

Technical Assessment Report

Sumas Gro-Media Ltd.

Chilliwack, BC

Prepared for Sumas Gro-Media Ltd. in fulfillment of Information Table
Requirements for Waste Discharge Application No. 440150

Prepared by,
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Date: October 20, 2025

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List of Acronyms

BOD	Biological Oxygen Demand
BMP	Best Management Practice

CALA	Canadian Association for Laboratory Accreditation
COD	Chemical Oxygen Demand
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSR	BC Contaminated Sites Regulation
EMA	Environmental Management Act
ENV	BC Ministry of Environment and Climate Change Strategy
EPN	Environmental Protection Notice
IRT	Information Request Table
MOE	BC Ministry of Environment and Parks
OMRR	Organic Matter Recycling Regulation
PCOC	Potential Contaminant of Concern
QA/QC	Quality Assurance/Quality Control
QP	Qualified Professional
SWMP	Stormwater Management Plan
TAR	Technical Assessment Report
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
WQG	BC Water Quality Guidelines

1 Introduction & Project Description

Weaver Technical Corp. (WeaverTech) was retained by Sumas Gro-Media Ltd. (Sumas) to complete a Technical Assessment Report (TAR) in accordance with the Information Requirements Table associated with Waste Discharge Application 440150. The Waste Discharge Application concerns runoff at Sumas Gro-Media Ltd. (the Facility) located at 42481 Industrial Way, Chilliwack, BC (PIDs 032-089-112 and 032-089-121), in the west end of the city of Chilliwack. The facility had completed a new 'closed loop' no-discharge stormwater management system in response to a Direction under the Fisheries Act, which now captures site wide runoff from all areas where uncovered stockpiles of growing media are kept.

It should be noted; a retention pond is maintained for storage of runoff water for recycling into a mulch process. Since it was constructed two winters ago, all captured runoff has been utilized via irrigation or the Ecomister system back onto sawmill residuals stockpiles, without the need to utilize any of the pond's retention capacity other than for testing purposes. Calculations and water balances are provided in the following sections, but they are conservative and may be well informed given there is lack of precedent or literature to support and not accurately represent the true evaporation potential of the mulch process, which generates heat and evaporation potential. A subsequent revision to this TAR may be provided which provides a more in-depth review of the specific conditions of the mulch process after measurements can be performed to confirm field conditions.

This TAR presents the information requested by the BC Ministry of Environment and Climate Change Strategy (ENV) IRT that was provided to Sumas on April 17, 2025. The information in this document includes details regarding:

- The meteorology and climate of the area for determining runoff volume
- Effluent characterization
- The implemented stormwater management system
- Potential environmental effects of discharge
- Planned environmental monitoring
- Additional management plans

All sections of this document accord to the numbered sections of the IRT.

In general, the implementation of the closed loop system has cut off all discharges to surface water, leaving only some incidental discharges to soil and groundwater, which do not appear to be adversely affecting the receiving environment. If the facility is operated in accordance with its Operations Plan and monitors in accordance with the proposed plans, the facility and its operation will continue to pose a low risk to the environment.

1.1 Project Description

The Facility is owned and operated by Sumas Gro-Media Ltd., which was founded in 2003 and operates 8am to 4pm every weekday throughout the year. The site of the facility operational footprint totals ~7.1 ha and is a plant potting soil/growing media manufacturer, using sawmill wood residuals (sawdust and hog), peat moss, and other feedstocks to manufacture custom grow media (“potting soil”) mixes for landscaping and agricultural industries. As mentioned, the facility has constructed a runoff collection, retention and recycling system utilizing ditching and drainage upgrades and pump lift stations for stormwater sequestration to be utilized in the mulch production onsite, which is a water consuming process. The objective of the system is to prevent the release of runoff impacted by wood residues or nutrients into the environment where it could degrade surface water quality or be acutely toxic to aquatic life.

Forestry residuals undergo screening for sizing for various grow media products. All over sized screenings are utilized, there is no organic waste produced by the facility. The only waste produced by the facility is plastic wrap from bagged imported feedstocks (e.g. peat moss) which is recycled.

The following were implemented in 2024 to capture, contain and recycle runoff:

- Ditching and drainage collection improvements, including settlement basins and pumping lift stations.
- Installation of a retention pond,
- Irrigation system to recycle captured runoff to irrigate feedstock piles, and
- Mechanical and electrical components for lift stations.

Section 3 outlines each of the stormwater management system components and upgrades in more detail.

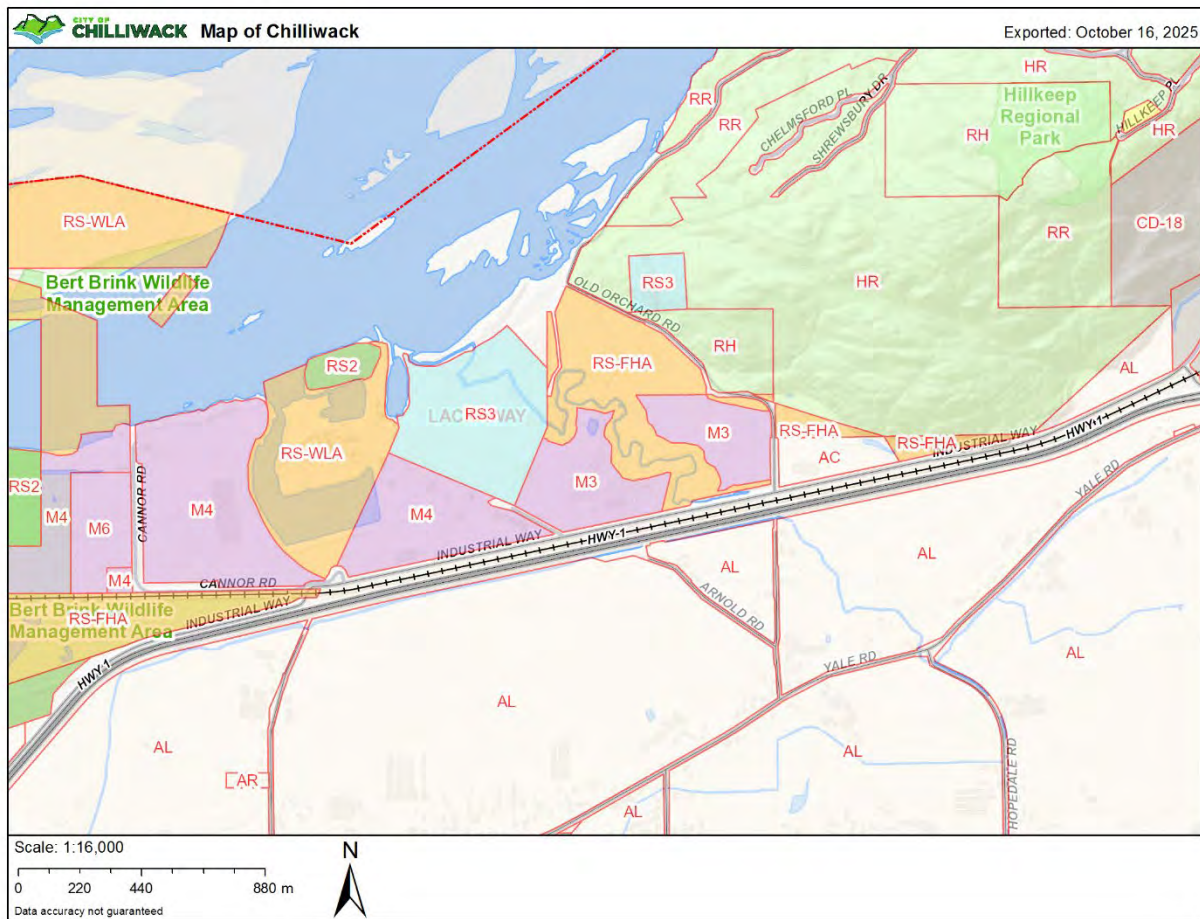
A summary of potential contaminants in captured effluent includes nutrients (N, K, P), total suspended solids (TSS), resin and fatty acids, phenols, biological oxygen demand (BOD), metals, potential hydrocarbons from mobile or hydraulic equipment, and Fecal Coliforms and *E. coli*.

1.2 Map of Project Location

Figure 1 depicts the geographic location of the facility and nearby parcels. Figure 2 shows nearby land use. Figure 3 displays the locations of upgrades and flow directions. Information regarding land uses and potential environmental receptors are discussed and illustrated in Section 4. A high-resolution site map has been included in Appendix A.



Figure 1. Site location (Black hatch) and PIDs (Source: iMapBC; Image source: Maxar, July 15, 2024)



(Zoning Bylaw 2020, 5000, 2020)

Figure 2. Nearby land use

Legend	
Short Form	Zone Designation
Agricultural	
AC	Agricultural Commercial
AL	Agricultural Lowland
AR	Agricultural Residential
Comprehensive Development	

CD-18	Comprehensive Development Zone 18
Industrial	
M3	General Industrial
M4	Heavy Industrial
M6	Special Industrial
Reserve	
RS-FHA	Reserve – Flood Hazard Area
RS-WLA	Reserve – Water Lot Area
RS2	Public Use Reserve
RS3	Special Jurisdiction Reserve
Residential	
R1-A	Urban Residential
Rural	
HR	Hillside Residential
RH	Rural Hillside
RR	Rural Residential

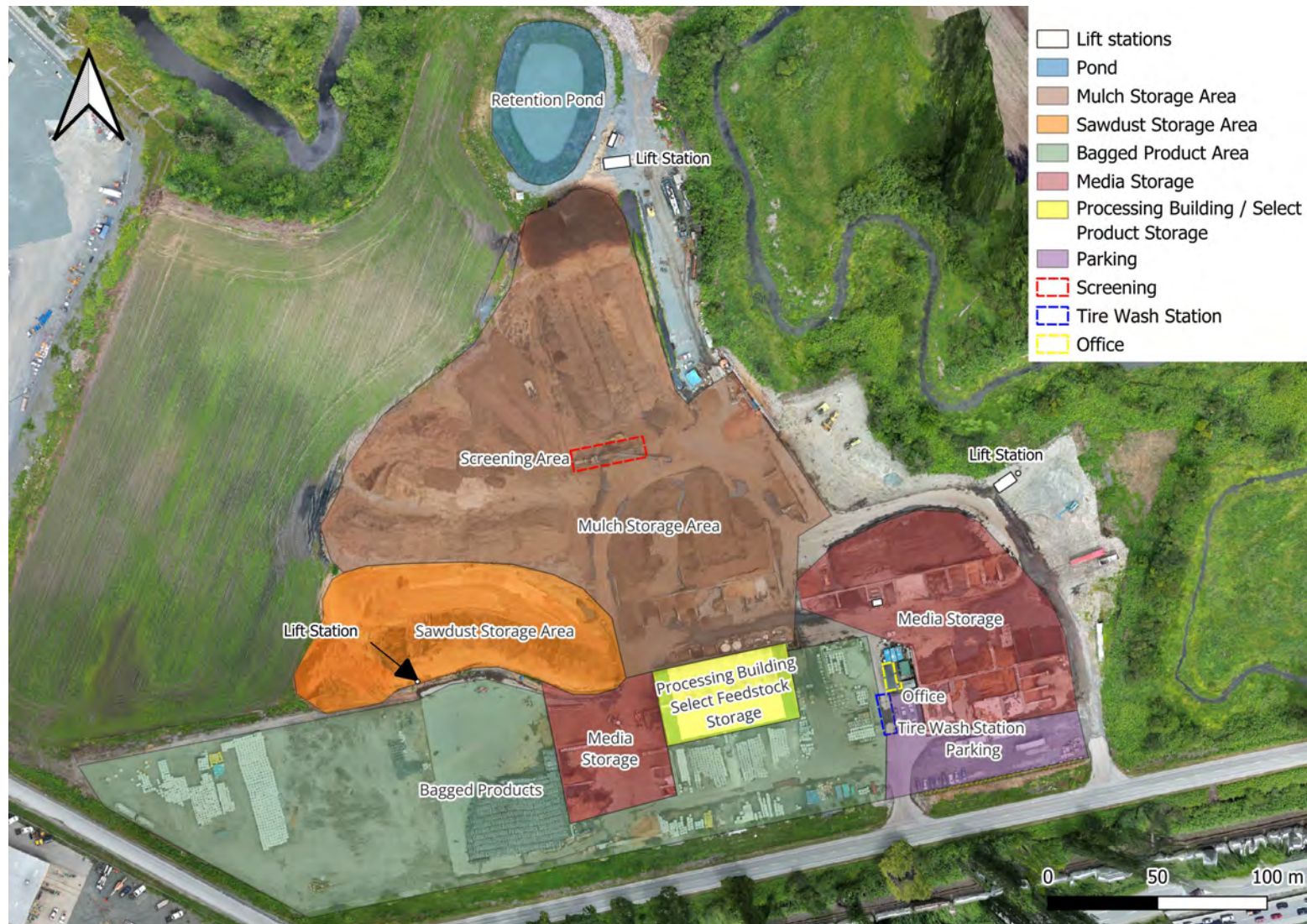


Figure 3. General Site plan



1.3 Map of Monitoring Locations

Figure 4 shows the locations of groundwater monitoring wells and surface water sampling locations. More information on sampling schedule and parameters to be sampled are located in Section 5.2.1.



