Waste Discharge Authorization

Effluent – Stormwater/Drainage

What is a Waste Discharge Authorization?

A Waste Discharge Authorization (WDA) is a permit issued by the BC Energy Regulator (BCER) that sets clear, enforceable limits on the type and quantity of substances a facility can release into the environment.

BC Energy Regulator (BCER) → Waste Discharge Authorization (WDA) → Limits on the type and quantity of substances

What is Woodfibre LNG applying for?

Under the *Environmental Management Act*, Woodfibre LNG is required to obtain a WDA permit from the BCER for the discharge of effluent (stormwater/drainage) into Atl'ḵa7tsem (Howe Sound). The permit ensures the effluent is thoroughly assessed, monitored, and reported against discharge limits set through scientific and regulatory review.

Effluent is a liquid waste stream that is discharged from a facility. At Woodfibre LNG, the proposed effluent discharge is collected stormwater that is treated as needed before being released into Atl'ḵa7tsem (Howe Sound).

This effluent stream discharged to Atl'ḵa7tsem (Howe Sound) is managed stormwater – not process wastewater.

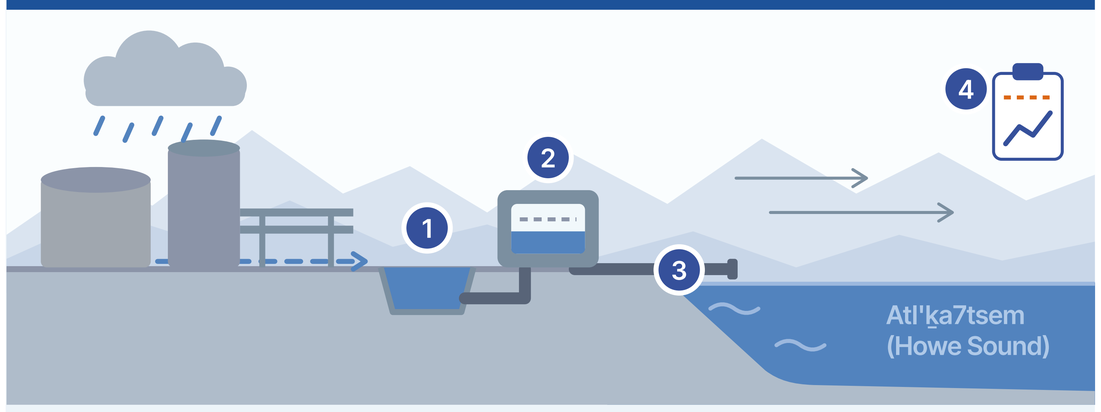
The application describes how stormwater that comes into contact with industrial equipment and industrial drainage will be managed, treated or disposed of off-site, discharged, and monitored during facility operations. It includes a data-driven technical assessment that shows the proposed discharge of treated water into Atl'ḵa7tsem (Howe Sound) is unlikely to cause adverse effects on marine aquatic life under the conditions evaluated.

What is reviewed by the technical assessment?

The technical assessment supporting the application covers several major components including the:

- Existing environmental conditions;
- Water management and contact water treatment system;
- Predicted quantity and quality of the contact water and discharge at Outfall 10 to Atl'ḵa7tsem (Howe Sound);
- Modelling of how discharged water mixes in Atl'ḵa7tsem (Howe Sound) with differing wind speeds;
- Assessment of potential environmental effects compared to the BC Water Quality Guidelines on Marine Aquatic Life and other applicable benchmarks;
- Proposed discharge limits and monitoring program.

Managed, Treated, Discharged and Monitored



1 Managed
Stormwater is collected and seperated depending on potential for contamination.

2 Treated
Potentially affected stormwater is treated to meet discharge requirements or disposed of off site.

3 Discharged
Treated water is periodically discharged into Atlkastem (Howe Sound)

4 Monitored
Reported against discharge limits

What is not included in this authorization?

This WDA application excludes treated domestic wastewater, treated landfill wastewater, and discharge from activities associated with the neighbouring FortisBC natural gas pipeline project – these are all regulated through their own discharge permits.

✓ Managed stormwater	This WDA
Treated domestic wastewater	Permit 2334
Treated landfill wastewater	Permit 1239
FortisBC pipeline project discharge	Permit PE-110163

30 days

Public Review

30-day public comment period

The application process includes a 30-day public comment period, where members of the public can review the application and submit comments to Woodfibre LNG. Woodfibre LNG will submit those comments to the BC Energy Regulator for consideration in its review of the application.

Review the application → Submit comments to Woodfibre LNG → Comments submitted to the BCER → Considered in the BCER's review

A copy of the WDA permit application is available at www.woodfibrelng.ca and at the Squamish Public Library. Comments can be mailed or emailed to Woodfibre LNG (info@wlng.ca), with a copy to the BC Energy Regulator (waste.management@bc-er.ca).

Woodfibre LNG

Understanding Natural Water Conditions

Local geology and rainfall influence water quality before it reaches Woodfibre LNG. Copper and zinc occur naturally in local soils, while nearby creeks and hillside runoff are often mildly acidic.

Why are copper and zinc elevated in water samples?

Copper and zinc are naturally occurring metals in rocks and soils at the project site and in the surrounding region. Weathering releases metals, and rainwater can carry them into waterways, either dissolved in water or attached to sediment.

Existing monitoring has recorded copper and zinc concentrations above BC Water Quality Guidelines (WQG) in local freshwater and Átl'ka7tsem (Howe Sound). Natural background conditions therefore help explain why modelled effluent concentrations may exceed guidelines. Treatment removes suspended sediment and helps reduce the metals attached to it.

