUT	November 15, 2024	Field, Physical and General Parameters, Total and Dissolved Metals, Hexavalent Chromium, PAHs, and VOCs.

Notes:

¹ As a result of the reconfigured pathway for effluent discharge at station SP-E-OUT effective October 28, contact water was stored in the East Sedimentation Pond and directed to the East WWTP for treatment. East WWTP effluent was discharged at station SP-E-OUT during the monitoring period on November 10 to 13 and November 15 to 16. From November 13 at 17:17 to November 15 at 03:00, East Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-E-OUT). On November 10, 12, 13, 15, and 16 field measurements and analytical samples were collected at station SP-E-OUT and fulfill the water quality monitoring requirements for station WWTP-E-OUT. Field measurements and analytical samples were collected at the East WWTP effluent station (WWTP-E-OUT) on November 11 since no active discharge was observed by site staff at the time of monitoring at station SP-E-OUT.

² As a result of the reconfigured pathway for effluent discharge at station SP-W-OUT effective October 28, the West Sedimentation Pond discharged through the TSS settling system (ESC system) during the monitoring period on November 10 to November 13 and on November 15 to November 16. From November 13 at 17:05 through November 15 at 06:12, West Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-W-OUT). From November 10 to November 16, field measurements and analytical samples were collected at station SP-W-OUT. There are no PE-111578 monitoring requirements established for station ESC-W-OUT; however, this station is monitored to evaluate the performance of the TSS settling system (ESC).

3.3 East Catchment

The East Catchment water quality monitoring results for East Sedimentation Pond and East WWTP stations are discussed in this section. Results for sedimentation pond stations are screened against PE-111578 discharge limits. Parameters without a discharge limit are screened against Canadian, Federal and BC WQGs for the protection of marine water aquatic life. East WWTP monitoring results are screened against operational MDOs which are equivalent to the PE-111578 discharge limits or the lowest applicable WQGs for parameters without discharge limits. The screened water quality results for analytical samples available at the time of reporting and for field parameters collected during the monitoring period are presented in Appendix B (East Sedimentation Pond influent and pond water quality, and all discharges to Howe Sound) and Appendix C (East WWTP influent and effluent). Exceedances of PE-111578 discharge limits and WQGs in samples of effluent discharged to Howe Sound are summarized below. Results received for methylmercury, dioxins and furans, are also discussed.

During the monitoring period (November 10 – 16), all discharge to Howe Sound from the East Catchment was through the authorized discharge location at station SP-E-OUT. From November 10 to 13 and 15 to 16, East WWTP treated effluent was discharged to Howe Sound. Due to significant rainfall from November 11 to 14 (Section 1), contact water runoff volumes exceeded East Catchment storage and treatment capacity and it was necessary to discharge surplus contact water from the East Sedimentation Pond to Howe Sound. On November 13 at 17:18 the discharge flow path was altered to direct East WWTP treated water to the pond and to discharge pond water at SP-E-OUT. This arrangement continued until November 15 at 3:04 when runoff volumes had subsided, and on-site storage capacity was regained. Therefore, field measurements and analytical samples collected during the monitoring period (November 10 – 16) at SP-E-OUT are for East WWTP treated effluent except on November 13 and 14 when East Sedimentation Pond water was being discharged at the time of monitoring.

Analytical results for effluent discharged at station SP-E-OUT were available at the time of reporting for samples collected November 3 (as discussed in Weekly Report #39), November 10, 12, 13, 14 (duplicates), and 15. Station SP-E-OUT samples collected November 3, 10, 12, and 15 represent treated East WWTP effluent; while samples collected November 13 and 14 represent East Sedimentation Pond contact water.

East WWTP influent and effluent water quality screening results are tabulated in Appendix C (Tables C-1 and C-4). Analytical samples and field measurements for treated East WWTP effluent that was discharged at station SP-E-OUT met PE-111578 discharge limits and WQGs except for field pH on November 12, nitrate on November 3, 10, and 12, and hexavalent chromium on November 10 (Table 4 and Table 5).

Screening results for East Sedimentation Pond influent and effluent water quality are tabulated in Appendix B (Tables B-1, B-2 and B-5). Analytical samples and field measurements for East Sedimentation Pond effluent discharged and monitored at station SP-E-OUT on November 13 and 14 showed high turbidity (103 to 163 NTU) and multiple parameters that exceeded PE-111578 discharge limits and WQGs (Table 4 and Table 5). The exceedances for total metals (cadmium, copper, lead, mercury, hexavalent chromium, vanadium, and zinc) and benzo(a)pyrene are attributed to particle-bound forms of these parameters associated with elevated TSS.

**Table 4:
Summary of Parameters Exceeding PE-111578 Discharge Limits in Effluent Discharged from Station SP-E-OUT for Field and Analytical Results Available at the Time of Reporting**

Parameter	Units	Discharge Limit	N	N > Limit	Commentary
Field pH	s.u.	5.5-9.0	6	1	Field pH measured at station SP-E-OUT on November 12 at 08:41 (pH 10) was above the upper limit of the PE-111578 discharge limit.
TSS	mg/L	75	6	2	TSS measured on November 14 (90.4 and 98.6 mg/L, sample and duplicate) was 1.2 and 1.3 times greater than the discharge limit applicable during wet conditions, respectively.
Total Copper	mg/L	0.0043	6	3	Total copper measured at station SP-E-OUT on November 13 (0.0088 mg/L) and November 14 (0.0147 mg/L in the sample and the duplicate) was 2.0 times and 3.4 times greater than the PE-111578 discharge limit, respectively.
Total Lead	mg/L	0.0035	6	3	Total lead measured at station SP-E-OUT on November 13 (0.00605 mg/L) and November 14 (0.0128 and 0.0127 mg/L, sample and duplicate) was 1.7, 3.7, and 3.6 times greater than the PE-111578 discharge limit, respectively.
Total Vanadium	mg/L	0.0081	6	3	Total vanadium measured at station SP-E-OUT on November 13 (0.0125 mg/L) and November 14 (0.0191 mg/L in the sample and the duplicate) was 1.5 times and 2.4 times greater than the PE-111578 discharge limit, respectively.
Total Zinc	mg/L	0.0133	6	3	Total zinc measured at station SP-E-OUT on November 13 (0.0229 mg/L) and November 14 (0.0440 and 0.0441 mg/L, sample and duplicate) was 1.7 times and 3.3 times greater than the PE-111578 discharge limit, respectively.

N = number of samples.

**Table 5:
Summary of Parameters Exceeding WQGs in Effluent Discharged from SP-E-OUT for Field and Analytical Results Available at the Time of Reporting**

Parameter	Units	WQG	N	N > WQG	Commentary
Nitrate	mg/L	3.7	6	2	Nitrate measured at station SP-E-OUT on November 10 (5.12 mg/L) and November 12 (3.90 mg/L) was 1.4 to 1.1 times greater than the long-term WQG. The nitrate concentrations met the short-term WQG (339 mg/L).
Total Cadmium	mg/L	0.00012	6	2	Total cadmium measured at station SP-E-OUT on November 14 (0.000146 and 0.000140 mg/L, sample and duplicate) was 1.2 times greater than the long-term WQG.

Total Mercury	mg/L	0.000016	6	3	Total mercury measured at station SP-E-OUT on November 13 (0.0000182 mg/L) and November 14 (0.0000347 and 0.0000368 mg/L, sample and duplicate) was 1.1, 2.2, and 2.3 times greater than the long-term WQG, respectively.
Hexavalent Chromium	mg/L	0.0015	6	2	Hexavalent chromium measured at station SP-E-OUT on November 10 (0.00176 mg/L) and November 13 (0.00187 mg/L) was 1.2 times greater than the long-term WQG.
Benzo(a)pyrene	mg/L	0.00001	6	3	Benzo(a)pyrene measured at station SP-E-OUT on November 13 (0.0000176 mg/L) and November 14 (0.0000361 and 0.0000374 mg/L, sample and duplicate) was 1.8, 3.6, and 3.7 times greater than the long-term WQG, respectively.

N = number of samples.

Methylmercury analytical results were available at the time of reporting for the East WWTP influent and effluent samples collected on October 29 and November 3 (as discussed in Weekly Report #38 and #39, respectively) and are tabulated in Appendix C, Table C-2. Methylmercury concentrations were 0.000041 µg/L and 0.000053 µg/L in the October 29 and November 3 samples of East WWTP effluent discharged at station SP-E-OUT, and results met the WQG (Appendix B, Table B-3).

Dioxins and furans analytical results were available at the time of reporting for East WWTP influent and effluent samples and East Sedimentation Pond in-pond samples collected on October 2 and October 17 (as discussed in Weekly Report #34 and #36, respectively). The results are summarized in Appendix B, Table B-4 (pond samples) and Appendix C, Table C-4 (East WWTP samples).

3.4 West Catchment

The West Catchment water quality results for the West Sedimentation Pond and West WWTP monitoring stations are discussed in this section. Results for sedimentation pond stations are screened against PE-111578 discharge limits. Parameters without a discharge limit are screened against Canadian, Federal and BC WQGs for the protection of marine water aquatic life. The screened water quality results for analytical samples and field parameters collected from West Sedimentation Pond influent and in-pond stations, TSS settling system stations, and discharges to Howe Sound, and available at the time of reporting are presented in Appendix D. Operation of the West WWTP is currently suspended and monitoring results are therefore not available. Results received for methylmercury, dioxins and furans, and exceedances of PE-111578 discharge limits and WQGs in samples of effluent discharged to Howe Sound are summarized below.

During the monitoring period (November 10 – 16) all discharges from the West Catchment to Howe Sound were routed through the authorized discharge location (SP-W-OUT). Clarified water from the West Sedimentation Pond TSS settling system (ESC system) discharged to Howe Sound each day except November 14. Due to significant rainfall from November 11 to 14 (Section 1), the West Catchment storage and TSS settling capacity was overwhelmed by runoff volumes and

non-clarified contact water was discharged from the West Sedimentation Pond to Howe Sound from November 13 (17:05) through November 15 (06:12). Analytical results for effluent discharged at station SP-W-OUT were available at the time of reporting for samples collected November 10, 12, 13, and 14. During the monitoring period (November 10 – 16), field measurements and analytical samples collected at station SP-W-OUT represent TSS clarified water except on November 13 and 14.

West Sedimentation Pond influent and effluent water quality screening results are presented in Appendix D, Tables D-1, D-2 and D-5. Analytical samples and field measurements for samples of TSS clarified water discharged to Howe Sound via station SP-W-OUT met PE-111578 discharge limits and WQGs except for hexavalent chromium on November 10 (Table 7). Results for non-clarified effluent samples collected November 13 and 14 at station SP-W-OUT showed high turbidity (99 and 278 NTU) and multiple parameters that exceeded PE-111578 discharge limits and WQGs (Table 6 and Table 7). The exceedances for total metals (cadmium, copper, lead, mercury, vanadium, and zinc) and benzo(a)pyrene are attributed to particle-bound forms of these parameters associated with elevated TSS.

Table 6:

Summary of Parameters Exceeding PE-111578 Discharge Limits in Effluent Discharged from SP-W-OUT for Field and Analytical Results Available at the Time of Reporting.

Parameter	Units	Discharge Limit	N	N >Limit	Commentary
TSS	mg/L	75	4	1	TSS measured on November 14 (262 mg/L) was 3.5 times greater than the discharge limit applicable during wet conditions.
Total Copper	mg/L	0.0043	4	2	Total copper measured at station SP-W-OUT on November 13 (0.0129 mg/L) and November 14 (0.0796 mg/L) was 3.0 times and 18.5 times greater than the PE-111578 discharge limit, respectively.
Total Lead	mg/L	0.0035	4	2	Total lead measured at station SP-W-OUT on November 13 (0.00999 mg/L) and November 14 (0.0409 mg/L) was 2.9 times and 11.7 times greater than the PE-111578 discharge limit, respectively.
Total Vanadium	mg/L	0.0081	4	2	Total vanadium measured at station SP-W-OUT on November 13 (0.0115 mg/L) and November 14 (0.0256 mg/L) was 1.4 times and 3.2 times greater than the PE-111578 discharge limit, respectively.
Total Zinc	mg/L	0.0133	4	2	Total zinc measured at station SP-W-OUT on November 13 (0.0310 mg/L) and November 14 (0.0807 mg/L) was 2.3 times and 6.1 times greater than the PE-111578 discharge limit, respectively.

N = number of samples.

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

**Table 7:
Summary of Parameters Exceeding WQGs in Effluent Discharged from SP-W-OUT for
Field and Analytical Results Available at the Time of Reporting.**

Parameter	Units	WQG	N	N >WQG	Commentary
Total Cadmium	mg/L	0.00012	4	2	Total cadmium measured at station SP-W-OUT on November 13 (0.00013 mg/L) and November 14 (0.00033 mg/L) was 1.1 times and 2.8 times greater than the long-term WQG, respectively.
Total Mercury	mg/L	0.000016	4	2	Total mercury measured at station SP-W-OUT on November 13 (0.0000224 mg/L) and November 14 (0.0000774 mg/L) was 1.4 times and 4.8 times greater than the long-term WQG, respectively.
Hexavalent Chromium	mg/L	0.0015	4	1	Hexavalent chromium measured at station SP-W-OUT on November 10 (0.00241 mg/L) was 1.6 times greater than the long-term WQG.
Benzo(a)pyrene	mg/L	0.00001	4	2	Benzo(a)pyrene measured at station SP-W-OUT on November 13 (0.0000171 mg/L) and November 14 (0.0000742 mg/L) was 1.7 times and 7.4 times greater than the long-term WQG, respectively.

N = number of samples.

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

Methylmercury analytical result was available at the time of reporting for a sample of West Sedimentation Pond effluent collected on October 29 (as discussed in Weekly Report #38) and is tabulated in Appendix D, Table D-3. The methylmercury concentration in the October 29 station SP-W-OUT sample was 0.000044 µg/L, which met the WQG.

Dioxins and furans analytical results were available at the time of reporting for West Sedimentation Pond effluent and influent samples collected October 8 and 19 (as discussed in Weekly Report #35 and #36, respectively). The results are presented in Appendix D, Table D-4. The lower and upper bound PCDD/F TEQ concentrations of the effluent sampled collected at station SP-W-OUT were 0.0595 and 1.30 pg/L, respectively.

3.5 Non-Contact Water Diversion Ditch Outlets

Non-contact water diversion ditch samples are screened against Canadian, Federal and BC WQGs for the protection of freshwater aquatic life. The analytical results, field parameters and WQGs are summarized in Appendix E.

East Creek was temporarily diverted to OUT-11 on September 17 to facilitate replacement of the OUT-12 culvert through which East Creek previously discharged. Only East Creek water is flowing through the OUT-11 culvert. East Creek is monitored at freshwater receiving environment station SW-04 and station OUT-11 is not monitored while diversion is in place.

Analytical results were available at the time of reporting for the October 26 non-contact water diversion ditch outlet sample (as discussed in Weekly Report #37) collected at station OUT-02

and for the October 27 samples collected at stations OUT-01 and OUT-06 (as discussed in Weekly Report #38). Parameter concentrations met WQGs except pH, total aluminum, total iron, and dissolved copper in one or more samples (Table 8).