Figure 4. Groundwater and surface water monitoring locations

1.4 Permitting and Ministry Visits Summary

On July 6, 2018, ENV Environmental Protection Division staff conducted an investigation of the Facility. Upon investigation, it was discovered the Facility did not have authorization to run an Organic Matter Recycling Regulation (OMRR) business. The Facility was receiving and processing wood residuals, manure, and different types of feedstocks, which are categorized by Schedule 12 of OMRR to be Organic Matter Suitable for Composting, and since composting is an activity prescribed in Schedule 2 of the Waste Discharge Regulation, the Facility required registration of these activities. Mixing and exporting the wastes without authorization was considered causing or allowing waste produced by a prescribed activity to be introduced into the environment, thus being out of compliance with Section 6(3) of the Environmental Management Act.

On June 12, 2024, ENV requested information regarding the stormwater management practices at the site. The Facility indicated that stormwater was managed through a site wide capture system that directs runoff to a holding pond to be recycled during the mulching process.

On July 30, 2024, ENV Environmental Protection Officer Taryn Angus conducted an office review inspection of the Facility in response to a complaint received by the Ministry. The inspection found the Facility to be handling waste solids, and thus effluent discharges to the environment require authorization under the Environmental Management Act. The Facility was generating effluent from uncovered stockpiles and was infiltrating to the ground through unlined ditches, an unlined retention pond, and permeable surfaces, which constituted unauthorized discharge.

Ministry inspection letters can be found in Appendix B.

1.5 Major Site Activities

1.5.1 Site Preparation

As shown in Figure 3, receiving and blending take place in the products building. Screening is conducted to the east of the mulch piles. Feedstocks are stored in lock block bunkers outside in the stockpile storage area. Leachate and runoff are stored in a clay-lined pond at the north end of the site for evaporation.

1.5.2 Operations

The Facility sources various feedstocks for mixing into growing media for plants to be sold to customers. These feedstocks include forestry residuals (e.g., stumps, broken logs), peat moss, coconut coir, fertilizers, and some inorganic materials such as sand, pumice, drain rock, and lava rock. Products such as plastic waste or similar are not permitted. If these wastes are found during screening, they are collected and disposed of at a licensed disposal facility. Leachate generated from storage and processing areas flows to lift stations and ditching and is ultimately conveyed to a clay lined retention pond. As shown in Figure 6, product storage stage doesn't generate leachate due to products are stored in plastic bags at the bagged products area and products are being stored only temporary on site for a couple of hours only before it gets send to consumers. More details regarding effluent characteristics are presented in Section 3.2.



Figure 5. Blended products flow diagram: screened (No waste material is generated other than plastic bags from bagged feedstock, screened oversize is used for other products)

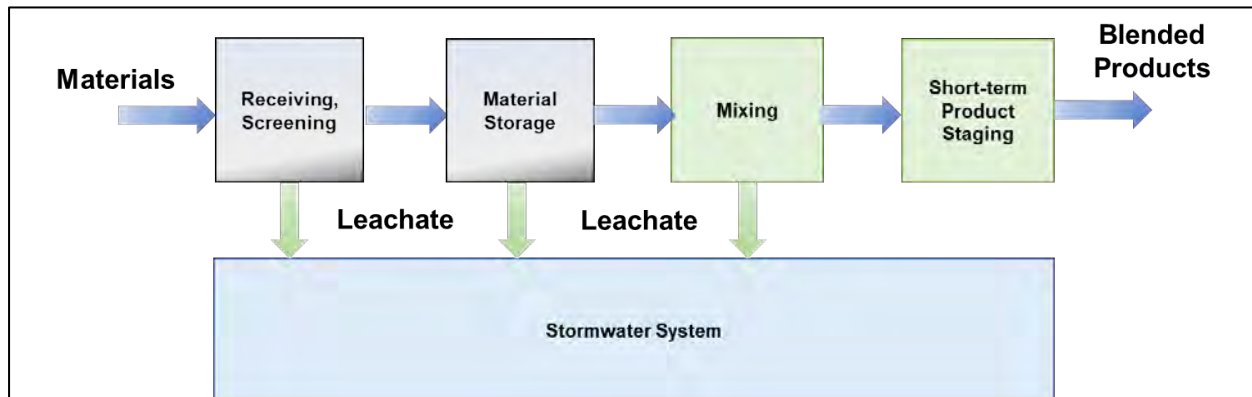


Figure 6. Blended products flow diagram: leachate

1.6 Other Relevant Regulatory Processes

No other applications are currently in-progress for Sumas Gro-Media Ltd.

2 Environmental Settings

This section characterizes the environmental setting of the site. It presents a meteorological and climatic assessment of the site for the purposes of informing about the amount of runoff expected to be managed by the site's stormwater system.

2.1 Meteorology and Climate

2.1.1 Baseline meteorology and climate assessment

The nearest public climate station is 'Agassiz', located approximately 23.7 km northeast of the Site (Figure 7). The second nearest associated climate station is 'Abbotsford A', located at approximately 26.2 km southwest of the site. The climatic data used in this description are taken from the Agassiz station's Climate Normals report (Appendix C). This report includes normals data for precipitation, wind speed and atmospheric and vapour pressure which are required for calculating evaporation potential and confirming runoff storage requirements.



Figure 7. Nearby climate stations and distances to site

Temperature and precipitation summary

Climate data from the Agassiz station ((*Canadian Climate Normals Agassiz Station; Climate ID: 1100119*)) for average temperature and precipitation by month (for the period 1991-2020) are given below. There is an approximate 10 m elevation difference between the climate station (20 masl) and the Site (10 masl). During the historical time period, the recorded annual daily average temperature was 11.0°C and the total annual precipitation was 1734.1 mm/year (Table 1).

Table 1 Agassiz (Agassiz Station) historical normals data: temperature and precipitation (1991-2020)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature													
Daily average (C)	3.5	5.3	7.3	10.4	14.2	16.4	19.0	19.0	16.2	11.2	6.4	3.5	11.0
Precipitation													
Rainfall (mm)	229.0	128.1	169.6	123.3	96.1	91.5	55.4	63.0	92.0	183.8	271.2	211.6	1714.6
Snowfall (cm)	18.2	4.7	7.2	0	0	0	0	0	0	0	7.4	14.4	52.0
Precipitation (mm)	250.2	136.6	151.8	123.0	89.7	90.7	55.1	68.7	98.3	185.4	267.8	216.8	1734.1

The attached document (Appendix C) contains the full historical normals report for the Agassiz station for the time: 1991-2020.

2.2 Surface Water Hydrology

2.2.1 Hydrological Assessment

2.2.1.1 Monthly and Annual Stream Flow Summary

No discharge to the surface water bodies, not applicable.

The stream flow in nearby surface water body Wilson Slough is variable but net flux would be north towards the Fraser River during rainy season, possibly slowing or reversing direction if water use in the dyke system within the Fraser Valley draws down water from the slough for irrigation.

2.2.1.2 Hydrologic Analysis

Wilson Slough is located along the east and north boundaries of the property. The slough flows generally from south to north and discharges into the Fraser River, serving as part of the local surface water drainage network within the Chilliwack Valley (Figure 8). No wetlands are located

within 1 kilometre of the site, although the peripheries/riparian zones of the slough are marsh like and may constitute wetland type habitats.

Wilson Slough originates near the intersection of South Sumas Road and Hopedale Road, adjacent to a horse arena. From there, it flows north along Hopedale Road, passing through several agricultural properties, including farms and dairy operations, before reaching the vicinity of the site and continuing northward to the Fraser River. The segment of Wilson Slough near the site is characterized by dense vegetative growth and riparian cover along the channel margins.

No direct stormwater or effluent discharges from the site are directed into Wilson Slough any longer, although historically the site drained directly into the slough prior to stormwater system improvements which now direct all runoff onsite into the clay lined retention pond. All site drainage is contained and managed internally through designated stormwater control systems, ensuring that no surface runoff from operational areas enters the slough or its tributaries.

2.2.1.3 Drainage Basins Map



Figure 8. Map of Wilson Slough (yellow) and other drainage courses near the Facility. Wilson Slough is denoted by the yellow arrow meandering north., linked to other dyke drainage ditching.

2.3 Hydrogeology

2.3.1 Baseline Hydrogeological Assessment

2.3.1.1 Groundwater information

The site is located within the Chilliwack–Rosedale Aquifer (Aquifer No. 6) in the Chilliwack Fraser Lowland. The detailed aquifer information can be found in Appendix D. The aquifer consists of Holocene fluvial sand and gravel deposits associated with the Fraser River. It is an unconfined sand and gravel aquifer with high permeability and high groundwater productivity. Although onsite soil conditions indicate clay layers near surface soils, which are likely to provide some amount of protection to the underlying aquifer on the site.

Groundwater occurs under unconfined conditions and is hydraulically connected to nearby surface water. Observation Wells 450 and 503 are active within this aquifer.

As of 2025, the aquifer contains 360 correlated wells and 707 uncorrelated wells within its mapped area of 208.7 km². There are 34 groundwater licences authorizing an annual withdrawal volume of approximately 1.9 million cubic metres for domestic, agricultural, and industrial use (Appendix D).

At the site, a layer of clay is present beneath the surface materials. This clay acts as a low-permeability barrier that limits vertical infiltration of surface water into the underlying sand and gravel aquifer, reducing the likelihood of direct recharge and providing some protection against potential surface contamination. A sample of the clay was submitted for analyses for hydraulic conductivity to ALS laboratories. The results indicated a conductivity of 1.2 E-07 cm/s as shown in Table 2.

Table 2. Clay Hydraulic Conductivity Result

Bureau Veritas ID		DQD207			
Sampling Date		2025/08/01 09:25			
COC Number		761868-01-01			
	UNITS	MW02(11-11.5)	RDL	MDL	QC Batch
Physical Properties					
Bulk Density	kg/m3	1540	1	1	C083411
Soil Water Content	wt%	31	0.1	0.1	C083414
Type of Compaction	N/A	STDPROC	N/A	N/A	C083401
Ksat cm/s	N/A	1.2E-07	N/A	N/A	C083401
Ksat cm/hr	N/A	4.1E-04	N/A	N/A	C083401
Ksat in/hr	N/A	1.6E-04	N/A	N/A	C083401
Ksat in/s	N/A	4.5E-08	N/A	N/A	C083401
RDL = Reportable Detection Limit					
N/A = Not Applicable					

Hydraulic conductivity tests within monitoring wells are forthcoming and will be performed in the coming months to confirm *in-situ* conditions during winter high groundwater conditions when there is sufficient head above the clay layer for a slug test.

The aquifer is rated as having high vulnerability due to its unconfined nature and coarse-grained material, which allow rapid infiltration where protective layers are absent. Monitoring and protection are conducted under the District of Chilliwack Groundwater Protection Plan.

2.3.1.2 Baseline Groundwater Assessment Design

Sumas has implemented a voluntary groundwater monitoring program to support information needs for this permit application and to determine if the Site has historically or may be impacting groundwater. The monitoring program is designed to assess potential vertical and horizontal movement of groundwater in relation to site operations and natural hydrogeologic conditions.

The site is underlain by the Chilliwack–Rosedale Aquifer, an unconfined sand and gravel aquifer of high permeability. A continuous clay layer (although varying in thickness) beneath the site was observed in monitoring well installation, which is expected to act as a low-permeability barrier that restricts vertical infiltration and provides separation between surface water and the underlying aquifer.

Four groundwater monitoring wells have been installed to characterize baseline conditions and detect potential effects from site activities (Figure 4):

- **Background well (upgradient):** Located near the south entrance of the site, this well is positioned upgradient of groundwater flow to establish baseline groundwater quality and level data that are unaffected by facility operations.
- **MW02:** Installed cross-gradient from the mulch storage area to monitor potential influence from surface infiltration and storage operations.
- **MW03:** Installed cross-gradient from the retention pond to provide early detection or effects monitoring for ground release from pond storage and clay lined swale.
- **MW01S/D:** Installed downgradient of the site's operational area and adjacent to the downstream surface-water sampling point. This location allows assessment of groundwater flow direction, potential connectivity to surface water, and early detection for future monitoring purposes. Two wells are installed at this point: a shallow well (MW01-S) with its screen located above the clay layer, and a deep well (MW01-D) with its screen positioned below the clay layer. This configuration allows for vertical profiling of hydraulic conductivity and assessment of groundwater movement through and beneath the clay barrier.

Monitoring results from these wells will be used to confirm that groundwater conditions remain stable, infiltration from precipitation does not impact the underlying aquifer, and no evidence of groundwater upwelling or daylighting occurs within or beyond the site boundary given it is generally flat and the only location where significant slope occurs is within the slough riparian area, which has a defined channel and embankment.

2.3.1.3 Aquitards

According to MAP 1485A – *Surficial Geology of Mission, British Columbia* (Appendix E), the site's surficial geology is characterized as "Fg", Fraser River Sediments, with the description of "Channelled deposits (expressed at surface by ridges and swales), silty clay loam, silt loam, silty clay, and minor organic sediments, up to 10m thick, overlie Ff and Fe". Fe's description says, "estuarine fine sand to clayey silt, in places fossiliferous; probably underlies extensive areas in Sumas and Matsqui valleys; thickness may vary from 10 to 150 m", and Ff's description says "Channel and floodplain sand and gravel, up to 60m thick, underlying Fd,g,h."