From Rock and Soil to Runoff



1. Rain falls on rock and soil
2. Weathering releases naturally occurring copper and zinc
3. Runoff carries metals, dissolved or attached to sediment
4. Treatment removes suspended sediment and the metals attached to it



Why is local freshwater sometimes acidic?

The pH scale measures how acidic or alkaline water is. A pH below 7 is acidic, 7 is neutral, and above 7 is alkaline.

The area's high rainfall, thin soils and slowly weathering granite produce water containing relatively little carbonate – a mineral component that helps neutralize acidity. This gives local freshwater less natural protection against changes in acidity.

Monitoring upstream of historical disturbance confirms that lower pH is a natural condition. For example, background measurements in Woodfibre Creek ranged from pH 5.63 to 6.49.

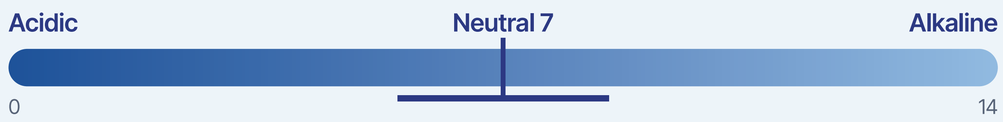
High rainfall

Thin soils

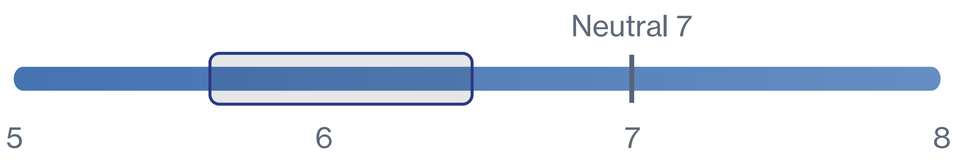
Slowly weathering granite

Relatively little carbonate, so less natural protection against changes in acidity

The pH Scale



Woodfibre Creek background: pH 5.63 to 6.49



What does this mean for the application?

A guideline exceedance does not automatically mean harm. The assessment considers background conditions, treatment, mixing and potential exposure. It concludes that the proposed discharge is unlikely to cause adverse effects on marine life under the conditions evaluated.

The Water Management System

How does Woodfibre LNG manage water on site?

Woodfibre LNG has to manage rainwater that comes into contact with site roads and equipment – just like other industrial sites and even your local parking lot.

1. **Prevent** contact with potential pollution sources where practical
2. **Separate** water based on its potential contamination risk
3. **Direct** water requiring treatment through an engineered treatment system to meet permit limits before discharge

The water management system collects stormwater from outside and within the Project area, as well as water generated during facility operations (i.e. vehicle washing). Separate systems manage runoff according to its potential contamination risk. Parameters of potential concern (POPC) are substances that have the potential to cause pollution in the receiving environment.

What are the parameters of potential concern at Woodfibre LNG?

The POPC that can mix with stormwater include reagents and oil products used in the equipment as well as from the condensate produced, equipment wash water and loose sediment that can be present on the infrastructure or ground surface.

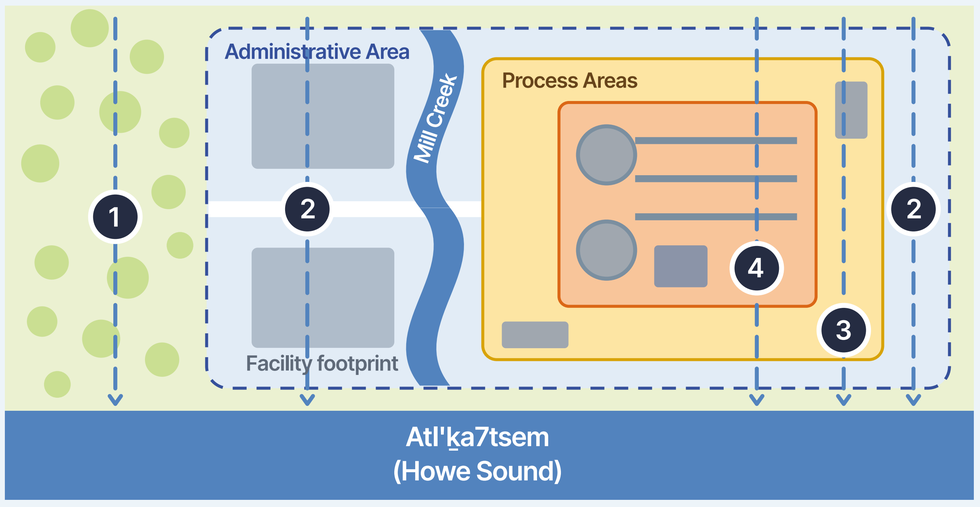
- Reagents and oil products
- Condensate
- Equipment wash water
- Loose sediment

What infrastructure makes up the system?

The system includes ditches, swales, trenches, culverts, piping, sumps, Stormceptor oil-grit separators, an Oily Water Storage Tank, the Oily Water Treatment System (OWTS), and outfalls to the receiving environment.

