Hartland Landfill Groundwater, Surface Water and Leachate Monitoring Program Annual Report

(April 2024 to March 2025)

Capital Regional District

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October 2025

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Executive Summary

This report summarizes the results of the 2024/25 water and leachate monitoring program at Hartland Landfill. Data was collected from groundwater, surface water, leachate infrastructure, and domestic wells to evaluate leachate containment, water quality trends, and assess regulatory compliance. The following sections summarize our analysis and interpretation of historical and new data collected in 2024/25.

Leachate Flow and Containment

In 2024/25, leachate levels and discharge at Hartland were consistent with historical interpretations. The leachate mound in Phase 1 persisted, but leachate levels continued to decrease slowly. The most notable change in leachate discharge patterns in Phase 1 occurred at the North Purge Wells, where leachate discharge volumes continued to decrease. Groundwater levels at P52 have been increasing for five years, indicating diminishing pump performance of the purge wells in that area. The pump appears to be able to maintain leachate levels within the purge wells at the target elevation, so the well should be tested to confirm it is performing adequately, effecting a drawdown cone as designed, and rehabilitated as part of ongoing maintenance activities if it is not doing so. Ultimately, groundwater quality at wells installed north of the North Purge Wells confirmed that no leachate had migrated north. Similarly, the South Purge Wells performed adequately, and no leachate impacts were observed downgradient.

Leachate elevations observed at monitoring stations within Phase 2 were comparable to historical values, indicating that the refuse was largely unsaturated. Groundwater levels at critical monitoring locations north of the Phase 2 Basin were consistently higher than leachate levels in Phase 2, implying that leachate levels were stable and the hydraulic trap was maintained.

Groundwater Flow

In 2024/25, groundwater flow patterns at Hartland were consistent with historical interpretations. Most groundwater in the bedrock underlying the landfill was captured by the Phase 2 leachate collection system, and groundwater levels along the North Ridge continued to be lower and show greater variability than historical values. We attributed these patterns to quarrying in the Toutle Valley and lowering of the valley floor. In early-2025, Cell 4 (within the Toutle Valley) was outfitted with a liner that may impact the groundwater flow regime, so groundwater levels along the North Ridge should be monitored closely in 2025/26. Despite the observed changes to the potentiometric surface in this area, the Phase 2 hydraulic trap was maintained in 2024/25.

Groundwater Quality

The primary sources of groundwater quality degradation at the Site include leachate, road salt, aggregate runoff, and the use of a magnesium lignosulphonate dust suppressant. The parameters used to identify impacts from various landfill activities include electrical conductivity, ammonia, chloride, sulphate, and nitrate concentrations. Professional judgement is used to differentiate between different contaminant sources and assess the nature and severity of any impacts. Groundwater quality may be judged to be impacted relative to background without exceeding regulatory criteria.

The 2024/25 groundwater quality data was interpreted with consideration for the following:

Background Conditions:

- Background conductivity is typically below 500 µS/cm but has been observed in some background wells at concentrations up to 1,000 µS/cm immediately after well installation or following prolonged dry periods.
- Background ammonia and nitrate concentrations are typically below 0.1 mg/L but occasionally reach 0.5 mg/L downgradient of wetland areas.
- Background chloride concentrations are typically below 20 mg/L.
- Background sulphate concentrations are typically below 50 mg/L but are regularly observed at concentrations up to 100 mg/L in wells screened within weathered bedrock and near geological alteration zones.

Impact Criteria:

- Leachate: Groundwater is considered impacted by leachate when conductivity is above 1,000 µS/cm, ammonia concentrations are above 1 mg/L, and chloride concentrations are above 20 mg/L. Peak concentrations in leachate

impacted wells are typically observed during the dry summer and early fall months, when there is limited dilution by precipitation.

- Aggregate Runoff: Groundwater is considered impacted by aggregate (e.g., production, stockpiling or site construction works) when nitrate concentrations are greater than background levels (~0.1 mg/L) and leachate indicator concentrations are low. In recent years, elevated nitrate concentrations have been observed in the absence of elevated sulphate concentrations, so sulphate may not be a reliable indicator of aggregate runoff. However, elevated sulphate concentrations may occur over a greater period and potentially after nitrate concentrations have subsided. Peak nitrate and sulphate concentrations are typically observed during the first sampling event following the onset of wet weather in the fall months after recent blasting and aggregate stockpiling.
- Road Salt: Groundwater is considered impacted by road salt when chloride concentration is elevated above background levels (i.e., 20 mg/L), and the molar ratio of chloride to sodium is around 1.0. Cl/Na molar ratios in road salt are generally 1:1, assuming 100% compositional purity. Road salt-impacted sites must also be located downgradient (or downstream) of surfaces where road salt is known to be applied. Conductivity and chloride concentrations typically exhibit peaks following cold weather periods when de-icing salt is often applied to roadways.
- Magnesium lignosulphonate: Magnesium Lignosulphonate has been used as a dust suppressant at the Site and likely has an impact on groundwater quality similar to aggregate runoff because it contains nitrogen and sulphur. Additionally, it exhibits elevated iron and manganese concentrations. Laboratory testing indicated that the dust suppressant exhibited elevated conductivity (520 µS/cm), ammonia (51 mg/L), and total sulphur concentrations (83.7 mg/L) in aqueous phase (Appendix I). AECOM is not aware of the volume of magnesium lignosulphonate that has been applied at the Site.

Analysis of the groundwater quality data indicated:

- Leachate Containment: Leachate-impacted groundwater was contained within the landfill property boundary.
- Aggregate Runoff Impacts: Aggregate runoff impacts (e.g., elevated conductivity, sulphate, and nitrate concentrations) are a pervasive issue at the Site, especially north of the landfill. Impacts were most severe at compliance monitoring locations 31, 111, 112, and in many areas of the Site immediately downgradient of stockpiles. Elevated nitrate and/or sulphate concentrations were also observed at the south end of the Site, at compliance monitoring locations 73 and 71. In the northwest area of the landfill, dilute aggregate runoff impacts were identified, but concentrations were low at the property boundary and low to non-detectable in the receiving environment.
- Elevated Boron Concentrations: Boron concentrations have exceeded the CSR DW standard seasonally at compliance monitoring location 20 for several years. AECOM analyzed historical groundwater quality data and determined that groundwater at monitoring locations 20, 52, and in the North and South Purge wells exhibits a distinct and localized geochemical signature characterized by highly elevated silicon and boron concentrations. We believe that the elevated boron originates from the silicate mineral dissolution in the bedrock below the Phase 1 landfill.
- Elevated Chloride Concentrations: Elevated chloride concentrations observed in the south area of the Site likely reflect road salt impacts, as indicated by Na/Cl ratios around 1.0, and low to non-detectable ammonia concentrations.

Domestic Well Water Quality

The domestic groundwater quality met applicable regulatory criteria at all locations, except for a few temperature and pH aesthetic objective exceedances. The data indicated that the wells were not impacted by leachate, and the water quality was consistent with background conditions as observed since the monitoring program began.

Surface Water Quality

The primary sources of surface water quality degradation at the Site include landfill leachate, road salting, aggregate runoff, and the use of a magnesium lignosulphonate dust suppressant. The parameters used to identify impacts from various landfill activities include electrical conductivity, ammonia, chloride, sulphate, and nitrate concentrations. Professional judgement is used to differentiate between different contaminant sources and assess the nature and severity of any impacts. Surface water quality may be judged to be impacted relative to background without exceeding regulatory criteria.

The 2024/25 surface water quality data was interpreted with consideration for the following:

Background Conditions:

- Background conductivity in surface water is typically below 200 µS/cm but has been observed at higher levels at some locations during periods of low flow, or after periods of prolonged dry weather.
- Background ammonia/nitrate concentrations are typically below 0.01 mg/L but occasionally exceed 0.1 mg/L in wetland areas.
- Background chloride concentrations are typically below 10 mg/L.
- Background sulphate concentrations are typically below 10 mg/L but often increase in the downstream direction as streams receive groundwater discharge.

Impact Criteria:

- Leachate: Surface water is considered impacted by leachate when electrical conductivity surpasses 500 µS/cm, ammonia concentrations exceed 0.5 mg/L and chloride concentrations exceed 20 mg/L. Peak concentrations of these parameters are typically observed during the dry summer and early fall months, when flows are low and there is limited dilution by precipitation.
- Aggregate Runoff: Surface water is considered impacted by aggregate (e.g., production, stockpiling or site construction works) when nitrate concentrations are greater than background levels (~0.1 mg/L) and leachate indicator concentrations are low. In recent years, elevated nitrate concentrations have been observed in the absence of elevated sulphate concentrations, so sulphate may not be a reliable indicator of aggregate runoff. However, elevated sulphate concentrations may occur over a greater period and potentially after nitrate concentrations have subsided. Peak nitrate and sulphate concentrations are typically observed during the first sampling event following the onset of wet weather in the fall months after recent blasting and aggregate stockpiling.
- Road Salt: Surface water is considered impacted by road salt when chloride concentration is elevated above background levels (i.e., 20 mg/L), and the molar ratio of chloride to sodium is around 1.0. Cl/Na molar ratios in road salt are generally 1:1, assuming 100% compositional purity. Road salt-impacted sites must also be located downgradient (or downstream) of surfaces where road salt is known to be applied. Conductivity and chloride concentrations typically exhibit peaks following cold weather periods when de-icing salt is often applied to roadways.
- Magnesium lignosulphonate: Magnesium Lignosulphonate has been used as a dust suppressant at the Site and likely has an impact on groundwater quality similar to aggregate runoff because it contains nitrogen and sulphur. Laboratory testing indicated that the dust suppressant exhibited elevated conductivity (520 µS/cm), ammonia (51 mg/L), and total sulphur concentrations (83.7 mg/L) in aqueous phase (Appendix I). AECOM is not aware of the volume of magnesium lignosulphonate that has been applied at the Site.

Analysis of the surface water quality data indicated:

- Elevated Trace Metal Concentrations: Several trace metal exceedances (e.g., aluminum, iron, dissolved copper) were reported, but the elevated metal concentrations correlated with TSS exceedances in almost all cases, suggesting turbid and/or low-flow conditions impacted the surface water quality. Relatively high trace metal concentrations were often observed downstream of monitoring locations downstream of the landfill, suggesting that elevated trace metal concentrations occur via background gas-water-rock interactions.
- Background Surface Water Quality: SW-N-66 is a background monitoring station and exhibited no evidence of landfill-related impacts in 2024/25. The surface water at SW-N-66 exhibited low conductivity, and low to non-detectable aggregate runoff and leachate indicator concentrations. A copper concentration exceeded the BCWQG STA, suggesting that elevated copper concentrations are typical of the local environment. Surface water quality at SW-N-66 is very dilute and likely similar to local precipitation. SW-N-41S4 is located downstream of the landfill and cannot be considered a background monitoring location, but the surface water at this location is a good proxy for relatively evolved background surface water quality.
- Copper Concentration Exceedances: Copper concentration LTC exceedances persisted in many areas of the Site, but as we stated above, a BCWQG STA copper concentration exceedance was reported at a background location. Copper concentration LTC exceedances were reported in the receiving environment (e.g., SW-N-15) and at all three surface water monitoring locations at the confluence of Durrance and Tod creeks. Many of the copper concentrations that exceeded the guidelines were relatively low (i.e., <3.0 µg/L).
- Aggregate Runoff Impacts: Surface water across the landfill, at most compliance monitoring points, and in several areas of the offsite receiving environment continued to exhibit aggregate runoff impacts. Nitrate concentrations

decreased in some areas (e.g., downstream of the Northwest Stockpile), but higher nitrate concentrations were observed around the Northeast Stockpile (e.g., location 19, and compliance monitoring locations 16 and 55). Furthermore, despite the decrease in nitrate concentrations observed downstream of the Northwest Stockpile, higher sulphate concentrations and conductivity were observed, which likely reflect sulphide oxidation in the Stockpile. The temporal patterns observed among nitrate and sulphate concentrations likely reflect differing reaction rates of ANFO leaching and sulphide oxidation in the stockpile.

Aggregate runoff impacts were observed north of the Site, in Durrance and Tod Creeks. The impacts in Durrance Creek likely begin where the narrow stream passing through SW-N-42S1 meets Durrance Creek.

- Elevated Chloride Concentrations: Some monitoring locations south of the landfill were likely impacted by road salt, as indicated by moderate to elevated chloride concentrations coinciding with Na/Cl molar ratios around 1.0.

Leachate Quality

The leachate quality at monitoring points within the Site and at the Hartland Valve Chamber was typical for the Site. The West Face Drainage exhibited the most concentrated leachate.

Landfill Compliance with the Operating Certificate and Waste Discharge Authorization

The 2024/25 groundwater, surface water, and leachate quality data were used to assess compliance with the Amended Operational Certificate and Waste Discharge Authorization and are discussed individually below. Ultimately, the landfill did not meet all applicable regulatory criteria pertaining to groundwater, surface water, and leachate quality.

Leachate

Leachate quality met the Waste Discharge Authorization sewer use criteria on all sampling events, except for one marginal COD exceedance that was reported at the Hartland Valve Chamber in March 2024.

Groundwater

Thirty-five (35) compliance monitoring wells have been established in 19 locations at the Hartland Landfill. The groundwater quality data were screened against BC Contaminated Sites Regulation (CSR) Groundwater Quality Standards for Drinking Water (DW) and the protection of Aquatic Wildlife (AW) to evaluate landfill compliance with the Operating Certificate. Groundwater quality exceedances reported at compliance monitoring locations are summarized in Table 9-1.

Table ES-1. Groundwater Quality Exceedances at Compliance Monitoring Locations

Station	General Parameters	Nutrients	Metals	Comments
GW-20-1-1	None	None	Boron (1)	• Boron is interpreted to originate from silicate mineral dissolution and/or changes to redox conditions near the bedrock below Phase 1.
GW-31-1-1	None	Nitrate (2)	None	• Nitrate exceedances are associated with aggregate production and stockpiling at Hartland. The nitrate originates from leaching of ANFO residue.
GW-31-1-2	None	Nitrate (2)	None	
GW-111-1-1	None	Nitrate (2)	None	
GW-111-2-1	None	Nitrate (1)	None	
GW-112-1-1	None	Nitrate (2), Nitrite (1)	Antimony (1)	
GW-112-2-1	None	Nitrate (1)	None	

Surface Water

Five (5) surface water monitoring locations have been identified as compliance monitoring points surrounding the landfill. These stations are concentrated along the southern and northern property boundaries, downgradient of areas that have the potential to be impacted by leachate or aggregate runoff. The surface water quality data were screened against BC Approved and Working Water Quality Guidelines (BCWQG) Long-Term/Chronic (LTC) and Short-Term/Acute (STA) Guidelines for the protection of Freshwater Aquatic Wildlife (AW) to assess compliance with the Landfill Operational Certificate. Surface water quality guideline exceedances reported at compliance monitoring locations are summarized in Table 9-2.

Table ES-2. Surface Water Quality Exceedances at Compliance Monitoring Locations

Station	General Parameters	Nutrients	Metals	Comments
SW-N-05	None	Nitrate (4)	Dissolved Copper (4)	• The TSS and metal concentration exceedances are anticipated to be related to turbid flow conditions following a prolonged dry period. It is unlikely that the elevated TSS and metal concentrations were influenced by landfill activities. • Nitrate exceedances are associated with aggregate production and stockpiling at Hartland. The nitrate originates from leaching of ANFO residue. • Elevated nitrate concentrations at SW-S-04 were attributed to an upstream wetland.
SW-N-16	TSS (2)	Nitrate (4)	Total Aluminum (1), Dissolved Copper (4)	
SW-N-41S1	TSS (1)	None	Dissolved Copper (1)	
SW-S-04	TSS (2)	Nitrate (1)	Total Aluminum (1), Cobalt (2), Iron (2), and Dissolved Copper (4)	
SW-N-55	None	Nitrate (2)	None	

QA/QC and Data Reliability

The quality analysis of the 2024/25 groundwater, surface water, and leachate quality data indicated that duplicate samples were collected at a frequency of approximately 18.3% (88/481 samples), exceeding the targeted duplicate sampling rate of 10%. Furthermore, we determined that the water sampling and the laboratory analysis produced reliable results, but some trace metals concentrations (e.g., aluminum and copper) should be interpreted with caution.

Recommendations

Based on the findings of this report, our recommendations were summarized as follows:

Table ES-3. Summary of Recommendations

	Leachate Collection System	Status
1	Closely monitor water levels and leachate quality in the North Purge Wells to verify the effectiveness of the leachate collection system. Water levels in well 52-3-0-P52, adjacent to 52-4-0-P7 have slowly increased since 2021/22 and may indicate diminished drawdown and leachate collection in this area. A step test should be conducted on each north purge well to measure the specific capacity, which is an indicator of well performance. All procedures should follow the Standard Operating Procedure (SOP) – North Purge Well Drawdown Cone Verification (AECOM 2016), with interpretation of results by a qualified professional. The results should be compared to historical assessments to determine the need for well rehabilitation.	New
2	Closely monitor water levels and leachate quality in the South Purge Wells to verify the effectiveness of the leachate collection system and identify opportunities for improvements. These wells have not been rehabilitated since they were installed in 2001 and have likely accumulated sediment, diminishing their performance and/or requiring excessive maintenance. Pumping elevations in the South Purge Wells should be maintained at elevations below 140 m asl. Pumping elevations in P1 should be maintained near the bottom of the screened interval around 146 m asl.	Ongoing
3	Groundwater monitoring wells in proximity to the Phase 2 Basin and Northwest Sedimentation Pond should be monitored closely to confirm the hydraulic trap leachate collection system is effectively containing leachate north of Phase 2. Quarrying in the Toutle Valley resulted in greater connection between the groundwater flow system on the west side of the Highland Fault and the Phase 2 hydraulic trap, resulting in lowering of the surrounding groundwater levels. This could lead to enhanced leachate generation.	Ongoing
4	Groundwater elevations around the Cell 4 liner should be monitored closely in 2025/26 to evaluate whether the liner has an impact on the hydraulic trap, particularly beneath the North Ridge. Both wells at monitoring location 113 should be instrumented with pressure transducers to monitor groundwater levels beneath the North Ridge continuously. The volume of groundwater discharge and groundwater quality in the Cell 4 underdrains should be monitored on a monthly basis.	New

Aggregate Runoff Impacts		
5	Minimize the spatial extent and volume of aggregate stockpiles outside of the leachate collection system. Where this is not feasible, stockpiles should be covered with low permeability temporary tarps to minimize sulphate, ammonia, nitrate, and TSS impacts on downgradient groundwater and surface water quality. Direct runoff from aggregate stockpiles away from natural water courses as it is known to exceed BCWQ guidelines for sulphate and some nitrogenous compounds. This approach proved to be effective for mitigation of historical aggregate impacts at the Hartland North Pad. Aggregate run-off mitigation and control is currently underway by the CRD, and additional measures are being evaluated/planned as part of an overall aggregate management plan.	Ongoing
Groundwater Monitoring Program		
6	Advance a network of boreholes into the bedrock west of Phase 2 to characterize and monitor groundwater levels and quality. This will also allow for establishment of a long-term groundwater monitoring network west and upslope of Phase 2 to support continued evaluations of hydraulic trap performance and monitor groundwater quality. This is required to monitor the lowering of the water table surrounding Phase 2 following completion of the Phase 2 Quarry. Water levels have dropped significantly over the past several years, and monitoring of the hydraulic trap is critical to confirming landfill performance.	Ongoing
7	An elevated and non-compliant boron concentration was observed at compliance monitoring location GW-20-1-1. Although it is presently thought to originate from bedrock at the north and south end of the Phase 1 landfill, boron concentrations should continue to be monitored at this location. The source of boron should be determined if concentrations continue to increase.	Ongoing
8	Resurvey all of the groundwater wells located within the refuse footprint. These wells are known to settle over time and should be periodically surveyed to ensure the resultant groundwater elevations are accurate	New
9	Leachate mounding should be investigated in Phase 1 and 2 because it has been over five years since they were assessed. It would be useful to construct a new cross section through the Phase 2 landfill to investigate and monitor this issue over time. If required, subsurface data can be obtained by drilling through the refuse to the base of the landfill and investigating leachate levels in new wells. Wells may need to periodically be replaced because the wells tend to shift and become damaged as the refuse settles over time.	New
10	As required by the Amended Operational Certificate, the results of the annual monitoring program should continue to be reviewed and interpreted by a Qualified Professional experienced in assessing the impacts of landfill leachate at large municipal landfills similar to Hartland.	Ongoing
11	Begin recording oxidation-reduction potential (ORP) when sampling groundwater to inform interpretation of oxidation-reduction conditions in different areas of the landfill. This would particularly be helpful for determining the source of boron north of Phase 1.	New
Surface Water Monitoring		
12	Investigate water quality impacts associated with the application of magnesium lignosulphonate. Understanding the volume of magnesium lignosulphonate used at the Site will be important for determining the potential impact on local groundwater quality. Use of the dust suppressant should be limited to unpaved roads within leachate containment.	Ongoing
13	Repair and enhance the Site weirs so accurate surface water flow measurements can be collected.	Ongoing
14	Improve surface water management north of the Phase 2 landfill to minimize impacts of aggregate runoff on groundwater and surface water that is not captured by the leachate collection system.	Ongoing
Leachate Monitoring		
15	Characterize the chemistry of residual wastewater solids and stabilized biosolids (solids and leachate) to allow for establishment of indicator parameter thresholds and future evaluation of any impacts to leachate chemistry. This information may be available from pilot studies or operational monitoring programs.	Ongoing
16	Investigate the source of chloride in the area south of the landfill. Additional waste has been placed on the western and southern portions of Phase 2 over recent years and occasional leachate seeps and runoff from the truck wash facility have been noted in the past. Changes in activities at the south end of the landfill and management of impacted surface runoff may play a role.	Ongoing
17	Begin collecting quarterly leachate samples from the Lower Lagoon. The Phase 2 Cleanout pump is not operable, so this data is needed to track changes in leachate chemistry as Phase 2 Cell 4/5/6 are developed.	Ongoing
18	In addition to the Sewer Use Criteria, leachate quality results for trace organic compounds and emerging contaminants should be compared to CSR standards to identify parameters in leachate that exceed CSR standards and guide any refinements to the monitoring program in future years.	Ongoing
Construction Management		
19	The placement of aggregate, road salt, dust suppressant and herbicides should be carefully considered and documented to help understand the causes of potential future concentrations of conductivity, ammonia, chloride, nitrate, sulphate and select metals at groundwater and surface water monitoring locations.	Ongoing
Quality Assurance and Quality Control		
20	Quality assurance for laboratory analyses should continue to be evaluated quarterly, and any discrepancies should be resolved with the laboratory and CRD sampling personnel within one month of receiving the laboratory results. The appropriate notation should be added to the data files to explain the reason for the low precision and the steps taken, if any, to improve the sampling or laboratory procedures.	Ongoing

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1. Introduction

Hartland Landfill (the Site) is located at the end of Hartland Avenue, approximately 14 kilometres (km) north of Victoria (Figure 1-1). Landfilling commenced at the Site in the 1950s. The site was owned and operated by a private company, until 1975, when the property was purchased by the Capital Regional District (CRD). The landfill is currently owned and operated by the CRD and is the primary solid waste disposal site for the 13 member municipalities and three electoral areas of the Capital Region.

The CRD initiated a surface water and groundwater monitoring program at the landfill in 1983. Since 1988, annual monitoring reports have been prepared and issued by Gartner Lee and AECOM. The present Hartland Monitoring Program is part of an Amended Operational Certificate (#12659), required by the BC Ministry of Environment and Climate Change Strategy (ENV) and last amended January 27, 2010.