The fine-grained deposits within the Fg unit, composed of silty clay loam, silt loam, silty clay, and minor organic sediments, act as an aquitard that restricts downward water movement. This low-permeability layer separates surface water and near-surface infiltration from the underlying coarse-grained Ff and Fe sand and gravel units, which form the primary aquifers. The clay-rich Fg layer provides hydraulic separation and protection for the underlying groundwater system, reducing the potential for surface infiltration or operational runoff to affect regional groundwater flow.

2.3.1.4 Groundwater Monitoring Maps

Refer to Figure 4 for groundwater monitoring locations.

2.3.1.5 Water Level Contour Map

Refer to Figure 14 for Groundwater level contour and water flow directions. Further discussion in sections below.

2.3.1.6 Well Logs

Refer to Appendix F for Borehole well logs, clay layer hydraulic test results, drill core pictures, monitoring well installation details, and hydro stratigraphic cross sections.

2.3.1.7 Downgradient Groundwater Users

Refer to Section 4.3 for detailed downgradient user analysis.

2.3.1.8 Downgradient Surface Water Groundwater Interactions

Groundwater at the site flows generally toward the east and northeast, consistent with the natural hydraulic gradient of the Chilliwack–Rosedale Aquifer and the regional topography of the Fraser River Lowland. The downgradient receptor for groundwater in this area is the Fraser River, which functions as the main discharge boundary for the regional groundwater system.

Groundwater within the sand and gravel units moves laterally through the permeable deposits in the direction of the Fraser River, where it eventually discharges as baseflow or seepage into the river channel. The fine-grained aquitard above reduces vertical hydraulic connection with the surface, minimizing the influence of precipitation infiltration or surface activities on groundwater quality. Overall, the groundwater system beneath the site is hydraulically connected to the Fraser River at depth, with flow directed northeast toward the river under natural gradient conditions.

Surface water in the area, including nearby Wilson Slough, also flows naturally north toward the Fraser River as shown in Figure 8.

2.3.1.9 Conceptual Model

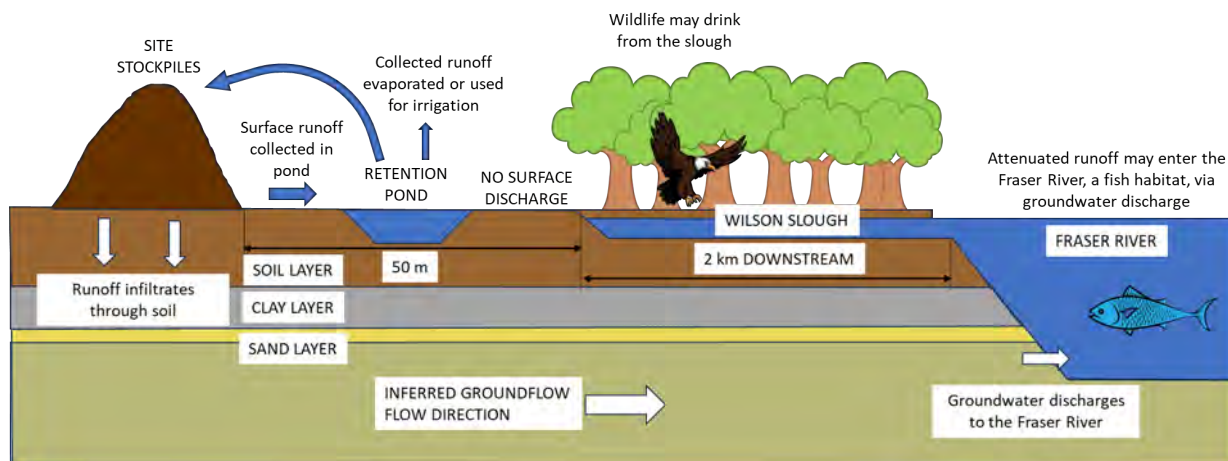


Figure 9. Conceptual site model

Figure 9 shows potential contaminant sources at the site include runoff and infiltration from the operational area where materials and runoff containing wood residue leachate are stored. Any infiltrating water first enters the upper soil layer composed of silty clay loam and silt. Below this, a continuous clay layer exists which may restrict vertical movement and limits downward migration of water or contaminants.

The primary transport pathway for groundwater is within the underlying sand layer, where flow occurs laterally toward the east and northeast. This flow direction leads to the downgradient receptors, Wilson Slough and the Fraser River. Wilson Slough is located approximately 50 metres from the operational area, and the slough runs for 2 km before entering the Fraser River.

2.3.1.10 Local Hydrogeological Conditions Summary

The site is underlain by Fraser River Sediments consisting of fine-grained silty clay loam, silt loam, and minor organic materials up to about 10 m thick, overlying sand and gravel deposits extending to approximately 60 metres depth. The fine-grained upper layer functions as an aquitard, while the underlying sand and gravel units form the unconfined aquifer associated with the Chilliwack–Rosedale Aquifer.

Groundwater levels indicate a shallow water table above the clay layer, with flow generally toward the east and northeast where discharge occurs into the Slough or Fraser River. Seasonal fluctuations may correspond to precipitation patterns, with minor rises during wet periods although there was insufficient monitoring time to support of this assessment to observe seasonal variability. The clay and silt materials have low hydraulic conductivity, while the sand and gravel layers are highly permeable, allowing lateral flow within the aquifer.

Estimated field-saturated hydraulic conductivity ranges from 10^{-6} to 10^{-7} cm/s for the fine-grained aquitard and 10^{-3} to 10^{-4} cm/s for the underlying aquifer materials. Groundwater flux is moderate to high, with travel velocities of approximately 0.1 to 1.0 m/day through the saturated zone (Appendix D). The thick clay layer substantially reduces vertical infiltration, resulting in limited hydraulic connection between surface water and the deeper groundwater system.

2.4 Surface Water Quality

2.4.1 Surface Water Downstream Receptors

Refer to Section 4.1.2 for detailed downgradient user analysis.

2.4.1.1 Sampling Locations Figure

Refer to Figure 4 for surface water sampling locations.

2.4.1.2 Surface Water Quality Discussion

As described in the previous section, Wilson Slough is the main surface water drainage feature situated along the east and north boundaries of the site. Surface water monitoring has been conducted in accordance with the Surface Water Monitoring Plan to assess potential influence from site activities. Two monitoring locations were established: one upstream of the slough before it enters the site's proximity, and one downstream of the slough after it passes the operational area (Figure 4).

Four sampling events were completed in 2025 during April, May, July, and August. The upstream monitoring point represents background surface water quality before the slough is

affected by any potential site-related runoff. The downstream location represents surface water conditions after the slough has flowed past the site.

Analytical result tables are included in Appendix G, with laboratory report included in Appendix H. Analytical results show that the upstream samples consistently exhibited higher concentrations of aluminum, cobalt, copper, iron, molybdenum, and faecal coliform compared to the downstream samples. This is consistent with the slough's upstream drainage pattern, which passes through multiple farms and dairy operations before entering the area near the site. The lower concentrations observed downstream may be attributed to natural attenuation and vegetative uptake within the heavily vegetated section of the slough along the site boundary. It appears in general that agricultural impacts to the upstream slough waters begin to attenuate as the slough meanders through its marshy reaches as it passes the site before entering the river. In general, there was no evidence that the slough was being impacted by the site operation itself.

Minimal runoff has been diverted to the retention pond. Water from the site's retention pond was analyzed in April 2025 to identify potential contaminants of concern, including cobalt, iron, silver, zinc, and resin and fatty acids. Elevated concentrations of resin and fatty acids were observed. Cobalt, silver, and zinc exceeded the BC WQG for freshwater long-term (chronic) protection, while iron exceeded the short-term (acute) guideline. Notably, the iron concentration in the retention pond was lower than that measured in the upstream surface water.

Key parameters such as silver, zinc, and resin and fatty acids were not detected in either the upstream or downstream slough samples. These findings indicate that stormwater runoff from the site is not entering Wilson Slough and that any groundwater migrating from the site to the slough is not having a measurable impact on the slough. Subsequently it does not appear that site activities have a measurable impact on surface water quality.

3 Effluent Discharges and Management

The total catchment area of the Site (7.1 ha) is divided into 3 catchment areas, according to location and flow direction (see Figure 13). The areas that are collected by the leachate collection system are the paved and unpaved catchments marked in green and red respectively. Relating to the site plan (Figure 3), the pond, mulch storage, and mixed storage areas drain into the leachate collection system which connects to the retention pond. The bagged storage and entrance areas are not considered contaminated areas and are left to drain off-site given the contact potential is low given material is fully bagged, and all drainage enters a blind ditch along the road with no physical connection to surface water bodies.

3.1 Process Flow for Waste Streams

Refer to Section 1.5.2 for the process flow diagram for waste streams.

3.2 Effluent Sources and Characterization

3.2.1 Wood residue specific PCOCs

Sumas processes and stores clean sawmill wood residuals for mulch/media, coconut husk, peat moss and clean aggregates onsite. Generally speaking, wood residues (including coconut husk which is analogous in constituents) contain natural resin compounds (namely polyphenols, terpenes, resin acids, nutrients etc.) that can be toxic to aquatic life and are present in all species of wood and plants. Wood residues also include nutrients such as nitrogen, phosphorous or solutes within the plant tissues. Nutrients can cause eutrophication, result in excess oxygen consumption, or can be presented as toxic metabolites (e.g., ammonia, nitrite and nitrate), although nitrogen containing species are in generally low concentrations in wood specifically compared to green wastes (not handled onsite).

PCOCs generated by wood residues that pose a higher risk of breakthrough to the environment than carbonaceous wood residues include:

- Resin acids and phenolics
- Biochemical Oxygen Demand (BOD)
- Suspended solids
- Nutrients (phosphorus, nitrogenous compounds, sulphides/sulphates)
- Metals such as Iron
- Other major ions (calcium, chloride, magnesium, potassium, sodium)

The main objective of the collection system is to prevent the release of a “deleterious substance” to fish bearing waters, with respect to compliance with the federal *Fisheries Act*.

Routine analytical results from Wilson Slough should be provided to a QP for validation since acute or chronic toxicity potential is not always directly proportional to any single contaminant of concern and can often be a result of cumulative effects of multiple substances.

Given the presence of nutrients, secondary pollution in groundwater could also occur if sufficient quantities enter groundwater such that it changes the redox state of groundwater and soil interaction geochemistry or equilibrium. Often eutrophication of groundwater can manifest as changes in pH and dissolved oxygen which can cause changes in metals solubility, causing mobility of natural compounds.

3.2.2 Mineral Oil and Grease

Other PCOCs at the facility that pose a risk of breakthrough to the environment if they were discharge are those that may leak from machinery or vehicles. These PCOCs are mainly:

- Oil and grease (accidental fuel or lubricant releases from mobile equipment, fueling or storage)

Oil and grease that are handled and utilized onsite include fuels and lubricants associated with the mobile equipment. If substances from a spill were to enter waterways, it could present a potential toxicity risk or could pose a risk for offsite contamination.

Although the risks of such contamination can be mitigated through spill protection and spill kits. The system also contains all runoff in a lined retention pond and confinement of a spill if it were to occur.

3.2.3 Fecal Coliforms

Sumas Gro-Media historically stored manure products on-site in an open stockpile, but this practice has been discontinued. Manure soil blends are now produced by others (offsite) and are only stored under tarp cover as pre-made blended products and in small quantities (~300 tonnes onsite). However, the process of wood mulching which is warm and generally low oxygen which can provide an environment which results in natural proliferation of fecal coliform species, although these species are unlikely to be pathogenic given the origins of the coliforms are natural flora that may be naturally present on wood.

Regardless, part of the function of the stormwater containment system is to prevent discharges of biologically active leachates into surface water bodies, which may degrade their quality for recreational or future drinking water uses.

3.3 Waste Discharge Map

There are no leachate discharges from the collection system to surface water. All collected leachate is stored in a pond for irrigation or evaporation. Runoff that is irrigated back into the mulch process may leach through the mulch piles and enter soils on unpaved surfaces, although migration potential to groundwater and to Wilson Slough is limited as will be discussed in more detail.

3.4 Mitigation Measures to Limit Discharge Rates and Contaminant Concentrations

Source prevention is the key prevention and mitigation measure for reducing the potential for impacts or burdens on the water collection system. The main preventative measures that will be taken for stopping contaminants at their source are:

1. Proper vehicle and machinery maintenance.
2. Regular site housekeeping (maintaining drainage systems; minimizing waste exposure to runoff).

Vehicles and site machinery should be well maintained so as to limit leaking of fuel or oil/grease as this may result in contamination of the water used in the mulching process. Vehicles that are stored onsite or parked there for periods of time that exceed regular workday hours should remain on concrete or paved surfaces when not in use.

Sizing of the holding pond and freeboard necessary and a rigorous plan to ensure stored water is utilized to maintain adequate freeboard are important considerations to prevent breaching of the pond to surface water. Further information is presented in the Operations Plan.