- **Ditches and swales**
- **Trenches and culverts**
- **Piping and sumps**
- **Oily Water Storage Tank**
- **Stormceptor oil-grit separators**
- **Oily Water Treatment System (OWTS)**
- **Outfalls to the receiving environment**

Water is categorized by how likely it is to have come in contact with industrial activity and POPC:

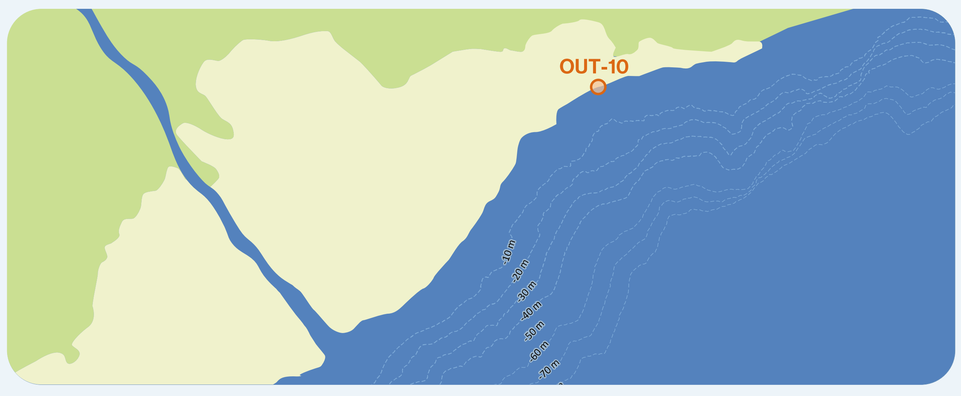


1. **Non-Contact Water:** Water from outside the facility footprint that does not come into any contact with the facility before discharge into Atl'ka7tsem (Howe Sound).
2. **Non-Contaminated Contact Water:** Water from within the facility area that does not contact potential contaminant sources.
3. **Potentially Contaminated Contact Water:** Water from facility areas that may contact process areas, such as paved areas beneath process equipment.
4. **Contaminated Contact Water:** Water from operational process areas that will contact the LNG process and other process areas (e.g., oils or other substances).

There is a separate system to handle each water category so clean water stays clean and any water that requires treatment is routed to the Oily Water Treatment System or disposed of offsite.

Where Water Is Discharged

Potentially contaminated water is collected and treated or otherwise managed according to its characteristics. Treated water is discharged to Atl'ka7tsem (Howe Sound) via Outfall 10, the focus of the water discharge application, on the eastern side of the project site.



An Operations Stormwater Drainage Management Program provides the framework for stormwater management including operational controls and adaptive measures used to maintain compliance with regulatory requirements.

Woodfibre LNG

How Contact Water Is Treated and Discharged

What happens to water that needs treatment?

Water collected from areas in the operational area that may or does come into contact with the LNG process or other process areas follows a defined process before it reaches Howe Sound.

1. Collection

During significant rainfall, the first 25 millimetres of stormwater runoff is most likely to mix with potential contaminants. Oily water sumps collect runoff from relevant process areas, while potentially contaminated runoff is held in a First Flush Sump for sampling and testing.

What's a sump?

A sump is a low point or collection pit where water gathers before being pumped or drained to storage, treatment or discharge.

2. Storage

Collected oily water is held in the Oily Water Storage Tank before treatment or disposal off-site.

3. Treatment

A corrugated plate interceptor separates oil and suspended solids from the water, using gravity and buoyancy. Oil droplets combine, rise to the surface and are skimmed off, while solids settle to the bottom, making them easy to remove for offsite disposal. Feed pumps are designed to prevent oil droplets from breaking into smaller droplets.