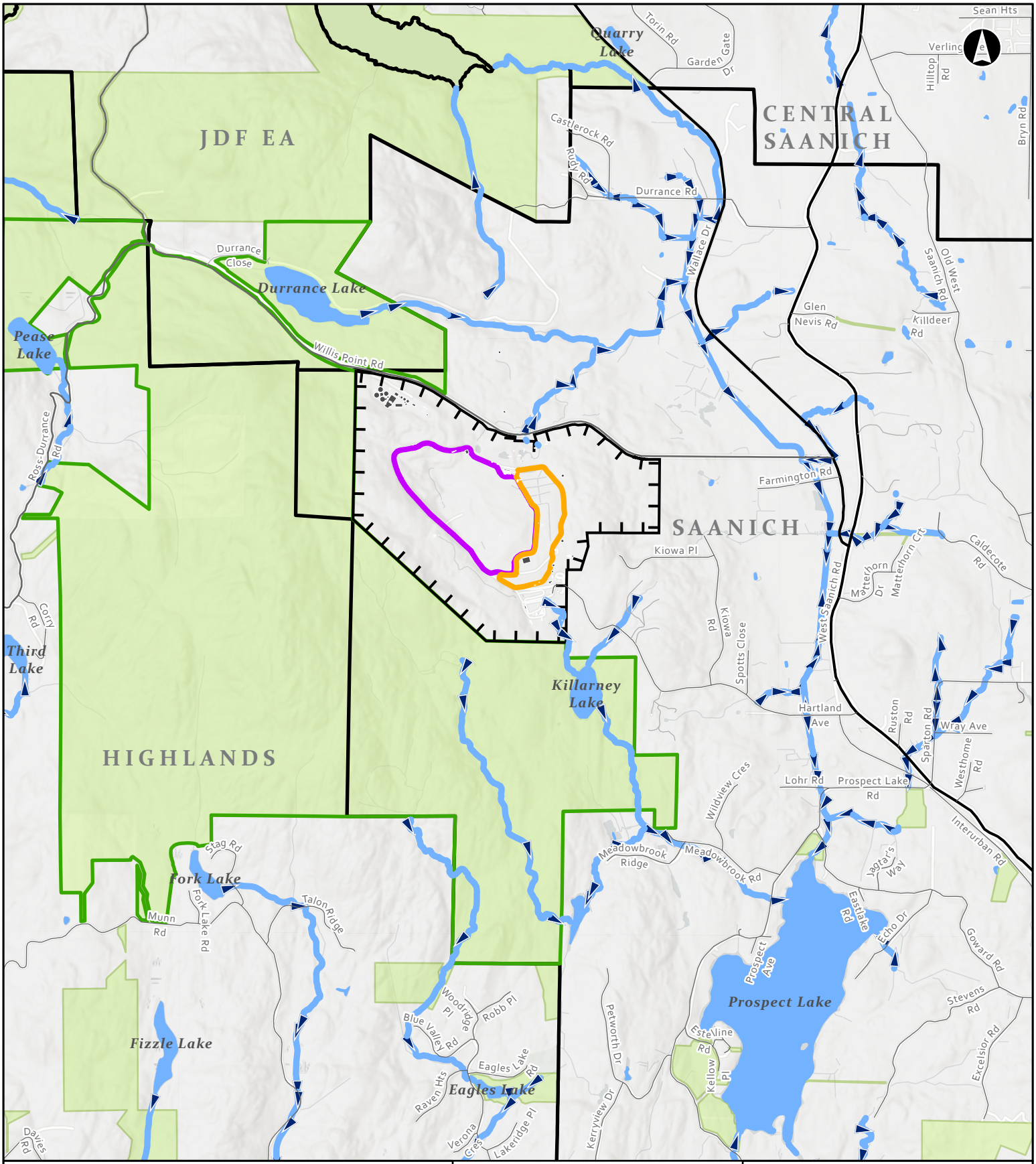
Hartland is divided into two distinct landfill areas referred to as Phase 1 and Phase 2. Initially, waste was deposited in Phase 1, which reached capacity and was capped in 1996/97. Phase 2 receives waste actively and is engineered and operated as a ‘hydraulic trap” landfill with the maintenance of upward groundwater gradients below the base of the Phase 2 landfill providing leachate containment. Filling of Phase 2 Cell 1 was completed in 2004, and that summer, the west face of Phase 2 Cell 1 was capped with a geomembrane to reduce passive gas venting and provide an internal leachate collection system for future development of Phase 2 Cell 2. This area is referred to as the West Face closure. Cell 1 was capped in 2011. In 2016, Phase 2 Cell 3 was developed on the west side of Phase 2 along with new leachate collection infrastructure. The Phase 2 Cell 4/5/6 quarry reached its maximum extents in September 2023, and construction and installation of a landfill liner system at the base of the quarry began in May 2024. Cell 4 received its first load of waste in January 2025 and is now fully operable.

Leachate and surface runoff from the active landfill areas are directed to two leachate lagoons at the north end of the landfill. The leachate is transported by a pipeline through the northwest trunk sewer system to the McLoughlin Point Wastewater Treatment Plant. Leachate discharge to sewer is authorized by CRD Regional Source Control Program Waste Discharge Authorization SC97.001, last amended on June 21, 2021, and is subject to the CRD Sewer Use Bylaw (Bylaw No. 2922).

This report presents our interpretation of water quantity and quality data collected between April 2024 and March 2025 and aims meet the following objectives:

1. Evaluate the effectiveness of the leachate containment and collection systems.
2. Assess the potential impact of landfill leachate and operational activities on groundwater and surface water quality.
3. Assess temporal trends in leachate, groundwater and surface water flow and quality.

Leachate, surface water, and groundwater data collected beyond the monitoring timeframe was not considered in this report.



LEGEND

Closure Areas
- Phase 1 Closure (1997)
- Phase 2 Base

Digital Roads Atlas
- Arterial minor; Major Collector
- Minor Collector
- Local; Lane; Ramp
- Restricted; Strata; Resource; Recreation

- Primary Stream or Ditch
- Structure
- Park
- Mount Work Regional Park Boundary
- Site Boundary
- Local Government Boundary

Hartland Landfill Monitoring Site Location Map

0 250 500 750 1000 1250 M

Figure 1-1	1:8,500 NAD83 UTM Zone 10N
P:60740388	May, 2025

Basemaps provided by: Esri, NASA, NGA, USGS, FEMA, District of Saanich, WA State Parks GIS, Esri Canada, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS, NRCan, Parks Canada and Capital Regional District

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2. Site Description

2.1 Physiography

Hartland Landfill is located in the Tod Creek watershed in the bedrock highlands of the Gowlland Range, northwest of Victoria. The terrain is moderately rugged with relief of up to 446 metres (m). Undeveloped CRD property (about 320 hectares (ha) in total) lies to the west and south of the landfill site. Mount Work Regional Park lies to the west, and the Department of National Defence Rifle Range is north of the landfill. Durrance Lake Regional Park is northwest of the landfill, and Killarney Lake Regional Park is southeast. Private residential properties are located to the east and southeast of the landfill.

Durrance Lake and Killarney Lake are two major surface water bodies located within one kilometre of the landfill. A lined perimeter ditch collects and diverts natural runoff from upslope areas around the landfill footprint. The water is discharged into ephemeral streams that report to Durrance Lake to the northwest and Killarney Lake to the southeast.

A Residuals Treatment Facility (RTF) was constructed at Hartland North to treat effluent from the McLoughlin Point Wastewater Treatment Plant. The RTF became operational in September 2020. Although the RTF is located within the Hartland Landfill Operating Area Boundary, it is managed by CRD as a separate site.

The Centrate Return Line (CRL) is used to return centrate from the RTF and leachate from the Hartland Landfill to the McLoughlin Point Wastewater Treatment Plant. The CRL was activated on December 30, 2020, and the formal switch from the leachate pipeline to the CRL occurred in March 2021.

A water main was installed along the East Perimeter Road, providing a water service between the two leachate lagoons in the northeast corner of the Hartland property. The new water main connects the RTF with Saanich's new water reservoir built on Hartland's eastern boundary. The new water service also supplies water to the newly built Pump Station No. 4, which is part of the Residual Solids Conveyance Line (RSCL). The RSCL conveys processed wastewater from the McLoughlin Point Wastewater Treatment Plant to the RTF. Construction of the RSCL was completed in the summer of 2020.

2.2 Geology

2.2.1 Surficial Geology

A veneer of till composed of silty, gravelly sand, with interspersed cobbles and boulders overlies the bedrock in areas of gentle slopes and in valley bottoms. Locally surrounding the landfill, fluvial deposits consisting of well-sorted sands and gravels are observed in bedrock depressions and channels, including the channel that drained Heal Lake prior to development of the Phase 2 landfill. Within the landfill, the bedrock is mantled by a discontinuous veneer of till (Vashon Drift) composed of silty, gravelly sand, with interspersed cobbles and boulders. Vashon Drift is generally absent from the North Ridge and the Hartland North area.

In 2022/23, AECOM supervised a drilling program in the northwest area of the landfill. During the drill program, a gully infilled with unconsolidated material was identified north of the Phase 2 landfill, between Phase 2 and the Northwest Sedimentation Pond (NWSP) (AECOM 2023). The subsurface materials consisted of dense, silty diamicton and till with interspersed cobbles.

2.2.2 Bedrock Geology

The bedrock geology in the area surrounding the landfill is comprised of Wark Diorite Gneiss and Colquitz Gneiss, with Colquitz Gneiss outcropping in the northern and eastern margins of the landfill Site. The Wark Diorite Gneiss is dark green to black in colour. It is competent, except in shear zones, where it has been chloritized and weathered into soft, sand-size particles and clay. Discontinuities, including joints, shear zones and altered veins have been observed at outcrops and noted in borehole logs. Geologic mapping of an exposed bedrock outcrop north of the Phase 2 landfill (AECOM 2018) characterized the undulating bedrock surface and confirmed the presence a complex network of lithologic contacts, faults, and fractures observed in exposed bedrock excavations (sub-vertical quarry walls), including the Highland Fault and other faults that were previously inferred based on lineaments identified on aerial photographs (Thurber 1987). Evidence supporting the identification of a major oblique-slip fault proximal to the trace of the Highland Fault was identified in this study and further validated by a drill investigation in the fall of 2019 (AECOM 2019a). Permeability testing and water level measurements have determined that

faults and shear zones behave as conduits and/or barriers to groundwater flow which impart a degree of anisotropy in the hydrogeological properties of the bedrock (AECOM 2018).

2.3 Climate

The climate of this area is classified as “cool Mediterranean.” Long-term (1981–2010) average climatic data is available for the Victoria International Airport Climatological Station (Victoria International Airport CS) located approximately 9 km from the landfill. Average annual temperature is 10.0ºC and mean monthly values range from a low of 4.0ºC in December to a high of 16.9ºC in July. Mean annual precipitation is approximately 882.9 mm.

In 1994, the CRD established a climate station (Victoria Hartland CS) at the landfill office. The original Hartland climate station was replaced in 2009/10 with new equipment at a location on top of Phase 1. The new weather station records temperature, precipitation, wind direction, wind speed, barometric pressure, and relative humidity directly to CRD's SCADA system.

Hartland daily precipitation measurements for 2024/25 are provided in Appendix C. The precipitation measured at Hartland Landfill from April 2024 to March 2025 was 935 mm, or about 6% higher than the 30-year average reported for Victoria International Airport CS (882.9 mm/year), and approximately 2.8% lower than the total precipitation recorded at Victoria Hartland CS (962 mm) in 2023/24. Precipitation during the 2024/25 wet season (i.e., October to February) was 546.3 mm, which is about 27.4% lower than in 2023/24 and contributed 58.4% of the total annual precipitation.

Climate change projections for the CRD were developed by the Pacific Climate Impacts Consortium to better understand the details of how climate may change in the Capital Region (CRD 2017). Overall, the results indicate that the region can expect warmer winter temperatures, fewer days below freezing, more extreme hot days in the summer, longer dry spells in summer months, more precipitation in fall, winter and spring, and more intense, extreme weather events. A water surplus occurs primarily in the cool, wet winter months (November, December, and January) with water deficit conditions occurring in the warm, dry summer months (July, August, and September).

2.4 Significant Site Activities in 2024/25

CRD staff maintain a log of landfill activities that are relevant to landfill operations, leachate containment, and compliance monitoring. Activities that were considered important in regard for compliance monitoring are summarized below:

- Purge Well P11 Repairs: In April 2024, the compressor running the pump in P11 was repaired, and the purge well is now operable. P11 was installed to collect contact water emanating from the Northwest Stockpile.
- Installation of the Cell 4 Liner: In May 2024, construction of the Cell 4 liner began in the Toutle Valley. The liner was completed in January 2025. The liner was designed to collect and convey leachate from Cell 4. Underdrains were installed below the liner to collect and divert clean groundwater away from Phase 2.
- Aggregate Crushing and Washing in the Toutle Valley: In June 2024, the CRD began crushing and washing aggregate in the Toutle Valley. The purpose of washing the aggregate was to meet grain size specifications. The contact water was discharged to a trench and pumped along SW-N-57 to the Upper Lagoon. The discharge was turbid, and some was captured by the Leachate Sump and the Heal Basin.
- Metals Removed from the Domestic Wells Analytical Suite: In June 2024, metals were removed from the domestic wells analytical suite, per AECOM’s recommendations in the 2024 Monitoring Network Review (AECOM 2024). The metal analysis suite was removed from the program because metals are not used to identify leachate and there have been very few exceedances historically.
- Drilling and Installation of Monitoring Wells: In September 2024, AECOM supervised a sonic drilling program for the purpose of installing new monitoring wells downgradient of the Northeast Stockpile (GW-111-1-1, GW-111-2-1, GW-112-1-1, and GW-112-2-1) and replacing monitoring wells GW-78-1-1 and GW-78-2-1 on the North Ridge. GW-113-1-1 and GW-113-2-1 were installed on the North Ridge. AECOM recognized GW-111-1-1 and GW-111-2-1 as a compliance monitoring points. The new wells were first sampled in October 2024.
- Activation of Surface Water Sampling Stations SW-N-55 and SW-N-56: In December 2024, the CRD began sampling surface water stations SW-N-55 and SW-N-56 to monitor surface water quality immediately downstream of the Northeast Stockpile. AECOM recognized SW-N-55 as a compliance monitoring location.

- Aggregate Washing at the Northeast Stockpile: In November 2024, the CRD began washing aggregate at the Northeast Stockpile and experienced problems with managing the drainage. A ditch system was constructed to convey the contact water to the Lower Lagoon while allowing sediments to settle along the flow path. The CRD noted that some of the runoff escaped the ditch and collected a single surface water sample (SW-N-Agg Drain) from the ditch in March 2025.

  On December 18, the CRD reported that aggregate washing was 50% complete and challenges with capturing the drainage persisted. It is possible that elevated metal concentrations and excessively turbid drainage reported to downstream surface waters over this period. Surface water sampling stations SW-N-55 and SW-N-56 are immediately downgradient of the Northeast Stockpile and were sampled on December 18 and 16, respectively.

- Mounding Leachate/Groundwater in Leachate Drain (Sumpzilla): In January 2025, the high-level alarm was set off in the Leachate Drain, which has a set point of 128.8 m asl. The maximum leachate/groundwater elevation recorded was 129.8 m asl. The CRD attributed the rising water levels to a pump failure. The pump likely failed because of the excessive turbidity of the leachate/groundwater. Based on interpretation of SCADA data, it is likely that the pump began struggling on January 5. A trash-pump was installed temporarily to lower the water levels.

- P10 Maintenance: In February 2025, the pump in purge well P10 underwent maintenance, after spikes in water levels were observed at the well throughout January. A new pump was installed in March 2025.

- Lower Lagoon Maintenance: From June to August 2024, and in March 2025, the Lower Lagoon underwent maintenance, during which leachate from the Lower Lagoon was pumped into the Upper Lagoon, resulting in elevated leachate levels reported by the SCADA system.

2.5 Applicable Regulatory Criteria

Hartland Landfill is required to operate in accordance with the monitoring requirements outlined in the following:

- Amended Operational Certificate (#12659) approved by ENV, last amended on January 21, 2013.
- Waste Discharge Authorization SC97.001 issued by the CRD Regional Source Control Program, last amended on June 21, 2021, and subject to the CRD Sewer Use Bylaw.
- Legally enforceable standards defined by the British Columbia Contaminated Sites Regulation (CSR).

The Stage 10 (Omnibus) and Stage 11 (Housekeeping) amendments to the CSR became effective on November 1, 2017. Stage 12 amendments to the CSR were issued January 24, 2019, and included clerical errors related to the Stage 10 and 11 amendments. The Stage 13 amendments came into force on February 1, 2021, and Stage 14 amendments came into effect on March 1, 2023. References to CSR standards in this report consider the latest amendments up to March 1, 2024.

As part of the update of Stage 10 (Omnibus) and Stage 11 (Housekeeping) amendments, a number of emerging contaminants were added to the water and soil schedules due to their persistence in the environment, toxicity, and relevance to contaminated sites in BC. In 2017, AECOM conducted a focused review on the applicability of emerging contaminants monitoring at the Landfill, and in 2018, we issued a sampling plan to the CRD. We recommended to continue sampling emerging contaminants of concern (CECs) at the Hartland Valve Chamber (HVC) on a quarterly basis in conjunction with the trace organics sampling program, and the review should be conducted every five years to ensure effectiveness and relevance.

In 2024, AECOM conducted the next emerging contaminant review and recommended that the CRD continue sampling emerging contaminants on a quarterly basis and include additional background samples for comparison of the HVC analytical data. Emerging contaminant monitoring is ongoing.

2.5.1 Groundwater

In February 2016, CSR Protocol 21 (P21), Water Use Determination, became legally enforceable. For the purposes of this report, Protocol 21 (Version 2.0, effective October 31, 2017) is considered when determining applicable water use standards at Hartland Landfill. Groundwater quality data were compared to CSR Schedule 3.2 Generic Numerical Water Standards Column 3 Aquatic Life Use (AW) and Column 6 Drinking Water Use (DW), as required by P21. Freshwater AW standards apply to groundwater because the landfill is “within 500 m of a surface water body containing aquatic life” (i.e., Heal Creek, Durrance Creek, Durrance Lake, Killarney Creek and Killarney Lake). DW standards apply because the aquifer underlying the landfill has:

- A hydraulic conductivity greater than 10^{-6} m/s and a yield greater than 1.3 L/min.
- Groundwater with natural total dissolved solids (TDS) concentrations of less than 4,000 mg/L.
- An average confined aquifer saturated thickness greater than 1 m.
- An overlying silt or clay aquitard that is less than 5 m thick.

DW standards for iron and manganese do not apply to municipal landfills based on the Stage 8 Amendments to the CSR that came into effect on January 24, 2013, as presented on CSR Schedule 3.2.

The Stage 13 amendments to the BC CSR were effective as of February 1, 2021. As part of the Stage 13 amendments, Protocol 9, which includes the list of regional groundwater background concentrations, was updated. Regional background concentrations are provided in Table 1 of Protocol 9. Regional background concentrations for the Southern Vancouver Island have been considered when assessing groundwater quality data collected at the Hartland Landfill. In several instances, regional background concentrations are greater than the applicable CSR Drinking Water Use standard and/or the most stringent CSR Freshwater Aquatic Life Use standard. Groundwater that contains a substance concentration above the applicable CSR standard but below the regional background concentration for that substance is not considered contaminated under the CSR. All reference to CSR standards in this report considers Stage 14 amendments and amendments up to March 1, 2024.

2.5.2 Surface Water

Surface water quality data were compared to the *British Columbia Approved and Working Water Quality Guidelines* (BCWQG) for DW and the protection of AW because CSR Technical Guidance 15 (April 2013) indicates that groundwater in receiving environments (i.e., within 10 m of the high water mark of a surface water body) should be compared to the BCWQG. The approved and working BCWQGs were last updated in May and March 2025, respectively, and the updated guidelines were considered when assessing data compliance in this report. There are two sets of BCWQG criteria for AW use:

- Long-term chronic (LTC)
- Short-term acute (STA)

The purpose of the long-term chronic (LTC) guideline is to protect the most sensitive species and life stages against chronic exposure to contaminants. The LTC concentration is typically calculated by averaging the results of five or more samples collected within a 30-day period. The short-term acute (STA) WQGs are established to protect the most sensitive species and life stages against short-term (i.e., <96 hours) exposure to contaminants. STA guidelines are typically used to assess risks associated with short-term exposures.

The dissolved copper and nickel data evaluation has been updated to reflect the revised BCWQG AW criteria. The dissolved copper and nickel BCWQGs vary with hardness, pH, dissolved organic carbon (DOC) and temperature, and are calculated using the Biotic Ligand Model (BLM). BLM is a series of linked equations that predict the toxicity of dissolved copper/nickel to aquatic life under specific conditions. In this report, only dissolved copper and nickel concentrations with paired DOC, pH and temperature data were compared to BCWQG AW criteria.

The BCWQGs apply to surface water on site and on adjacent sites under provincial jurisdiction. The Federal Water Quality Guidelines (CCME) apply on the property owned by the federal government located north of the Site and Willis Point Road. However, groundwater and surface water on federal land north of the Site and Willis Point Road report back to provincial land, so CCME guidelines were not considered in this report. Neither the BCWQG nor CCME guidelines have the same regulatory force as the CSR standards.

2.5.3 Leachate

Discharge from the leachate pipeline is subject to the CRD Regional Source Control Program (RSCP) Waste Discharge Authorization (SC97.001), authorizing the discharge of non-domestic waste to the sanitary sewer, in accordance with the CRD's Sewer Use Bylaw 2922. In June 2021, the discharge authorization was amended to reflect operation of the Centrate Return Line and decommissioning of the Markham Valve Chamber.

The leachate compliance monitoring location at the Site is the Hartland Valve Chamber, which is a flow detection chamber located near the Lower Lagoon. Leachate sampling is conducted on monthly basis, and discharge limits are identified within the authorization.

3. Methods and Quality Assurance

3.1 Field Techniques

All active leachate, surface water, and groundwater sampling locations are shown on Figure 4-1. Boreholes and monitoring wells are identified using a standard system adopted by the CRD, consisting of and acronym and three numbers (e.g., GW-02-02-01). The acronym refers to the sample type; GW indicates groundwater samples, and SW indicated surface water samples. The first number refers to the monitoring site, the second number refers to the borehole at the monitoring site (in the case of multi-level groundwater wells, there may be more than one), and the third number refers to the monitoring well in that borehole (there may be two or three at different depths in older, nested installations). If the third number is a zero, it indicates an open borehole where no PVC monitoring well has been installed. Additionally, several leachate purge (collector) wells have been installed at the Site, which are denoted with a “P” in front of the purge well number (e.g., P1).

Monitoring well construction details, including location coordinates and elevations, are summarized in Appendix A.1. Appendix A.1 also lists the status of all the groundwater monitoring wells at the site, with comments describing any problems associated with each monitoring well. Monitoring wells are categorized as active (functioning) or inactive (non-functioning, decommissioned, or destroyed). In 2024/25, there were 146 active groundwater monitoring wells at 86 locations at the Site; ten (10) are active purge wells and 13 are landfill gas wells.

The methods used to develop and sample each monitoring well are described in Appendix A.2. The Standard Operating Procedure (SOP) for groundwater sampling is updated periodically. A variety of sampling techniques are used depending on the depth of the monitoring well, the groundwater level in the monitoring well, and the permeability of the surrounding geologic formation. A number of dedicated submersible pumps have been installed in the deeper monitoring wells and open boreholes to facilitate more efficient sampling, resulting in improved data quality. Sampling events were scheduled to avoid heavy rainfall to avoid sample dilution.

In 2024/25, the monitoring program consisted of the following:

- Quarterly collection of manual groundwater level measurements.
- Continuous water level monitoring with pressure transducers at north end of the Phase 2 landfill.
- Continuous water level monitoring with pressure transducers at the north and south purge well systems.
- Continuous water level monitoring with pressure transducers east of Phase 1 landfill and Hartland North.
- Quarterly monitoring of wells near the property boundary and key locations to assess the effectiveness of leachate containment.
- Semi-annual monitoring stations with relatively stable long-term historical data.
- Annual sampling of 17 residential wells, including 14 wells within a 2 km radius of the landfill and five (5) domestic wells located north of the Hartland North Pad.
- Quarterly sampling of surface water stations at property boundary points and other selected monitoring locations.
- Quarterly testing of leachate discharge for trace organic compounds.
- Monthly testing of leachate for conventional parameters and metals at the point of discharge and select locations within the leachate collection system.
- Annual testing of leachate discharge for emerging contaminants.

The CRD has adopted a continuous improvement and quality assurance program that is review regularly to ensure that it remains effective in monitoring the impacts of various landfill operations. As in previous years, CRD staff carried out groundwater and leachate sampling as well as groundwater level measurements at the locations shown in Figure 4.1. Surface water samples were collected at monitoring locations shown in Figure 7.1. Further information on the monitoring program field procedures is contained in the CRD Monitoring Procedure Manual.