3.5 Need for Advanced Treatment

The collection system does not discharge. Treatment is not required.

3.6 Effluent discharge limits

The collection system does not discharge. Thus, there are no proposed discharge limits.

3.7 Proposed sampling and flow measuring facilities at discharge point

The collection system does not discharge. However, Wilson Slough will be monitored annually for contaminants of concern for two years minimum to characterize PCOCs as it relates to down gradient or receiving environment monitoring. The pond itself would need to re-characterize if the operation changes to include new feedstocks containing PCOCs or new activities that result in production of new PCOCs.

3.8 Stormwater Management System Overview

3.8.1 Best Achievable Technology

In determining the design for the planned upgrades and stormwater management system, several configurations were considered and weighed against cost and relative footprint of the site. For smaller sites, chemical/physical treatment systems, which may employ treatments such as peroxide injection, ozone injection, flocculation/microfiltration/reverse osmosis, and various types of coagulation are ideal as they are compact and can achieve most discharge limits without long retention times. They are, however, often cost prohibitive relative to the level of risk posed by the effluent, although there are exceptions at facilities that store large quantities or stockpiles of residuals in areas prone to runoff and require discharges, which may be to sensitive receiving environments. If space allows it, a more economical option that can treat

leachates from mulch facilities with the same outcome (i.e., removal of acute toxicity potential) is a biological aerated lagoon.

Given the size of the subject site, the characteristics of the site's contact runoff (suspended solids, wood residues, and fecal coliforms), and the surrounding environment, the significant water needs of the mulching process, a no-discharge retention pond is a suitable and achievable runoff management option. Since all generated runoff is evaporated through mulching and is not discharged to the water courses, treatment is not required.

See Appendix I for record drawings and calculations of the stormwater management system. Table 4 below summarizes the design calculations provided in Stormwater Management Plan (SWMP) in Appendix Q. The monitoring plan can be found in Section 5.

3.8.2 Retention Pond Design

Detailed calculations and methodology are provided in the Stormwater Management Plan (SWMP) in Appendix Q. This section summarizes the retention pond design and key parameters.

The retention pond was designed to accommodate a 1-in-10-year, 24-hour storm event at any time, while also being capable of containing the total November precipitation, the wettest month of the year, without overflowing or requiring drawdown for mulch irrigation.

The calculated pond storage requirements for November's precipitation and for the 1-in-10-year storm event are presented in Table 3 and Table 4, respectively.

Table 3. Required retention pond capacity to hold November's precipitation

Sub Catchment	Catchment Area	Runoff Coefficient	Rainfall	Volume
Unit	m ²		mm	m ³
Paved Catchment Area	22,677	0.95	271.2	5842.5
Unpaved Mulch Storage Area	23,066	0.3	271.2	1876.6
Retention Pond	3,094.7	1	271.2	839.3
Total:	48,837.7		Lined Pond Capacity:	8558.4

Table 4. Required capacity to hold 1-in-10-year 24 hr storm

Sub Catchment	Catchment Area	Runoff Coefficient	IDF	Volume
Unit	m ²		mm/24hr	m ³
Paved Catchment Area	22,677	0.95	74	1913
Unpaved Mulch Storage Area	23,066	0.3	74	614.5

Retention Pond	3,094.7	1	74	274.8
Total:	48,837.7		Required Capacity for Storm Surge:	2808.3

Table 5. Retention pond parameters

Parameter	Value	Unit
Pond length	70	m
Pond width	45	m
Pond depth	5	m
Pond water depth	4.7	m
Pond slope	2	
Dugout volume	10666.7	m ³
Max Water volume	9742.2	m ³
1:10 yr 24 hr storm volume	3211.9	m ³
Operating holding volume	6939.9	m ³
Water height at holding volume	3.7	m
Freeboard	1.3	m

The retention pond was constructed by Sumas in 2024, and an as-built survey completed by Weaver Technical Corp confirmed that the pond dimensions and capacity meet design requirements. The retention pond provides a total storage capacity of 9,742 m³. The operational freeboard is required to be maintained at approximately 1.3 m, ensuring the pond can accommodate extreme rainfall events to ensure a 1-in 10-year 24hr duration storm surge can be accommodated.

Water collected and stored in the pond must be either evaporated through the EcoMister system or recirculated to the mulch storage area via the sprinkler network.

3.9 Certification by Qualified Professionals

The runoff collection system, the retention pond, irrigation and misting system was reviewed by Tim Weaver P.L.Eng, R.P.Bio, EP through various field inspections, and through confirmatory calculations to ensure the works meet the capacity requirements for a 1-in-10-year 24-hour storm event. Based on information provided by Sumas Gro-Media Ltd., Mr. Weaver has confirmed that the system as constructed can retain and recycle such storm events and prevent a discharge to surface water. Furthermore, it is his opinion that the retention system appears to be adequately containing the stormwater containing leachate such that it is not causing harm to the nearby aquatic environment via groundwater discharges. This was evident in monitoring well analytical data (although limited to one sampling event) which showed low concentrations of organic residues and no detectable effects in nearby surface waters of Wilson Slough. He

certifies that based on the information available to date, that if the system is operated in accordance with the plans contained and referred to in this TAR, that the discharges will not cause harm aquatic receptors.

Refer to Section 9 for qualifications and certifications.

3.10 Construction and Commissioning Schedule

Not Applicable, system already in place, no further construction planned in the future.

4 Environmental Effects Prediction and Impacts Assessment

4.1 Receptors & Environmental Values

With respect to accidental discharges to the environment or planned discharges as part of the runoff management plan, this plan evaluates the following potential receptors based on a review of the BC Water Well Database (within 800 m of the site), Ministry of Environment Habitat Wizard Streams Report, and other information that was available as well as visual inspection of the near-by watercourses.

4.1.1 Ground water wells and drinking water sources.

A review of the BC Water Well Database shows that the site itself contains three Unlicensed groundwater wells with unknown use (with some irrigation purpose) (Table 6). Drinking water, specifically, for the site is supplied by the municipality. There are 13 additional wells outside of the site, within 800 m. The wells outside of the site are a combination of Unlicensed with Unknown use or Private domestic use and Licensed with Industrial and Commercial use. There is one unlicensed well for irrigation use. Domestic wells may be used for drinking water although no specific occurrence can be confirmed. None of the domestic wells registered are downgradient of the site. The private domestic well ID 106163 that is cross gradient from the site is situated across from the Wilson slough on a hill taller than the site and separated by hydraulic connection. It is expected to not be affected by operation at the site.

Table 6. Water supply wells on and offsite details and license status

Well Tag Number	Map Location	Latitude, Longitude	Well Status	Well Class	Intended Use	Yield (Gal/min)	Depth (ft bgl)
Cross Gradient							
106163	Offsite (cross gradient)	49.144911, -122.040719	Unlicensed	Water Supply	Private Domestic	1.5	360
Downgradient							
93865	Offsite (downgradient)	49.142608, -122.059287	Unlicensed	Water Supply	Commercial and Industrial	N/A	139
On-Site							
109803	Onsite(A)	49.14096, -122.04724	Unlicensed	Water Supply	Unknown	300	126
116249	Onsite(B)	49.14075, -122.04823	Unlicensed	Water Supply	Unknown	N/A	122
121898	Onsite(C)	49.142, -122.04753	Unlicensed	Unknown	N/A	N/A	235
Upgradient							
10015	Offsite (upgradient)	49.13507, -122.04536	Unlicensed	Water Supply	Private Domestic	N/A	N/A
10016	Offsite (upgradient)	49.1352, -122.04049	Unlicensed	Water Supply	Private Domestic	0	28
10021	Offsite (upgradient)	49.13347, -122.04622	Unlicensed	Water Supply	Private Domestic	0	12
10024	Offsite (upgradient)	49.13306, -122.04779	Unlicensed	Water Supply	Private Domestic	0	65
10033	Offsite (upgradient)	49.14041, -122.03808	Unlicensed	Water Supply	Private Domestic	0	24
55849	Offsite (upgradient)	49.135036, -122.044227	Unlicensed	Water Supply	Private Domestic	500	105

92224	Offsite (upgradient)	49.133372, - 122.043245	Unlicensed	Water Supply	Private Domestic	25	245
94103	Offsite (upgradient)	49.13911, -122.04467	Licensed	Water Supply	Commercial and Industrial	40	35
95898	Offsite (upgradient)	49.1403, -122.03949	Unlicensed	Water Supply	Private Domestic	0.5	82
122898	Offsite (upgradient)	49.14025, -122.03955	Unlicensed	Water Supply	Irrigation	N/A	124.5
121152	Offsite (upgradient)	49.13749, -122.04119	Unlicensed	Water Supply	Open LP Geoexchange	30	121.5

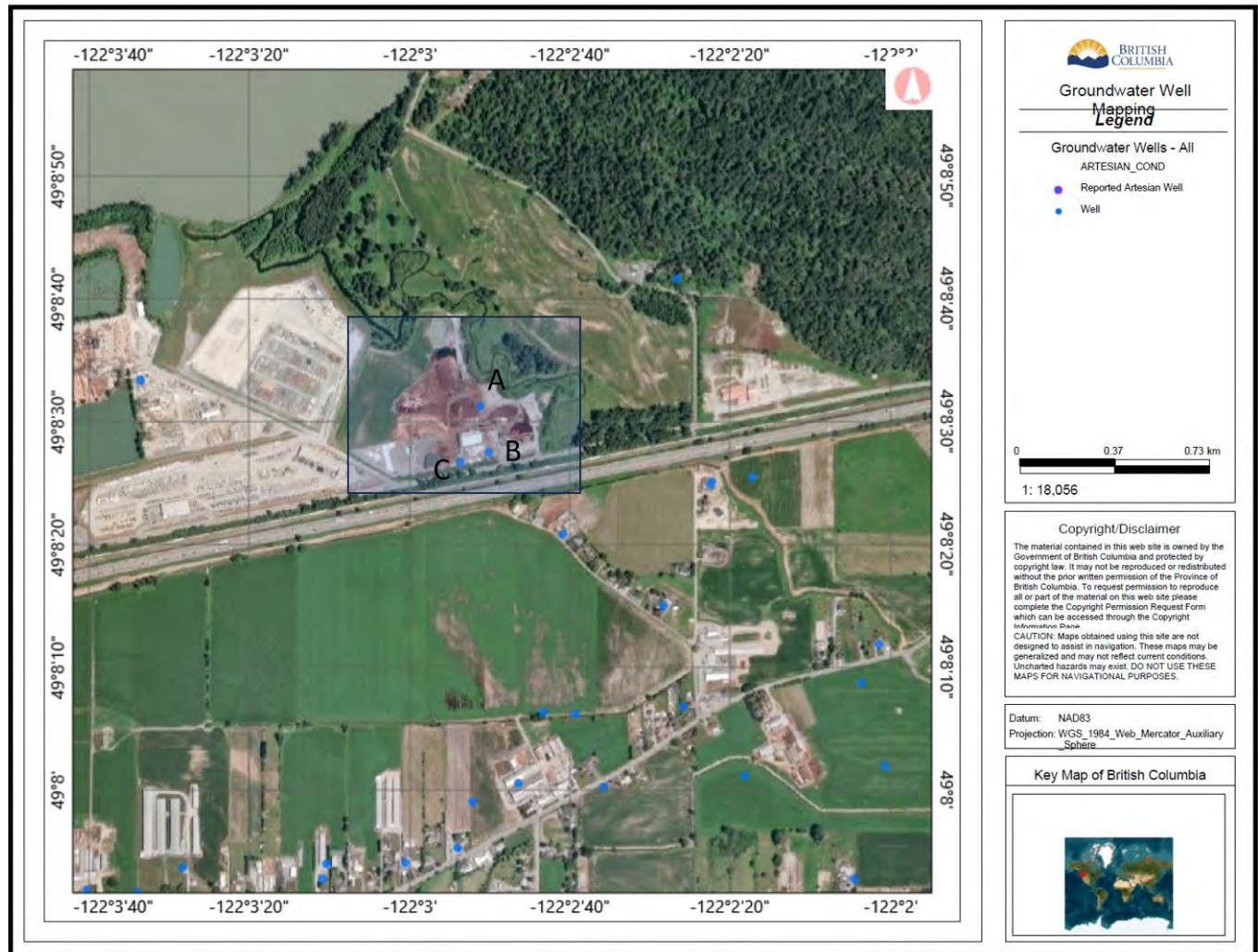


Figure 10. Groundwater wells status

Other than the wells located onsite for industrial use, there is one more well ID 106163 downgradient within 800 m of the site that is for commercial and industrial use.

Given the proximity of the site to the Fraser River, and inferred hydraulic gradient towards the river, it does not appear that there is a risk of groundwater use in zones within an area of influence of the site at present or in the operational future of the facility, given distance to property boundaries, hydraulic separation by water bodies and proximity to the highway and industrial land uses.

Considering the operational area of the facility is located primarily on paved surfaces, runoff may presumably enter groundwater at only unpaved surfaces at the site through infiltration, or an overflow event at the pond. The retention pond is specifically designed to prevent any impacts to groundwater. It has a >0.5 m thick clay lining with a hydraulic conductivity of 1.2×10^{-7}

cm/s. This prevents infiltration and limits groundwater impacts. In general, the purpose of the retention pond is to hold all the stormwater runoff generated from the site to be either retained for environmental protection or to be reused for site purposes.