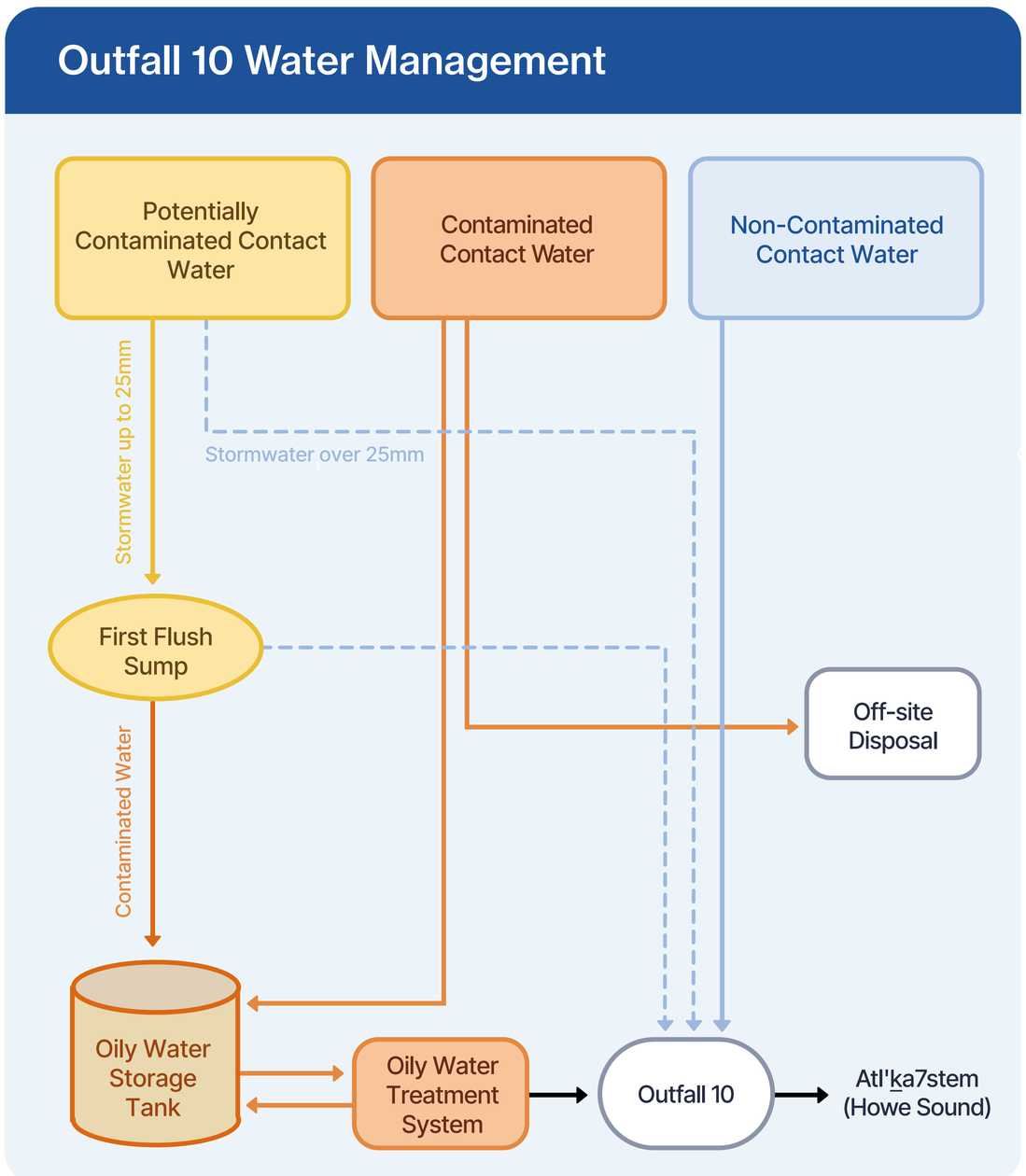
4. Discharge

Two oil-in-water analyzers monitor treated water for Extractable Petroleum Hydrocarbons (EPH). If EPH levels exceed 10.5 mg/L, valves automatically redirect the water back through the system for re-treatment. When EPH levels are below the required specification, treated water flows into the non-contaminated contact-water system and is discharged into Atl'ka7tsem (Howe Sound) via Outfall 10.

What about water from commissioning activities?

Getting a new facility ready for operation – commissioning – can involve equipment cleaning, degreasing, hydrotesting and similar activities that may use chemicals, glycol or other substances.

Water from these activities is not treated like ordinary stormwater. It is kept separate unless it has specifically been assessed and suitable for treatment through the OWTS. Water that doesn't meet treatment requirements is collected and recycled or removed from the site for disposal at an appropriate facility.



How often does discharge actually happen?

The Oily Water Treatment System (OWTS) operates in 12-hour batch cycles.

Discharge timing depends on the weather. During rainy conditions, discharge is expected to occur more often, as stormwater runoff combines with treated effluent from the OWTS. In dry conditions, the OWTS is expected to operate once or twice monthly for maintenance or to reduce the amount of stored water before anticipated rainfall.

12hr cycles

- Rainy conditions: more often
- Dry conditions: once or twice monthly

Commissioning Water

Kept separate from ordinary stormwater

- Assessed as suitable: treated through the OWTS
- Otherwise: recycled or removed for disposal

Total Suspended Solids (TSS)

What are total suspended solids?

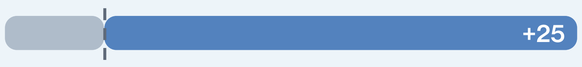
Total Suspended Solids (TSS) are small particles, such as sediment and dirt, suspended in water. At an industrial site, rainwater can carry these particles from roads, equipment and other surfaces into the drainage system.

Why do suspended solids matter?

- Reduces sunlight for underwater plants
- Interferes with fish feeding
- Can irritate or clog fish gills

B.C. Water Quality Guidelines (WQG) for the protection of marine aquatic life for TSS include:

Short term (for clear water): No more than 25 milligrams per litre (mg/L) TSS increase from background conditions for 24 hours.



Long term: No more than 5 mg/L increase in TSS from background conditions for 30 days.



25 mg/L average

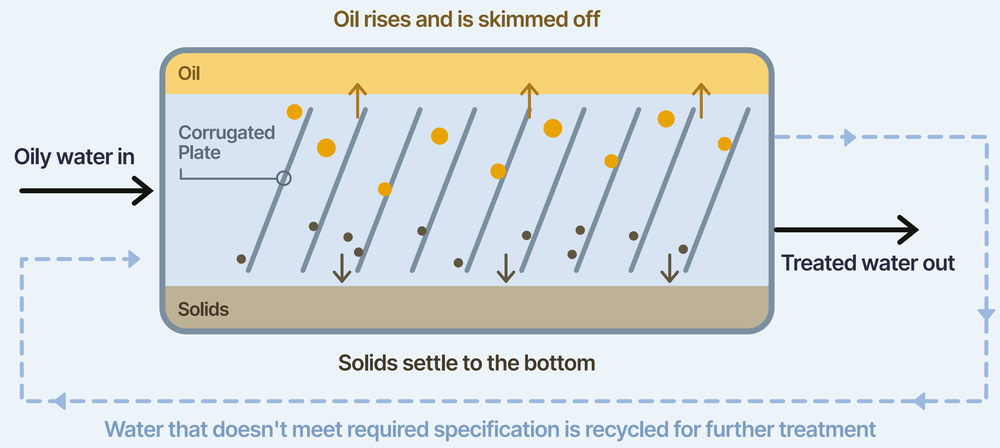
For comparison, the *Wastewater Systems Effluent Regulations* made under the *Fisheries Act* authorize effluent with an average suspended-solids concentration of 25 mg/L or less.

Near the Project site, TSS background levels have varied considerably from less than 2 to 121 mg/L between May 2020 and May 2025. The median was 3 mg/L at 0.5 metres below the surface.