3.2 Quality Assurance

In 2024/25, routine surface water, groundwater and domestic well water laboratory analyses were performed by Bureau Veritas Laboratory (BV) in Victoria and Burnaby, British Columbia. BV also analyzed leachate chemistry samples, which included analysis of trace organic compounds and emerging contaminants.

A quality assurance program is in place to assess the validity of the laboratory results. The program involves the submission of randomly selected field replicate, trip blank, and "reference" Victoria municipal water samples to the laboratory for analysis. Table 3-1 and Table 3-2 presents quality assurance of groundwater and surface water, respectively. There were 24 surface water, and 60 groundwater samples submitted in duplicate between March 2024 and April 2025. Table 3-3 presents quality assurance results for the Hartland Valve Chamber. In 2024/25, there were 4 leachate samples submitted in duplicate. In this report, each set of replicates were taken from the same source and/or sampling location and under the same conditions. In all cases, the field replicates were submitted ‘blind’ to the laboratory. This resulted in duplicate sampling frequencies of 17.9% (60/335 samples) for groundwater, 26.4% (24/91 samples) for surface water, 25% (4/16 samples) for the Hartland Valve Chamber compliance point, and 7.27% (4/55 samples) for the overall leachate sampling program. Overall, duplicate samples were collected at a frequency of approximately 18.3% (88/481), exceeding the duplicate sampling target of 10%.

Submission of duplicate samples provides an estimate of total uncertainty associated with the data. Typically, one duplicate sample is collected for every ten samples (10%) as part of quality control measures. Total uncertainty is the variability (precision plus bias) associated with the sample collection and sample analyses. In addition, the Limit of Quantification (LOQ) is considered because the precision of analytical results just above the Method Detection Limit (MDL) is known to be poor. The LOQ is the range of concentrations between the MDL and five times the MDL for each parameter, as outlined in Part E of the 2024 British Columbia Field Sampling Manual.

The CRD has used several different statistical methods to evaluate the precision and accuracy of its monitoring program. The CRD uses the relative percent difference (RPD) method, as recommended by ENV, which uses duplicate analyses to determine precision of the analytical results. This method expresses percent of difference between two values as the ratio of their absolute difference to the average value of the sample and the duplicate, as shown in the equation below:

$$\mathrm{RPD} = \frac{|x_1 - x_2|}{\frac{x_1 + x_2}{2}}$$

where:

x_1 is the initial sample concentration (mg/L)
x_2 is the duplicate sample concentration (mg/L)

Parameters with RPD values exceeding the RPD criteria should be interpreted with caution. Alarm limits were set as per the BC Ministry of Environment Environmental Laboratory Manual. Duplicate samples with RPD values within 30% for general inorganics and metals and within 45% for organic compounds are considered to meet the Data Quality Objectives (DQOs).

3.2.1 Groundwater and Surface Water RPDs and Blanks

Table 3-1 and Table 3-2 present calculated RPD values for replicate groundwater and surface water samples collected at or near the landfill. In both tables, RPD values were highlighted with an “a” if they were above 30% and all results were above the LOQ, and values were highlighted with a “b” if they were above 30% but one or more results were below the LOQ.

Table 3-1 indicates the following for groundwater samples collected at the landfill in 2024/25:

- A total of 60 duplicate samples were collected and analyzed for 41 parameters.
- Forty-six (46) RPD exceedances were reported when all parameters exceeded the LOQ.
- RPD values for dissolved aluminum (13 samples), antimony (2 samples), barium (3 samples), cadmium (1 sample), cobalt (2 samples), copper (7 samples), iron (4 samples), lead (2 samples), manganese (2 samples), nickel (3 samples), zinc (6 samples), and temperature (1 sample) were greater than the 30% target when all concentrations were above the LOQ.

Overall, the groundwater field replicates showed good precision for most parameters, and the majority of RPD values for the 2024/25 monitoring year were within the acceptable range. AECOM believes that, for the purpose of this report, the precision

of the groundwater quality data is acceptable. However, dissolved aluminum and copper concentrations should be interpreted with caution because these parameters exhibited a relatively high number of elevated RPD values. Both the trip and field blank groundwater samples exhibited negligible solute concentrations, and the conductivity of the blanks was below 37 µS/cm.

Table 3-2 indicates the following for surface water samples collected at the landfill in 2024/25:

- A total of 24 duplicate samples were collected and analyzed for 42 parameters.
- Thirty-two (32) RPD exceedances were reported when all parameters exceeded the LOQ.
- RPD values for total aluminum (2 samples), total cobalt (1 sample), total iron (1 sample), total manganese (2 samples), nitrate (1 sample), total nickel (2 samples), total zinc (2 samples), TSS (2 samples), conductivity (3 samples), dissolved aluminum (2 samples), dissolved copper (4 sample), dissolved iron (2 samples), dissolved manganese (2 sample), dissolved nickel (2 samples), and dissolved zinc (4 samples) were greater than the 30% target when all concentrations were above the LOQ.

Overall, the surface water sample replicates showed good precision for most parameters, and the majority of RPD values for the 2024/25 monitoring year were within the acceptable range. Some of the parameters that exhibited high RPD values (e.g., dissolved copper and zinc) may reflect poor sampling conditions and should be interpreted with caution. Both the trip and field blank surface water samples exhibited negligible solute concentrations and very low conductivity.

3.2.2 Leachate RPDs

In 2024/25, three (3) leachate samples were collected in duplicate and analyzed for 56 parameters, and one (1) sample was collected in duplicate and analyzed for 69 parameters (Table 3-3). All replicate samples exhibited RPD exceedances for one or more parameters when all parameters exceeded the LOQ. RPD exceedances were reported for total sulphide (2 samples), TSS (1 sample), COD (2 samples), cyanide WAD (1 sample), ammonia (1 sample), nitrite (1 sample), cadmium (1 sample), and zinc (1 sample). Overall, the leachate field replicates showed good precision for most parameters, and the quality of the data is considered acceptable for the purposes of this report.

3.3 Statistical Assessment of Temporal Trends

Seasonal variability in water quality parameters can mask the overall trend of parameters in groundwater, surface water and leachate quality data. A non-parametric statistical analysis (the Mann-Kendall analysis) has been used to evaluate long-term water and leachate quality trends at Hartland since 2005. The goal of implementing the analysis was to identify statistically significant trends (at the 95% confidence level) in groundwater, surface water, and leachate chemistry at each sampling location. The analysis does not require normally distributed data and allows for missing data (non-detects) and irregularly spaced measurement periods in the dataset. This is an advantage because water and leachate quality data at Hartland Landfill often include concentrations below detection limits and samples are not always collected at regularly intervals. Non-detect measurements were assigned the value of the detection limit. The Mann-Kendall test can be used for virtually any water quality or leachate parameter and provides a quantitative means of determining if a given parameter is changing (increasing or decreasing) in a statistically significant manner over time.

For this report, the Mann-Kendall analysis was conducted utilizing data collected between April 2020 and March 2025. A five-year time frame is consistent with the interval over which most water quality data is plotted within this report and is anticipated to provide an ideal balance between seasonal variation and the detection of long-term trends in water quality. However, the analysis will provide a result for a monitoring location that has been analyzed quarterly for at least two years, as per trend analysis guidelines described in the CSR.

All field and lab replicates were removed from the data set prior to the analysis. Conductivity, ammonia, and chloride concentrations were tested for trends using the Mann-Kendall test because they are considered key indicators of leachate at the landfill. Sulphate and nitrate concentrations were also evaluated because they are key indicators of aggregate runoff.

The analysis was conducted using data collected from a total of 91 groundwater monitoring wells (36 compliance and 55 routine), 10 purge wells, 29 surface water monitoring stations (5 compliance and 24 routine), and the leachate compliance monitoring station (Hartland Valve Chamber). The rest of the locations are either inactive or do not have sufficient data for Mann-Kendall analysis. The results of the statistical trend analysis for groundwater, surface water and leachate are provided in Appendices G-1, G-2, and G-3, respectively, and are discussed in relevant sections of this report.