Sufficient grading and ditching at the site will ensure all runoff during a 24-hr duration 1-in-10-year return storm event is directed to the retention pond and retained for evaporation or reuse. In the unlikely event of an emergency overflow, it will be discharge through the pond overflow pipe to the corn field west of the pond and not direct to the slough.

4.1.2 Surface Water Receptors

Aquatic life. No effluent is planned to be discharged; however limited infiltration via groundwater could potentially make it to the Wilson slough which flows to the Fraser River, a fish-bearing watercourse with high productivity and presence. Therefore, guidelines for the protection of aquatic life have been considered as a part of this assessment report.

The Fraser River (Trimmed Watershed Code: 100) runs east to west along the north side of the Site that is directly 500 m away. Fish observation points recorded between 2005 and 2008 (e.g., see EDI Environmental Dynamics, 2008)¹ indicate presence of the following species of fish in the area of the Fraser River adjacent to the site (see Figure 11).

- Chinook Salmon - *Oncorhynchus tshawytscha*
- Largescale Sucker - *Catostomus macrocheilus*
- Longnose Dace - *Rhinichthys cataractae*
- Northern Pikeminnow - *P. oregonensis*
- Peamouth Chub - *Mylocheilus caurinus*
- Prickly Sculpin - *Cottus asper*
- Redside Shiner - *Richardsonius balteatus*
- White Sucker - *Catostomus commersoni*
- Bull Trout – *Salvelinus confluentus*

Also present immediately adjacent to the site is Wilson slough (Trimmed Watershed Code: 100-069200), running south to north along the eastern and northern border of the site before it enters the Fraser River.

Upstream of Wilson slough around Industrial Way and Old Orchard Rd. has observed fish species listed below:

- Redside Shiner
- Stickleback (General)
- Cutthroat Trout

Downstream of Wilson slough near the exit to Fraser River has observed fished species listed below:

- Cutthroat Trout - *Oncorhynchus clarkii*
- Sickleback (General) - *Gasterosteus* spp.
- Coho Salmon - *Oncorhynchus kisutch*
- Lamprey (General) - *Entosphenus* spp.
- Western Brook Lamprey - *Lampetra richardsoni*
- Redside Shiner - *Richardsonius balteatus*
- Threespine Stickleback - *Gasterosteus aculeatus*

It is not anticipated that there will be a direct discharge from the site into this slough. If an overflow occurs, since the pumping systems and pond can accommodate 1-in-10-year 24 hr storms, it is highly unlikely that the system would breach and discharge. An overflow if it occurred, would be discharging from the west side of the pond into the cornfield on the northwestern side of the site.

An upstream sampling point and a downstream sampling point have been included in the sampling plan on this slough to ensure there is no impact from the activities on site. If detectable concentrations of concern are observed in the Slough that may impact life cycles or health of fish, a determination must be made to confirm if the facility produced attributable quantities of these substances.

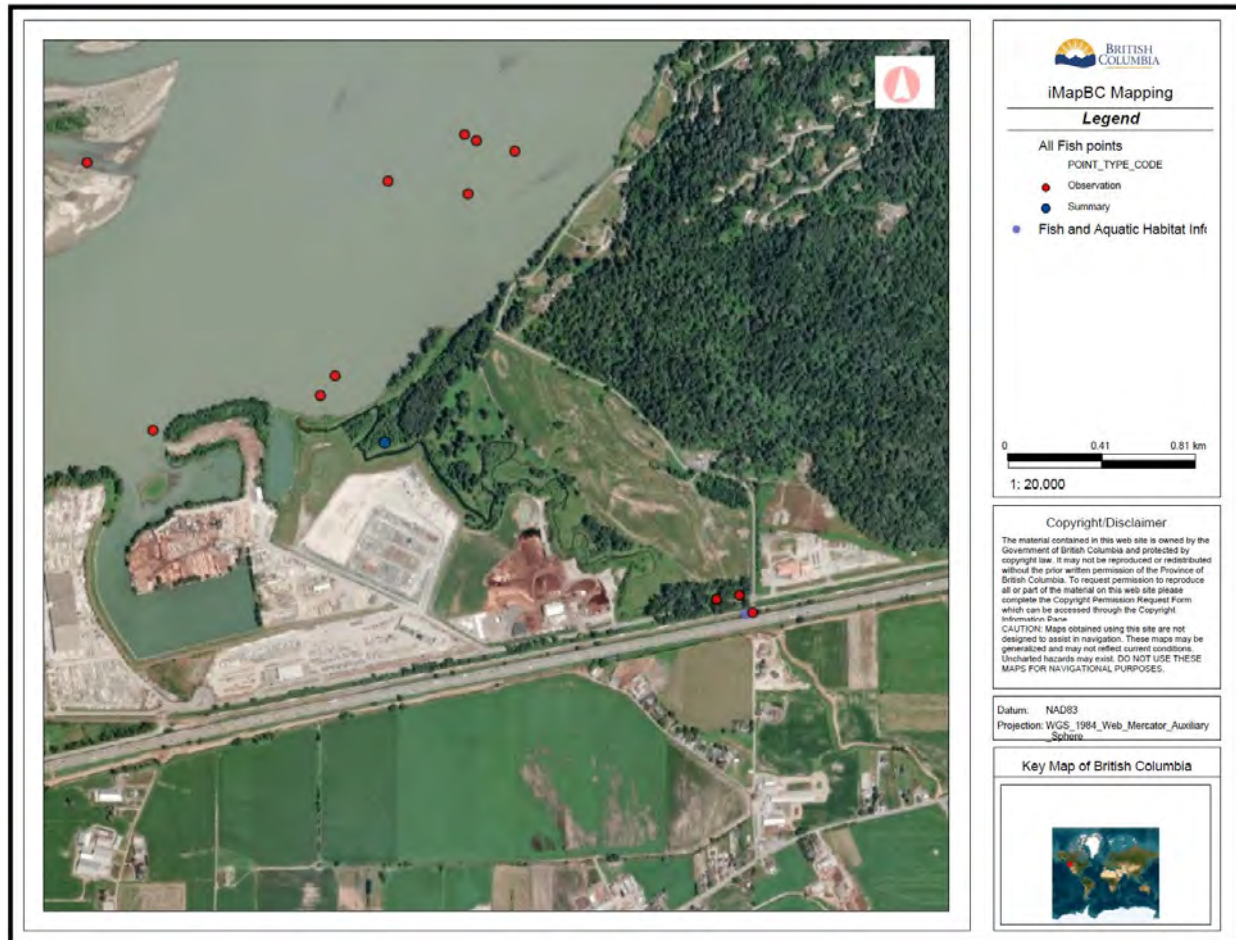


Figure 11. Fish Observation Points Nearby

Wildlife. Observations of bald eagle (*Numenius americanus*) have been made in an area adjacent to the site to the east (Figure 12). This species is not classified as at risk under the Species at Risk Act. However, bald eagles and their active nests are protected under the provincial wildlife act.

Activities on site and the retention pond pose no known threat for nearby bald eagle habitats. Vehicles, persons and equipment involved will not occur within the observational range of the species. Noise from site has been ongoing and routine since 2003, is not expected to change appreciably in future. Given proximity to the highway and other major industrial sites, the noise produced onsite is expected to be a minimal contribution to noise related wildlife disturbance. As for the quality of nearby watercourses, such as the Wilson slough that flows through the bald eagle observational area and along the east end of the site, no short-term or long-term disturbances are anticipated to affect the bald eagle observance area.

Other wildlife (e.g., birds, beavers, bears, ungulates, rodents and amphibians etc.) are assumed to occur nearby and use the nearby slough and the Fraser River. Subsequently, surface water in the area must meet wildlife protection guidelines. As for wildlife presence onsite, mulch and other potting soil mix materials have low vector attractant potential, and the noise and activities onsite are likely a further deterrent for vector presence in immediate proximity to the stockpiles. The operation is not expected to have any effect on current or future wildlife presence at or near the site.

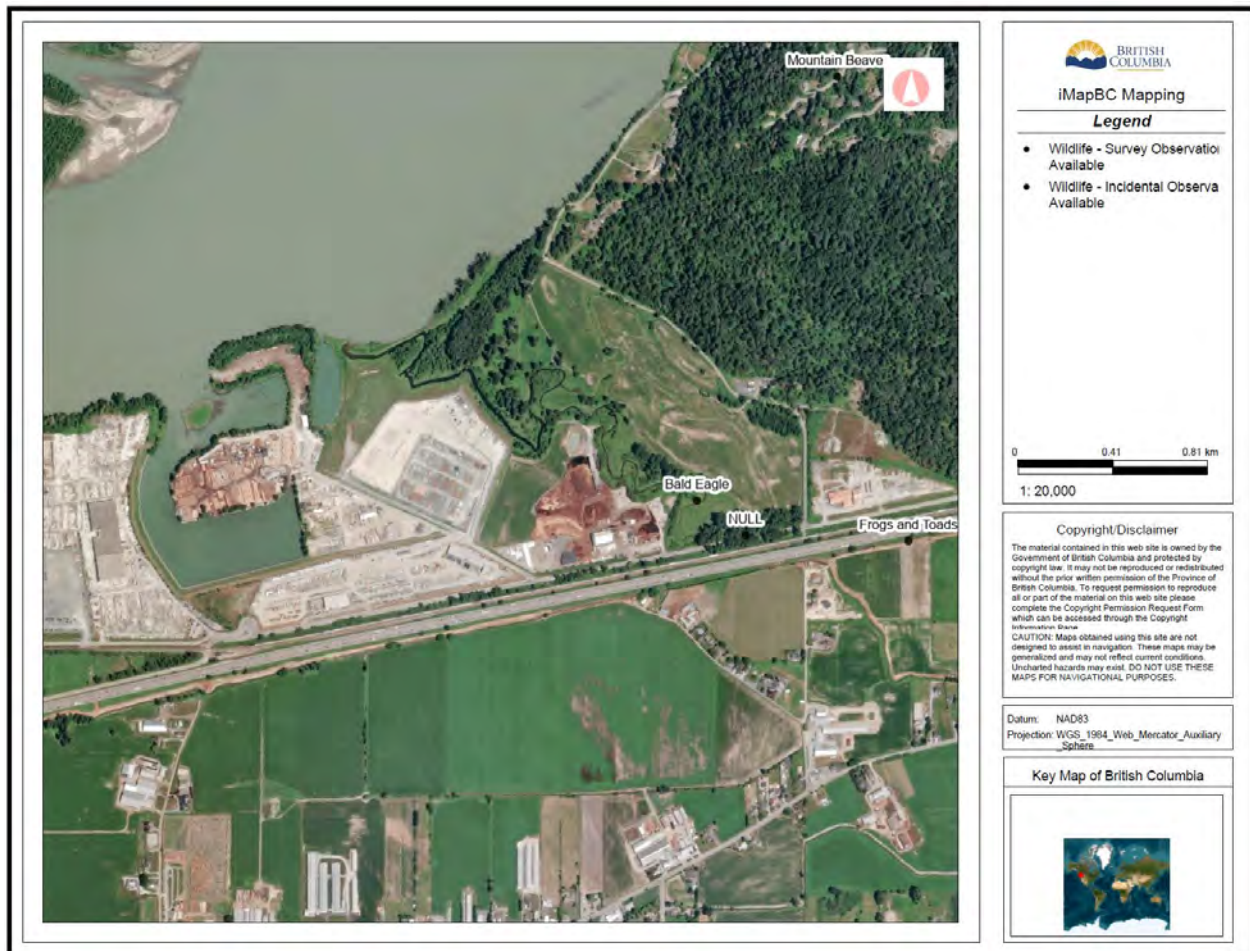


Figure 12. Wildlife Observation Points Nearby

4.2 Water Balance

Site-related activities are not expected to cause measurable changes to the site's water balance, surface water flow, or groundwater levels. The facility operates on a mostly paved surface, which directs stormwater to a contained retention pond. The pond captures and stores runoff for reuse on-site, primarily for dust control and moisture conditioning of mulch stockpiles.

In unpaved areas, limited infiltration occurs through the soil and is further restricted by the underlying clay layer. This clay layer reduces downward percolation and prevents direct recharge to the underlying aquifer. As a result, precipitation infiltration contributes minimally to groundwater levels. Infiltration calculations are discussed in Section 4.4.

Non-point discharges such as rainfall runoff are internally managed through the stormwater collection and reuse system. The collected water is subject to evaporation and controlled irrigation, maintaining a closed-loop hydrologic system. Given these controls, no alteration to off-site surface water flows, groundwater flow direction, or water table elevation is anticipated. The overall hydrologic regime of the area, including groundwater discharge toward Wilson Slough and the Fraser River, will remain unchanged by project operations.

The preliminary water balance assessment has been calculated based on theoretical modelling and calculation. Evaporation has been calculated using two different methods, Dalton's Law and Penman-Monteith Combination Method. Runoff quantities have been derived using the Rational Method.