Table 8:
Summary of Parameters Exceeding WQGs at Non-Contact Water Diversion Ditch Outlets

Parameter	Units	WQG	N	N >WQG	Commentary
Field pH	s.u.	6.5-9.0	3	1	Field pH was below the lower limit of the WQG at OUT-02 (pH 5.8) on October 26.
T-Al	mg/L	0.032 (OUT-01) 0.026 (OUT-02) 0.10 (OUT-06)	3	3	The total aluminum concentration measured at OUT-02 (0.854 mg/L) on October 26 and at OUT-01 (0.551 mg/L) and OUT-06 (0.224 mg/L) on October 27 were 33.5, 17.3, and 2.2 times greater than the calculated long-term WQG, respectively.
T-Fe	mg/L	0.3	3	1	The total iron concentration measured at OUT-02 on October 26 (0.399 mg/L) was 1.3 times greater than the WQG.
D-Cu	mg/L	0.00020 (OUT-01 and OUT-02) 0.00037 (OUT-06)	3	3	The dissolved copper concentration measured at OUT-02 (0.00129 mg/L) on October 26 and at OUT-01 (0.00111 mg/L) and OUT-06 (0.00104 mg/L) on October 27 were 6.5, 5.6 and 2.8 times greater than the calculated WQG, respectively.

N = number of samples.

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

3.6 Freshwater and Estuarine Water Receiving Environment

Freshwater and estuarine water receiving environment samples are screened against Canadian, Federal and BC WQGs for the protection of freshwater and estuarine aquatic life. Parameter concentrations above a WQG value, but within the range of values observed in the baseline monitoring program are considered to represent the natural condition of the water and are not flagged as exceedances. The analytical results, field parameters and WQGs are summarized in Appendix F (freshwater) and Appendix G (estuarine).

Analytical results were available at the time of reporting for freshwater and estuarine water samples (as discussed in Weekly Report #37) collected near the mouth of Mill Creek (station SW-02), upstream on Mill Creek (station SW-07) and the Mill Creek Estuary (station SW-03) on October 25, and near the mouth of Woodfibre Creek (station SW-01) and East Creek (station SW-04) on October 26.

Parameter concentrations met WQGs except pH, total aluminum, total copper, total iron, total lead, and dissolved copper in one or more samples (Table 9). Field pH was below the lower limit of the applicable WQG at SW-01 (pH 5.42), SW-02 (pH 6.42), SW-03 (pH 6.31), and SW-07 (6.11 mg/L). Total aluminum was above the WQG in samples collected from SW-01 (0.181 mg/L), SW-02 (0.0533 mg/L), SW-04 (0.149 mg/L), and SW-07 (0.0541 mg/L). Dissolved copper was above

the short-term and long-term WQGs at Woodfibre Creek (0.00028 mg/L) and Mill Creek stations SW-02 and SW-07 (0.00044 and 0.00025 mg/L, respectively); and was above the long-term WQG at East Creek (0.00106 mg/L). Total iron was above the WQG in the sample collected from East Creek (0.496 mg/L).

Raised detection limits were reported for total copper and total lead for the sample collected from the Mill Creek Estuary (<0.00250 and <0.000250 mg/L, respectively) on October 25 due to high dissolved solids and electrical conductivity likely attributed to a strong marine water and tidal influence in the estuary at the time of sampling. The raised detection limits were above the respective WQGs; however, the true concentration of total copper and total lead are not known therefore potential guideline exceedances could not be evaluated.

The observed pH and concentrations of total aluminum were within concentration ranges observed in the pre-construction baseline monitoring program for freshwater and estuarine water receiving environment stations. The dissolved copper concentration observed in Mill Creek (station SW-02) on October 25 (0.00044 mg/L) was 1.4 times greater than the maximum concentration observed in the pre-construction baseline monitoring program at Mill Creek (0.00031 mg/L; Table 6). The total iron and dissolved copper concentrations observed at the East Creek station (SW-04) on October 26 were 1.8 and 1.01 times greater, respectively, than the maximum concentrations observed in the pre-construction baseline monitoring program at East Creek (Table 6). The review and assessment of these results is tracked in Table 10.

Methylmercury results were available at the time of reporting for the October 12 freshwater and estuarine water samples (as discussed in Weekly Report #35). The methylmercury concentrations were <0.000020 µg/L in Woodfibre Creek and Mill Creek samples collected from stations SW-02 and SW-07 and was 0.000034 µg/L in the East Creek sample. A raised detection limit was reported for the Mill Creek Estuary (SW-03) sample (<0.000080 µg/L). Methylmercury results met the WQG. All freshwater and estuarine water samples were below the total mercury WQG that is calculated using methylmercury results for corresponding samples.

Dioxins and furans analytical results were available at the time of reporting for freshwater and estuarine water samples collected on September 28 and 29 (as discussed in Weekly Report #33 and #34, respectively) and on October 12 (as discussed in Weekly Report #35). The lower and upper bound PCDD/F TEQ concentrations were 0.00576 pg/L and 1.07 pg/L at Woodfibre Creek, 0.0464 pg/L and 1.65 pg/L at Mill Creek, 0.724 pg/L and 1.41 pg/L at upstream Mill Creek, 0.00270 pg/L and 1.90 pg/L at the Mill Creek Estuary, and 0.0128 pg/L and 1.27 pg/L at East Creek, respectively, for samples collected September 28 and 29. The lower and upper bound PCDD/F TEQ concentrations were 0 pg/L and 0.750 pg/L at Woodfibre Creek, 0 pg/L and 1.37 pg/L at Mill Creek, 0.00892 pg/L and 0.942 pg/L at upstream Mill Creek, 0 pg/L and 0.766 pg/L at the Mill Creek Estuary, and 0 pg/L and 0.700 pg/L at East Creek, respectively, for samples

collected October 12. The lower and upper bound PCDD/F TEQ concentrations were within the concentration ranges observed in the pre-construction baseline monitoring program for the freshwater and estuarine water stations.

**Table 9:
Summary of Parameters Exceeding WQGs and Baseline Ranges at Freshwater Receiving Environment Stations**

Parameter	Units	WQG	N	N >WQG	Commentary
T-Fe	mg/L	0.3	5	1	The total iron concentration measured in East Creek (SW-04) on October 26 (0.496 mg/L) was 1.7 times greater than the long-term WQG. The total iron concentration at SW-04 was 1.8 times greater than the maximum concentration observed in the pre-construction baseline monitoring program (0.273 mg/L).
D-Cu	mg/L	0.00020 (SW-02) 0.00050 (SW-04)	5	2	The dissolved copper concentration measured in Mill Creek (SW-02) on October 25 (0.00044 mg/L) was 2.2 times greater than the calculated short-term and long-term WQGs and was 2.1 times greater than the calculated long-term WQG in East Creek (SW-04) on October 26 (0.00106 mg/L). The dissolved copper concentration at SW-02 and SW-04 were 1.4 and 1.01 times greater than the maximum concentration observed in the baseline monitoring program (0.000310 mg/L and 0.00105 mg/L, respectively).

N = number of samples.

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

3.7 Marine Water Receiving Environment

Marine water receiving environment samples are screened against Canadian, Federal and BC WQGs for the protection of marine water aquatic life. Parameter concentrations above a WQG value, but within the range of values observed in the baseline monitoring program are considered to represent the natural condition of the water and are not flagged as exceedances. It is expected that samples collected within the IDZ (*i.e.*, mixing zone) defined in PE-111578 for the authorized discharge locations may have parameter concentrations above baseline or background (*i.e.*, reference station) concentrations due to project influence. The analytical results, field parameters and WQGs are summarized in Appendix H.

Analytical results were available at the time of reporting for the October 31 and November 3 marine water receiving environment samples collected at IDZ-E1 and IDZ-E2 at 0.5 m and 2 m below the water surface and 2 m above the seafloor. Analytical results were also available at the time of reporting for samples collected at 0.5 m and 2m below the water surface and 2 m above the seafloor at IDZ-E1 on November 12.

Parameter concentrations met WQGs except field turbidity, dissolved oxygen, total boron, and total copper in one or more samples. Dissolved oxygen was below the lower limit of the WQG (>8 mg/L) in the IDZ-E1 and IDZ-E2 samples collected at 2 m above the seafloor on October 31

and November 3, and in the IDZ-E1 sample collected at 2 m above the seafloor on November 12. Dissolved oxygen concentrations measured in these samples were within baseline ranges observed in the monitoring program for the marine reference stations.

Field turbidity at IDZ-E2 was above the WQG in the sample collected at 2 m below the surface on November 3 (21.36 NTU). Lab turbidity of the November 3 sample was 4.73 NTU indicating some variability between the analytical sample collected at 15:47 and the in-situ field measurements collected at 15:27.

Total boron concentration was above the long-term WQG (1.2 mg/L) in the sample collected at IDZ-E1 on November 12 at 2 m above the seafloor (3.12 mg/L). Total copper concentration was above the long-term WQG (0.002 mg/L) in the sample collected at IDZ-E1 on November 12 at 0.5 m below the water surface (0.00217 mg/L). The observed concentration of total boron is within the concentration ranges observed in the pre-construction baseline monitoring program for the marine reference stations. The observed concentration of total copper is within background concentrations observed at marine reference stations.

Dioxins and furans analytical results were available at the time of reporting for marine reference station WQR1 and WQR2 samples collected on October 6 and IDZ-E1 and IDZ-E2 samples collected October 10 and 12 (as discussed in Weekly Report #35). Dioxins and furans analytical results were available at the time of reporting for IDZ-W2 samples collected October 18 (as discussed in Weekly Report #36). The lower and upper bound PCDD/F TEQ concentrations varied from 0 to 0.000981 pg/L and 1.02 to 1.48 pg/L, respectively, for samples collected at WQR1 and WQR2 on October 6 at 0.5 m below the water surface. The lower and upper bound PCDD/F TEQ concentrations varied from 0 to 0.000735 pg/L and 1.20 to 1.33 pg/L, respectively, at 2 m below the water surface at WQR1 and WQR2. The lower bound PCDD/F TEQ concentration varied from 0.000201 to 0.0124 pg/L at 2 m above the seafloor at WQR1 and WQR2 and the upper bound PCDD/F TEQ concentration varied from 1.25 to 1.34 pg/L.

The lower and upper bound PCDD/F TEQ concentrations ranged from 0 to 0.0395 pg/L and 0.599 to 1.75 pg/L, respectively, for samples collected at IDZ-E1 and IDZ-E2 on October 10 and 12 at 0.5 m below the water surface. The lower and upper bound PCDD/F TEQ concentrations ranged from 0 to 0.0424 pg/L and 0.489 to 1.88 pg/L, respectively, at 2 m below the water surface at IDZ-E1 and IDZ-E2. The lower bound PCDD/F TEQ concentration ranged from 0 to 0.0111 pg/L at 2 m above the seafloor at IDZ-E1 and IDZ-E2 and the upper bound PCDD/F TEQ concentration varied from 0.822 to 1.48 pg/L. The lower and upper bound PCDD/F TEQ concentrations were 0.00190 pg/L and 1.13 pg/L, respectively, for the sample collected at IDZ-W2 on October 18 at 0.5 m below the water surface. The lower and upper bound PCDD/F TEQ concentrations were 0.0209 pg/L and 1.34 pg/L, respectively, at 2 m below the water surface at IDZ-W2. The lower bound PCDD/F TEQ concentration was 0.0340 pg/L at 2 m above the seafloor at IDZ-W2 and the

upper bound PCDD/F TEQ concentration was 1.55 pg/L. The lower and upper bound PCDD/F TEQ concentrations were within the concentration ranges observed in the pre-construction baseline monitoring program for marine reference stations.

Chronic toxicity test results for the September 9 marine receiving environment samples were evaluated and summarized herein. Marine water samples were tested for chronic toxicity to Pacific topsmelt (fish) and echinoderm (invertebrate). All chronic toxicity tests were conducted using 100% (undiluted) marine water collected from 0.5 m below the surface at stations IDZ-E1 and IDZ-E2 in the receiving environment of Howe Sound. The salinity of the September 9 samples (4.7 ppt) was below the acceptable range for marine toxicity tests; therefore, salinity was adjusted to 30 ± 2 ppt prior to testing as per standard test protocol.

Chronic toxicity test results showed no statistically significant differences between the marine samples (IDZ-E1 and IDZ-E2) and laboratory controls (natural seawater control and salt control) for any of the endpoints tested for Pacific topsmelt. For the echinoderm test, a statistically significant difference in fertilization rate was observed in the IDZ-E1 sample ($71.0 \pm 1.4\%$) and in the IDZ-E2 sample ($69.5 \pm 4.9\%$) relative to the laboratory control ($76.5 \pm 3.1\%$).

Analytical water samples were collected at IDZ-E1 (0.5 m below surface) on September 9 in tandem with toxicity sampling and samples were collected at IDZ-E2 (0.5 m below surface) on September 10, and results were presented in Weekly Report #31. Water quality results showed similar conditions between the two samples, and parameter concentrations met WQGs except for field pH in the IDZ-E2 sample (pH 6.8). Hence the water quality data do not explain the observed chronic effect on echinoderm fertilization rate in the IDZ-E1 and IDZ-E2 samples. Given this uncertainty, and in response to toxicity results reported for samples collected in May where similar observations were noted (as discussed in Weekly Report #25), enhanced sampling (*i.e.*, monthly for three months) for chronic toxicity testing was initiated in September for stations IDZ-E1, IDZ-E2, and reference stations WQR1 and WQR2 to obtain additional monitoring data needed to assess if there is natural variability of echinoderm chronic toxicity in the Howe Sound receiving environment.

4. Quality Control

This section presents the results of the quality control (QC) evaluation for the PE-111578 weekly report (Table 10). The evaluation includes a review of field and lab QC, completeness of the weekly report (*e.g.*, pending data), completeness of the monitoring program, confirmation of recordkeeping, evaluation of compliance and review of water management activities. Items flagged for follow-up in Section 3 are also tracked in Table 10. Any items flagged for follow-up are carried forward to future reports until they are closed.