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Alkalinity - Total - pH 4.5	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead
				Fraction	TOT	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	1	0.5	0.02	0.02	0.04	0.01	0.005	10	0.005	0.05	1	0.2	0.005	0.05	0.5	1	0.005
				Limit of Quantification (5x DL)	5	2.5	0.1	0.1	0.2	0.05	0.025	50	0.025	0.25	5	1	0.025	0.25	2.5	5	0.025
18-1-1	FR1	Y	2024-05-09	Clear and colourless	150.00	5.19	0.74	2.42	16.40	< 0.01	< 0.01	34	0.15	52.80	2.80	< 0.10	0.03	0.31	161.00	2.60	< 0.01
18-1-1	FR2	Y	2024-05-09	Clear and colourless	150.00	4.94	0.72	2.43	16.60	< 0.01	< 0.01	34	0.15	53.40	2.90	< 0.10	0.04	0.30	163.00	2.40	0.01
18-1-1	FRM	Y	2024-05-09	Mean of duplicates	150.00	5.07	0.73	2.43	16.50	< 0.01	< 0.01	34	0.15	53.10	2.85	< 0.10	0.04	0.30	162.00	2.50	0.01
18-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	4.9%	2.8%	0.4%	1.2%	0.0%	0.0%	0.0%	2.6%	1.1%	3.5%	0.0%	10.6%	4.3%	1.2%	8.0%	9.5%
18-1-1	FR1	Y	2024-09-17	Clear and colourless	140.00	6.35	0.60	2.54	14.30	< 0.01	< 0.01	28	0.05	55.90	3.10	< 0.10	0.01	0.19	169.00	4.60	0.01
18-1-1	FR2	Y	2024-09-17	Clear and colourless	140.00	6.69	0.59	2.51	14.30	< 0.01	< 0.01	28	0.05	52.40	2.80	< 0.10	0.01	0.18	159.00	8.40	0.01
18-1-1	FRM	Y	2024-09-17	Mean of duplicates	140.00	6.52	0.60	2.53	14.30	< 0.01	< 0.01	28	0.05	54.15	2.95	< 0.10	0.01	0.19	164.00	6.50	0.01
18-1-1	RPD	Y	2024-09-17	RPD of duplicates	0.0%	5.2%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	2.3%	6.5%	10.2%	0.0%	**41.6%** b	4.9%	6.1%	**58.5%** b	**46.8%** b
18-1-1	FR1	Y	2024-12-04	Clear and colourless	140.00	7.14	0.89	2.31	13.90	< 0.01	< 0.01	29	0.05	53.20	3.20	0.12	0.08	0.45	164.00	11.70	0.01
18-1-1	FR2	Y	2024-12-04	Clear and colourless	140.00	4.96	0.95	2.38	14.50	< 0.01	< 0.01	30	0.05	54.90	3.20	< 0.10	0.08	0.63	168.00	9.70	0.01
18-1-1	FRM	Y	2024-12-04	Mean of duplicates	140.00	6.05	0.92	2.35	14.20	< 0.01	< 0.01	30	0.05	54.05	3.20	0.11	0.08	0.54	166.00	10.70	0.01
18-1-1	RPD	Y	2024-12-04	RPD of duplicates	0.0%	**36.0%** a	6.3%	3.0%	4.2%	0.0%	0.0%	3.4%	10.1%	3.1%	0.0%	18.2%	3.8%	**32.1%** a	2.4%	18.7%	**47.6%** b
18-1-1	FR1	Y	2025-03-11	Clear and colourless	140.00	4.91	0.81	2.14	12.40	< 0.01	< 0.01	27	0.20	53.40	2.90	< 0.10	0.05	1.55	162.00	9.40	0.01
18-1-1	FR2	Y	2025-03-11	Clear and colourless	140.00	9.02	0.84	2.22	13.10	< 0.01	< 0.01	27	1.05	51.80	3.00	< 0.10	0.05	1.92	158.00	11.40	0.05
18-1-1	FRM	Y	2025-03-11	Mean of duplicates	140.00	6.97	0.83	2.18	12.75	< 0.01	< 0.01	27	0.62	52.60	2.95	< 0.10	0.05	1.74	160.00	10.40	0.03
18-1-1	RPD	Y	2025-03-11	RPD of duplicates	0.0%	**59.0%** a	4.4%	3.7%	5.5%	0.0%	0.0%	0.0%	**136.3%** a	3.0%	3.4%	0.0%	11.6%	21.3%	2.5%	19.2%	**109.8%** b
21-1-1	FR1	Y	2024-05-09	Clear and colourless	70.00	7.00	< 0.10	1.86	2.52	< 0.05	< 0.03	3900	< 0.03	20.10	3.00	< 0.50	< 0.03	< 0.25	64.70	7.00	< 0.03
21-1-1	FR2	Y	2024-05-09	Clear and colourless	70.00	25.50	< 0.10	1.82	2.26	< 0.05	< 0.03	4000	< 0.03	19.20	2.80	< 0.50	< 0.03	< 0.25	61.90	19.40	0.23
21-1-1	FRM	Y	2024-05-09	Mean of duplicates	70.00	16.25	< 0.10	1.84	2.39	< 0.05	< 0.03	3950	< 0.03	19.65	2.90	< 0.50	< 0.03	< 0.25	63.30	13.20	0.13
21-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	**113.8%** a	0.0%	2.2%	10.9%	0.0%	0.0%	2.5%	0.0%	4.6%	6.9%	0.0%	0.0%	0.0%	4.4%	**93.9%** a	**161.4%** a
21-1-1	FR1	Y	2024-09-23	Clear and colourless	70.00	4.40	< 0.04	0.46	1.60	0.04	< 0.01	3980	0.02	20.50	2.70	< 0.20	0.02	0.13	66.20	6.80	0.03
21-1-1	FR2	Y	2024-09-23	Clear and colourless	70.00	3.90	< 0.04	0.43	1.53	0.03	< 0.01	3890	0.01	19.70	2.60	< 0.20	0.02	0.12	64.10	7.70	0.02
21-1-1	FRM	Y	2024-09-23	Mean of duplicates	70.00	4.15	< 0.04	0.45	1.57	0.03	< 0.01	3935	0.02	20.10	2.65	< 0.20	0.02	0.13	65.15	7.25	0.03
21-1-1	RPD	Y	2024-09-23	RPD of duplicates	0.0%	12.0%	0.0%	6.9%	4.5%	24.2%	0.0%	2.3%	**50.0%** b	4.0%	3.8%	0.0%	21.1%	8.0%	3.2%	12.4%	**40.0%** b
21-1-1	FR1	Y	2024-11-13	Clear and colourless	69.00	2.70	< 0.10	0.91	2.79	< 0.05	< 0.03	3850	< 0.03	19.80	2.50	< 0.50	< 0.03	< 0.25	64.00	5.60	< 0.03
21-1-1	FR2	Y	2024-11-13	Clear and colourless	68.00	22.10	< 0.10	0.84	2.94	< 0.05	< 0.03	3840	< 0.03	19.90	3.10	< 0.50	< 0.03	< 0.25	64.20	< 5.00	< 0.03
21-1-1	FRM	Y	2024-11-13	Mean of duplicates	68.50	12.40	< 0.10	0.88	2.87	< 0.05	< 0.03	3845	< 0.03	19.85	2.80	< 0.50	< 0.03	< 0.25	64.10	5.30	< 0.03
21-1-1	RPD	Y	2024-11-13	RPD of duplicates	1.5%	**156.5%** a	0.0%	8.0%	5.2%	0.0%	0.0%	0.3%	0.0%	0.5%	21.4%	0.0%	0.0%	0.0%	0.3%	11.3%	0.0%
21-1-1	FR1	Y	2025-03-05	Clear and colourless	67.00	1.50	< 0.04	0.61	1.36	< 0.02	< 0.01	3510	< 0.01	19.50	2.80	< 0.20	< 0.01	< 0.10	62.50	4.50	< 0.01
21-1-1	FR2	Y	2025-03-05	Clear and colourless	69.00	1.40	< 0.04	0.60	1.35	< 0.02	< 0.01	3510	< 0.01	19.20	3.20	< 0.20	< 0.01	< 0.10	61.30	4.00	< 0.01
21-1-1	FRM	Y	2025-03-05	Mean of duplicates	68.00	1.45	< 0.04	0.61	1.36	< 0.02	< 0.01	3510	< 0.01	19.35	3.00	< 0.20	< 0.01	< 0.10	61.90	4.25	< 0.01
21-1-1	RPD	Y	2025-03-05	RPD of duplicates	2.9%	6.9%	0.0%	1.2%	0.7%	0.0%	0.0%	0.0%	0.0%	1.6%	13.3%	0.0%	0.0%	0.0%	1.9%	11.8%	0.0%
21-1-2	FR1	Y	2024-05-09	Clear and colourless	160.00	2.30	< 0.02	1.23	17.20	< 0.01	< 0.01	708	0.01	51.50	50.00	0.20	0.98	0.29	172.00	1080.00	0.01
21-1-2	FR2	Y	2024-05-09	Clear and colourless	150.00	1.52	< 0.02	1.22	17.20	< 0.01	< 0.01	721	< 0.01	50.70	50.00	0.16	0.95	0.28	170.00	1050.00	< 0.01
21-1-2	FRM	Y	2024-05-09	Mean of duplicates	155.00	1.91	< 0.02	1.23	17.20	< 0.01	< 0.01	715	0.01	51.10	50.00	0.18	0.96	0.28	171.00	1065.00	0.01
21-1-2	RPD	Y	2024-05-09	RPD of duplicates	6.5%	**40.8%** b	0.0%	0.8%	0.0%	0.0%	0.0%	1.8%	16.5%	1.6%	0.0%	22.2%	2.2%	4.6%	1.2%	2.8%	11.3%
21-1-2	FR1	Y	2024-09-20	Clear and colourless	180.00	2.71	< 0.02	1.24	21.80	< 0.01	< 0.01	779	0.01	64.20	69.00	0.28	1.14	0.24	216.00	1370.00	0.01
21-1-2	FR2	Y	2024-09-20	Clear and colourless	180.00	2.29	< 0.02	1.22	22.60	< 0.01	< 0.01	792	0.01	64.80	70.00	0.22	1.16	0.22	219.00	1360.00	0.01
21-1-2	FRM	Y	2024-09-20	Mean of duplicates	180.00	2.50	< 0.02	1.23	22.20	< 0.01	< 0.01	786	0.01	64.50	69.50	0.25	1.15	0.23	217.50	1365.00	0.01
21-1-2	RPD	Y	2024-09-20	RPD of duplicates	0.0%	16.8%	0.0%	1.6%	3.6%	0.0%	0.0%	1.7%	26.1%	0.9%	1.4%	24.0%	1.7%	8.7%	1.4%	0.7%	24.2%
21-1-2	FR1	Y	2024-11-13	Clear and colourless	180.00	4.08	< 0.02	1.21	20.40	< 0.01	< 0.01	745	0.01	64.60	67.00	0.25	1.27	0.32	216.00	1370.00	0.01
21-1-2	FR2	Y	2024-11-13	Clear and colourless	180.00	1.04	0.02	1.31	21.70	< 0.01	< 0.01	786	0.01	66.90	66.00	0.20	1.29	0.32	221.00	1390.00	0.01
21-1-2	FRM	Y	2024-11-13	Mean of duplicates	180.00	2.56	0.02	1.26	21.05	< 0.01	< 0.01	766	0.01	65.75	66.50	0.23	1.28	0.32	218.50	1380.00	0.01
21-1-2	RPD	Y	2024-11-13	RPD of duplicates	0.0%	**118.8%** b	4.9%	7.9%	6.2%	0.0%	0.0%	5.4%	**50.0%** b	3.5%	1.5%	22.2%	1.6%	0.3%	2.3%	1.4%	**44.4%** b
21-1-2	FR1	Y	2025-02-21	Clear and colourless	160.00	1.62	0.02	1.20	17.80	< 0.01	< 0.01	741	< 0.01	53.30	47.00	0.14	1.05	0.57	178.00	1060.00	0.01
21-1-2	FR2	Y	2025-02-21	Clear and colourless	160.00	1.81	0.02	1.21	18.20	< 0.01	< 0.01	759	0.01	59.30	48.00	0.17	1.01	0.45	193.00	1180.00	0.01
21-1-2	FRM	Y	2025-02-21	Mean of duplicates	160.00	1.72	0.02	1.21	18.00	< 0.01	< 0.01	750	0.01	56.30	47.50	0.16	1.03	0.51	185.50	1120.00	0.01
21-1-2	RPD	Y	2025-02-21	RPD of duplicates	0.0%	11.1%	0.0%	0.8%	2.2%	0.0%	0.0%	2.4%	5.8%	10.7%	2.1%	19.4%	3.9%	24.1%	8.1%	10.7%	**31.9%** b
21-2-1	FR1	Y	2024-05-09	Very slightly turbid, colourless	160.00	2.25	< 0.02	1.51	17.20	< 0.01	< 0.01	630	0.01	52.30	57.00	0.21	1.13	0.51	176.00	1030.00	0.01
21-2-1	FR2	Y	2024-05-09	Very slightly turbid, colourless	160.00	5.83	< 0.02	1.54	17.10	< 0.01	< 0.01	640	0.01	53.70	57.00	0.19	1.15	0.51	181.00	1070.00	0.01
21-2-1	FRM	Y	2024-05-09	Mean of duplicates	160.00	4.04	< 0.02	1.53	17.15	< 0.01	< 0.01	635	0.01	53.00	57.00	0.20	1.14	0.51	178.50	1050.00	0.01
21-2-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	**88.6%** b	0.0%	2.0%	0.6%	0.0%	0.0%	1.6%	11.0%	2.6%	0.0%	10.0%	1.8%	1.0%	2.8%	3.8%	12.5%
21-2-1	FR1	Y	2024-09-20	Clear and colourless	190.00	1.32	< 0.02	1.52	20.50	< 0.01	< 0.01	777	0.02	64.00	77.00	0.17	1.35	0.32	218.00	1130.00	0.01
21-2-1	FR2	Y	2024-09-20	Clear and colourless	190.00	1.93	< 0.02	1.54	20.50	< 0.01	< 0.01	783	0.02	68.00	77.00	0.17	1.34	0.45	227.00	1140.00	0.01
21-2-1	FRM	Y	2024-09-20	Mean of duplicates	190.00	1.63	< 0.02	1.53	20.50	< 0.01	< 0.01	780	0.02	66.00	77.00	0.17	1.35	0.39	222.50	1135.00	0.01
21-2-1	RPD	Y	2024-09-20	RPD of duplicates	0.0%	**37.5%** b	0.0%	1.3%	0.0%	0.0%	0.0%	0.8%	8.9%	6.1%	0.0%	0.0%	0.7%	**35.8%** a	4.0%	0.9%	**62.7%** b
21-2-1	FR1	Y	2024-11-13	Very slightly turbid, very slightly yellow	170.00	4.03	< 0.02	1.44	17.30	< 0.01	< 0.01	692	0.01	58.30	64.00	0.18	1.35	0.32	195.00	1150.00	0.01
21-2-1	FR2	Y	2024-11-13	Very slightly turbid, very slightly yellow	170.00	9.21	< 0.02	1.53	17.10	< 0.01	< 0.01	709	0.01	58.10	64.00	0.21	1.38	0.34	195.00	1140.00	0.01
21-2-1	FRM	Y	2024-11-13	Mean of duplicates	170.00	6.62	< 0.02	1.49	17.20	< 0.01	< 0.01	701	0.01	58.20	64.00	0.20	1.37	0.33	195.00	1145.00	0.01
21-2-1	RPD	Y	2024-11-13	RPD of duplicates	0.0%	**78.2%** a	0.0%	6.1%	1.2%	0.0%	0.0%	2.4%	**46.2%** b	0.3%	0.0%	15.4%	2.2%	3.9%	0.0%	0.9%	28.6%
21-2-1	FR1	Y	2025-02-21	Slightly turbid, moderately yellow	160.00	3.75	0.03	0.94	16.10	< 0.01	< 0.01	629	0.03	53.00	50.00	0.15	1.11	0.77	178.00	411.00	0.01
21-2-1	FR2	Y	2025-02-21	Slightly turbid, moderately yellow	160.00	4.24	0.03	0.94	16.20	< 0.01	< 0.01	644	0.04	53.60	50.00	0.16	1.15	0.77	180.00	428.00	0.01
21-2-1	FRM	Y	2025-02-21	Mean of duplicates	160.00	4.00	0.03	0.94	16.15	< 0.01	< 0.01	637	0.03	53.30	50.00	0.16	1.13	0.77	179.00	419.50	0.01
21-2-1	RPD	Y	2025-02-21	RPD of duplicates	0.0%	12.3%	3.4%	0.3%	0.6%	0.0%	0.0%	2.4%	9.0%	1.1%	0.0%	6.5%	3.5%	0.0%	1.1%	4.1%	5.7%
30-1-1	FR1	Y	2024-11-08	Clear and colourless	170.00	3.51	0.03	0.39	48.20	< 0.01	< 0.01	424	0.01	75.20	45.00	< 0.10	0.04	0.09	220.00	3.10	0.01
30-1-1	FR2	Y	2024-11-08	Clear and colourless	170.00	9.97	0.03	0.39	48.00	< 0.01	< 0.01	427	0.01	76.70	46.00	< 0.10	0.04	0.07	224.00	5.70	0.02
30-1-1	FRM	Y	2024-11-08	Mean of duplicates	170.00	6.74	0.03	0.39	48.10	< 0.01	< 0.01	426	0.01	75.95	45.50	< 0.10	0.04	0.08	222.00	4.40	0.01
30-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	**95.8%** a	3.5%	0.0%	0.4%	0.0%	0.0%	0.7%	10.5%	2.0%	2.2%	0.0%	2.1%	16.6%	1.8%	**59.1%** b	**41.4%** b
30-1-2	FR1	Y	2024-05-24	Clear and colourless	160.00	11.80	0.05	0.27	10.70	< 0.01	< 0.01	311	0.06	81.60	74.00	< 0.10	0.05	0.55	237.00	44.50	0.01
30-1-2	FR2	Y	2024-05-24	Clear and colourless	150.00	2.34	0.05	0.29	10.60	< 0.01	< 0.01	305	0.06	81.40	74.00	0.12	0.03	0.43	235.00	7.20	0.01
30-1-2	FRM	Y	2024-05-24	Mean of duplicates	155.00	7.07	0.05	0.28	10.65	< 0.01	< 0.01	308	0.06	81.50	74.00	0.11	0.04	0.49	236.00	25.85	0.01
30-1-2	RPD	Y	2024-05-24	RPD of duplicates	6.5%	**133.8%** b	3.8%	9.3%	0.9%	0.0%	0.0%	1.9%	1.4%	0.2%	0.0%	18.2%	**39.6%** a	24.9%	0.8%	**144.3%** a	5.1%
30-1-2	FR1	Y	2024-09-13	Clear and colourless	160.00	2.09	0.08	0.37	8.69	< 0.01	< 0.01	305	0.05	80.60	78.00	0.13	0.08	0.98	233.00	3.50	0.02
30-1-2	FR2	Y	2024-09-13	Clear and colourless	160.00	1.88	0.08	0.39	8.87	< 0.01	< 0.01	306	0.05	80.00	77.00	0.12	0.08	1.64	232.00	4.40	0.02
30-1-2	FRM	Y	2024-09-13	Mean of duplicates	160.00	1.99	0.08	0.38	8.78	< 0.01	< 0.01	306	0.05	80.30	77.50	0.13	0.08	1.31	232.50	3.95	0.02
30-1-2	RPD	Y	2024-09-13	RPD of duplicates	0.0%	10.6%	7.5%	5.2%	2.1%	0.0%	0.0%	0.3%	0.8%	0.7%	1.3%	8.0%	6.1%	**50.7%** a	0.4%	22.8%	**46.7%** b
30-1-2	FR1	Y	2025-02-14	Clear and colourless	61.00	7.60	0.03	0.17	3.84	< 0.01	< 0.01	46	0.10	16.60	14.00	0.14	0.04	0.76	50.20	1.60	< 0.01
30-1-2	FR2	Y	2025-02-14	Clear and colourless	61.00	6.96	0.03	0.16	3.77	< 0.01	< 0.01	45	0.11	17.30	14.00	0.18	0.04	0.76	52.10	2.70	< 0.01
30-1-2	FRM	Y	2025-02-14	Mean of duplicates	61.00	7.28	0.03	0.17	3.81	< 0.01	< 0.01	46	0.10	16.95	14.00	0.16	0.04	0.76	51.15	2.15	< 0.01
30-1-2	RPD	Y	2025-02-14	RPD of duplicates	0.0%	8.8%	16.4%	8.4%	1.8%	0.0%	0.0%	2.2%	3.9%	4.1%	0.0%	25.0%	2.6%	0.7%	3.7%	**51.2%** b	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a - *Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b - *Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Lithium	Magnesium	Manganese	Molybdenum	Ammonia	Nitrite	Nitrate	Nitrite + Nitrate	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Sulphate
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	0.5	0.05	0.05	0.05	0.015	0.005	0.02	0.02	0.02	2	0.05	0.04	100	0.005	0.05	0.05	1
				Limit of Quantification (5x DL)	2.5	0.25	0.25	0.25	0.075	0.025	0.1	0.1	0.1	10	0.25	0.2	500	0.025	0.25	0.25	5
18-1-1	FR1	Y	2024-05-09	Clear and colourless	0.66	7.04	22.50	0.51	< 0.02	< 0.01	< 0.02	< 0.02	0.18	7.10	0.21	< 0.04	8660	< 0.01	4.85	89	25
18-1-1	FR2	Y	2024-05-09	Clear and colourless	0.63	7.21	22.80	0.46	< 0.02	< 0.01	< 0.02	< 0.02	0.20	6.90	0.22	< 0.04	8620	< 0.01	4.90	86	25
18-1-1	FRM	Y	2024-05-09	Mean of duplicates	0.65	7.13	22.65	0.48	< 0.02	< 0.01	< 0.02	< 0.02	0.19	7.00	0.21	< 0.04	8640	< 0.01	4.88	88	25
18-1-1	RPD	Y	2024-05-09	RPD of duplicates	4.7%	2%	1.3%	9.3%	0.0%	0.0%	0.0%	0.0%	6.3%	2.9%	1.9%	0.0%	0.5%	0.0%	1.0%	3.9%	0.0%
18-1-1	FR1	Y	2024-09-17	Clear and colourless	1.09	7.11	1.02	0.62	< 0.02	< 0.01	< 0.02	< 0.02	0.19	6.40	0.27	< 0.04	8880	< 0.01	5.03	93	26
18-1-1	FR2	Y	2024-09-17	Clear and colourless	1.04	6.92	1.02	0.64	< 0.02	< 0.01	< 0.02	< 0.02	0.17	6.30	0.26	0.04	8560	< 0.01	4.93	92	26
18-1-1	FRM	Y	2024-09-17	Mean of duplicates	1.07	7.02	1.02	0.63	< 0.02	< 0.01	< 0.02	< 0.02	0.18	6.35	0.27	0.04	8720	< 0.01	4.98	92	26
18-1-1	RPD	Y	2024-09-17	RPD of duplicates	4.7%	2.71%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	8.9%	1.6%	2.6%	7.2%	3.7%	0.0%	2.0%	0.9%	0.0%
18-1-1	FR1	Y	2024-12-04	Clear and colourless	0.96	7.45	27.30	0.69	< 0.02	< 0.01	< 0.02	< 0.02	0.43	6.80	0.25	0.05	7940	< 0.01	5.39	85	26
18-1-1	FR2	Y	2024-12-04	Clear and colourless	1.04	7.59	28.50	0.68	< 0.02	< 0.01	< 0.02	< 0.02	0.43	5.70	0.26	< 0.04	8310	< 0.01	5.61	89	25
18-1-1	FRM	Y	2024-12-04	Mean of duplicates	1.00	7.52	27.90	0.68	< 0.02	< 0.01	< 0.02	< 0.02	0.43	6.25	0.26	0.04	8125	< 0.01	5.50	87	26
18-1-1	RPD	Y	2024-12-04	RPD of duplicates	8.0%	1.86%	4.3%	1.3%	0.0%	0.0%	0.0%	0.0%	0.2%	17.6%	5.5%	14.0%	4.6%	0.0%	4.0%	4.0%	3.9%
18-1-1	FR1	Y	2025-03-11	Clear and colourless	1.03	6.85	17.30	0.70	< 0.02	< 0.01	< 0.02	< 0.02	0.33	5.10	0.25	0.04	8190	< 0.01	5.01	86	26
18-1-1	FR2	Y	2025-03-11	Clear and colourless	1.02	7.01	18.30	0.70	< 0.02	< 0.01	< 0.02	< 0.02	0.66	6.10	0.27	0.04	7900	< 0.01	5.34	89	26
18-1-1	FRM	Y	2025-03-11	Mean of duplicates	1.03	6.93	17.80	0.70	< 0.02	< 0.01	< 0.02	< 0.02	0.49	5.60	0.26	0.04	8045	< 0.01	5.18	88	26
18-1-1	RPD	Y	2025-03-11	RPD of duplicates	1.0%	2.31%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	**66.8%** a	17.9%	5.0%	0.0%	3.6%	0.0%	6.4%	3.6%	0.0%
21-1-1	FR1	Y	2024-05-09	Clear and colourless	< 2.50	3.52	4.17	0.39	< 0.02	< 0.01	< 0.02	< 0.02	< 0.10	13.00	< 0.25	< 0.20	19800	< 0.03	8.74	460	10
21-1-1	FR2	Y	2024-05-09	Clear and colourless	< 2.50	3.39	5.86	0.42	< 0.02	< 0.01	< 0.02	< 0.02	0.12	17.00	< 0.25	< 0.20	18700	< 0.03	8.24	434	10
21-1-1	FRM	Y	2024-05-09	Mean of duplicates	< 2.50	3.46	5.02	0.41	< 0.02	< 0.01	< 0.02	< 0.02	0.11	15.00	< 0.25	< 0.20	19250	< 0.03	8.49	447	10
21-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	4%	**33.7%** a	7.4%	0.0%	0.0%	0.0%	0.0%	18.2%	26.7%	0.0%	0.0%	5.7%	0.0%	5.9%	5.8%	0.0%
21-1-1	FR1	Y	2024-09-23	Clear and colourless	1.00	3.66	3.68	0.52	< 0.02	< 0.01	< 0.02	< 0.02	0.05	7.40	0.25	< 0.08	19000	< 0.01	8.61	454	11
21-1-1	FR2	Y	2024-09-23	Clear and colourless	< 1.00	3.63	3.80	0.53	< 0.02	< 0.01	< 0.02	< 0.02	< 0.04	7.60	0.25	< 0.08	18700	< 0.01	8.58	458	11
21-1-1	FRM	Y	2024-09-23	Mean of duplicates	1.00	3.65	3.74	0.53	< 0.02	< 0.01	< 0.02	< 0.02	0.04	7.50	0.25	< 0.08	18850	< 0.01	8.60	456	11
21-1-1	RPD	Y	2024-09-23	RPD of duplicates	0.0%	0.82%	3.2%	1.9%	0.0%	0.0%	0.0%	0.0%	16.1%	2.7%	0.0%	0.0%	1.6%	0.0%	0.3%	0.9%	0.0%
21-1-1	FR1	Y	2024-11-13	Clear and colourless	< 2.50	3.53	6.97	0.41	< 0.02	< 0.01	< 0.02	< 0.02	< 0.10	10.00	< 0.25	< 0.20	17700	< 0.03	8.60	420	11
21-1-1	FR2	Y	2024-11-13	Clear and colourless	< 2.50	3.50	6.32	0.39	< 0.02	< 0.01	< 0.02	< 0.02	0.13	11.00	< 0.25	< 0.20	17400	< 0.03	8.54	418	11
21-1-1	FRM	Y	2024-11-13	Mean of duplicates	< 2.50	3.52	6.65	0.40	< 0.02	< 0.01	< 0.02	< 0.02	0.12	10.50	< 0.25	< 0.20	17550	< 0.03	8.57	419	11
21-1-1	RPD	Y	2024-11-13	RPD of duplicates	0.0%	0.85%	9.8%	5.0%	0.0%	0.0%	0.0%	0.0%	26.1%	9.5%	0.0%	0.0%	1.7%	0.0%	0.7%	0.5%	0.0%
21-1-1	FR1	Y	2025-03-05	Clear and colourless	1.10	3.33	6.13	0.41	0.02	< 0.01	< 0.02	< 0.02	< 0.04	< 4.00	0.18	< 0.08	17800	< 0.01	8.14	467	11
21-1-1	FR2	Y	2025-03-05	Clear and colourless	< 1.00	3.23	5.71	0.38	< 0.02	< 0.01	< 0.02	< 0.02	< 0.04	< 4.00	0.18	< 0.08	17400	< 0.01	7.73	442	11
21-1-1	FRM	Y	2025-03-05	Mean of duplicates	1.05	3.28	5.92	0.40	0.02	< 0.01	< 0.02	< 0.02	< 0.04	< 4.00	0.18	< 0.08	17600	< 0.01	7.94	455	11
21-1-1	RPD	Y	2025-03-05	RPD of duplicates	9.5%	3.05%	7.1%	7.6%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	0.0%	5.2%	5.5%	0.0%
21-1-2	FR1	Y	2024-05-09	Clear and colourless	< 0.50	10.70	2110.00	0.68	5.00	< 0.01	< 0.02	< 0.02	1.21	6.50	5.73	< 0.04	13300	< 0.01	23.80	488	35
21-1-2	FR2	Y	2024-05-09	Clear and colourless	< 0.50	10.60	2070.00	0.68	5.10	< 0.01	< 0.02	< 0.02	1.45	6.60	5.64	< 0.04	13000	< 0.01	23.80	473	35
21-1-2	FRM	Y	2024-05-09	Mean of duplicates	< 0.50	10.65	2090.00	0.68	5.05	< 0.01	< 0.02	< 0.02	1.33	6.55	5.69	< 0.04	13150	< 0.01	23.80	481	35
21-1-2	RPD	Y	2024-05-09	RPD of duplicates	0.0%	0.94%	1.9%	0.4%	2.0%	0.0%	0.0%	0.0%	18.0%	1.5%	1.6%	0.0%	2.3%	0.0%	0.0%	3.1%	0.0%
21-1-2	FR1	Y	2024-09-20	Clear and colourless	< 0.50	13.50	2510.00	0.66	5.50	< 0.01	< 0.02	< 0.02	1.97	6.50	6.09	< 0.04	13200	< 0.01	24.70	613	35
21-1-2	FR2	Y	2024-09-20	Clear and colourless	< 0.50	13.80	2540.00	0.61	5.50	< 0.01	< 0.02	< 0.02	1.95	7.60	6.12	< 0.04	13100	< 0.01	25.40	605	35
21-1-2	FRM	Y	2024-09-20	Mean of duplicates	< 0.50	13.65	2525.00	0.64	5.50	< 0.01	< 0.02	< 0.02	1.96	7.05	6.11	< 0.04	13150	< 0.01	25.05	609	35
21-1-2	RPD	Y	2024-09-20	RPD of duplicates	0.0%	2.20%	1.2%	6.9%	0.0%	0.0%	0.0%	0.0%	1.0%	15.6%	0.5%	0.0%	0.8%	0.0%	2.8%	1.3%	0.0%
21-1-2	FR1	Y	2024-11-13	Clear and colourless	< 0.50	13.30	2600.00	0.62	5.60	< 0.01	< 0.02	< 0.02	2.30	5.70	6.16	< 0.04	12800	< 0.01	26.60	580	32
21-1-2	FR2	Y	2024-11-13	Clear and colourless	< 0.50	13.10	2570.00	0.60	5.50	< 0.01	< 0.02	< 0.02	2.32	6.30	6.15	< 0.04	13100	< 0.01	26.50	593	32
21-1-2	FRM	Y	2024-11-13	Mean of duplicates	< 0.50	13.20	2585.00	0.61	5.55	< 0.01	< 0.02	< 0.02	2.31	6.00	6.16	< 0.04	12950	< 0.01	26.55	587	32
21-1-2	RPD	Y	2024-11-13	RPD of duplicates	0.0%	1.52%	1.2%	3.8%	1.8%	0.0%	0.0%	0.0%	0.9%	10.0%	0.2%	0.0%	2.3%	0.0%	0.4%	2.2%	0.0%
21-1-2	FR1	Y	2025-02-21	Clear and colourless	< 0.50	11.00	2070.00	0.69	5.10	< 0.01	0.05	0.05	1.45	6.00	5.64	< 0.04	12800	< 0.01	24.40	509	44
21-1-2	FR2	Y	2025-02-21	Clear and colourless	< 0.50	11.00	2040.00	0.70	5.10	< 0.01	0.05	0.05	1.49	6.70	5.70	< 0.04	14300	< 0.01	24.70	513	44
21-1-2	FRM	Y	2025-02-21	Mean of duplicates	< 0.50	11.00	2055.00	0.69	5.10	< 0.01	0.05	0.05	1.47	6.35	5.67	< 0.04	13550	< 0.01	24.55	511	44
21-1-2	RPD	Y	2025-02-21	RPD of duplicates	0.0%	0.00%	1.5%	2.2%	0.0%	0.0%	0.0%	0.0%	2.7%	11.0%	1.1%	0.0%	11.1%	0.0%	1.2%	0.8%	0.0%
21-2-1	FR1	Y	2024-05-09	Very slightly turbid, colourless	< 0.50	11.10	2370.00	0.59	5.50	< 0.01	0.02	0.02	1.41	4.80	5.98	< 0.04	12500	< 0.01	24.00	485	35
21-2-1	FR2	Y	2024-05-09	Very slightly turbid, colourless	< 0.50	11.40	2420.00	0.60	5.40	0.01	0.03	0.03	1.50	5.30	6.08	< 0.04	12700	< 0.01	23.90	493	36
21-2-1	FRM	Y	2024-05-09	Mean of duplicates	< 0.50	11.25	2395.00	0.59	5.45	0.01	0.02	0.03	1.46	5.05	6.03	< 0.04	12600	< 0.01	23.95	489	36
21-2-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	3%	2.1%	2.2%	1.8%	2.0%	4.1%	22.2%	6.2%	9.9%	1.7%	0.0%	1.6%	0.0%	0.4%	1.6%	2.8%
21-2-1	FR1	Y	2024-09-20	Clear and colourless	< 0.50	14.20	2750.00	0.62	5.90	0.02	0.19	0.21	2.52	6.00	6.80	< 0.04	12500	< 0.01	29.60	614	31
21-2-1	FR2	Y	2024-09-20	Clear and colourless	< 0.50	14.00	2770.00	0.62	6.00	0.02	0.20	0.23	2.46	5.40	6.68	< 0.04	13100	< 0.01	29.70	609	32
21-2-1	FRM	Y	2024-09-20	Mean of duplicates	< 0.50	14.10	2760.00	0.62	5.95	0.02	0.19	0.22	2.49	5.70	6.74	< 0.04	12800	< 0.01	29.65	612	32
21-2-1	RPD	Y	2024-09-20	RPD of duplicates	0.0%	1.42%	0.7%	0.6%	1.7%	7.9%	9.8%	9.3%	2.4%	10.5%	1.8%	0.0%	4.7%	0.0%	0.3%	0.8%	3.2%
21-2-1	FR1	Y	2024-11-13	Very slightly turbid, very slightly yellow	< 0.50	12.00	2490.00	0.60	5.00	0.01	0.91	0.92	2.03	4.80	6.04	< 0.04	11900	< 0.01	31.10	511	37
21-2-1	FR2	Y	2024-11-13	Very slightly turbid, very slightly yellow	< 0.50	12.10	2520.00	0.63	4.90	0.01	0.93	0.94	2.11	8.40	6.12	< 0.04	12000	< 0.01	31.50	519	37
21-2-1	FRM	Y	2024-11-13	Mean of duplicates	< 0.50	12.05	2505.00	0.62	4.95	0.01	0.92	0.93	2.07	6.60	6.08	< 0.04	11950	< 0.01	31.30	515	37
21-2-1	RPD	Y	2024-11-13	RPD of duplicates	0.0%	0.83%	1.2%	3.9%	2.0%	6.7%	2.0%	1.8%	3.9%	**54.5%** b	1.3%	0.0%	0.8%	0.0%	1.3%	1.6%	0.0%
21-2-1	FR1	Y	2025-02-21	Slightly turbid, moderately yellow	< 0.50	11.00	2280.00	0.65	5.30	< 0.01	0.13	0.13	1.72	5.40	5.84	< 0.04	12200	< 0.01	24.30	502	47
21-2-1	FR2	Y	2025-02-21	Slightly turbid, moderately yellow	< 0.50	11.30	2320.00	0.65	5.30	< 0.01	0.14	0.14	1.76	4.10	5.90	< 0.04	12400	< 0.01	24.80	500	48
21-2-1	FRM	Y	2025-02-21	Mean of duplicates	< 0.50	11.15	2300.00	0.65	5.30	< 0.01	0.14	0.14	1.74	4.75	5.87	< 0.04	12300	< 0.01	24.55	501	48
21-2-1	RPD	Y	2025-02-21	RPD of duplicates	0.0%	2.69%	1.7%	1.1%	0.0%	0.0%	10.4%	10.4%	2.3%	27.4%	1.0%	0.0%	1.6%	0.0%	2.0%	0.4%	2.1%
30-1-1	FR1	Y	2024-11-08	Clear and colourless	1.93	7.80	28.50	0.86	0.04	< 0.01	0.09	0.09	0.25	8.90	0.59	< 0.04	7680	< 0.01	19.70	488	36
30-1-1	FR2	Y	2024-11-08	Clear and colourless	1.93	7.83	28.90	0.85	0.03	< 0.01	0.08	0.08	0.24	9.40	0.56	< 0.04	7920	< 0.01	19.50	488	34
30-1-1	FRM	Y	2024-11-08	Mean of duplicates	1.93	7.82	28.70	0.85	0.03	< 0.01	0.09	0.09	0.24	9.15	0.57	< 0.04	7800	< 0.01	19.60	488	35
30-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	0%	1.4%	0.8%	**30.3%** b	0.0%	16.5%	16.5%	5.0%	5.5%	4.2%	0.0%	3.1%	0.0%	1.0%	0.0%	5.7%
30-1-2	FR1	Y	2024-05-24	Clear and colourless	< 0.50	8.11	0.52	2.63	0.03	< 0.01	0.09	0.09	0.72	13.70	2.08	0.05	5670	< 0.01	32.40	389	48
30-1-2	FR2	Y	2024-05-24	Clear and colourless	< 0.50	7.81	0.44	2.68	0.03	< 0.01	0.08	0.08	0.62	13.40	2.05	0.04	5600	< 0.01	32.20	391	47
30-1-2	FRM	Y	2024-05-24	Mean of duplicates	< 0.50	7.96	0.48	2.66	0.03	< 0.01	0.08	0.08	0.67	13.55	2.07	0.05	5635	< 0.01	32.30	390	48
30-1-2	RPD	Y	2024-05-24	RPD of duplicates	0.0%	3.77%	16.6%	1.9%	14.3%	0.0%	7.1%	7.1%	14.2%	2.2%	1.5%	6.6%	1.2%	0.0%	0.6%	0.5%	2.1%
30-1-2	FR1	Y	2024-09-13	Clear and colourless	< 0.50	7.67	2.97	5.72	< 0.02	< 0.01	0.07	0.07	0.71	15.60	2.25	0.10	5410	< 0.01	33.90	361	51
30-1-2	FR2	Y	2024-09-13	Clear and colourless	< 0.50	7.79	3.06	5.85	< 0.02	< 0.01	0.08	0.08	0.78	14.70	2.31	0.11	5380	< 0.01	34.10	362	51
30-1-2	FRM	Y	2024-09-13	Mean of duplicates	< 0.50	7.73	3.02	5.79	< 0.02	< 0.01	0.08	0.08	0.75	15.15	2.28	0.10	5395	< 0.01	34.00	362	51
30-1-2	RPD	Y	2024-09-13	RPD of duplicates	0.0%	1.55%	3.0%	2.2%	0.0%	0.0%	2.7%	2.7%	9.1%	5.9%	2.6%	7.8%	0.6%	0.0%	0.6%	0.3%	0.0%
30-1-2	FR1	Y	2025-02-14	Clear and colourless	< 0.50	2.13	0.29	0.41	< 0.02	< 0.01	0.96	0.96	0.54	7.70	1.19	0.06	3770	< 0.01	24.50	69	23
30-1-2	FR2	Y	2025-02-14	Clear and colourless	< 0.50	2.15	0.27	0.45	< 0.02	< 0.01	0.95	0.95	0.60	6.40	1.17	0.07	3920	< 0.01	24.10	69	23
30-1-2	FRM	Y	2025-02-14	Mean of duplicates	< 0.50	2.14	0.28	0.43	< 0.02	< 0.01	0.96	0.96	0.57	7.05	1.18	0.07	3845	< 0.01	24.30	69	23
30-1-2	RPD	Y	2025-02-14	RPD of duplicates	0.0%	0.93%	8.2%	10.2%	0.0%	0.0%	0.6%	0.6%	9.7%	18.4%	1.7%	12.1%	3.9%	0.0%	1.6%	0.1%	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a - *Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b - *Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Sulfur	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Zirconium
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	3	0.002	0.2	0.5	0.002	0.2	0.1	0.1
				Limit of Quantification (5x DL)	15	0.01	1	2.5	0.01	1	0.5	0.5
18-1-1	FR1	Y	2024-05-09	Clear and colourless	8.00	0.002	< 0.20	< 0.50	0.13	0.86	1.53	< 0.10
18-1-1	FR2	Y	2024-05-09	Clear and colourless	8.00	< 0.002	< 0.20	< 0.50	0.13	0.92	1.53	< 0.10
18-1-1	FRM	Y	2024-05-09	Mean of duplicates	8.00	0.002	< 0.20	< 0.50	0.13	0.89	1.53	< 0.10
18-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	9.5%	0.0%	0.0%	3.9%	7%	0.0%	0.0%
18-1-1	FR1	Y	2024-09-17	Clear and colourless	7.40	< 0.00	< 0.20	< 0.50	0.14	0.81	1.12	< 0.10
18-1-1	FR2	Y	2024-09-17	Clear and colourless	7.60	< 0.00	< 0.20	< 0.50	0.14	0.77	1.15	< 0.10
18-1-1	FRM	Y	2024-09-17	Mean of duplicates	7.50	< 0.00	< 0.20	< 0.50	0.14	0.79	1.14	< 0.10
18-1-1	RPD	Y	2024-09-17	RPD of duplicates	2.7%	0.0%	0.0%	0.0%	0.0%	5%	2.6%	0.0%
18-1-1	FR1	Y	2024-12-04	Clear and colourless	9.00	< 0.002	< 0.20	< 0.50	0.15	0.84	1.13	< 0.10
18-1-1	FR2	Y	2024-12-04	Clear and colourless	6.80	< 0.002	< 0.20	< 0.50	0.15	0.89	1.40	< 0.10
18-1-1	FRM	Y	2024-12-04	Mean of duplicates	7.90	< 0.002	< 0.20	< 0.50	0.15	0.87	1.27	< 0.10
18-1-1	RPD	Y	2024-12-04	RPD of duplicates	27.8%	0.0%	0.0%	0.0%	2.0%	6%	21.3%	0.0%
18-1-1	FR1	Y	2025-03-11	Clear and colourless	8.10	< 0.002	< 0.20	< 0.50	0.12	0.81	2.40	< 0.10
18-1-1	FR2	Y	2025-03-11	Clear and colourless	8.40	< 0.002	< 0.20	< 0.50	0.12	0.80	5.52	< 0.10
18-1-1	FRM	Y	2025-03-11	Mean of duplicates	8.25	< 0.002	< 0.20	< 0.50	0.12	0.81	3.96	< 0.10
18-1-1	RPD	Y	2025-03-11	RPD of duplicates	3.6%	0.0%	0.0%	0.0%	3.3%	1%	**78.8%** a	0.0%
21-1-1	FR1	Y	2024-05-09	Clear and colourless	< 15.00	< 0.01	< 1.00	< 2.50	0.03	< 1.00	0.51	< 0.50
21-1-1	FR2	Y	2024-05-09	Clear and colourless	< 15.00	< 0.01	< 1.00	< 2.50	0.03	< 1.00	1.68	< 0.50
21-1-1	FRM	Y	2024-05-09	Mean of duplicates	< 15.00	< 0.01	< 1.00	< 2.50	0.03	< 1.00	1.10	< 0.50
21-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	7.1%	0%	**106.8%** a	0.0%
21-1-1	FR1	Y	2024-09-23	Clear and colourless	< 6.00	< 0.004	< 0.40	< 1.00	0.04	< 0.40	0.37	< 0.20
21-1-1	FR2	Y	2024-09-23	Clear and colourless	< 6.00	< 0.004	< 0.40	< 1.00	0.03	< 0.40	0.33	< 0.20
21-1-1	FRM	Y	2024-09-23	Mean of duplicates	< 6.00	< 0.004	< 0.40	< 1.00	0.04	< 0.40	0.35	< 0.20
21-1-1	RPD	Y	2024-09-23	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	18.5%	0%	11.4%	0.0%
21-1-1	FR1	Y	2024-11-13	Clear and colourless	< 15.00	< 0.01	< 1.00	< 2.50	0.02	< 1.00	1.10	< 0.50
21-1-1	FR2	Y	2024-11-13	Clear and colourless	< 15.00	< 0.01	< 1.00	< 2.50	0.01	< 1.00	0.77	< 0.50
21-1-1	FRM	Y	2024-11-13	Mean of duplicates	< 15.00	< 0.01	< 1.00	< 2.50	0.01	< 1.00	0.94	< 0.50
21-1-1	RPD	Y	2024-11-13	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	6.9%	0%	**35.3%** a	0.0%
21-1-1	FR1	Y	2025-03-05	Clear and colourless	< 6.00	< 0.004	< 0.40	< 1.00	0.01	< 0.40	< 0.20	< 0.20
21-1-1	FR2	Y	2025-03-05	Clear and colourless	< 6.00	< 0.004	< 0.40	< 1.00	0.01	< 0.40	< 0.20	< 0.20
21-1-1	FRM	Y	2025-03-05	Mean of duplicates	< 6.00	< 0.004	< 0.40	< 1.00	0.01	< 0.40	< 0.20	< 0.20
21-1-1	RPD	Y	2025-03-05	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	22.9%	0%	0.0%	0.0%
21-1-2	FR1	Y	2024-05-09	Clear and colourless	11.20	0.002	< 0.20	< 0.50	0.05	0.26	0.40	< 0.10
21-1-2	FR2	Y	2024-05-09	Clear and colourless	11.20	< 0.002	< 0.20	< 0.50	0.05	0.24	0.18	< 0.10
21-1-2	FRM	Y	2024-05-09	Mean of duplicates	11.20	0.002	< 0.20	< 0.50	0.05	0.25	0.29	< 0.10
21-1-2	RPD	Y	2024-05-09	RPD of duplicates	0.0%	18.2%	0.0%	0.0%	2.0%	8%	**75.9%** b	0.0%
21-1-2	FR1	Y	2024-09-20	Clear and colourless	11.30	0.003	< 0.20	< 0.50	0.08	0.28	0.72	< 0.10
21-1-2	FR2	Y	2024-09-20	Clear and colourless	11.30	0.002	< 0.20	< 0.50	0.08	0.29	1.02	< 0.10
21-1-2	FRM	Y	2024-09-20	Mean of duplicates	11.30	0.002	< 0.20	< 0.50	0.08	0.29	0.87	< 0.10
21-1-2	RPD	Y	2024-09-20	RPD of duplicates	0.0%	4.1%	0.0%	0.0%	5.6%	4%	34.5%	0.0%
21-1-2	FR1	Y	2024-11-13	Clear and colourless	11.80	0.003	< 0.20	< 0.50	0.10	0.30	0.74	< 0.10
21-1-2	FR2	Y	2024-11-13	Clear and colourless	10.90	0.003	< 0.20	< 0.50	0.09	0.29	0.87	< 0.10
21-1-2	FRM	Y	2024-11-13	Mean of duplicates	11.35	0.003	< 0.20	< 0.50	0.10	0.30	0.81	< 0.10
21-1-2	RPD	Y	2024-11-13	RPD of duplicates	7.9%	0.0%	0.0%	0.0%	4.2%	3%	16.1%	0.0%
21-1-2	FR1	Y	2025-02-21	Clear and colourless	14.60	0.003	< 0.20	< 0.50	0.06	0.23	0.49	< 0.10
21-1-2	FR2	Y	2025-02-21	Clear and colourless	14.40	0.002	< 0.20	< 0.50	0.06	0.22	0.55	< 0.10
21-1-2	FRM	Y	2025-02-21	Mean of duplicates	14.50	0.003	< 0.20	< 0.50	0.06	0.23	0.52	< 0.10
21-1-2	RPD	Y	2025-02-21	RPD of duplicates	1.4%	**32.7%** b	0.0%	0.0%	2.5%	4%	11.5%	0.0%
21-2-1	FR1	Y	2024-05-09	Very slightly turbid, colourless	11.30	0.003	< 0.20	< 0.50	0.05	0.26	0.26	< 0.10
21-2-1	FR2	Y	2024-05-09	Very slightly turbid, colourless	11.50	0.003	< 0.20	< 0.50	0.06	0.27	0.74	< 0.10
21-2-1	FRM	Y	2024-05-09	Mean of duplicates	11.40	0.003	< 0.20	< 0.50	0.06	0.27	0.50	< 0.10
21-2-1	RPD	Y	2024-05-09	RPD of duplicates	1.8%	12.9%	0.0%	0.0%	12.5%	4%	**96.0%** b	0.0%
21-2-1	FR1	Y	2024-09-20	Clear and colourless	10.60	0.003	< 0.20	< 0.50	0.09	0.30	0.96	< 0.10
21-2-1	FR2	Y	2024-09-20	Clear and colourless	10.50	0.003	< 0.20	< 0.50	0.09	0.34	1.12	< 0.10
21-2-1	FRM	Y	2024-09-20	Mean of duplicates	10.55	0.003	< 0.20	< 0.50	0.09	0.32	1.04	< 0.10
21-2-1	RPD	Y	2024-09-20	RPD of duplicates	0.9%	15.9%	0.0%	0.0%	3.6%	13%	15.4%	0.0%
21-2-1	FR1	Y	2024-11-13	Very slightly turbid, very slightly yellow	12.30	0.004	< 0.20	< 0.50	0.09	0.30	0.23	< 0.10
21-2-1	FR2	Y	2024-11-13	Very slightly turbid, very slightly yellow	11.90	0.003	< 0.20	< 0.50	0.09	0.30	0.42	< 0.10
21-2-1	FRM	Y	2024-11-13	Mean of duplicates	12.10	0.004	< 0.20	< 0.50	0.09	0.30	0.33	< 0.10
21-2-1	RPD	Y	2024-11-13	RPD of duplicates	3.3%	28.6%	0.0%	0.0%	0.0%	0%	**58.5%** b	0.0%
21-2-1	FR1	Y	2025-02-21	Slightly turbid, moderately yellow	15.20	0.004	< 0.20	< 0.50	0.07	< 0.20	4.07	< 0.10
21-2-1	FR2	Y	2025-02-21	Slightly turbid, moderately yellow	15.10	0.003	< 0.20	< 0.50	0.07	< 0.20	4.15	< 0.10
21-2-1	FRM	Y	2025-02-21	Mean of duplicates	15.15	0.003	< 0.20	< 0.50	0.07	< 0.20	4.11	< 0.10
21-2-1	RPD	Y	2025-02-21	RPD of duplicates	0.7%	29.5%	0.0%	0.0%	0.4%	0%	1.9%	0.0%
30-1-1	FR1	Y	2024-11-08	Clear and colourless	11.10	0.006	< 0.20	< 0.50	0.31	< 0.20	0.28	< 0.10
30-1-1	FR2	Y	2024-11-08	Clear and colourless	11.00	0.006	< 0.20	< 0.50	0.30	< 0.20	0.36	< 0.10
30-1-1	FRM	Y	2024-11-08	Mean of duplicates	11.05	0.006	< 0.20	< 0.50	0.31	< 0.20	0.32	< 0.10
30-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.9%	1.7%	0.0%	0.0%	1.3%	0.	25.0%	0.0%
30-1-2	FR1	Y	2024-05-24	Clear and colourless	15.20	0.003	< 0.20	< 0.50	0.26	0.29	9.13	< 0.10
30-1-2	FR2	Y	2024-05-24	Clear and colourless	15.30	0.003	< 0.20	< 0.50	0.26	0.34	8.94	< 0.10
30-1-2	FRM	Y	2024-05-24	Mean of duplicates	15.25	0.003	< 0.20	< 0.50	0.26	0.32	9.04	< 0.10
30-1-2	RPD	Y	2024-05-24	RPD of duplicates	0.7%	11.3%	0.0%	0.0%	0.4%	16%	2.1%	0.0%
30-1-2	FR1	Y	2024-09-13	Clear and colourless	16.20	< 0.002	< 0.20	< 0.50	0.34	0.48	6.28	< 0.10
30-1-2	FR2	Y	2024-09-13	Clear and colourless	16.50	< 0.002	< 0.20	< 0.50	0.35	0.46	7.64	< 0.10
30-1-2	FRM	Y	2024-09-13	Mean of duplicates	16.35	< 0.002	< 0.20	< 0.50	0.35	0.47	6.96	< 0.10
30-1-2	RPD	Y	2024-09-13	RPD of duplicates	1.8%	0.0%	0.0%	0.0%	1.7%	4%	19.5%	0.0%
30-1-2	FR1	Y	2025-02-14	Clear and colourless	6.10	< 0.002	< 0.20	< 0.50	0.01	0.22	42.10	< 0.10
30-1-2	FR2	Y	2025-02-14	Clear and colourless	6.50	< 0.002	< 0.20	< 0.50	0.01	0.21	41.70	< 0.10
30-1-2	FRM	Y	2025-02-14	Mean of duplicates	6.30	< 0.002	< 0.20	< 0.50	0.01	0.22	41.90	< 0.10
30-1-2	RPD	Y	2025-02-14	RPD of duplicates	6.3%	0.0%	0.0%	0.0%	0.0%	5%	1.0%	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a - *Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b - *Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