Water balance calculations are shown in Appendix I

4.2.1.1 Limitation to Modelling

The water balance modelling is based on theoretical approaches and a combination of assumed and measured parameters related to evaporation, from which infiltration is derived. Evaporation has been estimated using two methods: Dalton's Law for evaporation for a free-water surface (Huffman et al., 2013) and the Penman-Monteith Combination Method for evapotranspiration (Allen et al., 1998) with coefficients for bare coarse soil. Each method has limitations. Dalton's Law accounts for the elevated temperature of the mulch piles but is primarily suited for open-water conditions and may overestimate evaporation if applied directly, as some irrigated water (not misted water) may percolate through the piles without sufficient exposure for evaporation. However, the mulch piles do retain and gradually release moisture as vapour, likely approximating the modelled rates if all runoff was irrigated in a recycling scenario as opposed to utilizing the misting system. Some of the applied water may also return to the pond or infiltrate through pore channels, depending on droplet size and soil structure. Use of fine misting is expected to increase efficiency by enhancing surface adsorption and promoting evaporation.

In contrast, the Penman-Monteith method uses ambient air temperature and does not account for internal heat generated within the mulch piles, resulting in an underestimation of actual evaporation potential in this specific circumstance. In practice, the true evaporation rate is expected to fall between the two estimates, though its exact value cannot be confirmed. For this TAR, the Penman-Monteith method has been adopted as a conservative basis for

calculation. Further investigation is recommended to refine both evaporation and infiltration estimates. Water consumption by microbial activity has not yet been specifically investigated in mulch but is expected to be substantial given the internal temperatures of mulch stockpiles normally exceed 30 degrees Celsius even in the coldest months.

As mentioned previously, the system has operated since fall of 2023 without the need to store any runoff water in the retention pond. All water has been distributed back into the mulch process without a need for storage. So, the theoretical methods discussed are conservative, but may not represent the true evaporation potential of the mulching process.

4.3 Downstream Receptors (Aquatic and Non-Aquatic)

Potential downstream receptors were investigated via a search of relevant Government of BC online resources including BC Species and Ecosystems Explorer, BC Conservation Status Reports, and iMapBC for mapping locations. Information from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was consulted as well as information about the occurrence of federally listed endangered species.

Potential downstream receptors of the site are summarized in Table 7. Mapping representation of these downstream receptors, relative to the site, are provided in Appendix J.

Table 7. Summary of potential downstream receptors

Applicable downstream receptor groups	Investigation results regarding potential downstream receptors	Figure # in Appendix J
Aquatic Life	High fish presence and productivity throughout Fraser River.	See Figure 1 in Appendix J
Wildlife	Wildlife in the area utilizes the Wilson Slough and Fraser River as a drinking water source. Proximity to Critical Habitat for Federally Listed Species: <i>Barn Owl</i> . Proximity to BC Schedule 1 Species at Risk: <i>White Sturgeon</i> ; <i>Oregon Forestsnail</i> ; <i>Mountain Beaver</i> .	See Figure 2 in Appendix J See Figure 3 in Appendix J See Figure 4 in Appendix J
Livestock & Livestock Water Licence	Site is situated across Fraser River from Livestock District ID #51, nearby Pound District: Nicomen Island.	See Figure 5 in Appendix J
Irrigation	Closest downstream water license for irrigation within 500 m of the Fraser River is ~10 km west.	See Figure 6 in Appendix J
Humans	Closest downstream rural residences = 12.9 km.	See Figure 7 in Appendix J

Regarding route of exposure of downstream receptors to potential contaminants of concern, as these are identified in the Baseline Study in Section 2, the following discussions are provided. Pictorial representations of the pathways of exposure are provided in the next section.

Aquatic life: aquatic life in surface watercourses in close proximity to the site is at risk of exposure to potential contaminants of concern (namely metals and wood residues) if site runoff is not adequately retained onsite or sufficient quantities migrate through groundwater to the Slough. Given the stormwater management system outlined in Section 8 of this document, and the proposed mitigation measures for retaining and reducing the amount of runoff from leaving the site are followed, aquatic life receptors surrounding the site are not at risk of exposure such that their life cycles would be harmed.

Wildlife: route of exposure to contaminants from the site by wildlife would be by way of direct contact or ingesting water or sediment from the retention pond or adjacent Wilson Slough. Similar to aquatic life, risk to wildlife is reduced provided the stormwater system functions as it is designed to, mitigation measures are taken to retain runoff, and no runoff leaves the site. Although mammalian or avian wildlife are not known to be particularly sensitive to wood residues, metals could pose a risk if there were opportunities for chronic direct undiluted ingestion. However, opportunities for ingestion exposure are very limited given site access and ongoing industrial activity. The noise of operations would act as deterrent for wildlife from accessing the retention pond.

Livestock: The areas surrounding the site are situated across the Fraser River from Livestock District #51 and Pound District Nicomen Island. As such, there will not be livestock that travel through areas close by. But directly across the Fraser River, there may be livestock using the Fraser River as a drinking water source, or livestock watering may utilize downstream Fraser River water. The retention pond is not accessible to grazing livestock.

Irrigation: Records of water rights in the area indicate a license for irrigation use about 10 km downstream of the Fraser River. Agriculture in this location is not at risk of exposure to contaminants from the site considering the significant distance and dilution potential of the Fraser River.

Humans: There are no known drinking water wells within 1 km downstream of the site and the residential areas to the north and northwest are hydraulically disconnected from the site by the slough. The Fraser River, especially near the site within an industrial area, is also not amenable to recreational swimming. The swift river currents at that location make swimming in the Fraser River dangerous, and the aesthetic and location of the site within an industrial area makes the area surrounding the site a particularly unlikely place to find human recreational swimmers. Although there may be outfitters using the river for recreational guided activities such as river rafting, the exposure potential is immaterial given the transient nature of those types of activities.

Given the location of the site and the absence of nearby drinking water wells, humans downstream of the site are not considered at risk of exposure to site contaminants by either ingestion of or contact with water in the Fraser River.

4.4 Infiltration to Ground

4.4.1 Downgradient Groundwater User

Based on the interpreted groundwater flow direction, there are two identified groundwater wells located downgradient and cross gradient of the Sumas site. These include:

- Well Tag No. 106163 – registered for private domestic use 520 m east of the site
- Well Tag No. 93865 – registered for commercial and industrial use 720 m northwest of the site.

Neither well is designated or utilized as a potable drinking water source, although it can be assumed that domestic wells may be used for drinking water. However, well 106163 is situated across Wilson slough, and separated by the slough while situated on an elevation higher than the site. It is expected that well to be hydraulically separated from the site.

The downgradient area between the facility and the Fraser River is characterized by commercial and industrial land use, with no residential zoning or domestic drinking water receptors identified along this flow path. Consequently, the potential for adverse effects to groundwater users downgradient of the facility is considered low.

4.4.2 Infiltration

This TAR includes a preliminary assessment of infiltration modelling. The assessment is based on theoretical assumptions, and further research is required to better understand the actual infiltration rates. The calculated values presented are preliminary and not final. Modelling limitations are discussed in Section 4.2.1.1. The calculations discussed assume bare soil substrate without organics interference. Not specifically discussed is the potential further impairment of infiltration due to the formation of biofilm expected on surface soils below stockpiles, which would impeded infiltration. A similar effect occurs in overloaded septic fields, where mass loading of organic nutrient causes bacterial mat formation, plugging septic fields. These are difficult parameters to estimate but evidenced of these effects are apparent in the fact that organic residues were only observed in ground water in trace concentrations at monitoring wells with only measurable changes in redox state. Further monitoring will confirm trends seasonally.

The majority of the operational areas within the facility are constructed with asphalt (Figure 13). The only portions of the site which remain unpaved are primarily within the mulch storage area and bagged product storage area.

Within the mulch storage area, we have conservatively assumed mulch piles are piled approximately 4-6 m over an unpaved surface (although the mulch is often >8m thick, depending upon time of year). The mulch functions as a sponge-like medium, retaining moisture and contains heat produced by microbial processes, which substantially reduces the quantity of water reaches the ground surface. During light rainfall events or irrigation cycles, most of the precipitation or applied water would be expected to be absorbed within the upper mulch layers and subsequently lost through evaporation, aided by elevated pile temperatures (which we would expect to average >40 °C at a depth of 1 m beneath mulch surface). Under heavier or prolonged rainfall, excess water may percolate through the mulch and infiltrate into the underlying soil.

The surface of the unpaved area consists of fine gravel underlain by compacted organic silt and topsoil, overlain by >4m thick sawmill residuals stockpiles (i.e. mulch). We have assumed the soil exhibits a runoff coefficient of approximately 0.3, indicating that about 30 % of the water reaching the ground surface becomes surface runoff, which is collected through the site's catchment system and conveyed to the retention pond. The remaining water that is not conveyed as runoff is conservatively assumed to be subject to infiltration and temporary subsurface storage before eventual loss through evaporation.

Other unpaved areas, such as the bagged product storage area, are limited in environmental exposure. These areas store only sealed and bagged feedstock or products; therefore, precipitation contact does not pose a contamination concern, and infiltration from these areas is considered clean.

In theory, water balance for the unpaved portions underneath the mulch storage piles can be expressed as:

Inputs: Precipitation + Irrigation of retained stormwater

Outputs: Evaporation + Runoff + Infiltration + Water Retained/lost in Mulch

Given the extensive paved coverage, the thermal and absorptive nature of the mulch piles, and the fine-gravel surface layer, the potential for significant infiltration of contaminated stormwater to ground is reduced. A detailed infiltration rate calculation is presented Appendix I.



Figure 13. Paved and Unpaved Area and Runoff Flow Directions

4.4.3 Infiltration Treatment, Quantity, and Quality

Infiltration at the facility is limited in quantity and subject to soil attenuation through the underlying soil profile (evidenced in monitoring well contaminant concentrations containing only trace concentrations of organics). The unpaved portions of the site are underlain by fine gravel and compacted organic silt and topsoil, which provide filtration, adsorption, and biodegradation of potential constituents before reaching the groundwater table.

The overall quantity of infiltration is minimized by the predominance of paved surfaces and the absorptive characteristics of the mulch piles. Runoff from paved areas is directed to the retention pond, while only a proportion of stormwater percolates through the unpaved mulch storage areas.

The quantity of infiltration has been estimated using a water balance method, incorporating both the mulch area and retention pond hydrologic inputs and outputs. The calculations consider precipitation, irrigation, evaporation, runoff, and infiltration under various operating conditions. Based on the most conservative assessment, the total estimated infiltration for the

mulch storage area is estimated based on modelling to be <21,000 m³ per year. Infiltration calculations can be found in Appendix I. Further analyses are needed on the specific temperatures of the stockpiles and evaporation potential and will be provided in future updates to this report. Limitations to the current calculations can be found in Section 4.2.1.1.

To evaluate groundwater quality and verify that infiltration is not adversely affecting subsurface conditions, five groundwater monitoring wells have been installed across the site. One of these wells serves as a background (upgradient) monitoring location, representing natural groundwater quality unaffected by site operations.

Groundwater monitoring results during dry season can be found in Appendix G, while the laboratory reports can be found in Appendix H.

Results from the initial monitoring event indicate that the background well exhibits naturally elevated manganese and copper concentrations, which are likely characteristic of the regional groundwater or native soil mineral composition. The deep well MW01, screened below the clay layer, shows high iron concentrations, consistent with observations at MW02 and MW03. Elevated manganese and arsenic were also detected in MW02 and MW03, potentially influenced by wood or recycled concrete fill materials known to be located near those wells, which can result in mobilization of these metals under reducing conditions.

Aside from the metal parameters, other wood-related or organic constituents were not detected at concerning concentrations, indicating adequate natural attenuation of these compounds in soils. Groundwater samples showed low ammonia, non-detectable faecal coliforms, only trace tannin and lignin, and resin/fatty acids below detection limits. These results indicate that infiltration from areas where stormwater contacts wood mulch is not currently resulting in measurable impacts to groundwater quality in a direct context, although may be affecting soil/groundwater chemistry to some extent given the presence of metals. Given no detectable concentrations of these issues in the slough itself, there is no specific concern with the conditions observed.

The monitoring wells were installed during the summer dry season, and to date, only one round of dry-season sampling has been completed. Additional wet season monitoring events will be required to better characterize seasonal groundwater flow conditions, measurable influences on groundwater quality and the slough, if any.

Groundwater quality and movement will continue to be monitored under the facility's Groundwater Monitoring Plan (see Section 5), which outlines sampling frequency, analytical parameters, and QA/QC protocols.

Overall, the available data confirm that infiltration volumes are limited, and that infiltrating water is potentially being treated by natural soil attenuation. Groundwater quality beneath and downgradient of the site is currently stable and within expected natural variability, with no evidence of impacts from site operations based on current data.

4.4.4 Groundwater Mounding and Daylighting

Given the limited infiltration volumes and the low permeability of the native soils, the formation of a groundwater mound beneath the site is not anticipated, though minor localized surface pooling may occur where conductivity is lowest. Infiltration would be expected to primarily result from precipitation and irrigation of the mulch storage areas, but in quantities unlikely to influence regional groundwater gradients.

Surface water monitoring data from the adjacent slough show no elevated concentrations of arsenic, manganese, or iron in downstream samples compared to upstream conditions. Although groundwater in the area generally discharges toward the slough, no evidence of measurable discharge or water-quality impact has been observed to date. Continued monitoring will be carried out to confirm these findings.