Table 10: Weekly Report QC Evaluations and Ongoing Items

QC Procedure	Observation	Investigation/Resolution
Reporting Period (November 10 – 16, Report #40)		
Monitoring Program Evaluation	PE-111578 contact water, non-contact water and initial dilution zone monitoring stations have not been fully established.	The PE-111578 authorized works were under construction during the reporting period. The East Sedimentation Pond and East WWTP are completed. The West Sedimentation Pond is completed. Temporary outfalls are used for both ponds until the permanent structures are completed. West WWTP pilot testing is suspended since September 25, and the plant has been repurposed to evaluate alternative treatment processes. The lower reach of East Creek is temporarily diverted through OUT-11 outfall since September 17 to facilitate replacement of the East Creek outfall culvert (OUT-12). This item remains open.
Authorized Works Non-Compliance	The East WWTP effluent is bypassing the East Sedimentation Pond since October 28.	The site received significant rainfall (104.6 mm) from October 26 to 28, and on October 28 it was necessary to place contact water directly into the East Sedimentation Pond thereby increasing the risk that effluent discharged from the pond would not meet PE-111578 discharge limits. Therefore, on October 28 water management was rearranged to store contact water in the East Sedimentation Ponds, route the pond water to the East WWTP, and discharge treated water from the East WWTP treatment system directly to Howe Sound through the SP-E-OUT authorized discharge location. The modification to the discharge pathway has been communicated to BCER. This item remains open.
Non-Complaint Effluent	Non-complaint discharge from the East and West Sedimentation Ponds on November 12, 13 and 14.	Field pH measured at station SP-E-OUT on November 12 at 08:41 (pH 10) was above the upper limit of the PE-111578 discharge limit, and the root cause is being investigated. Contact water stored in the East and West Sedimentation Ponds was discharged to Howe Sound on November 13 at 17:18 to November 15 at 03:04, and November 13 at 17:05 through November 15 at 06:12, respectively. The East and West Sedimentation Pond discharges exceeded multiple discharge limits on November 13 and November 14. The discharge of untreated and non-clarified contact water is due to high runoff flows from significant rainfall November 11-14. Discharge limit exceedances are attributed to elevated TSS in the discharged water. The anticipated potential for exceedances were communicated to BCER prior to commencing discharge. Review of these non-compliances is underway and outcomes will be communicated to BCER. This item remains open.
Monitoring Program Evaluation	Sampling was not conducted as prescribed in PE-111578 on occasion.	Weekly monitoring for physical parameters was not conducted at stations IDZ-W1 and IDZ-W2 at 2 m below the water surface nor at 2 m above the seafloor. A review of monitoring requirements with the QEP and site staff will be completed. This item remains open.
Potential Project Influence on Receiving Environment	Dissolved copper near the mouth of Mill Creek was above concentration ranges observed in the pre-construction baseline program.	The dissolved copper concentration observed in Mill Creek (station SW-02) on October 25 (0.00044 mg/L) was 1.42 times greater than the maximum concentration observed in the pre-construction baseline monitoring program at Mill Creek. A further investigation is underway with the QEP. This item remains open.
Pending Data	Analytical results were not reported for samples collected November 10, 11, 12, 14, 15, and 16. Methylmercury, dioxins and furans results were not reported for samples collected November 10, 11, 12, 13, 14, and 15.	Analytical results for samples collected November 10, 11, 12, 14, 15, and 16 were not complete at the time of Report #40 preparation. Methylmercury, dioxins and furans results for samples collected November 10, 11, 12, 13, 14, and 15 were not complete at the time of Report #40 preparation. The pending results will be included in future weekly reports when available. This item remains open.
Ongoing Items from Previous Weekly Reports		
Report #33: Pending Data	Analytical results for samples collected September 28 were not reported.	Analytical results for dioxins and furans for freshwater samples collected September 28 and 29 are discussed in Section 3.6 of Report #40. This item is closed.
Report #35: Pending Data	Methylmercury, dioxins and furans results for samples collected October 6, 8, and 12 were not reported.	Methylmercury results for samples collected October 12 are discussed in Section 3.6 of Report #40. Dioxins and furans results for samples collected October 6, 8, and 12 are discussed in Sections 3.3, 3.6, and 3.7 of Report #40. This item is closed.
Report #36: Pending Data	Methylmercury, dioxins and furans results were not reported for samples collected October 13, 18, and 19.	Dioxins and furans results for samples collected October 18 (IDZ-W2) are discussed in Section 3.7 of Report #40. Dioxins and furans results for samples collected October 13 and 19 were not complete at the time of Report #40 preparation. Testing of dioxins and furans typically requires up to 4 weeks to complete. The pending results will be included in future weekly reports when available. This item remains open.
Report #37: Potential Project Influence on Receiving Environment	Total iron, dissolved copper and dissolved nickel at East Creek were above concentration ranges observed in the pre-construction baseline program.	This item was first noted in Report #35. The total iron concentration observed at the East Creek station (SW-04) on September 28 and October 22 were 1.3 and 1.7 times the maximum concentration observed in the pre-construction baseline monitoring program at East Creek, respectively. Total iron, dissolved copper, and dissolved nickel concentrations observed at the East Creek station (SW-04) on October 4 were 4.2, 3.1, and 7.3 times greater than the maximum concentrations observed in the pre-construction baseline monitoring program at East Creek, respectively. The total iron and dissolved copper concentrations observed at the East Creek station (SW-04) on October 26 were 1.8 and 1.0 times greater than the maximum concentrations observed in the pre-construction baseline monitoring program at East Creek, respectively. It is possible the East Creek water quality at station SW-04 was influenced by discharge from the Fortis controlled portal area for the Eagle Mountain Pipeline Tunnel project. Follow-up with Woodfibre LNG staff is on-going. This item remains open.
Report #37: Pending Data	Analytical results were not reported for samples collected October 25 and 26. Methylmercury, dioxins and furans results were not reported for samples collected October 23 and 26.	Available analytical results for samples collected October 25 and 26 are discussed in Sections 3.5 and 3.6 of Report #40. Methylmercury results for samples collected October 23 and 26 are discussed in Section 3.7 (October 23) and Sections 3.3 and 3.5 of Report #38. Methylmercury, dioxins and furans results for samples collected October 23, 25, and 26 were not complete at the time of Report #40 preparation. Testing of methylmercury, dioxins and furans typically requires up to 4 weeks to complete. The pending results will be included in future weekly reports when available. This item remains open.
Report #38: Pending Data	Analytical results were not reported for samples collected October 27, 31, November 1 and 2. Methylmercury, dioxins and furans results were not reported for samples collected October 27, 28, and 29.	Analytical results for samples collected October 27 and 31 are discussed in Sections 3.3 and 3.7, respectively, of Report #40. Methylmercury results for samples collected October 29 are discussed in Section 3.3 of Report #40. Analytical results for samples collected November 1 and 2 were not complete at the time of Report #40 preparation. Methylmercury, dioxins and furans results for samples collected October 27, 28, and 30 were not complete at the time of Report #40 preparation. The pending results will be included in future weekly reports when available. This item remains open.
Report #38: Non-Complaint Effluent	East Sedimentation Pond effluent on October 28 and 30 did not meet the pH discharge limit.	East Catchment discharge at SP-E-OUT (<i>i.e.</i> , East WWTP effluent) was below the lower discharge limit for field pH on October 28 and 30 (pH 5.1 to 5.3). The low pH values are attributed to carbon dioxide used for final pH adjustment in the WWTP treatment process. Review of the preventive measure to prevent reoccurrence is underway. This item remains open.
Report #39: Data QC	Elevated TSS concentration at IDZ-W1 correlates poorly with observed turbidity values on October 30.	The total suspended solids (TSS) concentration at IDZ-W1 was above the calculated WQG in the sample collected at 2 m above the seafloor on October 30. The elevated TSS in the sample correlates poorly with field and lab turbidity measurements (0.89 and 0.40 NTU, respectively). A reanalysis for TSS has been requested with the laboratory. This item remains open.
Report #39: Pending Data	Analytical results were not reported for samples collected November 3 and 4. Methylmercury, dioxins and furans results were not reported for samples collected November 3, 4, 5, 6, 7, 8, and 9.	Analytical results for samples collected November 3 are discussed in Section 3.7 of Report #40. Analytical results for samples collected November 4 were not complete at the time of Report #40 preparation. Methylmercury results for samples collected November 3, 5, 6, 7, 8, and 9, and dioxins and furans results for samples collected November 3 and 4 were not complete at the time of Report #40 preparation. The pending results will be included in future weekly reports when available. 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 for modified detection limits.

Pending data are outstanding results from monitoring samples reported in the current or previous weekly reports.

Monitoring program evaluation is an assessment of the completeness of the monitoring program compared to PE-111578 specified or implied requirements.

WWTP performance evaluation is an assessment of WWTP effluent quality compared to operational MDOs.

Data QC indicates an evaluation of data trends or inter-parameter relationships that suggest a test result may not be representative of water quality at the time of monitoring.

Non-compliant discharge indicates exceedance of a discharge limit or a discharge that bypasses the sedimentation pond discharge location.

Potential project influence is an assessment that water quality at creek and Howe Sound baseline stations are above the baseline concentration range and may indicate project influence at these stations.

5. Closure

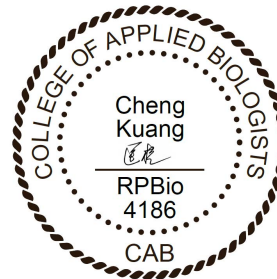
This weekly report is a desktop review by Lorax of the PE-111578 discharge and compliance monitoring program records, reports and results provided by Woodfibre LNG and prime contractor McDermott International and their sub-contractors. The records reviewed and analyzed by Lorax include ALS Environmental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

Regards,

LORAX ENVIRONMENTAL SERVICES LTD.



**Holly Pelletier, B.Sc., GIT.
Environmental Geoscientist**



**Cheng Kuang, M.Sc., RPBio.
Environmental Scientist**



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

Appendix A: Figures and Site Images



World Imagery: District of Squamish, Maxar. Additional imagery provided by McDermott International captured November 7th, 2024.

LEGEND	
	Freshwater Monitoring Station
	Marine Water Monitoring Station (Water Quality)
	Certified Project Area
	Watercourse
	East Creek Temporary Diversion
	Non Contact Ditch (Under Construction)
	Outfall
	Clean Water Diversion Discharge Station
	Sedimentation Pond Monitoring Stations (Water Quality)
	Wastewater Treatment Plant (WWTP)

DATE SAVED:	Nov 21, 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

CLIENT:

PROJECT:

Woodfibre LNG Project Construction Phase

TITLE:
Completed or Under Construction Water Management Facilities and
Established PE-111578 Monitoring Stations (November 16, 2024)

PROJECT #: **A633-7** FIGURE: **1**

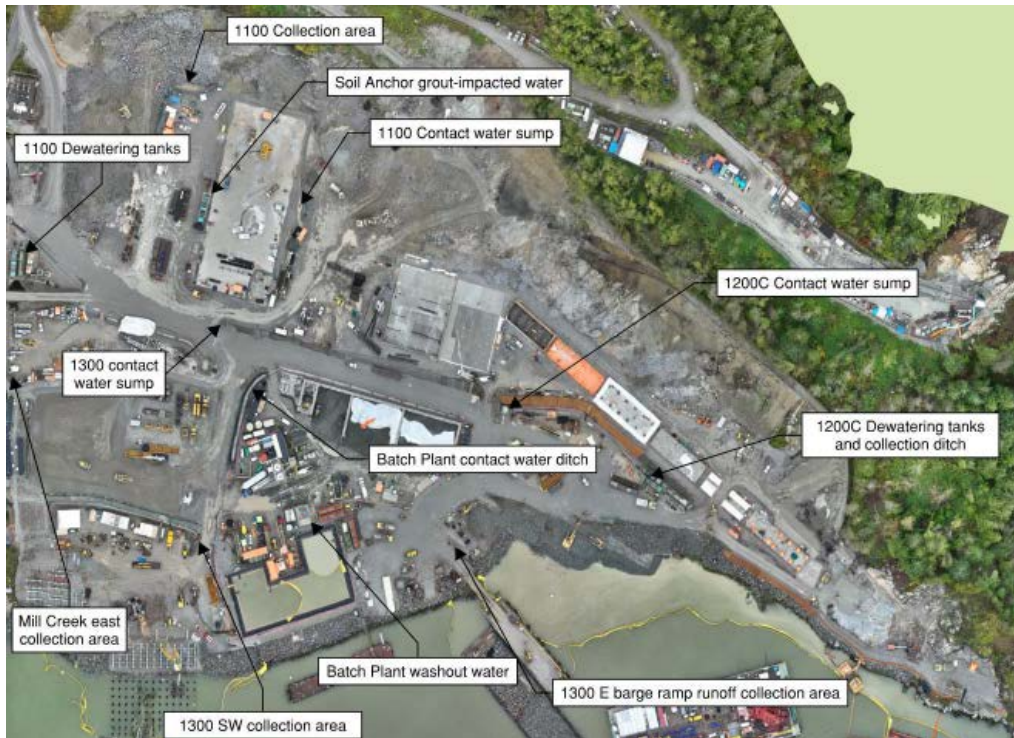


Figure 2: East Catchment contact water management facilities (November 10 – 16).

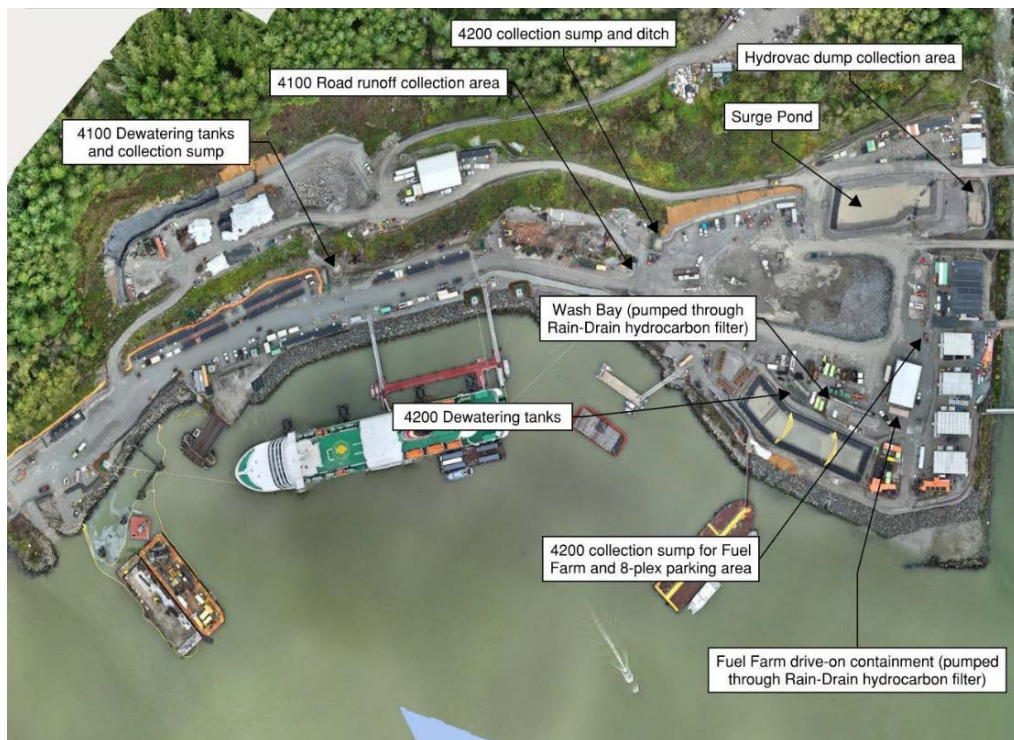


Figure 3: West Catchment contact water management facilities (November 10 – 16).