How does Woodfibre LNG plan to manage suspended solids?

Contact water from the LNG processing area will be routed to the Oily Water Treatment System. Suspended particles settle by gravity and are removed for off-site disposal. **The system is designed to meet a TSS discharge level below the 25 mg/L threshold.**

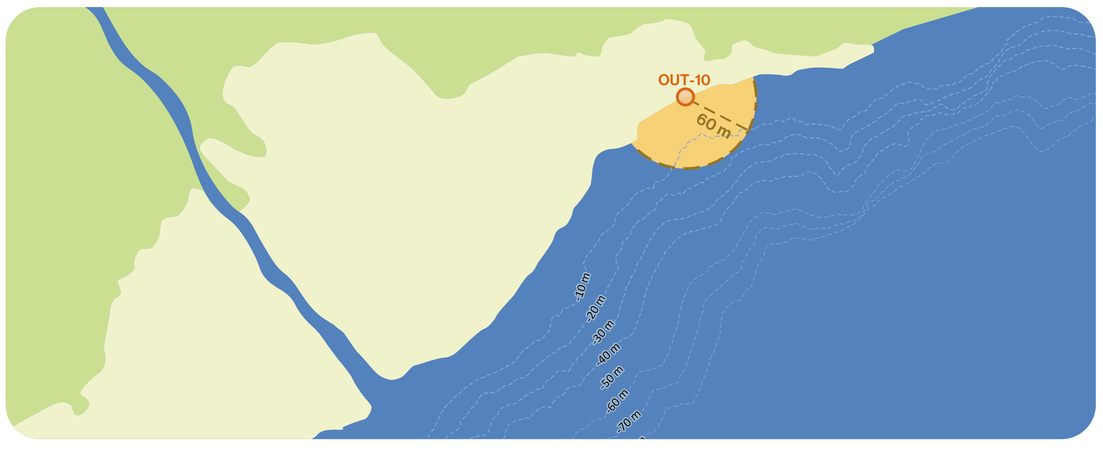
Inside the Oily Water Treatment System



In addition, there is a Stormceptor (oil/grit separator) located at Outfall 10 to remove any additional sediments and surficial oil in the other non-contaminated contact water during smaller, more frequent raingall events. Collected sludge is removed for off-site disposal.

What are the modelling predictions and environmental effects of TSS at Outfall 10?

Concentrations of TSS decrease rapidly as discharge water mixes with Howe Sound. At 25 mg/L TSS at Outfall 10, TSS concentrations would be below the short-term WQG and predicted to meet the long-term WQG within 60 metres under all modelled wind conditions in dry weather.



The environmental assessment rated potential residual TSS effects as low magnitude, local, short term, sporadic and reversible in Atl'ḵa7tsem (Howe Sound).

Woodfibre LNG

Extractable Petroleum Hydrocarbons (EPH)

What is EPH?

Extractable petroleum hydrocarbons, or EPH, is a general term for petroleum-related substances. They come from small amounts of things like lubricating oil, hydraulic oil or grease used on typical industrial equipment and can occasionally come into contact and mix with rainwater.

Lubricating oil

Hydraulic oil

Grease

Small amounts can mix with rainwater

Why does EPH matter?

Extractable petroleum hydrocarbons are comprised of a complex mixture of petroleum hydrocarbons that have the potential to induce effects on exposed organisms, including impaired growth and reproduction.

For reference, under the *BC Petroleum Storage and Distribution Facilities Stormwater Regulation* (B.C. Reg. 168/94), an operator may introduce effluent into the environment if the total EPH in the effluent at any time does not exceed 15 mg/L.

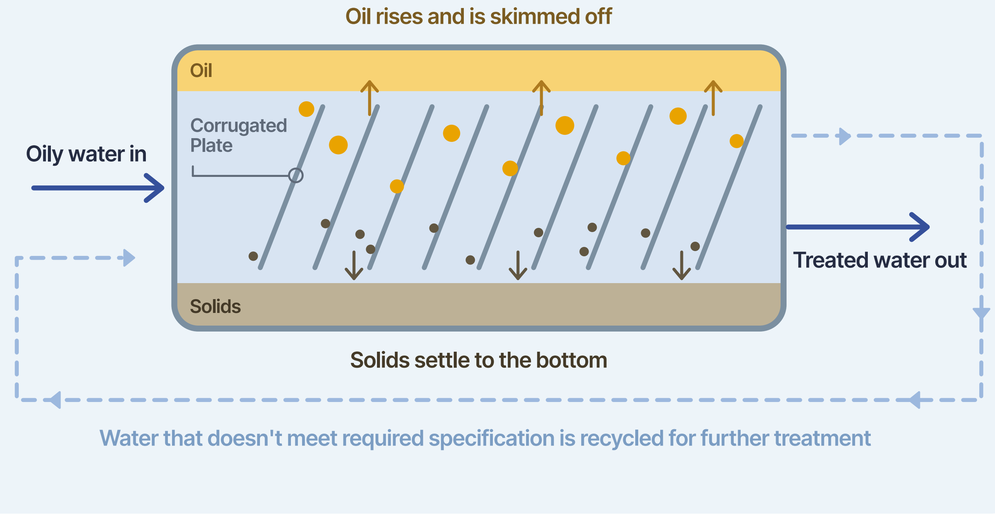
How does Woodfibre LNG plan to manage EPH?