AECOM

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Alkalinity - Total - pH 4.5	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead
				Fraction	TOT	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	1	0.5	0.02	0.02	0.04	0.01	0.005	10	0.005	0.05	1	0.2	0.005	0.05	0.5	1	0.005
				Limit of Quantification (5x DL)	5	2.5	0.1	0.1	0.2	0.05	0.025	50	0.025	0.25	5	1	0.025	0.25	2.5	5	0.025
31-1-1	FR1	Y	2024-05-21	Clear and colourless	150.00	1.08	0.09	0.20	5.72	< 0.01	< 0.01	58.00	0.04	146.00	14.00	< 0.10	0.14	0.36	415.00	1.10	0.01
31-1-1	FR2	Y	2024-05-21	Clear and colourless	150.00	6.81	0.09	0.21	5.68	< 0.01	< 0.01	59.00	0.05	146.00	14.00	< 0.10	0.14	0.62	413.00	9.20	0.08
31-1-1	FRM	Y	2024-05-21	Mean of duplicates	150.00	3.95	0.09	0.21	5.70	< 0.01	< 0.01	58.50	0.05	146.00	14.00	< 0.10	0.14	0.49	414.00	5.15	0.04
31-1-1	RPD	Y	2024-05-21	RPD of duplicates	0.0%	**145.2%** b	4.5%	5.3%	0.7%	0.0%	0.0%	1.7%	28.0%	0.0%	0.0%	0.0%	0.7%	**53.2%** a	0.5%	**157.3%** b	**174.9%** b
31-1-1	FR1	Y	2024-09-13	Clear and colourless	160.00	7.36	0.09	0.24	6.56	< 0.01	< 0.01	53.00	0.05	141.00	13.00	0.13	0.20	0.92	400.00	32.50	0.02
31-1-1	FR2	Y	2024-09-13	Clear and colourless	160.00	7.31	0.09	0.22	5.52	< 0.01	< 0.01	53.00	0.04	141.00	13.00	0.15	0.20	0.59	398.00	16.20	0.01
31-1-1	FRM	Y	2024-09-13	Mean of duplicates	160.00	7.34	0.09	0.23	6.04	< 0.01	< 0.01	53.00	0.05	141.00	13.00	0.14	0.20	0.76	399.00	24.35	0.02
31-1-1	RPD	Y	2024-09-13	RPD of duplicates	0.0%	0.7%	4.3%	8.2%	17.2%	0.0%	0.0%	0.0%	8.9%	0.0%	0.0%	14.3%	0.5%	43.7%	0.5%	66.9%	42.7%
31-1-1	FR1	Y	2024-11-08	Clear and colourless	160.00	2.33	0.08	0.18	6.87	< 0.01	< 0.01	61.00	0.05	134.00	12.00	< 0.10	0.16	0.38	382.00	3.90	0.01
31-1-1	FR2	Y	2024-11-08	Clear and colourless	160.00	3.09	0.08	0.18	5.07	< 0.01	< 0.01	59.00	0.04	135.00	12.00	< 0.10	0.16	0.45	383.00	3.00	0.01
31-1-1	FRM	Y	2024-11-08	Mean of duplicates	160.00	2.71	0.08	0.18	5.97	< 0.01	< 0.01	60.00	0.05	134.50	12.00	< 0.10	0.16	0.41	382.50	3.45	0.01
31-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	28.0%	1.2%	3.3%	**30.2%** a	0.0%	0.0%	3.3%	25.4%	0.7%	0.0%	0.0%	1.9%	15.5%	0.3%	26.1%	1.9%
39-1-1	FR1	Y	2024-05-09	Clear and colourless	94.00	5.53	0.75	0.30	10.20	< 0.01	< 0.01	18.00	0.01	60.50	10.00	0.10	0.02	0.33	172.00	3.80	0.01
39-1-1	FR2	Y	2024-05-09	Clear and colourless	94.00	4.62	0.73	0.29	10.60	< 0.01	< 0.01	18.00	0.01	59.60	10.00	< 0.10	0.02	0.29	169.00	3.10	0.01
39-1-1	FRM	Y	2024-05-09	Mean of duplicates	94.00	5.08	0.74	0.29	10.40	< 0.01	< 0.01	18.00	0.01	60.05	10.00	0.10	0.02	0.31	170.50	3.45	0.01
39-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	17.9%	2.9%	4.1%	3.8%	0.0%	0.0%	0.0%	3.5%	1.5%	0.0%	0.0%	1.5%	12.8%	1.8%	20.3%	16.9%
39-1-1	FR1	Y	2024-09-24	Clear and colourless	93.00	5.55	0.76	0.32	8.86	< 0.01	< 0.01	13.00	0.02	61.90	13.00	< 0.10	0.02	0.41	175.00	4.50	< 0.01
39-1-1	FR2	Y	2024-09-24	Clear and colourless	91.00	4.35	0.76	0.32	10.10	< 0.01	< 0.01	13.00	0.02	64.00	13.00	< 0.10	0.03	0.36	181.00	3.10	0.03
39-1-1	FRM	Y	2024-09-24	Mean of duplicates	92.00	4.95	0.76	0.32	9.48	< 0.01	< 0.01	13.00	0.02	62.95	13.00	< 0.10	0.03	0.38	178.00	3.80	0.02
39-1-1	RPD	Y	2024-09-24	RPD of duplicates	2.2%	24.2%	1.1%	0.9%	13.1%	0.0%	0.0%	0.0%	10.3%	3.3%	0.0%	0.0%	15.0%	13.9%	3.4%	**36.8%** b	**136.5%** b
39-1-1	FR1	Y	2024-11-19	Clear and colourless	91.00	9.15	0.83	0.48	10.70	< 0.01	< 0.01	16.00	0.02	59.50	12.00	0.13	0.03	0.60	169.00	18.90	0.01
39-1-1	FR2	Y	2024-11-19	Clear and colourless	92.00	4.65	0.80	0.47	9.04	< 0.01	< 0.01	15.00	0.02	59.30	12.00	< 0.10	0.02	0.21	168.00	2.20	< 0.01
39-1-1	FRM	Y	2024-11-19	Mean of duplicates	91.50	6.90	0.81	0.47	9.87	< 0.01	< 0.01	15.50	0.02	59.40	12.00	0.12	0.02	0.41	168.50	10.55	0.01
39-1-1	RPD	Y	2024-11-19	RPD of duplicates	1.1%	**65.2%** a	4.5%	2.1%	16.8%	0.0%	0.0%	6.5%	0.9%	0.3%	0.0%	26.1%	23.6%	**95.3%** b	0.6%	**158.3%** b	**75.0%** b
39-1-1	FR1	Y	2025-03-05	Clear and colourless	93.00	3.27	0.72	0.37	8.15	< 0.01	< 0.01	22.00	0.01	62.30	11.00	< 0.10	0.02	0.38	178.00	2.40	< 0.01
39-1-1	FR2	Y	2025-03-05	Clear and colourless	92.00	3.23	0.74	0.39	8.30	< 0.01	< 0.01	20.00	0.01	62.90	11.00	< 0.10	0.02	0.45	179.00	13.90	< 0.01
39-1-1	FRM	Y	2025-03-05	Mean of duplicates	92.50	3.25	0.73	0.38	8.23	< 0.01	< 0.01	21.00	0.01	62.60	11.00	< 0.10	0.02	0.42	178.50	8.15	< 0.01
39-1-1	RPD	Y	2025-03-05	RPD of duplicates	1.1%	1.2%	2.8%	3.7%	1.8%	0.0%	0.0%	9.5%	7.4%	1.0%	0.0%	0.0%	1.3%	16.3%	0.6%	**141.1%** b	0.0%
41-1-1	FR1	Y	2024-05-15	Clear and colourless	150.00	3.63	0.06	3.60	3.69	< 0.01	< 0.01	34.00	< 0.01	63.90	8.00	< 0.10	0.02	0.18	187.00	10.90	0.01
41-1-1	FR2	Y	2024-05-15	Clear and colourless	150.00	2.63	0.07	3.97	1.32	< 0.01	< 0.01	33.00	< 0.01	66.70	7.90	< 0.10	0.03	0.18	196.00	9.50	< 0.01
41-1-1	FRM	Y	2024-05-15	Mean of duplicates	150.00	3.13	0.07	3.79	2.51	< 0.01	< 0.01	33.50	< 0.01	65.30	7.95	< 0.10	0.02	0.18	191.50	10.20	0.01
41-1-1	RPD	Y	2024-05-15	RPD of duplicates	0.0%	**31.9%** a	13.1%	9.8%	**94.6%** a	0.0%	0.0%	3.0%	0.0%	4.3%	1.3%	0.0%	21.3%	1.1%	4.7%	13.7%	29.1%
41-1-1	FR1	Y	2024-09-13	Clear and colourless	160.00	1.93	0.04	3.27	2.32	< 0.01	< 0.01	37.00	0.01	67.80	8.00	< 0.10	0.05	0.48	199.00	32.90	0.01
41-1-1	FR2	Y	2024-09-13	Clear and colourless	160.00	1.21	0.04	3.28	1.34	< 0.01	< 0.01	29.00	0.01	69.30	7.60	< 0.10	0.05	0.51	202.00	5.60	< 0.01
41-1-1	FRM	Y	2024-09-13	Mean of duplicates	160.00	1.57	0.04	3.28	1.83	< 0.01	< 0.01	33.00	0.01	68.55	7.80	< 0.10	0.05	0.50	200.50	19.25	0.01
41-1-1	RPD	Y	2024-09-13	RPD of duplicates	0.0%	**45.9%** b	8.0%	0.3%	**53.6%** a	0.0%	0.0%	24.2%	**57.4%** b	2.2%	5.1%	0.0%	6.6%	5.0%	1.5%	**141.8%** a	**58.2%** b
41-1-1	FR1	Y	2024-11-08	Clear and colourless	160.00	2.26	0.06	4.39	1.28	< 0.01	< 0.01	32.00	0.01	68.00	7.10	< 0.10	0.06	0.25	199.00	5.20	< 0.01
41-1-1	FR2	Y	2024-11-08	Clear and colourless	160.00	2.35	0.04	4.34	1.31	< 0.01	< 0.01	30.00	0.01	65.60	7.10	< 0.10	0.05	0.36	192.00	5.80	0.01
41-1-1	FRM	Y	2024-11-08	Mean of duplicates	160.00	2.31	0.05	4.37	1.30	< 0.01	< 0.01	31.00	0.01	66.80	7.10	< 0.10	0.05	0.31	195.50	5.50	0.01
41-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	3.9%	22.2%	1.1%	2.3%	0.0%	0.0%	6.5%	9.9%	3.6%	0.0%	0.0%	4.8%	**36.2%** a	3.6%	10.9%	**46.2%** b
41-1-1	FR1	Y	2025-02-12	Clear and colourless	150.00	1.42	0.05	3.38	1.18	< 0.01	< 0.01	27.00	< 0.01	65.60	6.60	< 0.10	0.04	0.25	193.00	3.80	0.01
41-1-1	FR2	Y	2025-02-12	Clear and colourless	150.00	0.96	0.04	3.31	1.13	< 0.01	< 0.01	25.00	0.01	64.60	6.40	< 0.10	0.04	0.24	190.00	3.30	0.01
41-1-1	FRM	Y	2025-02-12	Mean of duplicates	150.00	1.19	0.05	3.35	1.16	< 0.01	< 0.01	26.00	0.01	65.10	6.50	< 0.10	0.04	0.25	191.50	3.55	0.01
41-1-1	RPD	Y	2025-02-12	RPD of duplicates	0.0%	**38.7%** b	13.0%	2.1%	4.3%	0.0%	0.0%	7.7%	0.0%	1.5%	3.1%	0.0%	7.4%	4.9%	1.6%	14.1%	**33.3%** b
42-1-1	FR1	Y	2024-05-16	Clear and colourless	210.00	22.70	0.02	0.17	15.50	< 0.01	< 0.01	69.00	< 0.01	92.60	21.00	0.24	0.09	0.12	255.00	737.00	0.03
42-1-1	FR2	Y	2024-05-16	Clear and colourless	200.00	4.39	< 0.02	0.15	14.50	< 0.01	< 0.01	69.00	< 0.01	93.60	21.00	0.18	0.07	0.07	258.00	696.00	0.01
42-1-1	FRM	Y	2024-05-16	Mean of duplicates	205.00	13.55	0.02	0.16	15.00	0.01	< 0.01	69.00	< 0.01	93.10	21.00	0.21	0.08	0.09	256.50	716.50	0.02
42-1-1	RPD	Y	2024-05-16	RPD of duplicates	4.9%	**135.2%** a	18.2%	11.1%	6.7%	9.5%	0.0%	0.0%	0.0%	1.1%	0.0%	28.6%	**35.5%** a	**51.1%** b	1.2%	5.7%	**133.9%** b
42-1-1	FR1	Y	2024-09-13	Clear and colourless	210.00	3.06	< 0.02	0.25	14.60	0.02	< 0.01	70.00	< 0.01	104.00	23.00	0.19	0.05	0.12	285.00	679.00	< 0.01
42-1-1	FR2	Y	2024-09-13	Clear and colourless	210.00	4.38	< 0.02	0.24	16.60	0.01	< 0.01	71.00	< 0.01	103.00	23.00	0.25	0.05	0.12	284.00	670.00	0.01
42-1-1	FRM	Y	2024-09-13	Mean of duplicates	210.00	3.72	< 0.02	0.25	15.60	0.02	< 0.01	70.50	< 0.01	103.50	23.00	0.22	0.05	0.12	284.50	674.50	0.01
42-1-1	RPD	Y	2024-09-13	RPD of duplicates	0.0%	**35.5%** a	0.0%	4.5%	12.8%	19.4%	0.0%	1.4%	0.0%	1.0%	0.0%	27.3%	1.2%	0.8%	0.4%	1.3%	**47.3%** b
42-1-1	FR1	Y	2024-11-08	Clear and colourless	200.00	7.08	< 0.02	0.16	14.80	0.02	< 0.01	81.00	0.01	98.90	26.00	0.28	0.06	0.07	271.00	691.00	< 0.01
42-1-1	FR2	Y	2024-11-08	Clear and colourless	200.00	5.09	< 0.02	0.18	16.00	0.02	< 0.01	88.00	< 0.01	110.00	26.00	0.23	0.06	0.06	302.00	768.00	0.01
42-1-1	FRM	Y	2024-11-08	Mean of duplicates	200.00	6.09	< 0.02	0.17	15.40	0.02	< 0.01	84.50	0.01	104.45	26.00	0.26	0.06	0.07	286.50	729.50	0.01
42-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	32.7%	0.0%	13.5%	7.8%	6.1%	0.0%	8.3%	43.8%	10.6%	0.0%	19.6%	6.1%	26.0%	10.8%	10.6%	3.9%
42-1-1	FR1	Y	2025-02-14	Clear and colourless	190.00	7.58	< 0.02	0.11	14.90	0.01	< 0.01	68.00	< 0.01	93.00	24.00	0.21	0.08	0.07	258.00	698.00	0.01
42-1-1	FR2	Y	2025-02-14	Clear and colourless	190.00	4.73	< 0.02	0.12	14.30	< 0.01	< 0.01	67.00	< 0.01	95.10	24.00	0.18	0.07	0.12	263.00	682.00	< 0.01
42-1-1	FRM	Y	2025-02-14	Mean of duplicates	190.00	6.16	< 0.02	0.11	14.60	0.01	< 0.01	67.50	< 0.01	94.05	24.00	0.20	0.07	0.09	260.50	690.00	0.01
42-1-1	RPD	Y	2025-02-14	RPD of duplicates	0.0%	**46.3%** a	0.0%	9.6%	4.1%	26.1%	0.0%	1.5%	0.0%	2.2%	0.0%	15.4%	9.8%	**61.0%** b	1.9%	2.3%	18.2%
71-1-1	FR1	Y	2024-05-22	Clear and colourless	140.00	1.84	0.05	0.42	7.28	< 0.01	< 0.01	531.00	0.01	49.80	6.50	< 0.10	0.10	< 0.05	152.00	46.30	0.01
71-1-1	FR2	Y	2024-05-22	Clear and colourless	140.00	2.20	0.06	0.42	8.03	< 0.01	< 0.01	558.00	< 0.01	52.40	6.20	< 0.10	0.11	0.06	160.00	47.20	< 0.01
71-1-1	FRM	Y	2024-05-22	Mean of duplicates	140.00	2.02	0.05	0.42	7.66	< 0.01	< 0.01	544.50	0.01	51.10	6.35	< 0.10	0.10	0.05	156.00	46.75	0.01
71-1-1	RPD	Y	2024-05-22	RPD of duplicates	0.0%	17.8%	17.5%	0.2%	9.8%	0.0%	0.0%	5.0%	0.0%	5.1%	4.7%	0.0%	10.0%	11.3%	5.1%	1.9%	0.0%
71-1-1	FR1	Y	2024-09-10	Clear and colourless	160.00	1.63	0.07	0.28	7.71	< 0.01	< 0.01	458.00	< 0.01	58.30	7.40	< 0.10	0.10	0.16	178.00	20.70	< 0.01
71-1-1	FR2	Y	2024-09-10	Clear and colourless	160.00	2.82	0.06	0.29	8.16	< 0.01	< 0.01	453.00	0.01	58.80	7.50	< 0.10	0.10	0.31	179.00	21.50	0.04
71-1-1	FRM	Y	2024-09-10	Mean of duplicates	160.00	2.23	0.07	0.29	7.94	< 0.01	< 0.01	455.50	0.01	58.55	7.45	< 0.10	0.10	0.24	178.50	21.10	0.02
71-1-1	RPD	Y	2024-09-10	RPD of duplicates	0.0%	**53.5%** b	6.1%	5.6%	5.7%	0.0%	0.0%	1.1%	**74.2%** b	0.9%	1.3%	0.0%	0.0%	**62.1%** b	0.6%	3.8%	**150.9%** b
71-1-1	FR1	Y	2024-11-26	Clear and colourless	150.00	5.26	0.07	0.45	8.86	< 0.01	< 0.01	454.00	< 0.01	55.50	7.50	0.13	0.19	0.14	170.00	39.80	0.03
71-1-1	FR2	Y	2024-11-26	Clear and colourless	150.00	2.60	0.07	0.44	7.23	< 0.01	< 0.01	465.00	< 0.01	54.70	7.30	< 0.10	0.15	0.14	167.00	31.20	< 0.01
71-1-1	FRM	Y	2024-11-26	Mean of duplicates	150.00	3.93	0.07	0.44	8.05	< 0.01	< 0.01	459.50	< 0.01	55.10	7.40	0.12	0.17	0.14	168.50	35.50	0.02
71-1-1	RPD	Y	2024-11-26	RPD of duplicates	0.0%	**67.7%** a	2.9%	2.0%	20.3%	0.0%	0.0%	2.4%	0.0%	1.5%	2.7%	26.1%	27.9%	5.8%	1.8%	24.2%	**137.3%** b
71-1-1	FR1	Y	2025-03-10	Clear and colourless	150.00	3.72	0.12	0.35	6.65	< 0.01	< 0.01	409.00	0.02	56.80	7.70	0.38	0.05	4.00	172.00	4.60	0.02
71-1-1	FR2	Y	2025-03-10	Clear and colourless	150.00	4.35	0.16	0.36	6.76	< 0.01	< 0.01	420.00	0.03	57.90	7.80	0.41	0.05	0.37	175.00	6.60	0.03
71-1-1	FRM	Y	2025-03-10	Mean of duplicates	150.00	4.04	0.14	0.35	6.71	< 0.01	< 0.01	414.50	0.03	57.35	7.75	0.40	0.05	2.19	173.50	5.60	0.02
71-1-1	RPD	Y	2025-03-10	RPD of duplicates	0.0%	15.6%	24.1%	1.4%	1.6%	0.0%	0.0%	2.7%	**38.6%** b	1.9%	1.3%	7.6%	2.6%	**166.0%** a	1.7%	**35.7%** b	9.2%
72-1-1	FR1	Y	2024-05-22	Clear and colourless	150.00	5.00	2.11	0.28	12.30	0.10	0.12	1710.00	0.09	83.70	66.00	0.20	0.18	0.16	265.00	350.00	0.18
72-1-1	FR2	Y	2024-05-22	Clear and colourless	150.00	2.30	2.15	0.27	12.30	0.09	0.10	1750.00	0.10	83.10	66.00	< 0.20	0.17	0.15	263.00	349.00	0.16
72-1-1	FRM	Y	2024-05-22	Mean of duplicates	150.00	3.65	2.13	0.28	12.30	0.09	0.11	1730.00	0.10	83.40	66.00	0.20	0.17	0.16	264.00	349.50	0.17
72-1-1	RPD	Y	2024-05-22	RPD of duplicates	0.0%	**74.0%** b	1.9%	3.6%	0.0%	8.5%	19.5%	2.3%	14.6%	0.7%	0.0%	0.0%	5.2%	6.5%	0.8%	0.3%	11.0%