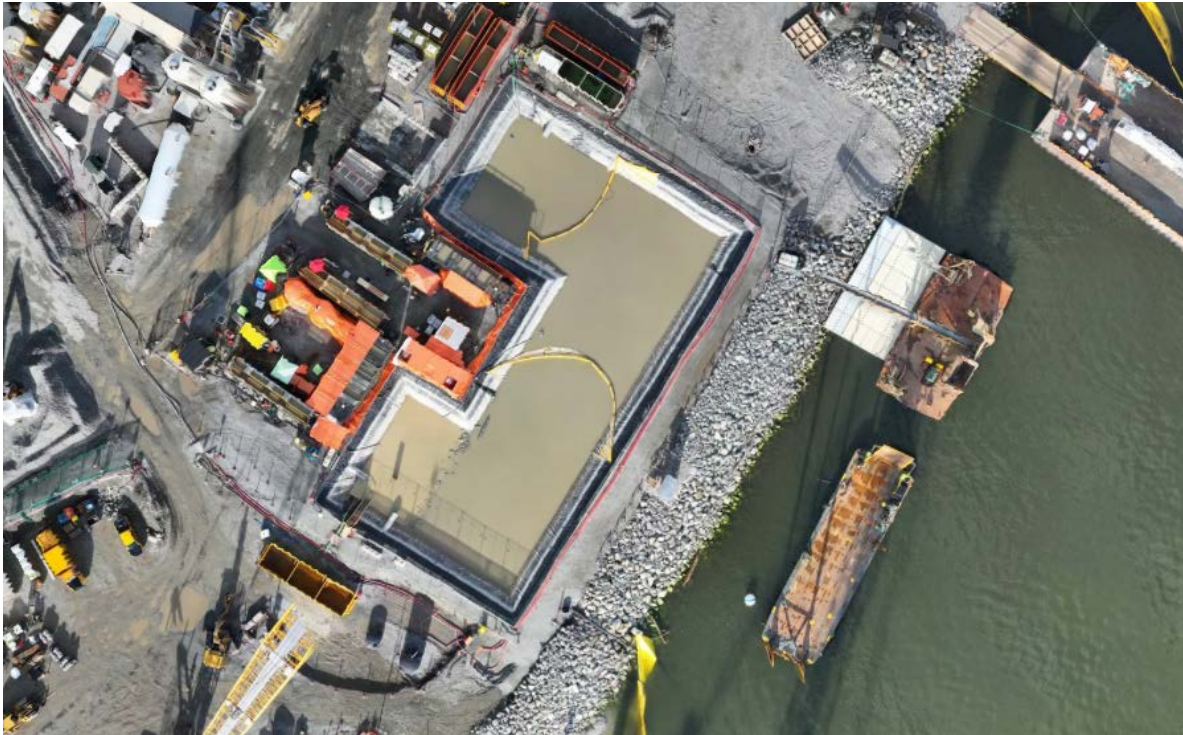


Figure 4: Aerial view of the East Sedimentation Pond (November 15, 2024). The East WWTP is located on the left side of the pond.

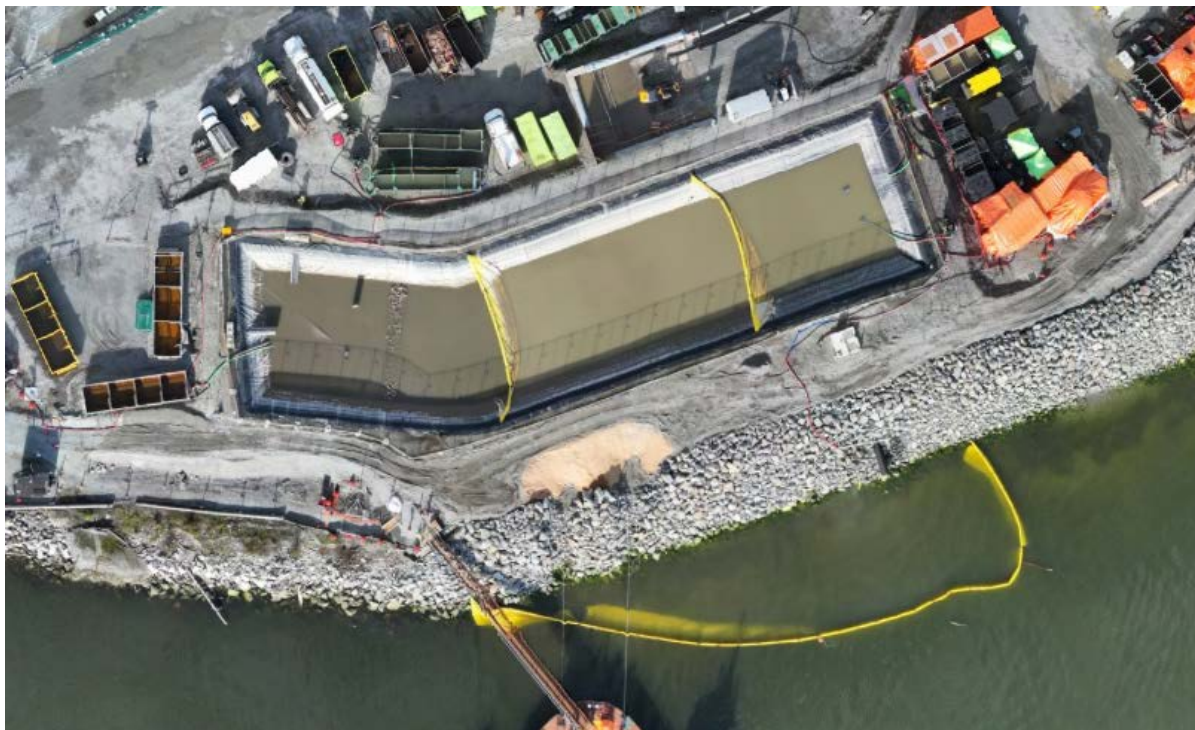


Figure 5: Aerial view of the West Sedimentation Pond (November 15, 2024). The TSS settling system (ESC System) and the West WWTP are located to the right of the pond.

Appendix B: East Sedimentation Pond Results

Table B-3: Summary of Methylmercury Water Quality Results Received at the Time of Reporting for East WWTP Effluent (WWTP-E-OUT) discharged at Station SP-E-OUT.

Parameter	Unit	Lowest Applicable Guideline ¹	Station SP-E-OUT ⁵	Station SP-E-OUT ⁵
			Effluent	Effluent
			WWTP-E-OUT	WWTP-E-OUT
			VA24C9188-002	VA24C9754-002
			2024-10-29	2024-11-03
Total Methylmercury	µg/L	0.0001 ²	0.000053	0.000041
Total Mercury	µg/L	0.012 ^{3,4}	0.0066	<0.0050

Notes:

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

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² From BC Ambient Water Quality Guidelines for Mercury Overview Report. The methylmercury concentration threshold of 0.0001 µg/L (0.1 ng/L) is indicated as a WQG for the protection of wildlife and is set at a concentration that protects fish from mercury bioaccumulation to a level that may harm wildlife that consume fish.

³ CCME guideline for total mercury = 0.016 µg/L.

⁴ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.02 µg/L. When MeHg > 0.5% of total Hg, BC WQG = 0.0001/(MeHg/Total Hg). Detection limit values are used to calculate the WQG for result reported as not detected.

⁵ East WWTP treated effluent was discharged at station SP-E-OUT.

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

Table B-4: Summary of East Sedimentation Pond Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station SP-E-NE	Station SP-E-IN
		In-pond Station at Influent Location	Influent
		SP-E-NE	SP-E-IN
		L2757623-3	L2757833-1
		2024-10-02	2024-10-19
Lower Bound PCDD/F TEQ	pg/L	0.000444	0.552
Upper Bound PCDD/F TEQ	pg/L	1.51	6.67

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table B-5: Summary of East Sedimentation Pond Daily Field Parameters November 10 – 16.

Parameter		Temperature	Dissolved Oxygen (DO)	Salinity	Turbidity	TSS ⁶ (estimated)	pH	Conductivity	Visibility of Sheen	Total Daily Discharge to Howe Sound from Station SP-E-OUT
Unit		°C	mg/L	ppt	NTU	mg/L	s.u.	µS/cm		m ³
PE-111578 Discharge Limit		-	-	-	-	25 or 75 ⁷	5.5 - 9.0	-	-	- ³
Lowest Applicable Guideline ¹		-	>=8	-	-	- ²	- ²	-	-	-
Station ID ⁴	Date									
SP-E-OUT/WWTP-E-OUT ⁵	2024-11-10 12:48	9.6	12.00	0.23	1.38	4	7.4	331	No	693 (East WWTP effluent)
SP-E-IN	2024-11-11 11:19	10.0	11.96	0.10	348.67	263	8.7	145	No	620(East WWTP effluent)
WWTP-E-OUT ⁵	2024-11-11 11:39	9.6	11.13	0.16	0.18	3	8.4	239	No	
SP-E-IN	2024-11-12 9:21	9.1	11.74	0.12	133.77	103	9.1	171	No	667(East WWTP effluent)
SP-E-OUT/WWTP-E-OUT ⁵	2024-11-12 8:41	9.6	11.49	0.26	0.35	3	10	380	No	
SP-E-OUT/WWTP-E-OUT ⁵	2024-11-12 18:03	9.6	10.43	0.29	0.13	3	6.3	414	No	
SP-E-OUT/WWTP-E-OUT ⁵	2024-11-13 10:25	9.4	11.15	0.19	6.39	8	6.0	283	No	730 (East WWTP effluent) 19 (East Sedimentation Pond water)
SP-E-NE	2024-11-13 15:52	9.9	11.12	0.14	85.44	67	7.9	202	No	
SP-E-IN	2024-11-13 17:00	8.5	11.77	0.04	486.8	366	9.6	65	No	
SP-E-OUT ⁵	2024-11-13 17:21	8.9	11.36	0.13	103.30	80	8.5	188	No	
SP-E-OUT ⁵	2024-11-14 11:41	9.1	11.05	0.16	162.56	124	6.7	228	No	3,129 (East Sedimentation Pond water)
SP-E-IN	2024-11-14 16:28	9.3	11.53	0.10	461.14	347	9.3	145	No	
SP-E-NE	2024-11-14 16:38	8.8	11.33	0.16	215.99	164	6.5	230	No	
SP-E-IN	2024-11-15 11:26	10.0	11.52	0.19	3904.51	2915	8.6	281	No	217 (East WWTP effluent) 1,045 (East Sedimentation Pond water)
SP-E-OUT/WWTP-E-OUT ⁵	2024-11-15 13:51	9.7	11.47	0.21	6.67	8	5.9	301	No	
SP-E-OUT/WWTP-E-OUT ⁵	2024-11-16 11:21	8.0	10.80	0.22	16.65	15	6.0	304	No	300 (East WWTP effluent)

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.

Results in orange text exceeded the PE-111578 East Sedimentation Pond Discharge Limit.

All SP-E-OUT samples collected from May 27 to the time of writing were taken from the sample port which is located near the inlet end of the temporary discharge hose.

The East Sedimentation Pond discharged each day during the monitoring period (November 10 – 16).

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² The WQG was not evaluated for parameters with discharge limits.

³ The annual average authorized discharge rate from the East Sedimentation Pond is 650 m³/day. As noted in PE-111578 Condition 2.1.4, the actual discharge rate may deviate from the annual average rate due to annual variations in precipitation amounts within the catchment area. Therefore, the annual average authorized discharge rate is not evaluated as a discharge limit.

⁴ The East Sedimentation Pond received non-contaminated contact water influent each day during the monitoring period; however, site staff noted there was no active input of influent sources to the pond at the time of monitoring on November 10 and 16, therefore daily measurements for station SP-E-IN were not collected. The East Sedimentation Pond discharged each day during the monitoring period (November 10 – November 16). Daily field measurements and weekly analytical samples were collected. In-Pond stations SP-E-NW and SP-E-NE may be monitored in place of stations SP-E-IN and SP-E-OUT, respectively when there is no influent to, or discharge from the East Sedimentation Pond at the time of monitoring.

⁵ From November 10 to November 13 and November 15 to November 16, East WWTP treated effluent was discharged at station SP-E-OUT. Field measurements and analytical samples were collected at station SP-E-OUT except on November 11 when daily field measurements were collected from the meter box at the East WWTP effluent station (WWTP-E-OUT) since no active discharge was observed by site staff at the time of monitoring at station SP-E-OUT. From November 13 at 17:18 to November 15 at 03:04, East Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-E-OUT). Daily field measurements and analytical samples were collected on November 13 and November 14 of the East Sedimentation Pond water discharge.

⁶ TSS concentration is estimated from field turbidity measurements using a site-specific relationship TSS = 0.7458 * [turbidity as NTU] + 3.

⁷ The PE-111578 discharge limit for TSS is 25 mg/L under dry conditions and 75 mg/L for Wet Conditions. Wet Conditions applied November 11-14, and 16.

Appendix C: East Wastewater Treatment Plant Results

Table C-2: Summary of East Wastewater Treatment Plant Water Quality Results for Methylmercury Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ¹	Influent	Effluent	Effluent
			WWTP-E-IN	WWTP-E-OUT	WWTP-E-OUT
			VA24C9188-001	VA24C9188-002	VA24C9754-002
			2024-10-29	2024-10-29	2024-11-03
Total Methylmercury	µg/L	0.0001 ²	<u>0.000155</u>	0.000053	0.000041

Notes:

Results **0.000155** exceed the applicable long-term water quality guideline for the protection of marine aquatic life.

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² From BC Ambient Water Quality Guidelines for Mercury Overview Report. The methylmercury concentration threshold of 0.0001 µg/L (0.1 ng/L) is indicated as a WQG for the protection of wildlife and is set at a concentration that protects fish from mercury bioaccumulation to a level that may harm wildlife that consume fish.

Table C-3: Summary of East Wastewater Treatment Plant Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station WWTP-E-IN	Station WWTP-E-OUT	Station WWTP-E-IN	Station WWTP-E-OUT
		Influent	Effluent	Influent	Effluent
		WWTP-E-IN	WWTP-E-OUT	WWTP-E-IN	WWTP-E-OUT
		L2757623-1	L2757623-2	L2757829-1	L2757829-2
		2024-10-02	2024-10-02	2024-10-17	2024-10-17
Lower Bound PCDD/F TEQ	pg/L	0.00190	0.0180	0.00456	0
Upper Bound PCDD/F TEQ	pg/L	2.00	1.32	4.52	3.56

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table C-4: Summary of East Wastewater Treatment Plant Daily Field Parameters November 10 – 16.

Parameter	Temperature	Dissolved Oxygen (DO)	Salinity	Turbidity	pH	Conductivity	Visibility of Sheen	Total Daily Discharge from the East WWTP	
Unit	°C	mg/L	ppt	NTU	s.u.	µS/cm		m ³	
PE-111578 Discharge Limit ¹	-	-	-	-	-	-	-	1,100	
Minimum Discharge Objective ²	-	-	-	-	5.5 – 9.0	-	-	-	
Station ID ³	Date								
WWTP-E-IN	2024-11-10 12:26	9.6	10.81	0.18	28.94	7.6	261	No	-
SP-E-OUT/ WWTP-E-OUT ³	2024-11-10 12:48	9.6	12.00	0.23	1.38	7.4	331	No	714
WWTP-E-IN	2024-11-11 11:27	9.4	10.72	0.16	70.92	7.3	231	No	-
WWTP-E-OUT ³	2024-11-11 11:39	9.6	11.13	0.16	0.18	8.4	239	No	710
WWTP-E-IN	2024-11-12 9:00	9.4	11.15	0.13	139.25	8.4	189	No	-
SP-E-OUT/ WWTP-E-OUT ³	2024-11-12 8:41	9.6	11.49	0.26	0.35	<u>10</u>	380	No	759
SP-E-OUT/ WWTP-E-OUT ³	2024-11-12 18:03	9.6	10.43	0.29	0.13	6.3	414	No	
WWTP-E-IN	2024-11-13 10:40	9.3	11.25	0.12	180.57	8.5	169	No	-
SP-E-OUT/ WWTP-E-OUT ³	2024-11-13 10:25	9.4	11.15	0.19	6.39	6.0	283	No	704
WWTP-E-IN	2024-11-14 11:25	9.2	11.41	0.10	235.63	8.5	150	No	-
WWTP-E-OUT ³	2024-11-14 16:44	8.9	8.94	0.39	6.65	<u>5.4</u>	545	No	586
WWTP-E-IN	2024-11-15 13:06	8.7	11.37	0.11	214.82	8.6	163	No	-
WWTP-E-OUT ³	2024-11-15 11:54	8.8	12.20	0.21	1.39	5.8	301	No	543
SP-E-OUT/ WWTP-E-OUT ³	2024-11-15 13:51	9.7	11.47	0.21	6.67	5.9	301	No	
WWTP-E-IN	2024-11-16 11:06	7.8	11.21	0.13	38.10	8.0	185	No	-
WWTP-E-OUT ³	2024-11-16 11:10	8.1	11.52	0.23	1.16	6.0	323	No	586
SP-E-OUT/ WWTP-E-OUT ³	2024-11-16 11:21	8.0	10.8	0.22	16.65	6.0	304	No	

Notes:

Results ***underlined in bold italics*** do not meet the applicable minimum discharge objective.