Contaminated contact water is routed to the Oily Water Treatment System, where it passes through a Corrugated Plate Interceptor (CPI) which separates oil and suspended solids. Solids drop to the bottom while oil droplets are encouraged to combine and rise toward the surface. Then, oil can be skimmed off and disposed offsite. **The system is designed to meet an EPH discharge level below 15 mg/L.**

Two oil-in-water analyzers monitor EPH levels in treated water. If EPH levels exceed required specification, valves automatically redirect the water back through the system for re-treatment. When EPH levels are below required specification, treated water flows into the non-contaminated contact-water system and is discharged into Atl'ḵa7tsem (Howe Sound) via Outfall 10.

In addition, there is a Stormceptor (oil/grit separator) located at Outfall 10 to remove any additional sediments and surficial oil in the other non-contaminated contact water during smaller, more frequent rainfall events.

Inside the Oily Water Treatment System



What are the modelling predictions and environmental effects of EPH at Outfall 10?

According to the modelling, the concentration of EPH will decrease rapidly as discharged water mixes in Atl'ḵa7tsem (Howe Sound).

In the absence of BC and Federal WQG for EPH, the assessment used a comparable No Observable Effects Concentration (NOEC) value of 2.12 mg/L developed by the Washington State Department of Ecology for weathered diesel-range organics.

In wet conditions (e.g., during a rainfall event), the EPH concentration was predicted to be 2.2 mg/L at Outfall 10, slightly exceeding the NOEC. During dry conditions, the modelling was based on 15 mg/L of EPH at the outfall. The mixing zone modelling shows that under moderate and high wind conditions, modelled EPH concentrations decrease to less than the NOEC within 30 metres of the outfall. Under low wind conditions, the EPH decreased to less than the NOEC within 80 metres of the outfall.

Distance to fall below the NOEC (dry conditions)



The Technical Assessment Process

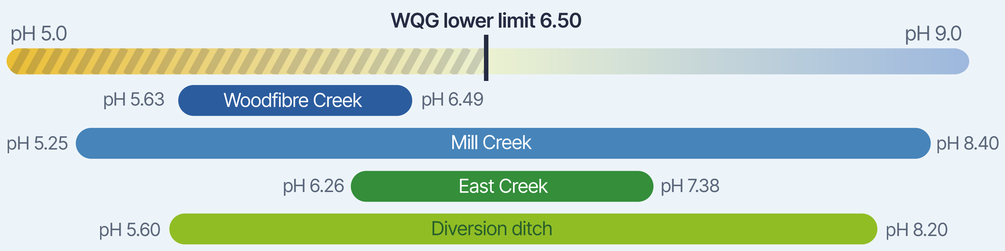
The Technical Assessment looks at the water we plan to discharge, how it will be treated, and what effects it could have on the environment. Existing freshwater data helps estimate the quality of stormwater runoff, and existing marine water quality data is used in the mixing modelling to characterize the receiving environment (where the water is being discharged to).

Freshwater quality data came from nearby creeks and drainage diversion ditches. Helps estimate stormwater runoff quality

Marine water quality data came from Atl'ḵa7tsem (Howe Sound) near the Project site. Characterizes the receiving environment

What we observed in the existing freshwater data set

The pH conditions of the freshwater are naturally mildly acidic to close to neutral values and frequently fall outside of the lower limit of the BC Water Quality Guidelines (WQG) of 6.50 due to the natural geography and geology of the area.



The freshwater quality data was compared to the WQG for freshwater aquatic life. There were exceedances for several parameters including total aluminum, dissolved copper, dissolved zinc, and total methylmercury.

Exceedances

- Al Total aluminum
- Cu Dissolved copper
- Zn Dissolved zinc
- MeHg Total methylmercury

What we observed in the existing marine quality data set

Marine water quality is influenced by the seasonal inputs from the Squamish River. The periods of high freshwater inputs in spring and summer influence the shallow marine water quality within the Project area and at the reference stations.

Occasional exceedances were observed in the deep and shallow water monitoring locations for pH, fluoride, and total metals (including total cadmium, total chromium, total copper, total mercury, total nickel, total lead, total selenium, total vanadium and total zinc) and more frequently for dissolved oxygen and total boron.

More frequent exceedences

- Dissolved oxygen
- Total boron

Occasional exceedences

- pH
- Fluoride
- Cd
- Cr
- Cu
- Hg
- Ni
- Pb
- Se
- V
- Zn

All of this data shows naturally occuring levels of certain metals in the area and provides valuable insight into the existing conditions at the Woodfibre LNG project site.

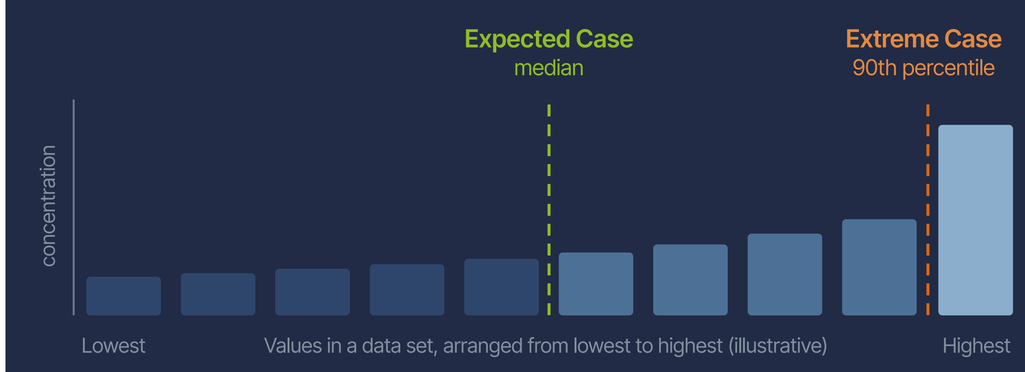
What was the assumed water quality of the stormwater runoff in the modelling?