Overall, infiltration at the facility would be expected to occur in lower volumes than calculated, due to the formation of biomass in soils below the stockpiles and within the clay lined retention system. Current monitoring results indicate that groundwater conditions appear moderately changed from background and within typical ranges one would expect for a wood waste handling operation (e.g. sawmill) and do not pose a risk of adverse effects to the adjacent surface water body.

5 Discharge and Environmental Monitoring Programs

Sumas will carry out routine sampling in accordance with the procedures described in the British Columbia Field Sampling Manual 2013 Edition (*BC Field Sampling Manual*, 2013). To ensure these procedures are adequately followed, WeaverTech recommends routine sampling be undertaken by site personnel who are trained in accordance with the BC Field Sampling Manual. There are numerous ways water samples can become compromised if they are not collected properly. Compromised water samples can lead to perceived permit contraventions when, in fact, there may be none or they could lead to underrepresentation of contaminants if hold times are exceeded.

5.1 Discharge Monitoring Program

No discharge proposed, therefore do not need discharge monitoring program. Given the only discharge is to ground and is discontinuous and not accessible for sampling under stockpiles, the monitoring well program shall suffice for discharge monitoring.

5.2 Receiving Environment Monitoring Programs

5.2.1 Groundwater Monitoring Program

The groundwater monitoring program is designed to assess groundwater flow direction, quality, and potential effects from facility operations. Five groundwater monitoring wells have been installed across the site, including one upgradient (background) well, one cross-gradient well, one upgradient of the pond, and two downgradient wells. This configuration allows for effective comparison between background and potentially affected groundwater.

5.2.1.1 Monitoring Well and Soil Topography

Five Monitoring wells were installed in August 2025 to assess groundwater quality for potential impacts from infiltration of stormwater that has come in contact with mulch on site. The Borehole logs can be found in Appendix F. The soil conditions assessed during monitoring well installation is similar to the geotechnical report done in 2016 (Appendix K).

2016 Geotechnical Report Pre-construction

The 2016 geotechnical report describes the Sumas Gro Media site as situated on gently sloping ground with overall surface grades declining toward the south and southwest. The site topography is generally uniform across the central operational area, allowing for controlled surface drainage.

Subsurface conditions encountered during the 2016 investigation typically consisted of a thin veneer of topsoil and organics underlain by silty sand to sandy silt, locally interbedded with glacially derived silty clay and clayey silt at depth. The soils were observed to be compact to dense, exhibiting moderate to low permeability and suitable for general foundation support. Beneath these fine-grained deposits, coarser sand and gravel layers were identified, indicating potential zones of enhanced drainage at depth.

Groundwater was encountered at shallow depths, generally between 1.0 m and 2.5 m below ground surface, with levels expected to fluctuate seasonally in response to rainfall and infiltration. Overall, the 2016 assessment indicated stable ground conditions, moderate infiltration potential, and a site drainage pattern directed toward the southwest.

2025 WeaverTech Well Installation

Additional subsurface investigations completed in 2025 provided a refined understanding of the soil stratigraphy across the site. Borehole logs and cross-sectional data show that the clay layer varies significantly in thickness across the site:

- On the west side, the clay unit is relatively thick, reaching approximately 3 to 4 m in depth, and acts as a semi-confining layer with low permeability.
- Toward the east side, the clay layer becomes thin to discontinuous, grading into silty sand and well-graded sand with gravel, which are more permeable and promote lateral drainage.

This lateral variability indicates restricted infiltration on the west side and greater subsurface transmissivity on the east side.

Borehole logs and well installation details can be found in Appendix F.

Groundwater levels measured in 2025 by WeaverTech are deeper than previously measured, typically within 3.0 m to 5.0 m below ground surface. Based on the recorded static water levels in the monitoring wells, groundwater flow is inferred to move from west toward east, following both the natural topographic gradient and the subsurface permeability transition see Figure 14.

The updated 2025 borehole data confirm that the western portion of the site serves as a groundwater upgradient zone, while the eastern side represents the downgradient discharge area. This supports the existing design of the runoff water management system, which captures and retains stormwater without off-site discharge.

In general, the monitoring wells in their current positions adequately intercept groundwater that may be impacted from operations.



Figure 14. Ground water elevation contour and direction

5.2.1.2 Sampling

Sampling will be conducted quarterly during the first year of monitoring to capture both wet- and dry-season conditions. Each event will include field measurements of temperature, pH, conductivity, dissolved oxygen, and turbidity using a calibrated YSI or Hanna meter. Groundwater samples will be collected using a low-flow peristaltic pump following the BC Field Sampling Manual (Part E2). Wells will be purged until field parameters stabilize, typically after three to six well volumes, and new tubing will be used for each well to prevent cross-contamination.

Collected samples will be preserved and stored on ice immediately, then transported to an accredited laboratory within 24 hours. Laboratory analyses will include general chemistry parameters shown in Table 9. Duplicate metals samples will be collected during each event for QA/QC verification.

Table 8. Monitoring well information

Well ID	Sampling Location	Coordinates	Depth(m)	Screen(m)
Background Well	Groundwater well upgradient	49.14108, - 122.04532	5.49	3.96 – 5.49
MW01-S	Groundwater well downgradient	49.14326, - 122.05044	4.57	3.05 - 4.57
MW01-D	Groundwater well downgradient	49.14326, - 122.05042	9.14	7.62 - 9.14
MW03	Groundwater well upgradient of the pond	49.14386, - 122.04827	5.64	4.11 – 5.64
MW02	Groundwater well cross gradient of the pond	49.14283, - 122.04799	6.71	5.18 - 6.71

Table 9. Groundwater monitoring analytes

Analyte Category	Analytes	# GW Samples
Analytes taken in field with handheld device		MW01-S/D, MW02, MW03, Background well, Duplicate
Field parameters (using YSI or Hannah device)	water temperature, specific conductance, dissolved oxygen, pH	5
Analytes assessed at the lab		
Conventional parameters (in-lab)	pH, total dissolved solids, hardness, dissolved organic carbon, Turbidity	5

Nutrients	ammonia, nitrate, nitrite, TKN, Total Nitrogen, orthophosphate, and total phosphorus	5
Anions	Sulphate, Bromide, Chloride, Fluoride	5
Biological	Fecal Coliforms, E.Coli	5
Metals	Dissolved metals only	6 (Collect duplicate)
Tannins and Lignin		5
Resin & Fatty Acids		5
Phenols		5

Analytical results will be evaluated against the BC Contaminated Sites Regulation (CSR) Schedule 3.2 Water Use Standards for Aquatic Life - Freshwater, Drinking Water, and Irrigation. Results will be compared between upgradient and downgradient wells to identify potential changes in groundwater chemistry that could be related to site activities.

5.2.2 Surface Water Monitoring Program

Surface water monitoring is conducted to confirm that stormwater infiltration or runoff from the facility does not affect the quality of the nearby slough. Subsequently we are not suggesting that additional modelling or analyses of dilution or loading is required given the conditions are ongoing and can be monitored by wells onsite.

Two monitoring locations are established: one upstream control point and one downstream location. Sampling will occur quarterly, concurrent with groundwater sampling events, to capture seasonal variation.

Grab samples are collected from the mid-depth of the water column, facing into the direction of flow, while avoiding disturbance of surface films or bottom sediments. Field readings for temperature, pH, conductivity, and dissolved oxygen are recorded with a calibrated YSI meter.

Samples are analyzed for pH, total suspended solids, hardness, dissolved organic carbon, nutrients (ammonia, nitrate, nitrite, total Kjeldahl nitrogen, total nitrogen, orthophosphate, total phosphorus), anions (sulphate, bromide, chloride, fluoride), BOD, COD, total metals,

tannins and lignin, resin and fatty acids, and microbiological indicators including fecal coliforms and *E. coli*. Duplicate metals samples are collected each round for QA/QC purposes.

The following guidelines and regulations are applicable for surface water:

- BC Working Water Quality Guidelines
- BC Approved Water Quality Guidelines
- *Fisheries Act*

Table 10. Surface water sampling location

Sampling Location	Figure Reference	Coordinates
Upstream	Upstream SW sampling point in Figure 1	49.141240° -122.044972°
Downstream	Downstream SW sampling point in Figure1	49.143513° -122.050514°

Table 11. Surface water monitoring analytes

Analyte Category	Analytes	# SW Samples
Analytes taken in field with handheld device		Upstream, Downstream, Duplicate
Field parameters (using YSI or Hannah device)	water temperature, Conductivity, dissolved oxygen, pH	2
Analytes assessed at the lab		
Conventional parameters (in-lab)	pH, total suspended solids, hardness, dissolved organic carbon	2
Nutrients	ammonia, nitrate, nitrite, TKN, Total Nitrogen, orthophosphate, and total phosphorus	2

Anions	Sulphate, Bromide, Chloride, Fluoride	2
BOD and COD		2
Biological	Fecal Coliforms, E.Coli	2
Metals	Total metals only	3 (Collect duplicate)
Tannins and Lignins		2
Resin & Fatty Acids		2

5.2.3 Monitoring Plan QA/QC

All monitoring activities follow the BC Field Sampling Manual and Weaver Technical Corp. standard operating procedures. Instruments are calibrated before each use with certified standards, and all sampling tubing and containers are cleaned with phosphate-free detergent (Liquinox) and rinsed with distilled water between locations. New tubing is used for each well.

Samples are immediately cooled on ice, labelled, and transported to the laboratory under chain-of-custody documentation. Duplicate samples are collected from a minimum of 10% of samples for each analyte will be obtained from each event to assess analytical precision, and field notes record weather, field readings, purged volumes, and visual observations. Photographs of sampling setups and filled bottles are taken for documentation. Only CALA-accredited laboratories are used, ensuring internal lab QA/QC through blanks, spikes, and duplicates.

5.3 Data Assessment, Reporting, and Notification

Data collected from groundwater and surface water monitoring will be assessed to identify temporal and spatial trends and to confirm that water quality remains protective of the environment. Analytical results will be compared to applicable BC Contaminated Sites Regulation (CSR) Schedule 3.2 standards for groundwater and BC Water Quality Guidelines (WQG) for surface water.

The assessment will consider both upgradient and downgradient wells to evaluate potential site-related influence on groundwater, and upstream versus downstream results to determine any changes in surface water quality. Field parameters such as pH, dissolved oxygen, conductivity, and temperature will also be reviewed for internal consistency and to identify anomalies or evidence of seasonal variation.

Sampling is suggested to take place once per quarter during the first year of monitoring, allowing the data to capture differences under varying precipitation and seasonal conditions (e.g., wet and dry seasons). After the first year, if the data remain relatively consistent and within acceptable limits, the sampling frequency and parameters may be reassessed and adjusted by a QP in consultation with the Ministry of Environment.

Quarterly monitoring summaries may be prepared during the first year to review interim results and ensure data quality. A comprehensive Annual Monitoring Report will be submitted to the Ministry of Environment and Climate Change Strategy, summarizing sampling activities, analytical results, QA/QC findings, and trend interpretations. The report will include tables, figures showing sampling locations and groundwater flow, and a comparison of results to the applicable BC CSR and BC WQG criteria.

In the event of any confirmed exceedance of guideline values or significant deviations from baseline conditions, results will be reviewed by a QP, and the Ministry will be notified. Follow-up sampling, further investigation, or mitigation measures will be implemented as required to ensure ongoing compliance and environmental protection.

6 Management Plans

6.1 Operations and Maintenance Manual

Refer to attached operation manual in Appendix L.

6.2 Effluent Management Plan

Refer to Section 8 Stormwater Management Plan

6.3 Residuals Management Plan

Refer to section 4.1 in attached operation manual Appendix L.

6.4 Contingency Plan

Refer to Section 4.2 in attached operation manual Appendix L.

6.5 Erosion and Sediment Control

Sedimentation is not a concern given the entire runoff drainage is directed to the retention pond.

For limited areas outside the pond catchment, operational activities may create erosion potential and increase the risk of sediment transport via wind (as fugitive dust), vehicle

movement, or stormwater runoff. Although it should be noted that other areas of the site have no physical connection to the slough and drain to blind ditches and percolate into soils. No known breaching of these ditches has occurred, presumably due to highly conductive engineered coarse fill near the roadway to the south.

However, sediment-laden runoff can adversely affect aquatic life by:

- Smothering benthic habitats and degrading spawning areas.
- Damaging fish gills, removing protective mucous layers, or suffocating eggs.
- Reducing water clarity and impairing fish vision, schooling, and feeding behaviour.
- Transporting suspended metals or other contaminants.

To mitigate these risks, standard soil erosion and sediment control measures will be applied wherever direct discharge to the environment may occur if they are to occur in future with site configuration changes or regrading. Although nothing is planned at this time that would result in erosion potential, measures in future could include:

- Controlling and diverting site runoff through grading, catch basins, and subsurface piping.
- Regularly wetting stockpiles to prevent dust generation and erosion.
- Isolating catch basins with appropriate sediment filtration inserts or filter socks.
- Fugitive Dust Plan has been developed (see Appendix M).

As the facility is designed with no direct discharge to surface waters, the potential for sediment entry into aquatic environments is minimal.