¹ PE-111578 East WWTP Discharge Limit is applied to effluent compliance station WWTP-E-OUT.

² Operational minimum discharge objectives (MDOs) for WWTP effluent that are listed in Appendix B of the Construction Wastewater Treatment Plant Operations Environmental Protection Plan dated February 7, 2024.

³ From November 10 to November 13 and November 15 to November 16, most of the East WWTP treated effluent was discharged at station SP-E-OUT, and the balance was recirculated within the plant. Field measurements and analytical samples were collected at station SP-E-OUT except on November 11 when daily field measurements were collected from the meter box at the East WWTP effluent station (WWTP- E- OUT) since no active discharge was observed by site staff at the time of monitoring at station SP-E-OUT. Daily field measurements collected on November 14 at 16:44, November 15 at 11:54, and November 16 at 11:10 were collected from the meter box at station WWTP-E-OUT and represent waters that were discharged to the East sedimentation Pond proximal to the in-pond influent quality station SP-E-NE (November 14) or to holding tanks in the WWTP treatment train (November 15 and 16).

⁴Field measurements were not collected from the East WWTP influent station WWTP-E-IN on October 6 as there was no active input of influent to the East WWTP at the time of monitoring.

Appendix D: West Sedimentation Pond Results

Table D-1: Summary of West Sedimentation Pond Water Quality Results Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ¹		PE-111578 Discharge Limit	Station SP-W-IN	Station SP-W-OUT ⁷	Station SP-W-IN	Station SP-W-OUT ⁷
					Influent	Effluent	Influent	Effluent
					SP-W-IN	ESC-W-OUT	SP-W-IN	ESC-W-OUT
					VA24D0512-003	VA24D0512-004	VA24D0600-004	VA24D0600-001
		Long Term	Short Term		2024-11-10 10:10	2024-11-10 9:36	2024-11-12 13:10	2024-11-12 9:40
General Parameters								
pH - Field	pH units	- ²	-	5.5 - 9.0	8.9	8.2	8.9	8.2
Conductivity - Field	µS/cm	-	-	-	163	174	115	132
Temperature - Field	°C	-	-	-	9.5	9.6	10.1	9.4
Salinity - Field	ppt	-	-	-	0.11	0.12	0.07	0.1
Turbidity - Field	NTU	-	-	-	22	7.5	29.4	0.5
TSS	mg/L	-	-	25 or 75 ⁶	16.2	<3.0	22.5	<3.0
Dissolved Oxygen - Field	mg/L	≥8	-	-	11.74	11.76	10.51	11.48
Anions and Nutrients								
Sulphate	mg/L	-	-	-	24.8	24.6	13.1	15.2
Chloride	mg/L	-	-	-	7.11	7.1	3.43	6.07
Fluoride	mg/L	-	1.5	-	0.112	0.1000	0.087	0.083
Ammonia (N-NH ₃)	mg/L	Variable ³	Variable ³	-	0.0218	0.0606	0.0587	0.0439
Nitrite (N-NO ₂)	mg/L	-	-	-	0.163	0.087	0.0677	0.0377
Nitrate (N-NO ₃)	mg/L	3.7	339	-	<u>5.01</u>	2.94	2.15	1.92
Total Metals								
Aluminum, total (T-Al)	mg/L	-	-	-	1.25	0.199	1.76	0.175
Antimony, total (T-Sb)	mg/L	-	0.27 ⁴	-	0.00246	0.00189	0.00158	0.00135
Arsenic, total (T-As)	mg/L	0.0125	0.0125	-	0.00324	0.0022	0.00267	0.00204
Barium, total (T-Ba)	mg/L	-	-	-	0.0161	0.00714	0.0238	0.00575
Beryllium, total (T-Be)	mg/L	0.1	-	-	0.000023	<0.000020	0.000029	<0.000020
Boron, total (T-B)	mg/L	1.2	-	-	0.05	0.02	0.033	0.022
Cadmium, total (T-Cd)	mg/L	0.00012	-	-	<0.0000300	<0.0000100	0.0000524	0.000007
Chromium, total (T-Cr)	mg/L	-	-	-	0.00364	0.00248	0.00209	0.00109
Cobalt, total (T-Co)	mg/L	-	-	-	0.00058	0.00026	0.00061	0.00021
Copper, total (T-Cu)	mg/L	- ²	- ²	0.0043	0.00426	0.002	0.00516	0.00156
Iron, total (T-Fe)	mg/L	-	-	-	0.854	0.014	1.19	0.03
Lead, total (T-Pb)	mg/L	- ²	- ²	0.0035	0.00233	<0.000050	0.00402	0.000103
Manganese, total (T-Mn)	mg/L	-	-	-	0.0254	0.00035	0.0353	0.00069
Mercury, total (T-Hg)	mg/L	0.000016 ⁵	-	-	0.0000056	0.00000143	0.00000793	0.00000135
Molybdenum, total (T-Mo)	mg/L	-	-	-	0.055	0.0383	0.028	0.0248
Nickel, total (T-Ni)	mg/L	0.0083	-	-	<0.00050	<0.00050	0.00065	<0.00050
Selenium, total (T-Se)	mg/L	0.002	-	-	0.000364	0.000217	0.00021	0.00017
Silver, total (T-Ag)	mg/L	0.0015	0.003	-	<0.000010	<0.000010	0.000025	<0.000010
Thallium, total (T-Tl)	mg/L	-	-	-	0.000011	<0.000010	0.000017	<0.000010
Uranium, total (T-U)	mg/L	-	-	-	0.00954	0.0106	0.00688	0.00688
Vanadium, total (T-V)	mg/L	- ²	-	0.0081	0.00886	0.0037	0.00714	0.00268
Zinc, total (T-Zn)	mg/L	- ²	- ²	0.0133	0.0063	<0.0030	0.0104	<0.0030
Hexavalent Chromium, total	mg/L	0.0015	-	-	<u>0.00337</u>	<u>0.00241</u>	0.00129	0.00100
Dissolved Metals								
Cadmium, dissolved (D-Cd)	mg/L	-	-	-	<0.0000150	<0.0000150	<0.0000100	0.0000067
Copper, dissolved (D-Cu)	mg/L	-	-	-	0.00233	0.00153	0.00226	0.00136
Iron, dissolved (D-Fe)	mg/L	-	-	-	<0.010	<0.010	<0.010	<0.010
Lead, dissolved (D-Pb)	mg/L	-	-	-	<0.000050	<0.000050	0.000066	<0.000050
Manganese, dissolved (D-Mn)	mg/L	-	-	-	0.0018	0.00024	0.00248	0.00037
Nickel, dissolved (D-Ni)	mg/L	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050
Strontium, dissolved (D-Sr)	mg/L	-	-	-	0.0918	0.099	0.0654	0.0709
Vanadium, dissolved (D-V)	mg/L	-	-	-	0.00712	0.00346	0.00475	0.00238
Zinc, dissolved (D-Zn)	mg/L	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010
Polycyclic Aromatic Hydrocarbons (PAHs)								
Acenaphthene	mg/L	0.006	-	-	0.000024	<0.000010	0.000023	<0.000010
Acridine	mg/L	-	-	-	0.000014	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	-	-	<0.000010	<0.000010	<0.000011	<0.000010
Benz(a)anthracene	mg/L	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.00001	-	-	<0.0000050	<0.0000050	0.0000054	<0.0000050
Chrysene	mg/L	0.0001	-	-	<0.000010	<0.000010	<0.000010	<0.000010
Fluoranthene	mg/L	-	-	-	0.000052	<0.000010	0.000049	<0.000010
Fluorene	mg/L	0.012	-	-	0.000015	<0.000010	0.000016	<0.000010
1-methylnaphthalene	mg/L	0.001	-	-	<0.000010	<0.000010	<0.000010	<0.000010
2-methylnaphthalene	mg/L	0.001	-	-	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	0.001	-	-	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	-	-	<0.000020	<0.000020	0.000025	<0.000020
Pyrene	mg/L	-	-	-	0.000066	<0.000010	0.000052	<0.000010
Quinoline	mg/L	-	-	-	0.000055	<0.000050	<0.000050	<0.000050
Volatile Organic Compounds (VOCs)								
Benzene	mg/L	0.11	-	-	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	0.25	-	-	<0.00050	<0.00050	<0.00050	<0.00050
Methyl-tert-butyl-ether	mg/L	5	0.44	-	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	mg/L	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	0.215	-	-	<0.00040	<0.00040	<0.00050	<0.00050
Total Xylenes	mg/L	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.025	-	-	<0.00050	<0.00050	- ⁸	- ⁸
1,2-Dichlorobenzene	mg/L	0.042	-	-	<0.00050	<0.00050	- ⁸	- ⁸

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.

Results in orange text exceeded the PE-11578 West Sedimentation Pond Discharge Limit.

The West Sedimentation Pond discharged each day during the monitoring period (November 10 – 16).

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² The WQG was not evaluated for parameters with discharge limits.

³ The BC WQG for total ammonia is salinity, pH and temperature dependent; see Tables 27E and 27F in BC WQG guidance document.

⁴ The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.

⁵ When MeHg ≤ 0.5% of total Hg, the BC WQG = 0.00002 mg/L. The Canadian WQG = 0.000016 mg/L.

⁶ The PE-11578 discharge limit for TSS is 25 mg/L under dry conditions and 75 mg/L for each day of Wet Conditions. Wet Conditions applied on November 11, 13, and 16.

⁷ The West Sedimentation Pond discharged through the TSS settling system (ESC system) on November 10 to November 13 and on November 15 to November 16. From November 13 at 17:05 through November 15 at 06:12, West Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-W-OUT). From November 10 through November 16, field measurements and analytical samples were collected at station SP-W-OUT.

⁸ Chlorobenzene and 1,2-dichlorobenzene were not analyzed in the WWTP-E-IN and WWTP-E-OUT sample collected on November 12.

Table D-2: Summary of West Sedimentation Pond Water Quality Results Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ¹		PE-111578 Discharge Limit	Station SP-W-OUT ⁷	Station SP-W-IN	Station SP-W-OUT ⁷
					Effluent	Influent	Effluent
		SP-W-OUT	SP-W-IN		SP-W-OUT		
		VA24D0777-002	VA24D0946-001		VA24D0946-002		
		Long Term	Short Term		2024-11-13 17:44	2024-11-14 10:00	2024-11-14 10:27
General Parameters							
pH - Field	pH units	- ²	-	5.5 - 9.0	8.5	8.6	8.9
Conductivity - Field	µS/cm	-	-	-	121	122.2	105
Temperature - Field	°C	-	-	-	9	9.8	9.2
Salinity - Field	ppt	-	-	-	0.08	0.08	0.07
Turbidity - Field	NTU	-	-	-	99.2	49.6	277.87
TSS	mg/L	-	-	25 or 75 ⁶	56.1	107	262
Dissolved Oxygen - Field	mg/L	≥8	-	-	11.4	10.88	11.78
Anions and Nutrients							
Sulphate	mg/L	-	-	-	14.1	12.8	11.3
Chloride	mg/L	-	-	-	4.54	4.01	3.63
Fluoride	mg/L	-	1.5	-	0.088	0.083	0.084
Ammonia (N-NH ₃)	mg/L	Variable ³	Variable ³	-	0.12	0.0826	0.0713
Nitrite (N-NO ₂)	mg/L	-	-	-	0.0804	0.0895	0.0719
Nitrate (N-NO ₃)	mg/L	3.7	339	-	2.22	2.58	2.11
Total Metals							
Aluminum, total (T-Al)	mg/L	-	-	-	7.08	9.87	17.8
Antimony, total (T-Sb)	mg/L	-	0.27 ⁴	-	0.00137	0.00136	0.00137
Arsenic, total (T-As)	mg/L	0.0125	0.0125	-	0.00347	0.00474	0.00734
Barium, total (T-Ba)	mg/L	-	-	-	0.0657	0.0935	0.144
Beryllium, total (T-Be)	mg/L	0.1	-	-	0.000104	0.000206	0.000374
Boron, total (T-B)	mg/L	1.2	-	-	0.028	0.03	0.028
Cadmium, total (T-Cd)	mg/L	0.00012	-	-	0.00013	0.000202	0.00033
Chromium, total (T-Cr)	mg/L	-	-	-	0.00352	0.00469	0.00763
Cobalt, total (T-Co)	mg/L	-	-	-	0.00173	0.00273	0.00516
Copper, total (T-Cu)	mg/L	- ²	- ²	0.0043	0.0129	0.0296	0.0796
Iron, total (T-Fe)	mg/L	-	-	-	4.16	7.43	13.4
Lead, total (T-Pb)	mg/L	- ²	- ²	0.0035	0.00999	0.0193	0.0409
Manganese, total (T-Mn)	mg/L	-	-	-	0.131	0.224	0.441
Mercury, total (T-Hg)	mg/L	0.000016 ⁵	-	-	0.0000224	0.0000391	0.0000774
Molybdenum, total (T-Mo)	mg/L	-	-	-	0.0235	0.0251	0.0238
Nickel, total (T-Ni)	mg/L	0.0083	-	-	0.00174	0.00266	0.0051
Selenium, total (T-Se)	mg/L	0.002	-	-	0.000226	0.000231	0.000233
Silver, total (T-Ag)	mg/L	0.0015	0.003	-	0.000067	0.000167	0.000542
Thallium, total (T-Tl)	mg/L	-	-	-	0.000049	0.00009	0.000129
Uranium, total (T-U)	mg/L	-	-	-	0.00866	0.0126	0.0134
Vanadium, total (T-V)	mg/L	- ²	-	0.0081	0.0115	0.0159	0.0256
Zinc, total (T-Zn)	mg/L	- ²	- ²	0.0133	0.031	0.0456	0.0807
Hexavalent Chromium, total	mg/L	0.0015	-	-	0.00117	0.00128	0.00111
Dissolved Metals							
Cadmium, dissolved (D-Cd)	mg/L	-	-	-	<0.0000150	<0.0000100	<0.0000100
Copper, dissolved (D-Cu)	mg/L	-	-	-	0.00216	0.00216	0.00233
Iron, dissolved (D-Fe)	mg/L	-	-	-	0.011	0.01	<0.010
Lead, dissolved (D-Pb)	mg/L	-	-	-	<0.000050	0.000058	<0.000050
Manganese, dissolved (D-Mn)	mg/L	-	-	-	0.0056	0.0038	0.00289
Nickel, dissolved (D-Ni)	mg/L	-	-	-	<0.000050	<0.000050	<0.000050
Strontium, dissolved (D-Sr)	mg/L	-	-	-	0.0623	0.0713	0.0568
Vanadium, dissolved (D-V)	mg/L	-	-	-	0.0032	0.0033	0.00291
Zinc, dissolved (D-Zn)	mg/L	-	-	-	<0.0010	<0.0010	<0.0010
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	mg/L	0.006	-	-	0.000033	0.000044	0.000056
Acridine	mg/L	-	-	-	<0.000010	<0.000010	<0.000013
Anthracene	mg/L	-	-	-	0.000016	0.000019	0.000043
Benz(a)anthracene	mg/L	-	-	-	0.000028	0.000027	0.000068
Benzo(a)pyrene	mg/L	0.00001	-	-	0.0000171	0.0000299	0.0000742
Chrysene	mg/L	0.0001	-	-	<0.000026	<0.000030	0.000088
Fluoranthene	mg/L	-	-	-	0.000105	0.000109	0.000229
Fluorene	mg/L	0.012	-	-	0.000027	0.000035	0.000048
1-methylnaphthalene	mg/L	0.001	-	-	<0.000010	0.000014	0.000017
2-methylnaphthalene	mg/L	0.001	-	-	0.000011	0.000016	0.000021
Naphthalene	mg/L	0.001	-	-	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	-	-	0.000058	0.000072	0.000127
Pyrene	mg/L	-	-	-	0.000096	0.00010	0.00020
Quinoline	mg/L	-	-	-	<0.000050	0.000064	<0.000050
Volatile Organic Compounds (VOCs)							
Benzene	mg/L	0.11	-	-	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	0.25	-	-	<0.00050	<0.00050	<0.00050
Methyl-tert-butyl-ether	mg/L	5	0.44	-	<0.00050	<0.00050	<0.00050
Styrene	mg/L	-	-	-	<0.00050	<0.00050	<0.00050
Toluene	mg/L	0.215	-	-	<0.00040	<0.00040	<0.00050
Total Xylenes	mg/L	-	-	-	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.025	-	-	<0.00050	<0.00050	⁸
1,2-Dichlorobenzene	mg/L	0.042	-	-	<0.00050	<0.00050	⁸

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.