Two water quality scenarios were developed, based on the concentration of **113 parameters** in the existing dataset of stormwater, including:

113 parameters

- pH
- Total suspended solids (TSS)
- Nutrients
- Total and dissolved metals
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Polycyclic aromatic hydrocarbons (PAHs)
- Extractable petroleum hydrocarbons (EPH)

Two scenarios were used to address the potential range of parameter concentrations in the stormwater:



Expected Case: Based on the median values of the parameters – which is the middle value in the data set when they are arranged from lowest to highest.

Extreme Case: Based on the 90th percentile concentration of the parameters – which is the value that is higher than 90% of the data and lower than only the highest 10%. This case reflects the upper range of potential concentrations which are considered significantly less likely to occur than the expected case, and to occur infrequently.

Woodfibre LNG

Modelling Results & Potential Effects

What were the results from the modelling?

The assessment modelled 113 water quality parameters and the following two flow conditions with three wind speeds (low, moderate and high):

Flow Conditions Modelled

Dry conditions (8.3 L/s):
Only treated water from Oily Water Treatment System (OWTS) is discharged at Outfall 10 (least amount of water/flow).

Wet conditions (290 L/s):
Stormwater runoff from non-contaminated areas and the treated water from the OWTS are discharged together at Outfall 10.

Five parameters required further evaluation because predicted discharge levels fell outside applicable guidelines: total copper (T-Cu), total zinc (T-Zn), pH, Total Suspended Solids (TSS) and Extractable Petroleum Hydrocarbons (EPH).



113 parameters modelled
5 required further evaluation

Total copper (T-Cu) and total zinc (T-Zn) are naturally occurring metals in the stormwater that are bound to the total suspended solids (TSS) and are not directly related to Woodfibre LNG. The lower pH is due to the natural background condition

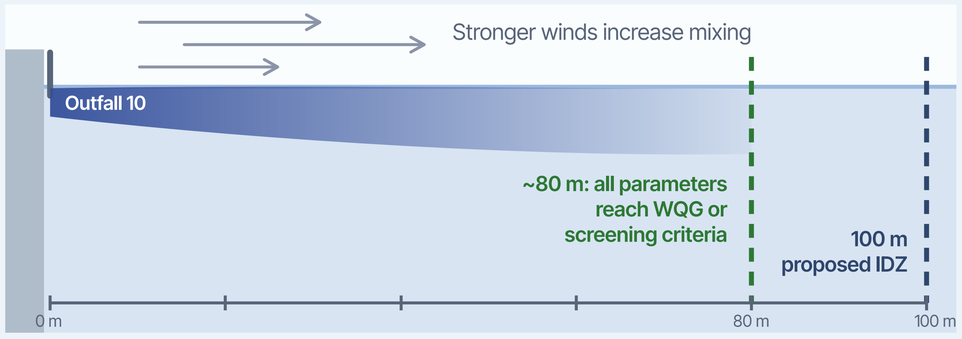
The proposed discharge is unlikely to result in adverse effects in the receiving environment as the effects are brief, localized and low magnitude.

Effects on Shoreline Marine Habitat

The effects assessment considered that the intertidal and subtidal zones within the Project area consisted of marginal quality habitat. Suitable spawning habitat has been limited in spatial extent. To improve ecological conditions on the Project shoreline, the Project's Fisheries Act authorization includes habitat enhancement measures which will be located outside the proposed 100 m initial dilution zone.

Releasing Treated Water

Concentrations decrease rapidly as discharged water mixes with Atl'ka7tsem (Howe Sound), with all parameters reaching BC Water Quality Guidelines (WQG) limits or screening criteria within approximately 80m of the outfall. Stronger winds increase mixing, resulting in a smaller area where elevated concentrations could occur.



What is the initial dilution zone?

The initial dilution zone (IDZ) is the area surrounding the outfall where discharged water mixes with Atl'ka7tsem (Howe Sound). Based on modelling, Woodfibre LNG is proposing a 100m IDZ, although many parameters of potential concern (POPC) will be below WQG closer to the outfall.

Will discharged water affect Howe Sound?

The environmental effects assessment determined the potential residual effects from EPH, TSS, T-Cu and T-Zn were unlikely to result in adverse effects based on the following rationale:

Effects Assessment for Dry Conditions

- Concentrations were of low magnitude: Concentrations steadily reduce with distance from Outfall 10 and were less than the long term WQG at the edge of the Initial Dilution Zone.
- Local spatial extent: The only concentrations that are greater than WQG are all predicted to be contained within an 80m zone from the outfall.
- Short-term duration and sporadic frequency: The Oily Water Treatment System operates in 12-hour batch cycles. Contact water is expected to be discharged during stormwater events, or once or twice per month when the Oily Water Treatment System is operated during dry conditions.
- Reversible and short-term effect: Concentrations will return to background levels or below their long-term WQG within days of any discharge.

Dry conditions are shown because they represent the highest predicted concentrations of potentially concerning substances (POPC). Concentrations are lower in wet conditions.

Monitoring

Monitoring will be required and a part of Woodfibre LNG's operations under the WDA permit. Once approved, the permit will set specific requirements for the effluent discharge to Atl'ḵa7tsem (Howe Sound) and the associated monitoring requirements which will be enforced by the British Columbia Energy Regulator (BCER). Woodfibre LNG will be required to report monitoring data to the BCER, who will review it to confirm the facility is operating within its permitted limits.