Notes:

FR1 *Field replicate 1*
FR2 *Field replicate 2*
FRM *Average of field replicates*
RPD *Relative percent difference of field replicates*
Bold *RPD greater than 30%*
a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*
b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Lithium	Magnesium	Manganese	Molybdenum	Ammonia	Nitrite	Nitrate	Nitrite + Nitrate	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Sulphate
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	0.5	0.05	0.05	0.05	0.015	0.005	0.02	0.02	0.02	2	0.05	0.04	100	0.005	0.05	0.05	1
				Limit of Quantification (5x DL)	2.5	0.25	0.25	0.25	0.075	0.025	0.1	0.1	0.1	10	0.25	0.2	500	0.025	0.25	0.25	5
31-1-1	FR1	Y	2024-05-21	Clear and colourless	< 0.50	12.10	20.90	0.83	< 0.02	< 0.01	16.10	16.10	0.27	5.30	0.76	0.10	5410	< 0.01	8.13	492	210
31-1-1	FR2	Y	2024-05-21	Clear and colourless	< 0.50	11.90	21.90	0.79	< 0.02	< 0.01	16.10	16.10	0.31	8.20	0.79	0.10	5440	< 0.01	8.06	491	210
31-1-1	FRM	Y	2024-05-21	Mean of duplicates	< 0.50	12.00	21.40	0.81	< 0.02	< 0.01	16.10	16.10	0.29	6.75	0.78	0.10	5425	< 0.01	8.10	492	210
31-1-1	RPD	Y	2024-05-21	RPD of duplicates	0.0%	1.67%	4.7%	4.7%	0.0%	0.0%	0.0%	0.0%	12.1%	**43.0%** b	3.3%	5.0%	0.6%	0.0%	0.9%	0.2%	0.0%
31-1-1	FR1	Y	2024-09-13	Clear and colourless	< 0.50	11.60	40.00	0.97	< 0.02	0.01	12.20	12.20	0.69	7.60	0.71	0.07	5580	< 0.01	7.48	472	190
31-1-1	FR2	Y	2024-09-13	Clear and colourless	< 0.50	11.40	40.20	0.97	< 0.02	0.01	12.30	12.30	0.73	7.70	0.70	0.07	5490	< 0.01	7.47	466	200
31-1-1	FRM	Y	2024-09-13	Mean of duplicates	< 0.50	11.50	40.10	0.97	< 0.02	0.01	12.25	12.25	0.71	7.65	0.71	0.07	5535	< 0.01	7.48	469	195
31-1-1	RPD	Y	2024-09-13	RPD of duplicates	0.0%	1.74%	0.5%	0.6%	0.0%	2.7%	0.8%	0.8%	5.1%	1.3%	1.8%	7.4%	1.6%	0.0%	0.1%	1.3%	5.1%
31-1-1	FR1	Y	2024-11-08	Clear and colourless	< 0.50	11.20	27.20	0.89	0.02	0.01	9.01	9.02	0.28	4.60	0.74	0.18	5130	< 0.01	7.20	422	200
31-1-1	FR2	Y	2024-11-08	Clear and colourless	< 0.50	11.00	26.90	0.86	0.02	0.01	9.07	9.08	0.30	4.30	0.71	0.19	5160	< 0.01	7.00	419	210
31-1-1	FRM	Y	2024-11-08	Mean of duplicates	< 0.50	11.10	27.05	0.88	0.02	0.01	9.04	9.05	0.29	4.45	0.72	0.19	5145	< 0.01	7.10	421	205
31-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	1.80%	1.1%	3.8%	23.3%	4.5%	0.7%	0.7%	7.9%	6.7%	3.7%	4.3%	0.6%	0.0%	2.8%	0.7%	4.9%
39-1-1	FR1	Y	2024-05-09	Clear and colourless	< 0.50	5.04	0.11	3.17	< 0.02	0.03	8.60	8.62	0.17	3.00	0.31	0.41	5000	< 0.01	5.74	356	49
39-1-1	FR2	Y	2024-05-09	Clear and colourless	< 0.50	5.02	0.09	3.36	< 0.02	0.03	8.55	8.58	0.15	2.80	0.32	0.36	5030	< 0.01	5.97	357	49
39-1-1	FRM	Y	2024-05-09	Mean of duplicates	< 0.50	5.03	0.10	3.27	< 0.02	0.03	8.58	8.60	0.16	2.90	0.31	0.39	5015	< 0.01	5.86	357	49
39-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	0.40%	20.8%	5.8%	0.0%	0.0%	0.6%	0.5%	11.4%	6.9%	2.2%	13.7%	0.6%	0.0%	3.9%	0.3%	0.0%
39-1-1	FR1	Y	2024-09-24	Clear and colourless	< 0.50	4.84	0.17	3.36	< 0.02	0.03	6.04	6.07	0.18	2.30	0.33	0.52	4970	< 0.01	5.16	355	64
39-1-1	FR2	Y	2024-09-24	Clear and colourless	< 0.50	5.04	0.14	3.50	< 0.02	0.03	6.21	6.24	0.20	3.10	0.34	0.52	5010	< 0.01	5.25	371	64
39-1-1	FRM	Y	2024-09-24	Mean of duplicates	< 0.50	4.94	0.16	3.43	< 0.02	0.03	6.13	6.16	0.19	2.70	0.33	0.52	4990	< 0.01	5.21	363	64
39-1-1	RPD	Y	2024-09-24	RPD of duplicates	0.0%	4%	18.9%	4.1%	0.0%	11.7%	2.8%	2.8%	7.4%	29.6%	1.5%	0.4%	0.8%	0.0%	1.7%	4.4%	0.0%
39-1-1	FR1	Y	2024-11-19	Clear and colourless	< 0.50	4.94	0.36	2.95	< 0.02	< 0.01	3.46	3.46	0.27	< 2.00	0.33	0.80	5160	< 0.01	4.72	369	70
39-1-1	FR2	Y	2024-11-19	Clear and colourless	< 0.50	4.87	< 0.05	2.85	< 0.02	< 0.01	3.48	3.48	0.24	< 2.00	0.32	0.79	4980	< 0.01	4.58	356	71
39-1-1	FRM	Y	2024-11-19	Mean of duplicates	< 0.50	4.91	0.20	2.90	< 0.02	< 0.01	3.47	3.47	0.25	< 2.00	0.33	0.79	5070	< 0.01	4.65	363	71
39-1-1	RPD	Y	2024-11-19	RPD of duplicates	0.0%	1.43%	**151.0%** b	3.4%	0.0%	0.0%	0.6%	0.6%	8.3%	0.0%	3.1%	2.1%	3.6%	0.0%	3.0%	3.6%	1.4%
39-1-1	FR1	Y	2025-03-05	Clear and colourless	< 0.50	5.32	< 0.05	2.51	0.02	< 0.01	6.82	6.82	0.26	< 2.00	0.30	0.76	4690	< 0.01	4.62	396	66
39-1-1	FR2	Y	2025-03-05	Clear and colourless	< 0.50	5.43	0.12	2.51	< 0.02	< 0.01	6.89	6.89	0.27	< 2.00	0.32	0.78	4760	< 0.01	4.79	397	67
39-1-1	FRM	Y	2025-03-05	Mean of duplicates	< 0.50	5.38	0.08	2.51	0.02	< 0.01	6.86	6.86	0.26	< 2.00	0.31	0.77	4725	< 0.01	4.71	397	67
39-1-1	RPD	Y	2025-03-05	RPD of duplicates	0.0%	2.05%	**81.0%** b	0.0%	0.0%	0.0%	1.0%	1.0%	4.9%	0.0%	3.9%	3.6%	1.5%	0.0%	3.6%	0.3%	1.5%
41-1-1	FR1	Y	2024-05-15	Clear and colourless	< 0.50	6.72	5.74	1.63	< 0.02	< 0.01	0.10	0.10	0.11	4.10	0.84	0.05	6980	< 0.01	5.48	186	48
41-1-1	FR2	Y	2024-05-15	Clear and colourless	< 0.50	7.04	10.70	1.70	0.02	< 0.01	0.10	0.10	0.12	2.80	0.91	0.05	7440	< 0.01	5.84	196	48
41-1-1	FRM	Y	2024-05-15	Mean of duplicates	< 0.50	6.88	8.22	1.67	0.02	< 0.01	0.10	0.10	0.11	3.45	0.87	0.05	7210	< 0.01	5.66	191	48
41-1-1	RPD	Y	2024-05-15	RPD of duplicates	0.0%	4.65%	**60.3%** a	4.2%	18.2%	0.0%	0.0%	0.0%	6.2%	**37.7%** b	8.2%	3.8%	6.4%	0.0%	6.4%	5.2%	0.0%
41-1-1	FR1	Y	2024-09-13	Clear and colourless	< 0.50	7.26	229.0	2.69	0.04	< 0.01	0.10	0.10	0.21	3.40	0.90	0.17	7170	< 0.01	5.19	215	56
41-1-1	FR2	Y	2024-09-13	Clear and colourless	< 0.50	7.15	226.0	2.59	0.04	< 0.01	0.10	0.10	0.22	2.50	0.89	0.04	7410	< 0.01	5.14	209	56
41-1-1	FRM	Y	2024-09-13	Mean of duplicates	< 0.50	7.21	227.5	2.64	0.04	< 0.01	0.10	0.10	0.21	2.95	0.90	0.10	7290	< 0.01	5.17	212	56
41-1-1	RPD	Y	2024-09-13	RPD of duplicates	0.0%	2%	1.3%	3.8%	0.0%	0.0%	3.0%	3.0%	4.2%	**30.5%** b	1.0%	**122.3%** b	3.3%	0.0%	1.0%	2.8%	0.0%
41-1-1	FR1	Y	2024-11-08	Clear and colourless	< 0.50	7.00	250.0	2.40	0.04	< 0.01	0.13	0.13	0.17	2.20	0.82	< 0.04	7600	< 0.01	5.28	199	52
41-1-1	FR2	Y	2024-11-08	Clear and colourless	< 0.50	6.97	247.0	2.40	0.06	< 0.01	0.13	0.13	0.19	2.90	0.81	< 0.04	7430	< 0.01	5.16	196	51
41-1-1	FRM	Y	2024-11-08	Mean of duplicates	< 0.50	6.99	248.5	2.40	0.05	< 0.01	0.13	0.13	0.18	2.55	0.81	< 0.04	7515	< 0.01	5.22	198	52
41-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	0.43%	1.2%	0.0%	**50.0%** b	0.0%	1.6%	1.6%	9.9%	27.5%	2.2%	0.0%	2.3%	0.0%	2.3%	1.5%	1.9%
41-1-1	FR1	Y	2025-02-12	Clear and colourless	< 0.50	7.14	95.8	1.94	0.04	< 0.01	0.06	0.06	0.21	< 2.00	0.76	< 0.04	7400	< 0.01	5.01	206	48
41-1-1	FR2	Y	2025-02-12	Clear and colourless	< 0.50	7.07	85.7	1.86	0.04	< 0.01	0.05	0.05	0.11	< 2.00	0.76	< 0.04	7210	< 0.01	4.89	203	48
41-1-1	FRM	Y	2025-02-12	Mean of duplicates	< 0.50	7.11	90.8	1.90	0.04	< 0.01	0.05	0.05	0.16	< 2.00	0.76	< 0.04	7305	< 0.01	4.95	205	48
41-1-1	RPD	Y	2025-02-12	RPD of duplicates	0.0%	0.99%	11.1%	4.2%	7.6%	0.0%	17.1%	17.1%	**58.8%** a	0.0%	0.4%	0.0%	2.6%	0.0%	2.4%	1.5%	0.0%
42-1-1	FR1	Y	2024-05-16	Clear and colourless	< 0.50	5.81	162.0	0.25	0.07	< 0.01	< 0.02	< 0.02	0.17	6.90	1.02	< 0.04	6010	< 0.01	9.09	357	55
42-1-1	FR2	Y	2024-05-16	Clear and colourless	< 0.50	5.83	160.0	0.24	0.07	< 0.01	< 0.02	< 0.02	0.16	7.20	1.02	< 0.04	6080	< 0.01	9.20	360	55
42-1-1	FRM	Y	2024-05-16	Mean of duplicates	< 0.50	5.82	161.0	0.24	0.07	< 0.01	< 0.02	< 0.02	0.16	7.05	1.02	< 0.04	6045	< 0.01	9.15	359	55
42-1-1	RPD	Y	2024-05-16	RPD of duplicates	0.0%	0.34%	1.2%	1.6%	7.0%	0.0%	0.0%	0.0%	3.0%	4.3%	0.0%	0.0%	1.2%	0.0%	1.2%	0.8%	0.0%
42-1-1	FR1	Y	2024-09-13	Clear and colourless	< 0.50	6.11	158.0	0.35	0.08	< 0.01	< 0.02	< 0.02	0.15	7.50	0.96	< 0.04	6720	< 0.01	9.76	418	74
42-1-1	FR2	Y	2024-09-13	Clear and colourless	< 0.50	6.21	158.0	0.39	0.08	< 0.01	< 0.02	< 0.02	0.17	6.10	0.97	< 0.04	6800	< 0.01	9.79	421	73
42-1-1	FRM	Y	2024-09-13	Mean of duplicates	< 0.50	6.16	158.0	0.37	0.08	< 0.01	< 0.02	< 0.02	0.16	6.80	0.97	< 0.04	6760	< 0.01	9.78	420	74
42-1-1	RPD	Y	2024-09-13	RPD of duplicates	0.0%	1.62%	0.0%	8.9%	1.3%	0.0%	0.0%	0.0%	17.6%	20.6%	1.3%	0.0%	1.2%	0.0%	0.3%	0.7%	1.4%
42-1-1	FR1	Y	2024-11-08	Clear and colourless	< 0.50	5.89	153.0	0.32	0.08	< 0.01	< 0.02	< 0.02	0.18	7.00	0.99	< 0.04	6640	< 0.01	9.31	374	69
42-1-1	FR2	Y	2024-11-08	Clear and colourless	< 0.50	6.35	163.0	0.30	0.10	< 0.01	< 0.02	< 0.02	0.17	6.20	1.07	< 0.04	7510	< 0.01	9.98	404	71
42-1-1	FRM	Y	2024-11-08	Mean of duplicates	< 0.50	6.12	158.0	0.31	0.09	< 0.01	< 0.02	< 0.02	0.17	6.60	1.03	< 0.04	7075	< 0.01	9.65	389	70
42-1-1	RPD	Y	2024-11-08	RPD of duplicates	0.0%	7.52%	6.3%	6.8%	23.5%	0.0%	0.0%	0.0%	5.2%	12.1%	8.2%	0.0%	0	0.0%	6.9%	0	0
42-1-1	FR1	Y	2025-02-14	Clear and colourless	< 0.50	6.26	158.0	0.26	0.07	< 0.01	< 0.02	< 0.02	0.12	3.90	1.06	< 0.04	5910	< 0.01	10.10	364	66
42-1-1	FR2	Y	2025-02-14	Clear and colourless	< 0.50	6.15	155.0	0.28	0.07	< 0.01	< 0.02	< 0.02	0.15	4.10	1.06	< 0.04	5970	< 0.01	10.10	362	65
42-1-1	FRM	Y	2025-02-14	Mean of duplicates	< 0.50	6.21	156.5	0.27	0.07	< 0.01	< 0.02	< 0.02	0.14	4.00	1.06	< 0.04	5940	< 0.01	10.10	363	66
42-1-1	RPD	Y	2025-02-14	RPD of duplicates	0.0%	1.77%	1.9%	6.7%	0.0%	0.0%	0.0%	0.0%	20.4%	5.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.6%	1.5%
71-1-1	FR1	Y	2024-05-22	Clear and colourless	0.64	6.79	123.0	0.53	< 0.02	< 0.01	< 0.02	< 0.02	0.30	13.20	0.24	0.04	13000	< 0.01	8.16	128	24
71-1-1	FR2	Y	2024-05-22	Clear and colourless	0.73	7.17	131.0	0.56	< 0.02	< 0.01	< 0.02	< 0.02	0.34	13.50	0.26	0.05	13700	< 0.01	8.58	132	24
71-1-1	FRM	Y	2024-05-22	Mean of duplicates	0.69	6.98	127.0	0.54	< 0.02	< 0.01	< 0.02	< 0.02	0.32	13.35	0.25	0.04	13350	< 0.01	8.37	130	24
71-1-1	RPD	Y	2024-05-22	RPD of duplicates	13.1%	5.44%	6.3%	5.2%	0.0%	0.0%	0.0%	0.0%	12.9%	2.2%	7.6%	6.9%	5.2%	0.0%	5.0%	3.1%	0.0%
71-1-1	FR1	Y	2024-09-10	Clear and colourless	< 0.50	7.77	83.2	0.38	< 0.02	< 0.01	0.07	0.07	0.36	13.60	0.26	< 0.04	11800	< 0.01	6.71	170	22
71-1-1	FR2	Y	2024-09-10	Clear and colourless	< 0.50	7.82	83.1	0.37	< 0.02	< 0.01	0.04	0.04	0.39	13.30	0.27	< 0.04	12000	< 0.01	6.85	171	22
71-1-1	FRM	Y	2024-09-10	Mean of duplicates	< 0.50	7.80	83.2	0.37	< 0.02	< 0.01	0.05	0.05	0.37	13.45	0.26	< 0.04	11900	< 0.01	6.78	171	22
71-1-1	RPD	Y	2024-09-10	RPD of duplicates	0.0%	1%	0.1%	4.5%	0.0%	0.0%	**56.6%** b	**56.6%** b	8.3%	2.2%	3.0%	0.0%	1.7%	0.0%	2.1%	0.6%	0.0%
71-1-1	FR1	Y	2024-11-26	Clear and colourless	0.51	7.56	134.0	0.56	< 0.02	< 0.01	< 0.02	< 0.02	0.43	15.30	0.27	< 0.04	11700	< 0.01	7.71	148	25
71-1-1	FR2	Y	2024-11-26	Clear and colourless	< 0.50	7.52	133.0	0.52	< 0.02	< 0.01	< 0.02	< 0.02	0.42	14.80	0.26	< 0.04	11600	< 0.01	7.81	150	24
71-1-1	FRM	Y	2024-11-26	Mean of duplicates	0.51	7.54	133.5	0.54	< 0.02	< 0.01	< 0.02	< 0.02	0.43	15.05	0.26	< 0.04	11650	< 0.01	7.76	149	25
71-1-1	RPD	Y	2024-11-26	RPD of duplicates	2.0%	0.53%	0.7%	7.1%	0.0%	0.0%	0.0%	0.0%	1.2%	3.3%	1.5%	0.0%	0.9%	0.0%	1.3%	1.3%	4.1%
71-1-1	FR1	Y	2025-03-10	Clear and colourless	< 0.50	7.43	10.8	0.63	< 0.02	< 0.01	< 0.02	< 0.02	1.08	22.60	0.56	< 0.04	10900	< 0.01	7.51	149	23
71-1-1	FR2	Y	2025-03-10	Clear and colourless	0.52	7.39	10.8	0.61	< 0.02	< 0.01	< 0.02	< 0.02	0.95	22.90	0.56	< 0.04	11400	< 0.01	7.43	146	23
71-1-1	FRM	Y	2025-03-10	Mean of duplicates	0.51	7.41	10.8	0.62	< 0.02	< 0.01	< 0.02	< 0.02	1.01	22.75	0.56	< 0.04	11150	< 0.01	7.47	148	23
71-1-1	RPD	Y	2025-03-10	RPD of duplicates	3.9%	0.54%	0.0%	2.6%	0.0%	0.0%	0.0%	0.0%	13.0%	1.3%	0.4%	0.0%	4.5%	0.0%	1.1%	2.0%	0.0%
72-1-1	FR1	Y	2024-05-22	Clear and colourless	< 1.00	13.70	107.0	4.44	< 0.02	< 0.01	0.14	0.14	1.81	11.10	0.22	0.33	21300	0.09	8.39	266	45
72-1-1	FR2	Y	2024-05-22	Clear and colourless	< 1.00	13.40	106.0	4.36	< 0.02	< 0.01	< 0.02	< 0.02	1.82	7.70	0.21	0.35	21100	0.09	8.34	271	44
72-1-1	FRM	Y	2024-05-22	Mean of duplicates	< 1.00	13.55	106.5	4.40	< 0.02	< 0.01	0.08	0.08	1.82	9.40	0.22	0.34	21200	0.09	8.37	269	45
72-1-1	RPD	Y	2024-05-22	RPD of duplicates	0.0%	2.21%	0.9%	1.8%	0.0%	0.0%	**148.7%** b	**148.7%** b	0.6%	**36.2%** b	4.7%	7.9%	0.9%	0.0%	0.6%	1.9%	2.2%