Results in orange text exceeded the PE-111578 West Sedimentation Pond Discharge Limit.

The West Sedimentation Pond discharged each day during the monitoring period (November 10 – 16).

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² The WQG was not evaluated for parameters with discharge limits.

³ The BC WQG for total ammonia is salinity, pH and temperature dependent; see Tables 27E and 27F in BC WQG guidance document.

⁴ The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.

⁵ When MeHg ≤ 0.5% of total Hg, the BC WQG = 0.00002 mg/L. The Canadian WQG = 0.000016 mg/L.

⁶ The PE-111578 discharge limit for TSS is 25 mg/L under dry conditions and 75 mg/L for each day of Wet Conditions. Wet Conditions applied on November 11, 13, and 16.

⁷ The West Sedimentation Pond discharged through the TSS settling system (ESC system) on November 10 to November 13 and on November 15 to November 16. From November 13 at 17:05 through November 15 at 06:12, West Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-W-OUT). From November 10 through November 16, field measurements and analytical samples were collected at station SP-W-OUT.

⁸ Chlorobenzene and 1,2-dichlorobenzene were not analyzed in the SP-W-IN and SP-W-OUT samples collected on November 14.

Table D-3: Summary of West Sedimentation Pond Water Quality Results for Methylmercury Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ¹	Station SP-W-OUT
			Effluent
			ESC-W-OUT
			VA24C9188-003
			2024-10-29
Total Methylmercury	µg/L	0.0001 ²	0.000044
Total Mercury	µg/L	0.011 ^{3,4}	<0.0050

Notes:

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

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² From BC Ambient Water Quality Guidelines for Mercury Overview Report. The methylmercury concentration threshold of 0.0001 µg/L (0.1 ng/L) is indicated as a WQG for the protection of wildlife and is set at a concentration that protects fish from mercury bioaccumulation to a level that may harm wildlife that consume fish.

³ CCME guideline for total mercury = 0.016 µg/L.

⁴ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.02 µg/L. When MeHg > 0.5% of total Hg, BC WQG = 0.0001/(MeHg/Total Hg). Detection limit values are used to calculate the WQG for result reported as not detected.

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

Table D-4: Summary of West Sedimentation Pond Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station SP-W-OUT	Station SP-W-IN
		Effluent	Influent
		SP-W-OUT	SP-W-IN
		L2757691-1	L2757833-2
		2024-10-08	2024-10-19
Lower Bound PCDD/F TEQ	pg/L	0.0595	13.7
Upper Bound PCDD/F TEQ	pg/L	1.30	19.4

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table D-5: Summary of West Sedimentation Pond Daily Field Parameters November 10 – 16.

Parameter	Temperature	Dissolved Oxygen (DO)	Salinity	Turbidity	TSS ⁶ (estimated)	pH	Conductivity	Visibility of Sheen	Total Daily Discharge to Howe Sound from station SP-W-OUT
Unit	°C	mg/L	ppt	NTU	mg/L	s.u.	µS/cm		m ³
PE-111578 Discharge Limit	-	-	-	-	25 or 75 ⁷	5.5 - 9.0	-	-	- ³
Lowest Applicable Guideline ¹	-	≥8	-	-	- ²	- ²	-	-	-
Station ID ⁴	Date								
SP-W-IN	2024-11-10 10:10	9.5	11.74	0.11	22.0	19	8.9	163	No
ESC-W-IN	2024-11-10 10:22	9.4	11.33	0.12	39.5	32	8.7	174	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-10 9:36	9.6	11.76	0.12	7.5	9	8.2	174	No
SP-W-IN	2024-11-11 12:15	10	10.98	0.07	154.9	119	7.3	112	No
ESC-W-IN	2024-11-11 12:03	9.5	11.52	0.09	31.4	26	7.3	126	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-11 12:06	9.4	11.60	0.10	1.8	4	7.4	146	No
SP-W-IN	2024-11-12 13:10	10.1	10.51	0.07	29.4	25	8.9	115	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-12 9:40	9.4	11.48	0.10	0.48	3	8.2	132	No
SP-W-E	2024-11-13 15:43	9	11.65	0.08	83.9	66	8.4	122	No
SP-W-IN	2024-11-13 10:00	9.8	10.98	0.07	164.4	126	8.8	106	No
ESC-W-IN	2024-11-13 10:00	9.4	11.64	124	104.5	81	8.4	124	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-13 10:06	9.5	11.73	0.09	0.05	3	8.1	127	No
SP-W-OUT ⁴	2024-11-13 17:44	9.0	11.40	0.08	99.2	77	8.5	121	No
SP-W-IN	2024-11-14 9:58	9.8	10.88	0.08	49.6	40	8.6	122	No
ESC-W-IN	2024-11-14 11:03	9.4	11.68	0.07	272.5	206	8.8	102	No
SP-W-OUT ⁴	2024-11-14 10:27	9.2	11.78	0.07	277.9	210	8.9	105	No
ESC-W-IN	2024-11-15 15:39	8.9	11.62	0.10	51.0	41	8.0	147	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-15 15:41	8.8	12.07	0.10	1.8	4	7.8	150	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-15 16:00	8.5	11.98	0.10	0.78	4	8.0	149	No
ESC-W-IN	2024-11-16 10:46	7.8	11.69	0.12	23.2	20	6.9	171	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-16 10:54	7.8	12.42	0.10	1.4	4	7.9	137	No
SP-W-OUT/ESC-W-OUT ⁵	2024-11-16 11:45	7.7	11.91	0.10	0.48	3	7.9	147	No

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.

Results in **orange** text exceeded the PE-111578 West Sedimentation Pond Discharge Limit.

The West Sedimentation Pond discharged each day during the monitoring period (November 10 – 16).

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² The WQG was not evaluated for parameters with discharge limits.

³ The annual average authorized discharge rate from the West Sedimentation Pond is 310 m³/day. As noted in PE-111578 Condition 2.1.4, the actual discharge rate may deviate from the annual average rate due to annual variations in precipitation amounts within the catchment area. Therefore, the annual average authorized discharge rate is not evaluated as a discharge limit.

⁴ Daily field measurements for the TSS settling system (ESC) influent station ESC-W-IN were collected except on November 12. Contact water was directly discharged into Cell 1 of the West Sedimentation Pond at SP-W-W on November 10, 11, 12, 13, 14, and daily field measurements were collected and analytical samples were collected of this influent source (SP-W-IN) on November 10, 12, and 14. Site records noted unsafe access to the active input of influent to the West Sedimentation Pond on November 15 and 16, therefore daily field measurements for station SP-W-IN were not collected.

⁵ The West Sedimentation Pond discharged through the TSS settling system (ESC system) on November 10 to November 13 and on November 15 to November 16. From November 13 at 17:05 through November 15 at 06:12, West Sedimentation Pond water was discharged directly to Howe Sound at the authorized discharge location (SP-W-OUT). From November 10 through November 16, field measurements and analytical samples were collected at station SP-W-OUT. Additional field measurements were collected from TSS settling system effluent (station ESC-W-OUT) on November 15 and 16 at 15:41 and 10:54, respectively, of West sedimentation Pond discharge through the TSS settling system to Howe Sound. There are no PE-111578 monitoring requirements established for station ESC-W-OUT; however, this station is analogous to the West Sedimentation Pond effluent station (SP-W-OUT) and is monitored to evaluate the performance of the TSS settling system (ESC). In-Pond stations SP-W-W and SP-W-E may be monitored in place of stations SP-W-IN/SP-W-IN-1/SP-W-IN-2 and SP-W-OUT, respectively when there is no influent to, or discharge from the West Sedimentation Pond at the time of monitoring.

⁶ TSS concentration is estimated from field turbidity measurements using a site-specific relationship TSS = 0.7458 * [turbidity as NTU] + 3.

⁷ The PE-111578 discharge limit for TSS is 25 mg/L under dry conditions and 75 mg/L for Wet Conditions. Wet Conditions applied November 11-14, and 16.

**Appendix E:
Non-Contact Water Diversion Ditch Outlets
Results**

Table E-1: Summary of Non-Contact Water Diversion Ditch Outlet Water Quality Results Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ^{1,2}		Station OUT-02	Station OUT-01	Station OUT-06
				Non-Contact Water Diversion Ditch Outlet	Non-Contact Water Diversion Ditch Outlet	Non-Contact Water Diversion Ditch Outlet
				OUT-02	OUT-01	OUT-06
				VA24C8965-003	VA24C8965-004	VA24C8964-001
		Long Term	Short Term	2024-10-26 16:25	2024-10-27 9:45	2024-10-27 14:10
General Parameters						
pH - Field	pH units	6.5 - 9.0	-	<u>5.8</u>	6.7 ⁵	6.7
Specific Conductivity - Field	µS/cm	-	-	10.6	51	36
Temperature - Field	°C	-	-	10	10.1	10.5
Salinity - Field	ppt	-	-	0.01	0.03	0.02
Turbidity - Field	NTU	-	-	0.04	2.45	0.56
TSS	mg/L	-	-	4.6	<3.0	<3.0
Dissolved Oxygen - Field	mg/L	>=8	>=5	11.32	11.16	10.85
Anions and Nutrients						
Sulphate ²	mg/L	128	-	2.88	1.80	2.44
Chloride	mg/L	120	600	0.93	0.66	0.65
Fluoride ²	mg/L	-	0.400-0.710	<0.020	<0.020	<0.020
Ammonia (N-NH ₃) ²	mg/L	1.84	23.9-25.5	<0.0050	<0.0050	0.0096
Nitrite (N-NO ₂) ²	mg/L	0.02	0.06	<0.0010	<0.0010	<0.0010
Nitrate (N-NO ₃)	mg/L	3	32.8	0.166	0.077	0.244
Total Metals						
Aluminum, total (T-Al) ²	mg/L	0.0255-0.0996	-	<u>0.854</u>	<u>0.551</u>	<u>0.224</u>
Antimony, total (T-Sb)	mg/L	0.074	-	0.00012	<0.00010	0.00016
Arsenic, total (T-As)	mg/L	0.005	-	0.0003	0.00024	0.0003
Barium, total (T-Ba)	mg/L	1	-	0.0091	0.00576	0.00707
Beryllium, total (T-Be)	mg/L	0.00013	-	<0.000100	<0.000100	<0.000100
Boron, total (T-B)	mg/L	1.2	29	<0.010	<0.010	0.011
Cadmium, total (T-Cd) ²	mg/L	0.000036-0.000044	0.000149-0.000434	0.0000210	0.0000173	0.0000066
Chromium, total (T-Cr) ⁴	mg/L	0.001	-	<0.00050	<0.00050	<0.00050
Cobalt, total (T-Co)	mg/L	0.001	0.11	0.00021	<0.00014	<0.00010
Copper, total (T-Cu)	mg/L	-	-	0.00411	0.00189	0.00113
Iron, total (T-Fe)	mg/L	0.3	1	<u>0.399</u>	0.224	0.048
Lead, total (T-Pb) ²	mg/L	-	-	0.00108	0.000524	0.000188
Manganese, total (T-Mn) ²	mg/L	0.768	0.816	0.0161	0.00728	0.00178
Mercury, total (T-Hg) ³	mg/L	0.00002	-	<0.0000050	<0.0000050	0.000006
Molybdenum, total (T-Mo)	mg/L	0.073	46	0.00236	0.000734	0.000675
Nickel, total (T-Ni) ²	mg/L	0.025	-	0.00052	<0.00050	<0.00050
Selenium, total (T-Se)	mg/L	0.001	-	<0.000050	<0.000050	0.00006
Silver, total (T-Ag) ²	mg/L	0.000050	0.00010	<0.000010	<0.000010	<0.000010
Thallium, total (T-Tl)	mg/L	0.0008	-	<0.000010	<0.000010	<0.000010
Uranium, total (T-U)	mg/L	0.0085	0.033	0.000701	0.000281	0.000102
Vanadium, total (T-V)	mg/L	0.12	-	0.00115	0.00075	0.0007
Zinc, total (T-Zn)	mg/L	-	-	0.0036	0.0044	<0.0030
Hexavalent Chromium, total	mg/L	0.001	-	<0.00050	<0.00050	<0.00050
Dissolved Metals						
Cadmium, dissolved (D-Cd) ²	mg/L	0.000031-0.000068	0.000040-0.000119	0.0000079	<0.0000050	0.0000092
Copper, dissolved (D-Cu) ²	mg/L	0.00020-0.00037	0.00020-0.0025	<u>0.00129</u>	<u>0.00111</u>	<u>0.00104</u>
Iron, dissolved (D-Fe)	mg/L	-	0.35	0.042	0.04	0.017
Lead, dissolved (D-Pb) ²	mg/L	0.0027-0.0037	-	0.000165	<0.000135	0.000080
Manganese, dissolved (D-Mn) ²	mg/L	0.29-0.35	1.97	0.0018	0.00202	0.00237
Nickel, dissolved (D-Ni) ²	mg/L	0.00070-0.00090	0.0119-0.0155	<0.00050	<0.00050	<0.00050
Strontium, dissolved (D-Sr)	mg/L	2.5	-	0.0099	0.00893	0.0341
Vanadium, dissolved (D-V)	mg/L	-	-	<0.00050	<0.00050	0.00065
Zinc, dissolved (D-Zn)	mg/L	0.0088-0.011	0.0106-0.0166	<0.0010	0.0027	0.0011
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	mg/L	0.0058	-	-	-	-
Acridine	mg/L	0.003	-	-	-	-
Anthracene	mg/L	0.000012	-	-	-	-
Benz(a)anthracene	mg/L	0.000018	-	-	-	-
Benzo(a)pyrene	mg/L	0.00001	-	-	-	-
Chrysene	mg/L	-	-	-	-	-
Fluoranthene	mg/L	0.00004	-	-	-	-
Fluorene	mg/L	0.003	-	-	-	-
1-methylnaphthalene	mg/L	-	-	-	-	-
2-methylnaphthalene	mg/L	-	-	-	-	-
Naphthalene	mg/L	0.001	0.001	-	-	-
Phenanthrene	mg/L	0.0003	-	-	-	-
Pyrene	mg/L	0.00002	-	-	-	-
Quinoline	mg/L	0.0034	-	-	-	-
Volatile Organic Compounds (VOCs)						
Benzene	mg/L	0.04	-	-	-	-
Ethylbenzene	mg/L	0.09	-	-	-	-
Methyl-tert-butyl-ether	mg/L	10	3.4	-	-	-
Styrene	mg/L	0.072	-	-	-	-
Toluene	mg/L	0.0005	-	-	-	-
Total Xylenes	mg/L	0.03	-	-	-	-
Chlorobenzene	mg/L	-	-	-	-	-
1,2-Dichlorobenzene	mg/L	-	-	-	-	-

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 The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.² 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.³ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L.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 Field pH (pH 4.0) reported for OUT-01 is suspected to be an erroneous measurement, therefore laboratory pH is reported.