Permit sets discharge and monitoring requirements › Woodfibre LNG monitors › Data reported to the BCER › BCER confirms operation within limits

Where does monitoring happen?

The WDA application proposes monitoring at the treatment system, outfalls and in Atl'ḵa7tsem (Howe Sound).

1. Oily Water Treatment System monitoring

Water can be sampled before and after treatment. Two oil-in-water analyzers automatically redirect water to the storage tank for re-treatment if Extractable Petroleum Hydrocarbons (EPH) exceed 10.5 mg/L. At readings below the required specification, water is directed to the non-contaminated contact water system for discharge to Atl'ḵa7tsem (Howe Sound) via Outfall 10.

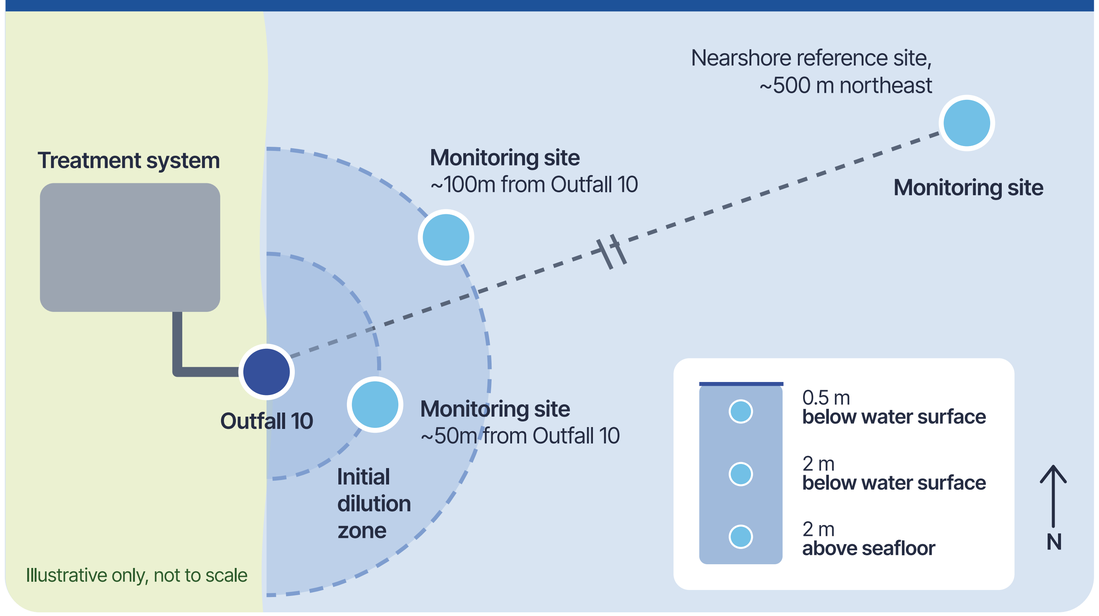
2. Outfall monitoring

The application proposes monitoring outfalls that direct non-contact and non-contaminated stormwater runoff to Atl'ḵa7tsem (Howe Sound), to make sure the stormwater diversion measures are working. At Outfall 10, monitoring can also assess permit compliance, including acute or chronic toxicity.

3. Marine monitoring

Monitoring is proposed at three locations in Atl'ḵa7tsem (Howe Sound): Two in the initial dilution zone, approximately 50 to 100 metres from Outfall 10, and a nearshore reference site approximately 500 metres northeast of the Woodfibre LNG site. Samples are proposed at three depths, allowing the analysis to go beyond just surface water.

Proposed Howe Sound Monitoring Locations



What gets measured?

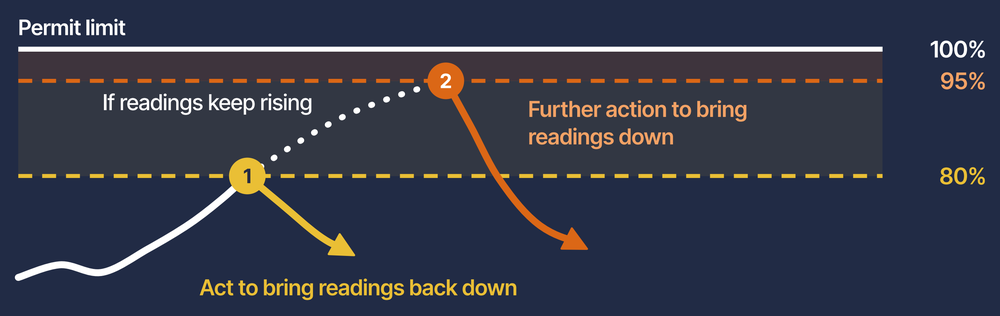
The proposed monitoring program covers several groups of measurements:

- Flow rates and field readings like turbidity
- General water chemistry
- Petroleum-related compounds
- Volatile hydrocarbons
- Total and dissolved metals
- Acute and chronic toxicity testing using fish and invertebrate species

What happens if monitoring finds a problem?

Monitoring is designed to trigger action, not just track numbers. The proposed program includes early-warning measures. If readings reach 80% of a discharge limit defined in the WDA permit, Woodfibre LNG would verify the result, investigate the source, apply mitigation steps if needed, and increase monitoring. At 95%, additional measures would be applied, including contingency planning to reduce or stop discharge where necessary and further technical evaluation.

Taking action early



1 At 80%

Verify the result
Investigate the source
Apply mitigation if needed
Increase monitoring

2 At 95%

Additional measures
Contingency planning to reduce or stop discharge
Further technical evaluation