For any future site improvements or regrading/ construction projects, Sumas will adhere to the *Best Management Practices for Soil Erosion and Sediment Control* developed by the BC Ministry of Transportation and Infrastructure (*Erosion and Sediment Control Manual*, n.d.). Any deviation from these BMPs will only occur under the direction of a QP and/or with notification of the relevant regulatory authorities, as appropriate. If sediment discharge is observed, Sumas will take immediate corrective action and engage a QP to confirm that control measures are effective and protective of the environment.

6.6 Fugitive Dust Management Plan

Refer to Appendix M

6.7 Closure Plan

This Facility Closure Plan outlines the procedures that will be followed in the event that Sumas Gro Media permanently ceases operation of its soil mixing and runoff water management system. The intent of the plan is to ensure that decommissioning and site restoration activities

are conducted in a safe, orderly, and environmentally responsible manner, consistent with the requirements of the EMA, Soil Amendments Code of Practice, and any applicable municipal or regional bylaws.

The primary objective of the closure process is to prevent contamination of soil, surface water, and groundwater by ensuring that all system components are safely de-energized, cleaned, and removed or stabilized prior to site vacating or redevelopment.

6.7.1 Closure Triggers

Closure may be initiated under any of the following conditions:

- Permanent discontinuation of soil blending operations.
- Relocation of operations to a new facility.
- Revocation or expiry of operational permits.
- Directive by regulatory authorities requiring decommissioning.

Once the decision to close has been confirmed by management, the closure plan shall be activated immediately.

6.7.2 Pre-Closure Notification

Prior to the commencement of closure activities:

- Written notification will be provided to the ENV at least 60 days prior to closure.
- The notification will include:
 - Proposed closure schedule and responsible personnel.
 - Description of materials on site and plan for removal.
 - Contact information for the QP overseeing the closure.

6.7.3 Decommissioning Procedures

The following steps outline the decommissioning process for each major component of the runoff water management system:

Lift Station and Pumps

- Drain and clean all pump bays and sumps using a vacuum truck.
- Remove accumulated sediment, inspect for cracks or leaks, and dispose of sediment at an approved receiving facility or reuse it in the soil blending process if testing confirms suitability.
- Disconnect and remove pumps, hoses, and fittings for reuse or disposal.

Retention Pond

- Allow water level in the pond to naturally evaporate or pump water through the EcoMister and sprinkler systems onto mulch piles until minimal residual volume remains.
- Perform analytical testing on remaining pond sludges, determine appropriate disposal of the sludge by approved means under direction of a QP.
- If QP requires, sludges will be removed by vacuum truck for off-site treatment or disposal.
- Backfill the pond with clean, compacted fill or regrade to match surrounding topography and establish positive surface drainage.

Residuals and Waste Management

All accumulated sediments, in the retention pond shall be:

- Characterized through laboratory testing for metals and hydrocarbons (per CSR Schedule 10 Analytical Methods) and the BC Hazardous Waste classification criteria.
- Reused, recycled, or disposed of at approved facilities or approved methods depending on analytical results.

All disposal manifests and laboratory reports will be retained for at least five years following closure.

Infrastructure Removal

Following dewatering and decontamination:

- Remove all aboveground equipment
- Disconnect electrical service and ensure all wiring and conduit are de-energized by a certified electrician.
- Remove non-essential piping, berms, and filters unless otherwise directed by the property owner or regulatory authority.
- Restore site grading to ensure runoff continues to be contained within the property.

6.7.4 Records and Reporting

A Closure Summary Report will be prepared and signed by the overseeing QP upon completion of the closure activities. The report will include:

- Summary of decommissioning steps completed.
- Analytical results and interpretation.
- Waste manifests and disposal records.
- Confirmation that the facility no longer poses environmental risk.

- Photographic documentation of site condition before and after closure.

The report will be submitted to the MOA and the City of Chilliwack within 90 days of closure completion.

7 Operations and Maintenance Manual

A standalone Operation and Maintenance Manual has been prepared and included in Appendix L. It is currently a working draft. The following paragraphs provide a summary of the manual. Future revisions will incorporate detailed operational procedures for post-1-in-10-year storm management in November, retention pond cleaning, and confirmation of lift station pumping capacity.

- **Facility Information/Design** – Overview of site operations, feedstocks, infrastructure, and service utilities.
- **System Overview** – Description of the closed-loop, zero-discharge runoff system and its four main subsystems:
 - **Capture and Conveyance** – Three pump stations, filters, and conveyance lines.
 - **Storage** – 9,700 m³ clay-lined retention pond.
 - **Evaporation** – EcoMister HD-30 evaporation unit.
 - **Recycling/Reuse** – Sprinkler network applying stored water to mulch piles.
- **Subsystem Integration** – Procedures for balancing water distribution across systems and maintaining capacity during storm events.
- **Seasonal Operation Guidance** – Operational adjustments for dry, wet, and shoulder seasons.
- **Residuals Management** – Handling of sediments and maintenance waste.
- **Contingency Plan** – Emergency and episode management procedures for spills, fire, flooding, nuisance, and exceedances of water-quality benchmarks.
- **Operator Duties and Training** – Roles, safety, and three-phase training program for new operators.
- **Inspection Schedule and Procedures** – Daily, seasonal, and subsystem-specific inspection protocols.
- **Maintenance and Inventory Requirements** – EcoMister upkeep, spare parts list, and winterization steps.
- **Record Keeping and Reporting** – Documentation and forms for inspections, inventory audits, maintenance logs, and sampling results.
- **Troubleshooting Guides** – Procedures for pump, sprinkler, and EcoMister issues.

- **Technical Data and Spec Sheets** – Equipment specifications for pumps and evaporator components.

7.1 Facility Design

Refer to Operation Plan in Appendix L

7.2 Facility Design Drawings

Refer to Appendix O

7.3 Receiving Environment

7.3.1 Sensitive Receptors

Refer to Section 4.1.2

7.3.2 Water body and Wells

Refer to Section 2.2 and 4.1.1.

7.3.3 First Nation's Use of Surrounding Land

The parcel of land adjacent to the Sumas facility, shown in brown on Figure 14, is owned by Leq'á:mel First Nation. Most of the surrounding lands are also under Leq'á:mel ownership. The property includes a paved storage area as part of its developed portion, while other current land uses are not known at this time. Leq'á:mel First Nation traditionally uses the Fraser River

for fishing and related cultural activities.

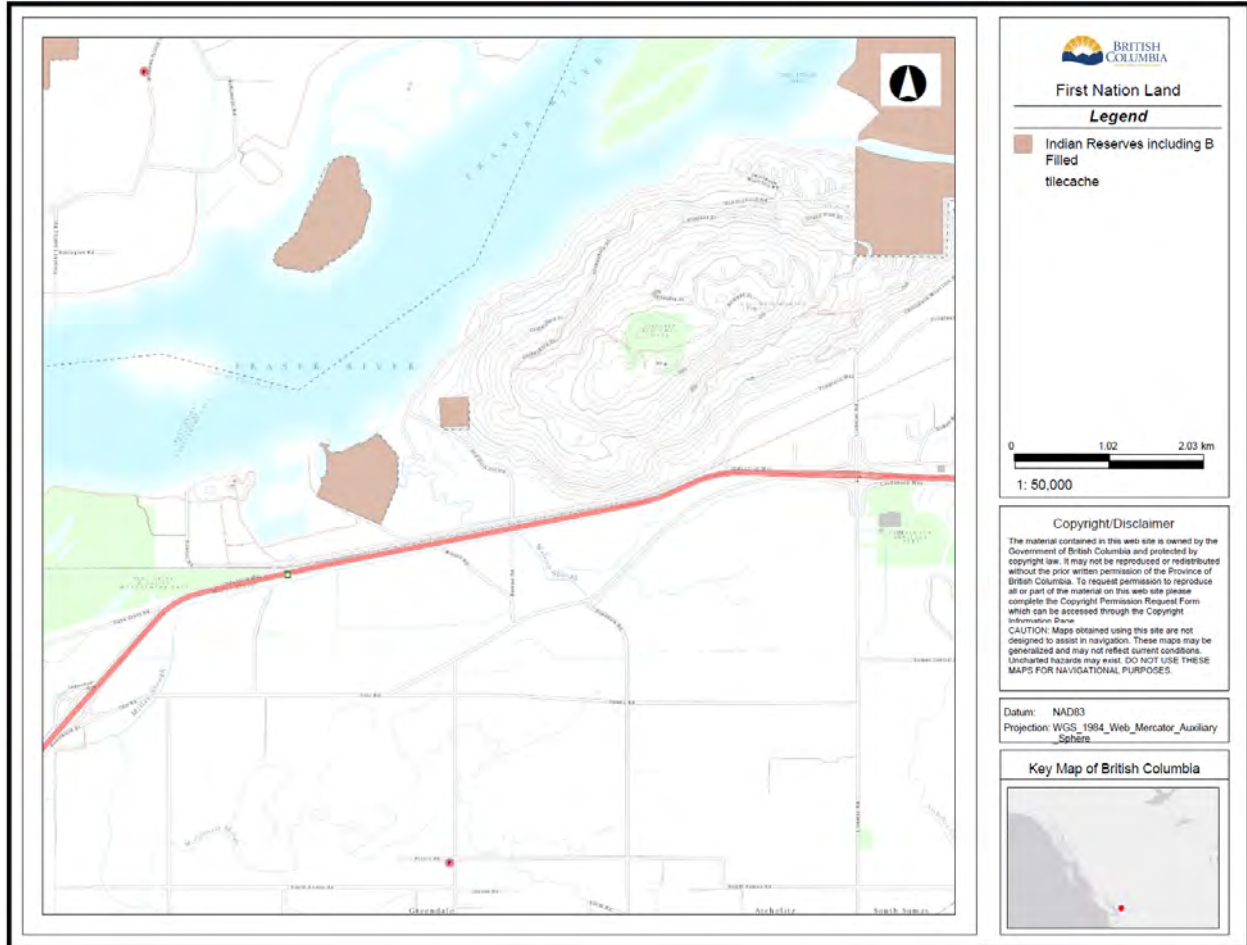


Figure 15. First Nation Land

7.3.4 Soil Type and Topography

Refer to Section 5.2.1.1

7.3.5 Site Weather Conditions

Refer to Section 2.1

7.3.6 Summary of surrounding properties

Refer to Section 1.2

7.3.7 Distance to Nearest Residential, Commercial, Institution, and Hospital Location



Figure 16. Distance to Nearest Residential, Commercial, Institution, and Hospital Location

7.4 Potential Impacts

Refer to Section 4.

7.5 Personnel Training Plan

Refer to Appendix L Operation Manual.

7.6 Environmental Monitoring Plan

Refer to Section 5.2.

7.7 Record Keeping and Reporting

Refer to Appendix L Operation Manual.

8 Stormwater Management Plan

A standalone Stormwater Management Plan (SWMP) has been prepared and included in Appendix Q. It remains a working draft, as certain parameters, such as the operational pumping rate from the lift station are still under review and calculation. The table of contents for the SWMP is provided below.

- **Site Description and Drainage Overview** – Facility layout, drainage system, and catchment areas.
- **Meteorology and IDF Data** – Local climate data and rainfall design parameters (Agassiz and Chilliwack stations).
- **Retention Pond Design** – Sizing methodology, storage capacity, freeboard, and as-built verification.
- **Evaporation Calculation** – Method and estimated annual evaporation rate for the pond.
- **Overflow Control** – 300 mm overflow pipe directing excess water to the west field.
- **Stormwater Flow Design** – Runoff analysis, flow rates, and lift station capacity for design storms.
- **Stormwater Management System** – Ditching, lift stations, clay-lined conveyance, and closed-loop recirculation.
- **Recycle Components** – Sprinkler system, EcoMister evaporation unit, and pump specifications.

9 Professional Accountability

9.1 List of Qualified Professionals

Tim Weaver, P.L.Eng, R.P.Bio, EP

Tim Weaver, who led the preparation of this document, is recognized in areas of heavy industrial land development, organic waste and waste water management, permitting and construction management. He is a registered professional engineering licensee, registered professional biologist and a registered environmental professional. Mr. Weaver has 15 years of experience in assisting industrial facilities and landfills across BC with environmental impact assessment, waste and waste treatment systems designs and organic waste treatment. Other specializations and relevant experience include managing landfill closure, land application of soil amendments and nutrients, water treatment, runoff control, contaminant hydrogeology, upland and aquatic habitats, and aquatic toxicology.

See Appendix P for the full list of Qualified Professionals (QPs) undertaking work on this project as well as the signed Conflict of Interest and Declaration of Competency form.

10 Public Notification

In progress; updates will be included in the additional submission on December 20, 2025. The Environmental Protection Notice (EPN) was sent for posting in a local newspaper on October 20, 2025, and will be posted at the site entrance during the week of October 20, 2025. The EPN package will be available on the company website by October 21, 2025. Agency referral letters are being sent to all relevant stakeholders during the week of October 20, 2025.

11 Closure

We trust that this report meets your needs at this time.

For any question related to this letter, please contact the undersigned.

Sincerely,
Han Lei Huang B.Tech, B.A.Sc.
Chris Webster EIT.

Review and input by:



Tim Weaver, EP, R.P.Bio, P.L.Eng.

List of References

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