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

Appendix F: Freshwater Receiving Environment Results

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

Parameter	Unit	Lowest Applicable Guideline ^{1,2}		Station SW-01	Station SW-02	Station SW-04	Station SW-07
				Woodfibre Creek Lower Reach	Mill Creek Mid- Reach	East Creek Lower Reach	Mill Creek Background
				SW-01	SW-02	SW-04	SW-07
				VA24C8965-002 2024-10-26 15:50	VA24C8832-001 2024-10-25 12:45	VA24C8965-001 2024-10-26 12:15	VA24C8832-004 2024-10-25 15:30
		Long Term	Short Term				
General Parameters							
pH - Field	pH units	6.5 - 9.0	-	<u>5.42</u>	<u>6.42</u>	7.02	<u>6.11</u>
Specific Conductivity - Field	µS/cm	-	-	6.3	73.6	48.1	12
Temperature - Field	°C	-	-	8.6	10.7	10	7.2
Salinity - Field	ppt	-	-	0	0.05	0.3	0.01
Turbidity - Field	NTU	-	-	0.32	0.23	3.29	1.95
TSS	mg/L	-	-	<3.0	<3.0	<3.0	<3.0
Dissolved Oxygen - Field	mg/L	>=8	>=5	11.98	11.81	11.36	12.01
Anions and Nutrients							
Sulphate ²	mg/L	128-218	-	0.48	3.57	5.90	4.17
Chloride	mg/L	120	600	0.59	1.03	1.41	1.01
Fluoride ²	mg/L	-	0.400-0.871	<0.020	<0.020	0.041	<0.020
Ammonia (N-NH ₃) ²	mg/L	1.84-1.90	20.5-26.2	0.0052	<0.0050	<0.0050	<0.0050
Nitrite (N-NO ₂) ²	mg/L	0.020	0.06	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate (N-NO ₃)	mg/L	3	32.8	0.0365	0.104	0.062	0.0997
Total Metals							
Aluminum, total (T-Al) ²	mg/L	0.014-0.12	-	<u>0.181</u>	<u>0.0533</u>	<u>0.149</u>	<u>0.0541</u>
Antimony, total (T-Sb)	mg/L	0.074	-	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total (T-As)	mg/L	0.005	-	0.00012	<0.00010	0.00032	<0.00010
Barium, total (T-Ba)	mg/L	1	-	0.00214	0.00328	0.00723	0.00297
Beryllium, total (T-Be)	mg/L	0.00013	-	<0.000100	<0.000100	<0.000100	<0.000100
Boron, total (T-B)	mg/L	1.2	29	<0.010	0.011	<0.010	0.011
Cadmium, total (T-Cd) ²	mg/L	0.000036-0.000061	0.00011-0.00065	<0.000050	0.0000064	0.0000186	0.0000072
Chromium, total (T-Cr) ⁴	mg/L	0.001	-	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total (T-Co)	mg/L	0.001	0.11	<0.00010	<0.00010	0.0001	<0.00010
Copper, total (T-Cu)	mg/L	-	-	<0.00050	<0.00050	0.00157	<0.00050
Iron, total (T-Fe)	mg/L	0.3	1	0.044	0.010	<u>0.496</u>	<0.010
Lead, total (T-Pb) ²	mg/L	-	-	0.000074	<0.000050	0.000221	<0.000050
Manganese, total (T-Mn) ²	mg/L	0.768	0.816-0.888	0.0013	0.00057	0.0385	0.00055
Mercury, total (T-Hg) ³	mg/L	0.00002	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, total (T-Mo)	mg/L	0.073	46	0.000272	0.000512	0.00124	0.000413
Nickel, total (T-Ni) ²	mg/L	0.025	-	<0.00050	<0.00050	0.00077	<0.00050
Selenium, total (T-Se)	mg/L	0.001	-	<0.000050	<0.000050	<0.000050	<0.000050
Silver, total (T-Ag) ²	mg/L	0.000050	0.00010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium, total (T-Tl)	mg/L	0.0008	-	<0.000010	<0.000010	<0.000010	<0.000010
Uranium, total (T-U)	mg/L	0.0085	0.033	0.000719	0.000146	0.000192	0.000116
Vanadium, total (T-V)	mg/L	0.12	-	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total (T-Zn)	mg/L	-	-	<0.0030	<0.0030	0.0036	<0.0030
Hexavalent Chromium, total	mg/L	0.001	-	<0.00050	<0.00050	<0.00050	<0.00050
Dissolved Metals							
Cadmium, dissolved (D-Cd) ²	mg/L	0.000018-0.000091	0.000038-0.00018	<0.0000050	<0.0000050	<0.0000050	0.0000075
Copper, dissolved (D-Cu) ²	mg/L	0.00020-0.00050	0.00020-0.0031	<u>0.00028</u>	<u>0.00044</u>	<u>0.00106</u>	<u>0.00025</u>
Iron, dissolved (D-Fe)	mg/L	-	0.35	0.03	<0.010	0.028	<0.010
Lead, dissolved (D-Pb) ²	mg/L	0.0013-0.0032	-	0.000056	<0.000050	<0.000050	<0.000050
Manganese, dissolved (D-Mn) ²	mg/L	0.29-0.38	1.97-2.42	0.00101	0.00050	0.0111	0.00054
Nickel, dissolved (D-Ni) ²	mg/L	0.00060-0.0011	0.00092-0.00182	<0.00050	<0.00050	0.00063	<0.00050
Strontium, dissolved (D-Sr)	mg/L	2.5	-	0.00374	0.0081	0.0322	0.00757
Vanadium, dissolved (D-V)	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, dissolved (D-Zn)	mg/L	0.0059-0.0087	0.0082-0.021	<0.0010	0.0011	0.0020	<0.0010
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	mg/L	0.0058	-	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	0.003	-	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	0.000012	-	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	0.000018	-	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.00001	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chrysene	mg/L	-	-	<0.000010	<0.000010	<0.000010	<0.000010
Fluoranthene	mg/L	0.00004	-	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	0.003	-	<0.000010	<0.000010	<0.000010	<0.000010
1-methylnaphthalene	mg/L	-	-	<0.000010	<0.000010	<0.000010	<0.000010
2-methylnaphthalene	mg/L	-	-	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	0.001	0.001	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	0.0003	-	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	0.00002	-	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	0.0034	-	<0.000050	<0.000050	<0.000050	<0.000050
Volatile Organic Compounds (VOCs)							
Benzene	mg/L	0.04	-	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	0.09	-	<0.00050	<0.00050	<0.00050	<0.00050
Methyl-tert-butyl-ether	mg/L	10	3.4	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	mg/L	0.072	-	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	mg/L	0.0005	-	<0.00040	<0.00040	<0.00040	<0.00040
Total Xylenes	mg/L	0.03	-	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050
1,2-Dichlorobenzene	mg/L	-	-	<0.00050	<0.00050	<0.00050	<0.00050

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 The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.² 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.³ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L.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.

Table F-2: Summary of Freshwater Quality Results for Methylmercury Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ¹	Station SW-01	Station SW-02	Station SW-07	Station SW-04
			Lower Reach of Woodfibre Creek (near the mouth)	Upper Reach of Mill Creek (upstream of the third bridge)	Upstream Mill Creek (at the diversion inlet)	Lower Reach of East Creek (near the outlet to the outfall culvert)
			SW-01	SW-02	SW-07	SW-04
			VA24C7381-001	VA24C7381-002	VA24C7381-005	VA24C7381-004
			2024-10-12	2024-10-12	2024-10-12	2024-10-12
Total Methylmercury	µg/L	0.0001 ²	<0.000020	<0.000020	<0.000020	0.000034
Total Mercury	µg/L	0.015 ^{3,4}	<0.0050	<0.0050	<0.0050	<0.0050

Notes:

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

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² From BC Ambient Water Quality Guidelines for Mercury Overview Report. The methylmercury concentration threshold of 0.0001 µg/L (0.1 ng/L) is indicated as a WQG for the protection of wildlife and is set at a concentration that protects fish from mercury bioaccumulation to a level that may harm wildlife that consume fish.

³ CCME guideline for total mercury = 0.026 µg/L.

⁴ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.02 µg/L. When MeHg > 0.5% of total Hg, BC WQG = 0.0001/(MeHg/Total Hg). Detection limit values are used to calculate the WQG for result reported as not detected.

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

Table F-3: Summary of Freshwater Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station SW-01	Station SW-02	Station SW-07	Station SW-04
		Lower Reach of Woodfibre Creek (near the mouth)	Upper Reach of Mill Creek (upstream of the third bridge)	Upstream Mill Creek (at the diversion inlet)	Lower Reach of East Creek (near the outlet to the outfall culvert)
		SW-01	SW-02	SW-07	SW-04
		L2757584-1	L2757587-1	L2757587-4	L2757584-2
		2024-09-28	2024-09-29	2024-09-29	2024-09-28
Lower Bound PCDD/F TEQ	pg/L	0.00576	0.0464	0.724	0.0128
Upper Bound PCDD/F TEQ	pg/L	1.07	1.65	1.41	1.27

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table F-4: Summary of Freshwater Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station SW-01	Station SW-02	Station SW-07	Station SW-04
		Lower Reach of Woodfibre Creek (near the mouth)	Upper Reach of Mill Creek (upstream of the third bridge)	Upstream Mill Creek (at the diversion inlet)	Lower Reach of East Creek (near the outlet to the outfall culvert)
		SW-01	SW-02	SW-07	SW-04
		L2757756-1	L2757756-2	L2757756-5	L2757756-4
		2024-10-12	2024-10-12	2024-10-12	2024-10-12
Lower Bound PCDD/F TEQ	pg/L	0	0	0.00892	0
Upper Bound PCDD/F TEQ	pg/L	0.750	1.37	0.942	0.700

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Appendix G: Estuarine Water Receiving Environment Results

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

Parameter	Unit	Lowest Applicable Guideline ¹		Station SW-03
				Mill Creek Estuary
				SW-03
				VA24C8832-003 2024-10-25 13:45
General Parameters				
pH - Field	pH units	7.0 - 8.7	-	<u>6.31</u>
Specific Conductivity - Field	µS/cm	-	-	4086
Temperature - Field	°C	-	-	10.9
Salinity - Field	ppt	-	-	3.04
Turbidity - Field	NTU	-	-	0.5
TSS	mg/L	-	-	<3.8
Dissolved Oxygen - Field	mg/L	-	-	11.48
Anions and Nutrients				
Sulphate	mg/L	-	-	215
Chloride	mg/L	-	-	1480
Fluoride	mg/L	-	-	<0.400
Ammonia (N-NH ₃)	mg/L	-	-	<0.0055
Nitrite (N-NO ₂)	mg/L	-	-	<0.0200
Nitrate (N-NO ₃)	mg/L	-	-	0.108
Total Metals				
Aluminum, total (T-Al)	mg/L	-	-	0.0878
Antimony, total (T-Sb)	mg/L	-	-	<0.00050
Arsenic, total (T-As)	mg/L	-	-	<0.00050
Barium, total (T-Ba)	mg/L	-	-	0.00745
Beryllium, total (T-Be)	mg/L	-	-	<0.000100
Boron, total (T-B)	mg/L	-	-	<0.386
Cadmium, total (T-Cd)	mg/L	-	-	<0.0000250
Chromium, total (T-Cr)	mg/L	-	-	<0.00250
Cobalt, total (T-Co)	mg/L	-	-	<0.00050
Copper, total (T-Cu)	mg/L	0.002	0.003	<u><0.00250</u>
Iron, total (T-Fe)	mg/L	-	-	<0.050
Lead, total (T-Pb)	mg/L	0.002	0.14	<u><0.000250</u>
Manganese, total (T-Mn)	mg/L	-	-	0.00341
Mercury, total (T-Hg) ²	mg/L	0.00002	-	<0.0000050
Molybdenum, total (T-Mo)	mg/L	-	-	0.00134
Nickel, total (T-Ni)	mg/L	-	-	<0.00250
Selenium, total (T-Se)	mg/L	-	-	<0.000250
Silver, total (T-Ag)	mg/L	0.0015	0.003	<0.000050
Thallium, total (T-Tl)	mg/L	-	-	<0.000050
Uranium, total (T-U)	mg/L	-	-	0.000394
Vanadium, total (T-V)	mg/L	-	-	<0.00250
Zinc, total (T-Zn)	mg/L	-	-	<0.0150
Hexavalent Chromium, total	mg/L	-	-	<0.00050
Dissolved Metals				
Cadmium, dissolved (D-Cd)	mg/L	-	-	<0.0000262
Copper, dissolved (D-Cu)	mg/L	-	-	<0.00100
Iron, dissolved (D-Fe)	mg/L	-	-	<0.050
Lead, dissolved (D-Pb)	mg/L	-	-	<0.000250
Manganese, dissolved (D-Mn)	mg/L	-	-	0.00397
Nickel, dissolved (D-Ni)	mg/L	-	-	<0.00250
Strontium, dissolved (D-Sr)	mg/L	-	-	1.01
Vanadium, dissolved (D-V)	mg/L	-	-	<0.00250
Zinc, dissolved (D-Zn)	mg/L	-	-	<0.0050
Polycyclic Aromatic Hydrocarbons (PAHs)				
Acenaphthene	mg/L	-	-	0.000010
Acridine	mg/L	-	-	<0.000010
Anthracene	mg/L	-	-	<0.000010
Benz(a)anthracene	mg/L	-	-	<0.000010
Benzo(a)pyrene	mg/L	-	-	<0.0000050
Chrysene	mg/L	-	-	<0.000010
Fluoranthene	mg/L	-	-	0.000012
Fluorene	mg/L	-	-	0.000012
1-methylnaphthalene	mg/L	-	-	<0.000010
2-methylnaphthalene	mg/L	-	-	<0.000010
Naphthalene	mg/L	-	-	<0.000050
Phenanthrene	mg/L	-	-	0.000028
Pyrene	mg/L	-	-	<0.000010
Quinoline	mg/L	-	-	<0.000050
Volatile Organic Compounds (VOCs)				
Benzene	mg/L	-	-	<0.00050
Ethylbenzene	mg/L	-	-	<0.00050
Methyl-tert-butyl-ether	mg/L	-	-	<0.00050
Styrene	mg/L	-	-	<0.00050
Toluene	mg/L	-	-	<0.00040
Total Xylenes	mg/L	-	-	<0.00050
Chlorobenzene	mg/L	-	-	<0.00050
1,2-Dichlorobenzene	mg/L	-	-	<0.00050

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 The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.² When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L.