Notes:

FR1 *Field replicate 1*
FR2 *Field replicate 2*
FRM *Average of field replicates*
RPD *Relative percent difference of field replicates*
Bold *RPD greater than 30%*
a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*
b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Sulfur	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Zirconium
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	3	0.002	0.2	0.5	0.002	0.2	0.1	0.1
				Limit of Quantification (5x DL)	15	0.01	1	2.5	0.01	1	0.5	0.5
31-1-1	FR1	Y	2024-05-21	Clear and colourless	70.40	0.002	< 0.20	< 0.50	0.44	0.32	0.55	< 0.10
31-1-1	FR2	Y	2024-05-21	Clear and colourless	70.80	< 0.002	< 0.20	< 0.50	0.45	0.34	2.68	< 0.10
31-1-1	FRM	Y	2024-05-21	Mean of duplicates	70.60	0.002	< 0.20	< 0.50	0.44	0.33	1.62	< 0.10
31-1-1	RPD	Y	2024-05-21	RPD of duplicates	0.6%	4.9%	0.0%	0.0%	1.6%	6%	**131.9%** a	0.0%
31-1-1	FR1	Y	2024-09-13	Clear and colourless	67.40	0.002	0.41	< 0.50	0.42	0.35	3.57	< 0.10
31-1-1	FR2	Y	2024-09-13	Clear and colourless	65.70	< 0.002	0.34	< 0.50	0.41	0.34	3.27	< 0.10
31-1-1	FRM	Y	2024-09-13	Mean of duplicates	66.55	0.002	0.38	< 0.50	0.42	0.35	3.42	< 0.10
31-1-1	RPD	Y	2024-09-13	RPD of duplicates	2.6%	0.0%	18.7%	0.0%	2.4%	3%	8.8%	0.0%
31-1-1	FR1	Y	2024-11-08	Clear and colourless	67.60	< 0.002	< 0.20	< 0.50	0.48	< 0.20	1.00	< 0.10
31-1-1	FR2	Y	2024-11-08	Clear and colourless	66.70	< 0.002	< 0.20	< 0.50	0.47	0.21	0.59	< 0.10
31-1-1	FRM	Y	2024-11-08	Mean of duplicates	67.15	< 0.002	< 0.20	< 0.50	0.48	0.21	0.80	< 0.10
31-1-1	RPD	Y	2024-11-08	RPD of duplicates	1.3%	0.0%	0.0%	0.0%	1.7%	5%	**51.6%** a	0.0%
39-1-1	FR1	Y	2024-05-09	Clear and colourless	16.80	< 0.002	< 0.20	< 0.50	0.28	1.52	0.73	< 0.10
39-1-1	FR2	Y	2024-05-09	Clear and colourless	16.80	< 0.002	< 0.20	< 0.50	0.28	1.53	0.66	< 0.10
39-1-1	FRM	Y	2024-05-09	Mean of duplicates	16.80	< 0.002	< 0.20	< 0.50	0.28	1.53	0.70	< 0.10
39-1-1	RPD	Y	2024-05-09	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	1.8%	1%	10.1%	0.0%
39-1-1	FR1	Y	2024-09-24	Clear and colourless	21.10	< 0.002	< 0.20	< 0.50	0.30	1.49	0.71	< 0.10
39-1-1	FR2	Y	2024-09-24	Clear and colourless	21.10	< 0.002	< 0.20	< 0.50	0.32	1.53	0.94	< 0.10
39-1-1	FRM	Y	2024-09-24	Mean of duplicates	21.10	< 0.002	< 0.20	< 0.50	0.31	1.51	0.83	< 0.10
39-1-1	RPD	Y	2024-09-24	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	3.9%	3%	27.9%	0.0%
39-1-1	FR1	Y	2024-11-19	Clear and colourless	21.60	< 0.002	< 0.20	< 0.50	0.30	1.63	2.62	< 0.10
39-1-1	FR2	Y	2024-11-19	Clear and colourless	21.40	< 0.002	< 0.20	< 0.50	0.30	1.57	0.81	< 0.10
39-1-1	FRM	Y	2024-11-19	Mean of duplicates	21.50	< 0.002	< 0.20	< 0.50	0.30	1.60	1.72	< 0.10
39-1-1	RPD	Y	2024-11-19	RPD of duplicates	0.9%	0.0%	0.0%	0.0%	1.0%	4%	**105.5%** a	0.0%
39-1-1	FR1	Y	2025-03-05	Clear and colourless	18.80	< 0.002	< 0.20	< 0.50	0.26	1.65	0.72	< 0.10
39-1-1	FR2	Y	2025-03-05	Clear and colourless	19.90	< 0.002	< 0.20	< 0.50	0.26	1.67	0.67	< 0.10
39-1-1	FRM	Y	2025-03-05	Mean of duplicates	19.35	< 0.002	< 0.20	< 0.50	0.26	1.66	0.70	< 0.10
39-1-1	RPD	Y	2025-03-05	RPD of duplicates	5.7%	0.0%	0.0%	0.0%	0.8%	1%	7.2%	0.0%
41-1-1	FR1	Y	2024-05-15	Clear and colourless	14.60	< 0.002	< 0.20	< 0.50	0.18	< 0.20	0.55	< 0.10
41-1-1	FR2	Y	2024-05-15	Clear and colourless	15.80	< 0.002	< 0.20	< 0.50	0.19	< 0.20	0.16	< 0.10
41-1-1	FRM	Y	2024-05-15	Mean of duplicates	15.20	< 0.002	< 0.20	< 0.50	0.18	< 0.20	0.36	< 0.10
41-1-1	RPD	Y	2024-05-15	RPD of duplicates	7.9%	0.0%	0.0%	0.0%	6.0%	0%	**109.9%** b	0.0%
41-1-1	FR1	Y	2024-09-13	Clear and colourless	16.50	0.002	< 0.20	< 0.50	0.23	0.21	0.49	< 0.10
41-1-1	FR2	Y	2024-09-13	Clear and colourless	16.00	0.002	< 0.20	< 0.50	0.23	0.20	0.22	< 0.10
41-1-1	FRM	Y	2024-09-13	Mean of duplicates	16.25	0.002	< 0.20	< 0.50	0.23	0.21	0.36	< 0.10
41-1-1	RPD	Y	2024-09-13	RPD of duplicates	3.1%	18.2%	0.0%	0.0%	0.9%	5%	**76.1%** b	0.0%
41-1-1	FR1	Y	2024-11-08	Clear and colourless	15.50	0.003	< 0.20	< 0.50	0.22	< 0.20	0.14	< 0.10
41-1-1	FR2	Y	2024-11-08	Clear and colourless	15.70	0.003	< 0.20	< 0.50	0.21	< 0.20	1.06	< 0.10
41-1-1	FRM	Y	2024-11-08	Mean of duplicates	15.60	0.003	< 0.20	< 0.50	0.21	< 0.20	0.60	< 0.10
41-1-1	RPD	Y	2024-11-08	RPD of duplicates	1.3%	3.5%	0.0%	0.0%	2.8%	0%	**153.3%** b	0.0%
41-1-1	FR1	Y	2025-02-12	Clear and colourless	14.20	< 0.002	< 0.20	< 0.50	0.20	< 0.20	0.43	< 0.10
41-1-1	FR2	Y	2025-02-12	Clear and colourless	13.70	< 0.002	< 0.20	< 0.50	0.19	< 0.20	0.23	< 0.10
41-1-1	FRM	Y	2025-02-12	Mean of duplicates	13.95	< 0.002	< 0.20	< 0.50	0.19	< 0.20	0.33	< 0.10
41-1-1	RPD	Y	2025-02-12	RPD of duplicates	3.6%	0.0%	0.0%	0.0%	4.2%	0%	**60.6%** b	0.0%
42-1-1	FR1	Y	2024-05-16	Clear and colourless	18.20	< 0.002	< 0.20	1.48	0.05	0.84	0.57	< 0.10
42-1-1	FR2	Y	2024-05-16	Clear and colourless	18.20	< 0.002	< 0.20	< 0.50	0.05	0.74	0.19	< 0.10
42-1-1	FRM	Y	2024-05-16	Mean of duplicates	18.20	< 0.002	< 0.20	0.99	0.05	0.79	0.38	< 0.10
42-1-1	RPD	Y	2024-05-16	RPD of duplicates	0.0%	0.0%	0.0%	**99.0%** b	1.1%	13%	**100.0%** b	0.0%
42-1-1	FR1	Y	2024-09-13	Clear and colourless	24.90	< 0.002	< 0.20	< 0.50	0.08	0.84	0.15	< 0.10
42-1-1	FR2	Y	2024-09-13	Clear and colourless	24.40	< 0.002	< 0.20	0.51	0.08	0.80	0.51	< 0.10
42-1-1	FRM	Y	2024-09-13	Mean of duplicates	24.65	< 0.002	< 0.20	0.51	0.08	0.82	0.33	< 0.10
42-1-1	RPD	Y	2024-09-13	RPD of duplicates	2.0%	0.0%	0.0%	2.0%	3.7%	5%	**109.1%** b	0.0%
42-1-1	FR1	Y	2024-11-08	Clear and colourless	23.10	< 0.002	< 0.20	< 0.50	0.06	0.79	0.16	< 0.10
42-1-1	FR2	Y	2024-11-08	Clear and colourless	24.60	< 0.002	< 0.20	< 0.50	0.06	0.86	0.13	0.11
42-1-1	FRM	Y	2024-11-08	Mean of duplicates	23.85	< 0.002	< 0.20	< 0.50	0.06	0.83	0.15	0.11
42-1-1	RPD	Y	2024-11-08	RPD of duplicates	6.3%	0.0%	0.0%	0.0%	1.1%	8%	20.7%	9.5%
42-1-1	FR1	Y	2025-02-14	Clear and colourless	22.20	< 0.002	< 0.20	< 0.50	0.05	0.79	0.25	< 0.10
42-1-1	FR2	Y	2025-02-14	Clear and colourless	21.90	< 0.002	< 0.20	< 0.50	0.05	0.70	0.27	< 0.10
42-1-1	FRM	Y	2025-02-14	Mean of duplicates	22.05	< 0.002	< 0.20	< 0.50	0.05	0.75	0.26	< 0.10
42-1-1	RPD	Y	2025-02-14	RPD of duplicates	1.4%	0.0%	0.0%	0.0%	4.3%	12%	7.7%	0.0%
71-1-1	FR1	Y	2024-05-22	Clear and colourless	7.00	0.006	< 0.20	< 0.50	0.23	0.31	0.51	< 0.10
71-1-1	FR2	Y	2024-05-22	Clear and colourless	6.00	0.005	< 0.20	< 0.50	0.25	0.33	0.47	< 0.10
71-1-1	FRM	Y	2024-05-22	Mean of duplicates	6.50	0.006	< 0.20	< 0.50	0.24	0.32	0.49	< 0.10
71-1-1	RPD	Y	2024-05-22	RPD of duplicates	15.4%	18.2%	0.0%	0.0%	10.0%	6%	8.2%	0.0%
71-1-1	FR1	Y	2024-09-10	Clear and colourless	7.10	0.007	< 0.20	< 0.50	0.24	0.29	0.36	< 0.10
71-1-1	FR2	Y	2024-09-10	Clear and colourless	8.30	0.006	< 0.20	< 0.50	0.25	0.28	2.59	< 0.10
71-1-1	FRM	Y	2024-09-10	Mean of duplicates	7.70	0.007	< 0.20	< 0.50	0.24	0.29	1.48	< 0.10
71-1-1	RPD	Y	2024-09-10	RPD of duplicates	15.6%	17.9%	0.0%	0.0%	6.6%	4%	**151.2%** b	0.0%
71-1-1	FR1	Y	2024-11-26	Clear and colourless	7.30	0.006	< 0.20	< 0.50	0.27	0.37	0.49	< 0.10
71-1-1	FR2	Y	2024-11-26	Clear and colourless	7.20	0.007	< 0.20	< 0.50	0.28	0.36	0.56	< 0.10
71-1-1	FRM	Y	2024-11-26	Mean of duplicates	7.25	0.007	< 0.20	< 0.50	0.28	0.37	0.53	< 0.10
71-1-1	RPD	Y	2024-11-26	RPD of duplicates	1.4%	12.3%	0.0%	0.0%	1.8%	3%	13.3%	0.0%
71-1-1	FR1	Y	2025-03-10	Clear and colourless	11.10	0.006	< 0.20	< 0.50	0.35	0.44	3.16	< 0.10
71-1-1	FR2	Y	2025-03-10	Clear and colourless	11.30	0.006	< 0.20	< 0.50	0.34	0.46	3.48	< 0.10
71-1-1	FRM	Y	2025-03-10	Mean of duplicates	11.20	0.006	< 0.20	< 0.50	0.34	0.45	3.32	< 0.10
71-1-1	RPD	Y	2025-03-10	RPD of duplicates	1.8%	3.4%	0.0%	0.0%	3.2%	4%	9.6%	0.0%
72-1-1	FR1	Y	2024-05-22	Clear and colourless	12.70	0.135	3.55	4.40	0.18	< 0.40	1.36	2.26
72-1-1	FR2	Y	2024-05-22	Clear and colourless	13.10	0.132	3.43	3.60	0.17	< 0.40	1.25	2.19
72-1-1	FRM	Y	2024-05-22	Mean of duplicates	12.90	0.134	3.49	4.00	0.17	< 0.40	1.31	2.23
72-1-1	RPD	Y	2024-05-22	RPD of duplicates	3.1%	2.2%	3.4%	20.0%	1.7%	0%	8.4%	3.1%

Notes:

FR1 *Field replicate 1*
FR2 *Field replicate 2*
FRM *Average of field replicates*
RPD *Relative percent difference of field replicates*
Bold *RPD greater than 30%*
a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*
b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