Table G-2: Summary of Estuarine Water Quality Results for Methylmercury Received at the Time of Reporting.

Parameter	Unit	Lowest Applicable Guideline ¹	Station SW-03
			Mill Creek Estuary
			SW-03
			VA24C7381-003
			2024-10-12
Methylmercury	µg/L	0.0001 ²	<0.000080
Total Mercury	µg/L	0.00625 ³	<0.0050

Notes:

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

¹ The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² From BC Ambient Water Quality Guidelines for Mercury Overview Report. The methylmercury concentration threshold of 0.0001 µg/L (0.1 ng/L) is indicated as a WQG for the protection of wildlife and is set at a concentration that protects fish from mercury bioaccumulation to a level that may harm wildlife that consume fish.

³ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.02 µg/L. When MeHg > 0.5% of total Hg, BC WQG = 0.0001/(MeHg/Total Hg). Detection limit values are used to calculate the WQG for result reported as not detected.

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

Table G-3: Summary of Estuarine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station SW-03	Station SW-03
		Mill Creek Estuary	Mill Creek Estuary
		SW-03	SW-03
		L2757587-3	L2757756-3
		2024-09-29	2024-10-12
Lower Bound PCDD/F TEQ	pg/L	0.00270	0
Upper Bound PCDD/F TEQ	pg/L	1.90	0.766

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Appendix H: Marine Water Receiving Environment Results

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

Parameter	Unit	Lowest Applicable Guideline ¹		Station IDZ-E1		
				0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
				IDZ-E1-0.5	IDZ-E1-2m	IDZ-E1-SF
				VA24D0610-001	VA24D0610-002	VA24D0610-003
		Long Term	Short Term	2024-11-12 10:04	2024-11-12 10:05	2024-11-12 10:08
General Parameters						
pH - Field	pH units	7.0 - 8.7	-	7.4	7.3	7.4
Specific Conductivity - Field	µS/cm	-	-	5639	6761	32699
Temperature - Field	°C	-	-	7.4	7.6	10.2
Salinity - Field	ppt	Narrative ²	-	4.72	5.7	29.35
Turbidity - Field	NTU	Narrative ²	Narrative ²	6.24	7.12	0.93
TSS	mg/L	Narrative ²	Narrative ²	6.7	5.1	4.8
Dissolved Oxygen - Field	mg/L	>=8	-	11.1	10.97	4.8
Anions and Nutrients						
Sulphate	mg/L	-	-	321	419	1760
Chloride	mg/L	-	-	2960	3630	13600
Fluoride	mg/L	-	1.5	<1.0	<1.0	<1.0
Ammonia (N-NH ₃)	mg/L	Variable ³	Variable ³	0.0107	0.0091	<0.0050
Nitrite (N-NO ₂)	mg/L	-	-	<0.10	<0.10	<0.10
Nitrate (N-NO ₃)	mg/L	3.7	339	<0.50	<0.50	<0.50
Total Metals						
Aluminum, total (T-Al)	mg/L	-	-	0.377	0.35	0.288
Antimony, total (T-Sb)	mg/L	-	0.27 ⁴	<0.0010	<0.0010	<0.0010
Arsenic, total (T-As)	mg/L	0.0125	0.0125	0.0004	<0.00040	0.00166
Barium, total (T-Ba)	mg/L	-	-	0.0106	0.0113	0.0127
Beryllium, total (T-Be)	mg/L	0.1	-	<0.00050	<0.00050	<0.00050
Boron, total (T-B)	mg/L	1.2	-	0.63	0.83	3.12
Cadmium, total (T-Cd)	mg/L	0.00012	-	<0.000020	0.000021	0.000076
Chromium, total (T-Cr)	mg/L	-	-	<0.00050	<0.00050	0.00051
Cobalt, total (T-Co)	mg/L	-	-	0.00023	0.000223	0.000342
Copper, total (T-Cu)	mg/L	0.002	0.003	0.00217	0.00191	0.00166
Iron, total (T-Fe)	mg/L	-	-	0.328	0.315	0.341
Lead, total (T-Pb)	mg/L	0.002	0.14	0.00016	0.00016	0.00048
Manganese, total (T-Mn)	mg/L	-	-	0.0113	0.0112	0.0115
Mercury, total (T-Hg)	mg/L	0.000016 ⁵	-	0.00000167	0.00000123	0.00000105
Molybdenum, total (T-Mo)	mg/L	-	-	0.00173	0.0022	0.00825
Nickel, total (T-Ni)	mg/L	0.0083	-	<0.00050	<0.00050	0.00069
Selenium, total (T-Se)	mg/L	0.002	-	<0.00050	<0.00050	<0.00050
Silver, total (T-Ag)	mg/L	0.0015	0.003	<0.00010	<0.00010	0.00015
Thallium, total (T-Tl)	mg/L	-	-	<0.000050	<0.000050	<0.000050
Uranium, total (T-U)	mg/L	-	-	0.000593	0.000684	0.00274
Vanadium, total (T-V)	mg/L	0.005	-	0.00132	0.00129	0.00219
Zinc, total (T-Zn)	mg/L	0.01	0.055	<0.0030	<0.0030	<0.0030
Hexavalent Chromium, total	mg/L	0.0015	-	<0.00150	<0.00150	<0.00150
Dissolved Metals						
Cadmium, dissolved (D-Cd)	mg/L	-	-	0.000023	<0.000020	0.000055
Copper, dissolved (D-Cu)	mg/L	-	-	0.00122	0.00112	0.00076
Iron, dissolved (D-Fe)	mg/L	-	-	0.026	0.024	0.011
Lead, dissolved (D-Pb)	mg/L	-	-	<0.00010	<0.00010	<0.00010
Manganese, dissolved (D-Mn)	mg/L	-	-	0.00479	0.00494	0.00492
Nickel, dissolved (D-Ni)	mg/L	-	-	<0.00050	<0.00050	<0.00050
Strontium, dissolved (D-Sr)	mg/L	-	-	1.27	1.63	4.42
Vanadium, dissolved (D-V)	mg/L	-	-	0.00059	0.00067	0.00112
Zinc, dissolved (D-Zn)	mg/L	-	-	0.0025	0.0022	<0.0010
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	mg/L	0.006	-	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	-	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	-	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	-	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	0.00001	-	<0.0000050	<0.0000050	<0.0000050
Chrysene	mg/L	0.0001	-	<0.000010	<0.000010	<0.000010
Fluoranthene	mg/L	-	-	<0.000010	<0.000010	0.000016
Fluorene	mg/L	0.012	-	<0.000010	<0.000010	<0.000010
1-methylnaphthalene	mg/L	0.001	-	<0.000010	<0.000010	<0.000010
2-methylnaphthalene	mg/L	0.001	-	<0.000010	0.000012	<0.000010
Naphthalene	mg/L	0.001	-	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	-	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	-	<0.000010	<0.000010	0.000011
Quinoline	mg/L	-	-	<0.000050	<0.000050	<0.000050
Volatile Organic Compounds (VOCs)						
Benzene	mg/L	0.11	-	<0.00050	<0.00050	<0.00050
Ethylbenzene	mg/L	0.25	-	<0.00050	<0.00050	<0.00050
Methyl-tert-butyl-ether	mg/L	5	0.44	<0.00050	<0.00050	<0.00050
Styrene	mg/L	-	-	<0.00050	<0.00050	<0.00050
Toluene	mg/L	0.215	-	<0.00040	<0.00040	<0.00040
Total Xylenes	mg/L	-	-	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.025	-	<0.00050	<0.00050	<0.00050
1,2-Dichlorobenzene	mg/L	0.042	-	<0.00050	<0.00050	<0.00050

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 The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² Narrative guideline for the evaluation of change from background conditions arising from discharges to the aquatic environment. The water quality data presented in the table were collected when the site was not discharging, therefore the guidelines were not evaluated.

³ The approved total ammonia nitrogen BC WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in BC WQG guidance document.

⁴ The working BC WQG for trivalent antimony [SB(III)] is 0.27 mg/L and is applied to total antimony results.

⁵ When MeHg ≤ 0.5% of total Hg, BC WQG = 0.00002 mg/L. The Canadian WQG = 0.000016 mg/L.

Table H-2: Summary of Marine Water Quality Results Received at the Time of Reporting

Parameter	Unit	Lowest Applicable Guideline ¹		Station IDZ-E1			Station IDZ-E2		
				0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor	0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
				IDZ-E1-0.5	IDZ-E1-2m	IDZ-E1-SF	IDZ-E2-0.5	IDZ-E2-2m	IDZ-E2-SF
				VA24C9593-001	VA24C9593-002	VA24C9593-003	VA24C9593-004	VA24C9593-005	VA24C9593-006
		Long Term	Short Term	2024-10-31 14:52	2024-10-31 14:55	2024-10-31 14:58	2024-10-31 15:18	2024-10-31 15:21	2024-10-31 15:22
General Parameters									
pH - Field	pH units	7.0 - 8.7	-	7.5	7.5	7.4	7.4	7.5	7.4
Specific Conductivity - Field	µS/cm	-	-	26403	18904	32631	10956	21616	31323
Temperature - Field	°C	-	-	10.8	9.8	10.5	8.8	10.1	10.9
Salinity - Field	ppt	Narrative ²	-	22.8	16.3	29.1	9.27	18.69	27.48
Turbidity - Field	NTU	Narrative ²	Narrative ²	0.54	1.41	0.46	2.89	1.43	0.86
TSS	mg/L	Narrative ²	Narrative ²	3.9	4.2	6.1	6.5	4.7	5.1
Dissolved Oxygen - Field	mg/L	≥8	-	8.53	9.37	<u>5.68</u>	10.64	9.36	<u>6.76</u>

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 The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² Narrative guideline for the evaluation of change from background conditions arising from discharges to the aquatic environment. The water quality data presented in the table were collected when the site was discharging, therefore the guidelines were evaluated. Turbidity and TSS BC WQG were evaluated using Reference Station WQR2 at 0.5 m and 2 m below the water surface and 2 m above the seafloor on October 29, as applicable, as the background station for samples collected October 31. Reference stations are considered to be background stations.

Table H-3: Summary of Marine Water Quality Results Received at the Time of Reporting

Parameter	Unit	Lowest Applicable Guideline ¹		Station IDZ-E1			Station IDZ-E2		
				0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor	0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
				IDZ-E1-0.5	IDZ-E1-2m	IDZ-E1-SF	IDZ-E2-0.5	IDZ-E2-2m	IDZ-E2-SF
				VA24C9832-001	VA24C9832-002	VA24C9832-003	VA24C9832-004	VA24C9832-005	VA24C9832-006
		Long Term	Short Term	2024-11-03 15:30	2024-11-03 15:32	2024-11-03 15:36	2024-11-03 15:45	2024-11-03 15:47	2024-11-03 15:50
General Parameters									
pH - Field	pH units	7.0 - 8.7	-	7.0	7.3	7.3	7.0	7.3	7.3
Specific Conductivity - Field	µS/cm	-	-	7791	24807	31644	8131	24350	28897
Temperature - Field	°C	-	-	8.5	10.4	10.8	8.5	10.4	11.0
Salinity - Field	ppt	Narrative ²	-	6.48	21.54	27.85	6.78	21.11	25.09
Turbidity - Field	NTU	Narrative ²	Narrative ²	1.70	1.16	0.33	2.03	<u>21.36</u>	0.85
TSS	mg/L	- ²	- ²	2.7	3.2	5.0	3.0	6.8	11.5
Dissolved Oxygen - Field	mg/L	≥8	-	11.10	9.14	<u>6.57</u>	10.58	8.74	<u>7.50</u>

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 The lowest applicable guidelines from approved or working BC WQGs, Canadian (CCME) WQGs and Federal WQGs.

² Narrative guideline for the evaluation of change from background conditions arising from discharges to the aquatic environment. The water quality data presented in the table were collected when the site was discharging, therefore the guidelines were evaluated. Turbidity BC WQG was evaluated using Reference Station WQR2 collected at 0.5 m and 2 m below the water surface and 2 m above the seafloor on November 2, as applicable, as the background station for samples collected November 3. The TSS BC WQG was not evaluated as analytical results for WQR2 collected November 2 were not available at the time of reporting. Reference stations are considered to be background stations.

Table H-4: Summary of Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Reference Station WQR1			Reference Station WQR2		
		0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor	0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
		WQR1-0.5	WQR1-2m	WQR1-SF	WQR2-0.5	WQR2-2m	WQR2-SF
		L2757680-1	L2757680-2	L2757680-3	L2757680-4	L2757680-5	L2757680-6
		2024-10-06	2024-10-06	2024-10-06	2024-10-06	2024-10-06	2024-10-06
Lower Bound PCDD/F TEQ	pg/L	0.000981	0.000735	0.000201	0	0	0.0124
Upper Bound PCDD/F TEQ	pg/L	1.48	1.20	1.25	1.02	1.33	1.34

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table H-5: Summary of Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station IDZ-E1			Station IDZ-E2		
		0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor	0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
		IDZ-E1-0.5	IDZ-E1-2m	IDZ-E1-SF	IDZ-E2-0.5	IDZ-E2-2m	IDZ-E2-SF
		L2757757-1	L2757757-2	L2757757-3	L2757757-4	L2757757-5	L2757757-6
		2024-10-10	2024-10-10	2024-10-10	2024-10-10	2024-10-10	2024-10-10
Lower Bound PCDD/F TEQ	pg/L	0	0.000543	0.000984	0.0217	0	0
Upper Bound PCDD/F TEQ	pg/L	0.890	0.489	0.895	0.599	0.677	0.822

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table H-6: Summary of Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station IDZ-E1			Station IDZ-E2		
		0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor	0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
		IDZ-E1-0.5	IDZ-E1-2m	IDZ-E1-SF	IDZ-E2-0.5	IDZ-E2-2m	IDZ-E2-SF
		L2757754-1	L2757754-2	L2757754-3	L2757754-4	L2757754-5	L2757754-6
		2024-10-12	2024-10-12	2024-10-12	2024-10-12	2024-10-12	2024-10-12
Lower Bound PCDD/F TEQ	pg/L	0.0311	0.0110	0.000459	0.0395	0.0424	0.0111
Upper Bound PCDD/F TEQ	pg/L	1.26	1.88	1.48	1.75	1.57	1.31

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.

Table H-7: Summary of Marine Water Quality Results for Dioxins and Furans Received at the Time of Reporting.

Parameter	Unit	Station IDZ-W2		
		0.5 m Below Surface	2 m Below Surface	2 m Above Seafloor
		IDZ-W2-0.5	IDZ-W2-2m	IDZ-W2-SF
		L2757837-1	L2757837-2	L2757837-3
		2024-10-18	2024-10-18	2024-10-18
Lower Bound PCDD/F TEQ	pg/L	0.00190	0.0209	0.0340
Upper Bound PCDD/F TEQ	pg/L	1.13	1.34	1.55

Notes:

PCDD = polychlorinated dibenzodioxins (dioxins)

PCDF = polychlorinated dibenzofurans (furans)

TEQ = toxic equivalency

Lower bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned a value of zero (0).

Upper bound PCDD/F TEQ is the sum of the toxic equivalency results for the individual PCDD/F parameters. Non-detectable parameters are assigned the value of the detection limit.