AECOM

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Alkalinity - Total - pH 4.5	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead
				Fraction	TOT	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	1	0.5	0.02	0.02	0.04	0.01	0.005	10	0.005	0.05	1	0.2	0.005	0.05	0.5	1	0.005
				Limit of Quantification (5x DL)	5	2.5	0.1	0.1	0.2	0.05	0.025	50	0.025	0.25	5	1	0.025	0.25	2.5	5	0.025
72-1-1	FR1	Y	2024-09-12	Clear and colourless	150.00	1.41	< 0.02	0.16	13.30	< 0.01	< 0.01	1610.00	< 0.01	84.70	67.00	0.55	0.04	< 0.05	266.00	386.00	< 0.01
72-1-1	FR2	Y	2024-09-12	Clear and colourless	150.00	1.63	< 0.02	0.16	14.40	< 0.01	< 0.01	1650.00	< 0.01	86.30	67.00	0.22	0.04	< 0.05	271.00	387.00	0.01
72-1-1	FRM	Y	2024-09-12	Mean of duplicates	150.00	1.52	< 0.02	0.16	13.85	< 0.01	< 0.01	1630.00	< 0.01	85.50	67.00	0.39	0.04	< 0.05	268.50	386.50	0.01
72-1-1	RPD	Y	2024-09-12	RPD of duplicates	0.0%	14.5%	0.0%	0.0%	7.9%	0.0%	0.0%	2.5%	0.0%	1.9%	0.0%	**85.7%** b	6.3%	0.0%	1.9%	0.3%	**51.9%** b
72-1-1	FR1	Y	2024-11-26	Clear and colourless	150.00	1.94	< 0.02	0.12	13.80	< 0.01	< 0.01	1610.00	< 0.01	92.50	65.00	< 0.10	0.03	0.07	291.00	424.00	< 0.01
72-1-1	FR2	Y	2024-11-26	Clear and colourless	150.00	1.77	< 0.02	0.12	13.50	< 0.01	< 0.01	1650.00	< 0.01	97.90	65.00	0.10	0.03	< 0.12	304.00	431.00	< 0.01
72-1-1	FRM	Y	2024-11-26	Mean of duplicates	150.00	1.86	< 0.02	0.12	13.65	< 0.01	< 0.01	1630.00	< 0.01	95.20	65.00	0.10	0.03	0.09	297.50	427.50	< 0.01
72-1-1	RPD	Y	2024-11-26	RPD of duplicates	0.0%	9.2%	0.0%	0.8%	2.2%	0.0%	0.0%	2.5%	0.0%	5.7%	0.0%	0.0%	3.2%	**51.6%** b	4.4%	1.6%	0.0%
72-1-1	FR1	Y	2025-03-05	Clear and colourless	150.00	1.60	< 0.02	0.12	11.90	< 0.01	< 0.01	1500.00	< 0.01	80.80	64.00	< 0.10	0.03	0.13	256.00	380.00	0.01
72-1-1	FR2	Y	2025-03-05	Clear and colourless	150.00	1.21	< 0.02	0.11	11.80	< 0.01	< 0.01	1480.00	< 0.01	83.60	64.00	< 0.10	0.03	0.06	263.00	375.00	< 0.01
72-1-1	FRM	Y	2025-03-05	Mean of duplicates	150.00	1.41	< 0.02	0.12	11.85	< 0.01	< 0.01	1490.00	< 0.01	82.20	64.00	< 0.10	0.03	0.09	259.50	377.50	0.01
72-1-1	RPD	Y	2025-03-05	RPD of duplicates	0.0%	27.8%	0.0%	3.5%	0.8%	0.0%	0.0%	1.3%	0.0%	3.4%	0.0%	0.0%	12.4%	**79.6%** b	2.7%	1.3%	3.9%
73-1-1	FR1	Y	2024-05-23	Clear and colourless	160.00	16.10	0.03	0.21	14.80	< 0.01	< 0.01	133.00	0.03	68.70	20.00	0.63	0.69	0.41	220.00	22.10	0.02
73-1-1	FR2	Y	2024-05-23	Clear and colourless	160.00	16.60	0.03	0.21	14.60	< 0.01	< 0.01	128.00	0.03	68.50	20.00	0.64	0.66	0.44	219.00	22.90	0.02
73-1-1	FRM	Y	2024-05-23	Mean of duplicates	160.00	16.35	0.03	0.21	14.70	< 0.01	< 0.01	130.50	0.03	68.60	20.00	0.64	0.67	0.43	219.50	22.50	0.02
73-1-1	RPD	Y	2024-05-23	RPD of duplicates	0.0%	3.1%	10.5%	3.8%	1.4%	0.0%	0.0%	3.8%	28.2%	0.3%	0.0%	1.6%	4.5%	8.9%	0.5%	3.6%	9.7%
73-1-1	FR1	Y	2024-09-10	Clear and colourless	160.00	1.62	0.03	0.19	16.20	< 0.01	< 0.01	134.00	0.03	66.10	21.00	0.11	0.54	0.20	213.00	4.20	< 0.01
73-1-1	FR2	Y	2024-09-10	Clear and colourless	160.00	1.15	0.03	0.20	15.90	< 0.01	< 0.01	130.00	0.02	67.30	21.00	0.11	0.54	0.22	216.00	4.00	< 0.01
73-1-1	FRM	Y	2024-09-10	Mean of duplicates	160.00	1.39	0.03	0.19	16.05	< 0.01	< 0.01	132.00	0.02	66.70	21.00	0.11	0.54	0.21	214.50	4.10	< 0.01
73-1-1	RPD	Y	2024-09-10	RPD of duplicates	0.0%	**33.9%** b	0.0%	4.7%	1.9%	0.0%	0.0%	3.0%	19.8%	1.8%	0.0%	0.0%	0.9%	12.9%	1.4%	4.9%	0.0%
73-1-1	FR1	Y	2024-11-28	Clear and colourless	160.00	4.44	0.03	0.22	14.50	< 0.01	< 0.01	127.00	0.02	67.00	24.00	0.12	0.56	0.21	217.00	34.30	0.03
73-1-1	FR2	Y	2024-11-28	Clear and colourless	160.00	5.04	0.04	0.22	14.50	< 0.01	< 0.01	127.00	0.01	69.80	24.00	0.12	0.56	0.19	225.00	14.60	0.02
73-1-1	FRM	Y	2024-11-28	Mean of duplicates	160.00	4.74	0.03	0.22	14.50	< 0.01	< 0.01	127.00	0.01	68.40	24.00	0.12	0.56	0.20	221.00	24.45	0.02
73-1-1	RPD	Y	2024-11-28	RPD of duplicates	0.0%	12.7%	36.4%	0.5%	0.0%	0.0%	0.0%	0.0%	37.0%	4.1%	0.0%	0.0%	0.7%	11.6%	3.6%	80.6%	40.0%
73-1-1	FR1	Y	2025-03-03	Clear and colourless	160.00	1.69	0.09	0.24	14.40	< 0.01	< 0.01	116.00	0.02	71.40	21.00	< 0.10	0.16	0.20	227.00	4.40	0.01
73-1-1	FR2	Y	2025-03-03	Clear and colourless	160.00	1.99	0.08	0.25	14.40	< 0.01	< 0.01	108.00	0.02	68.90	22.00	< 0.10	0.16	0.43	220.00	5.40	0.02
73-1-1	FRM	Y	2025-03-03	Mean of duplicates	160.00	1.84	0.08	0.25	14.40	< 0.01	< 0.01	112.00	0.02	70.15	21.50	< 0.10	0.16	0.31	223.50	4.90	0.01
73-1-1	RPD	Y	2025-03-03	RPD of duplicates	0.0%	16.3%	8.6%	4.4%	0.0%	0.0%	0.0%	7.1%	0.0%	3.6%	4.7%	0.0%	0.0%	**70.7%** b	3.1%	20.4%	**79.0%** b
73-3-1	FR1	Y	2024-05-23	Clear and colourless	160.00	16.10	0.03	0.21	14.80	< 0.01	< 0.01	133.00	0.03	68.70	20.00	0.63	0.69	0.41	220.00	22.10	0.02
73-3-1	FR2	Y	2024-05-23	Clear and colourless	160.00	16.60	0.03	0.21	14.60	< 0.01	< 0.01	128.00	0.03	68.50	20.00	0.64	0.66	0.44	219.00	22.90	0.02
73-3-1	FRM	Y	2023-05-23	Mean of duplicates	160.00	16.35	0.03	0.21	14.70	< 0.01	< 0.01	130.50	0.03	68.60	20.00	0.64	0.67	0.43	219.50	22.50	0.02
73-3-1	RPD	Y	2023-05-23	RPD of duplicates	0.0%	3.1%	10.5%	3.8%	1.4%	0.0%	0.0%	3.8%	28.2%	0.3%	0.0%	1.6%	4.5%	8.9%	0.5%	3.6%	9.7%
73-3-1	FR1	Y	2024-09-10	Clear and colourless	160.00	1.62	0.03	0.19	16.20	< 0.01	< 0.01	134.00	0.03	66.10	21.00	0.11	0.54	0.20	213.00	4.20	< 0.01
73-3-1	FR2	Y	2024-09-10	Clear and colourless	160.00	1.15	0.03	0.20	15.90	< 0.01	< 0.01	130.00	0.02	67.30	21.00	0.11	0.54	0.22	216.00	4.00	< 0.01
73-3-1	FRM	Y	2023-09-10	Mean of duplicates	160.00	1.39	0.03	0.19	16.05	< 0.01	< 0.01	132.00	0.02	66.70	21.00	0.11	0.54	0.21	214.50	4.10	< 0.01
73-3-1	RPD	Y	2023-09-10	RPD of duplicates	0.0%	**33.9%** b	0.0%	4.7%	1.9%	0.0%	0.0%	3.0%	19.8%	1.8%	0.0%	0.0%	0.9%	12.9%	1.4%	4.9%	0.0%
73-3-1	FR1	Y	2024-11-28	Clear and colourless	160.00	4.44	0.03	0.22	14.50	< 0.01	< 0.01	127.00	0.02	67.00	24.00	0.12	0.56	0.21	217.00	34.30	0.03
73-3-1	FR2	Y	2024-11-28	Clear and colourless	160.00	5.04	0.04	0.22	14.50	< 0.01	< 0.01	127.00	0.01	69.80	24.00	0.12	0.56	0.19	225.00	14.60	0.02
73-3-1	FRM	Y	2023-11-28	Mean of duplicates	160.00	4.74	0.03	0.22	14.50	< 0.01	< 0.01	127.00	0.01	68.40	24.00	0.12	0.56	0.20	221.00	24.45	0.02
73-3-1	RPD	Y	2023-11-28	RPD of duplicates	0.0%	12.7%	**36.4%** b	0.5%	0.0%	0.0%	0.0%	0.0%	**37.0%** b	4.1%	0.0%	0.0%	0.7%	11.6%	3.6%	**80.6%** a	**40.0%** b
73-3-1	FR1	Y	2025-03-03	Clear and colourless	160.00	1.69	0.09	0.24	14.40	< 0.01	< 0.01	116.00	0.02	71.40	21.00	< 0.10	0.16	0.20	227.00	4.40	0.01
73-3-1	FR2	Y	2025-03-03	Clear and colourless	160.00	1.99	0.08	0.25	14.40	< 0.01	< 0.01	108.00	0.02	68.90	22.00	< 0.10	0.16	0.43	220.00	5.40	0.02
73-3-1	FRM	Y	2025-03-03	Mean of duplicates	160.00	1.84	0.08	0.25	14.40	< 0.01	< 0.01	112.00	0.02	70.15	21.50	< 0.10	0.16	0.31	223.50	4.90	0.01
73-3-1	RPD	Y	2025-03-03	RPD of duplicates	0.0%	16.3%	8.6%	4.4%	0.0%	0.0%	0.0%	7.1%	0.0%	3.6%	4.7%	0.0%	0.0%	**70.7%** b	3.1%	20.4%	**79.0%** b
95-1-1	FR1	N	2024-05-15	Slightly turbid, very slightly grey	210.00	3.17	0.64	0.49	10.00	< 0.01	< 0.01	313.00	0.03	132.00	9.50	< 0.10	0.49	0.54	372.00	6.20	< 0.01
95-1-1	FR2	N	2024-05-15	Slightly turbid, very slightly grey	210.00	2.13	0.63	0.47	9.86	< 0.01	< 0.01	316.00	0.02	133.00	9.70	< 0.10	0.48	0.52	373.00	4.10	< 0.01
95-1-1	FRM	N	2024-05-15	Mean of duplicates	210.00	2.65	0.64	0.48	9.93	< 0.01	< 0.01	314.50	0.03	132.50	9.60	< 0.10	0.49	0.53	372.50	5.15	< 0.01
95-1-1	RPD	N	2024-05-15	RPD of duplicates	0.0%	**39.2%** b	1.3%	2.7%	1.4%	0.0%	0.0%	1.0%	16.9%	0.8%	2.1%	0.0%	2.7%	4.9%	0.3%	**40.8%** b	0.0%
95-1-1	FR1	N	2024-09-24	Slightly turbid, slightly grey	200.00	1.86	0.16	0.15	10.70	< 0.01	< 0.01	367.00	0.03	163.00	6.50	< 0.10	0.29	0.80	461.00	4.40	< 0.01
95-1-1	FR2	N	2024-09-24	Slightly turbid, slightly grey	200.00	2.66	0.16	0.15	12.00	< 0.01	< 0.01	369.00	0.03	163.00	6.50	< 0.10	0.30	0.82	461.00	5.10	< 0.01
95-1-1	FRM	N	2024-09-24	Mean of duplicates	200.00	2.26	0.16	0.15	11.35	< 0.01	< 0.01	368.00	0.03	163.00	6.50	< 0.10	0.29	0.81	461.00	4.75	< 0.01
95-1-1	RPD	N	2024-09-24	RPD of duplicates	0.0%	**35.4%** b	2.5%	1.3%	11.5%	0.0%	0.0%	0.5%	5.2%	0.0%	0.0%	0.0%	4.4%	2.5%	0.0%	14.7%	0.0%
95-1-1	FR1	N	2024-11-14	Very turbid, moderately grey	140.00	1.74	0.17	0.23	6.93	< 0.01	< 0.01	265.00	0.02	138.00	8.70	< 0.10	0.36	0.80	396.00	4.40	0.01
95-1-1	FR2	N	2024-11-14	Very turbid, moderately grey	140.00	2.84	0.17	0.27	7.63	< 0.01	< 0.01	241.00	0.02	131.00	8.70	0.10	0.36	0.80	380.00	4.80	0.01
95-1-1	FRM	N	2024-11-14	Mean of duplicates	140.00	2.29	0.17	0.25	7.28	< 0.01	< 0.01	253.00	0.02	134.50	8.70	0.10	0.36	0.80	388.00	4.60	0.01
95-1-1	RPD	N	2024-11-14	RPD of duplicates	0.0%	**48.0%** b	0.6%	15.0%	9.6%	0.0%	0.0%	9.5%	4.9%	5.2%	0.0%	0.0%	0.3%	0.9%	4.1%	8.7%	**33.3%** b
95-1-1	FR1	N	2025-03-13	Turbid, slightly grey	140.00	3.25	0.11	0.12	8.12	< 0.01	< 0.01	292.00	0.02	206.00	24.00	< 0.10	0.42	0.88	592.00	38.00	< 0.01
95-1-1	FR2	N	2025-03-13	Turbid, slightly grey	140.00	4.86	0.11	0.13	8.35	< 0.01	< 0.01	302.00	0.02	205.00	24.00	< 0.10	0.42	0.86	590.00	44.30	< 0.01
95-1-1	FRM	N	2025-03-13	Mean of duplicates	140.00	4.06	0.11	0.13	8.24	< 0.01	< 0.01	297.00	0.02	205.50	24.00	< 0.10	0.42	0.87	591.00	41.15	< 0.01
95-1-1	RPD	N	4572900%	RPD of duplicates	0%	**40%** a	4%	6%	3%	0%	0%	3%	1%	0%	0%	0%	1%	2%	0%	15%	0%
104-1-1	FR1	N	2024-05-23	Moderatley turbid, moderately yellow	180.00	27.30	0.19	0.20	7.64	< 0.01	< 0.01	101.00	0.10	127.00	68.00	0.36	37.30	58.20	391.00	114.00	0.02
104-1-1	FR2	N	2024-05-23	Moderatley turbid, moderately yellow	190.00	27.60	0.20	0.20	7.78	< 0.01	< 0.01	103.00	0.11	141.00	66.00	0.42	37.10	58.50	424.00	124.00	0.01
104-1-1	FRM	N	2024-05-23	Mean of duplicates	185.00	27.45	0.19	0.20	7.71	< 0.01	< 0.01	102.00	0.10	134.00	67.00	0.39	37.20	58.35	407.50	119.00	0.02
104-1-1	RPD	N	2024-05-23	RPD of duplicates	5.4%	1.1%	4.1%	0.5%	1.8%	0.0%	0.0%	2.0%	3.8%	10.4%	3.0%	15.4%	0.5%	0.5%	8.1%	8.4%	23.4%
109-1-1	FR1	N	2024-05-24	Very slightly turbid, very slightly grey	140.00	3.49	0.31	6.47	6.65	< 0.01	< 0.01	225.00	< 0.01	10.10	6.90	< 0.10	0.02	0.08	40.80	1.70	0.03
109-1-1	FR2	N	2024-05-24	Very slightly turbid, very slightly grey	150.00	4.46	0.29	6.56	6.46	< 0.01	< 0.01	214.00	< 0.01	10.50	6.80	< 0.10	0.02	0.08	42.80	2.40	0.03
109-1-1	FRM	N	2024-05-24	Mean of duplicates	145.00	3.98	0.30	6.52	6.56	< 0.01	< 0.01	219.50	< 0.01	10.30	6.85	< 0.10	0.02	0.08	41.80	2.05	0.03
109-1-1	RPD	N	4543600%	RPD of duplicates	7%	24%	4%	1%	3%	0%	0%	5%	0%	4%	1%	0%	3%	8%	5%	**34%** b	10%
109-1-1	FR1	N	2024-12-06	Very slightly turbid, slightly grey	160.00	38.30	0.31	7.61	3.64	< 0.01	0.01	230.00	< 0.01	4.88	12.00	< 0.10	0.03	0.09	21.40	20.10	0.06
109-1-1	FR2	N	2024-12-06	Very slightly turbid, slightly grey	160.00	42.40	0.32	7.33	3.60	< 0.01	0.01	233.00	< 0.01	4.74	12.00	< 0.10	0.03	0.09	20.60	21.70	0.04
109-1-1	FRM	N	2024-12-06	Mean of duplicates	160.00	40.35	0.31	7.47	3.62	< 0.01	0.01	231.50	< 0.01	4.81	12.00	< 0.10	0.03	0.09	21.00	20.90	0.05
109-1-1	RPD	N	2024-12-06	RPD of duplicates	0.0%	10.2%	2.6%	3.7%	1.1%	0.0%	2.9%	1.3%	0.0%	2.9%	0.0%	0.0%	5.6%	1.1%	3.8%	7.7%	20.8%
109-1-1	FR1	N	2025-03-13	Moderately turbid, slightly grey	170.00	10.50	0.26	7.15	1.86	< 0.01	< 0.01	225.00	< 0.01	2.71	13.00	< 0.10	0.02	0.26	11.10	8.40	0.03
109-1-1	FR2	N	2025-03-13	Moderately turbid, slightly grey	170.00	13.30	0.38	7.04	2.12	< 0.01	< 0.01	227.00	0.04	3.04	13.00	< 0.10	0.03	0.50	12.00	10.50	0.06
109-1-1	FRM	N	2025-03-13	Mean of duplicates	170.00	11.90	0.32	7.10	1.99	< 0.01	< 0.01	226.00	0.02	2.88	13.00	< 0.10	0.03	0.38	11.55	9.45	0.04
109-1-1	RPD	N	2025-03-13	RPD of duplicates	0.0%	23.5%	**39.7%** a	1.6%	13.1%	0.0%	0.0%	0.9%	**158.7%** b	11.5%	0.0%	0.0%	**37.1%** b	**63.3%** a	7.8%	22.2%	**54.5%** a
111-1-1	FR1	Y	2024-11-13	Clear and colourless	150.00	3.13	0.36	0.22	26.40	< 0.01	< 0.01	14.00	0.01	86.50	7.60	< 0.10	0.09	0.13	242.00	3.70	0.01
111-1-1	FR2	Y	2024-11-13	Clear and colourless	150.00	2.42	0.80	0.20	26.20	< 0.01	< 0.01	13.00	0.01	86.30	7.70	< 0.10	0.09	0.13	242.00	1.30	0.01
111-1-1	FRM	Y	2024-11-13	Mean of duplicates	150.00	2.78	0.58	0.21	26.30	< 0.01	< 0.01	13.50	0.01	86.40	7.65	< 0.10	0.09	0.13	242.00	2.50	0.01
111-1-1	RPD	Y	2024-11-13	RPD of duplicates	0.0%	25.6%	**76.2%** a	10.3%	0.8%	0.0%	0.0%	7.4%	**52.6%** b	0.2%	1.3%	0.0%	0.0%	4.6%	0.0%	**96.0%** b	**46.2%** b

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a - *Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b - *Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

AECOM

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Lithium	Magnesium	Manganese	Molybdenum	Ammonia	Nitrite	Nitrate	Nitrite + Nitrate	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Sulphate
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	0.5	0.05	0.05	0.05	0.015	0.005	0.02	0.02	0.02	2	0.05	0.04	100	0.005	0.05	0.05	1
				Limit of Quantification (5x DL)	2.5	0.25	0.25	0.25	0.075	0.025	0.1	0.1	0.1	10	0.25	0.2	500	0.025	0.25	0.25	5
72-1-1	FR1	Y	2024-09-12	Clear and colourless	< 0.50	13.20	115.0	0.74	< 0.02	< 0.01	< 0.02	< 0.02	1.58	9.10	0.24	< 0.04	19300	< 0.01	8.55	304	46
72-1-1	FR2	Y	2024-09-12	Clear and colourless	< 0.50	13.40	117.0	0.75	0.02	< 0.01	< 0.02	< 0.02	1.68	10.10	0.25	< 0.04	19500	< 0.01	8.70	311	46
72-1-1	FRM	Y	2024-09-12	Mean of duplicates	< 0.50	13.30	116.0	0.75	0.02	< 0.01	< 0.02	< 0.02	1.63	9.60	0.24	< 0.04	19400	< 0.01	8.63	308	46
72-1-1	RPD	Y	2024-09-12	RPD of duplicates	0.0%	2%	1.7%	0.5%	0.0%	0.0%	0.0%	0.0%	6.1%	10.4%	2.9%	0.0%	1.0%	0.0%	1.7%	2.3%	0.0%
72-1-1	FR1	Y	2024-11-26	Clear and colourless	< 0.50	14.60	127.0	0.74	< 0.02	< 0.01	< 0.02	< 0.02	1.68	7.90	0.26	< 0.04	18800	< 0.01	9.32	298	44
72-1-1	FR2	Y	2024-11-26	Clear and colourless	< 0.50	14.50	126.0	0.74	0.02	< 0.01	0.04	0.04	1.63	7.70	0.26	< 0.04	19900	< 0.01	9.09	297	44
72-1-1	FRM	Y	2024-11-26	Mean of duplicates	< 0.50	14.55	126.5	0.74	0.02	< 0.01	0.03	0.03	1.66	7.80	0.26	< 0.04	19350	< 0.01	9.21	298	44
72-1-1	RPD	Y	2024-11-26	RPD of duplicates	0.0%	0.69%	0.8%	0.1%	6.5%	0.0%	**66.7%** b	**66.7%** b	3.0%	2.6%	1.2%	0.0%	5.7%	0.0%	2.5%	0.3%	0.0%
72-1-1	FR1	Y	2025-03-05	Clear and colourless	< 0.50	13.10	111.0	0.67	0.03	< 0.01	< 0.02	< 0.02	1.46	6.10	0.23	0.09	17900	< 0.01	8.67	295	49
72-1-1	FR2	Y	2025-03-05	Clear and colourless	< 0.50	13.20	110.0	0.67	0.04	< 0.01	< 0.02	< 0.02	1.56	5.80	0.23	< 0.04	18600	< 0.01	8.54	291	50
72-1-1	FRM	Y	2025-03-05	Mean of duplicates	< 0.50	13.15	110.5	0.67	0.03	< 0.01	< 0.02	< 0.02	1.51	5.95	0.23	0.06	18250	< 0.01	8.61	293	50
72-1-1	RPD	Y	2025-03-05	RPD of duplicates	0.0%	0.76%	0.9%	0.9%	**35.3%** b	0.0%	0.0%	0.0%	6.6%	5.0%	0.4%	**73.0%** b	3.8%	0.0%	1.5%	1.4%	2.0%
73-1-1	FR1	Y	2024-05-23	Clear and colourless	< 0.50	11.70	74.8	1.26	< 0.02	< 0.01	0.16	0.16	2.60	13.20	0.44	< 0.04	9450	0.01	6.63	219	43
73-1-1	FR2	Y	2024-05-23	Clear and colourless	< 0.50	11.60	75.7	1.25	< 0.02	< 0.01	0.16	0.16	2.49	11.90	0.44	< 0.04	9560	< 0.01	6.58	218	43
73-1-1	FRM	Y	2024-05-23	Mean of duplicates	< 0.50	11.65	75.3	1.26	< 0.02	< 0.01	0.16	0.16	2.55	12.55	0.44	< 0.04	9505	0.01	6.61	219	43
73-1-1	RPD	Y	2024-05-23	RPD of duplicates	0.0%	0.86%	1.2%	0.8%	0.0%	0.0%	0.0%	0.0%	4.3%	10.4%	0.5%	0.0%	1.2%	**31.9%** b	0.8%	0.5%	0.0%
73-1-1	FR1	Y	2024-09-10	Clear and colourless	< 0.50	11.60	193.0	1.05	< 0.02	< 0.01	< 0.02	< 0.02	1.23	14.90	0.48	< 0.04	9410	< 0.01	6.52	215	45
73-1-1	FR2	Y	2024-09-10	Clear and colourless	< 0.50	11.70	195.0	1.07	< 0.02	< 0.01	< 0.02	< 0.02	1.29	14.90	0.49	< 0.04	9400	< 0.01	6.56	212	45
73-1-1	FRM	Y	2024-09-10	Mean of duplicates	< 0.50	11.65	194.0	1.06	< 0.02	< 0.01	< 0.02	< 0.02	1.26	14.90	0.49	< 0.04	9405	< 0.01	6.54	214	45
73-1-1	RPD	Y	2024-09-10	RPD of duplicates	0.0%	0.86%	1.0%	1.9%	0.0%	0.0%	0.0%	0.0%	4.8%	0.0%	1.8%	0.0%	0.1%	0.0%	0.6%	1.4%	0.0%
73-1-1	FR1	Y	2024-11-28	Clear and colourless	< 0.50	12.10	206.0	1.11	< 0.02	< 0.01	0.08	0.08	1.64	13.60	0.49	< 0.04	9670	< 0.01	6.82	199	50
73-1-1	FR2	Y	2024-11-28	Clear and colourless	< 0.50	12.30	206.0	1.13	< 0.02	< 0.01	0.08	0.08	1.63	15.00	0.51	< 0.04	9930	< 0.01	6.76	201	51
73-1-1	FRM	Y	2024-11-28	Mean of duplicates	< 0.50	12.20	206.0	1.12	< 0.02	< 0.01	0.08	0.08	1.64	14.30	0.50	< 0.04	9800	< 0.01	6.79	200	51
73-1-1	RPD	Y	2024-11-28	RPD of duplicates	0.0%	1.64%	0.0%	1.8%	0.0%	0.0%	7.4%	7.4%	0.6%	9.8%	3.2%	0.0%	2.7%	0.0%	0.9%	1.0%	2.0%
73-1-1	FR1	Y	2025-03-03	Clear and colourless	< 0.50	11.90	82.60	1.01	< 0.02	< 0.01	0.09	0.09	1.19	13.70	0.51	< 0.04	9320	< 0.01	6.14	221	46
73-1-1	FR2	Y	2025-03-03	Clear and colourless	< 0.50	11.70	83.10	0.99	< 0.02	< 0.01	0.10	0.10	1.09	14.20	0.50	< 0.04	9140	< 0.01	6.04	218	46
73-1-1	FRM	Y	2025-03-03	Mean of duplicates	< 0.50	11.80	82.85	1.00	< 0.02	< 0.01	0.09	0.09	1.14	13.95	0.50	< 0.04	9230	< 0.01	6.09	220	46
73-1-1	RPD	Y	2025-03-03	RPD of duplicates	0.0%	1.69%	0.6%	2.5%	0.0%	0.0%	4.3%	4.3%	8.8%	3.6%	2.4%	0.0%	2.0%	0.0%	1.6%	1.4%	0.0%
73-3-1	FR1	Y	2024-05-23	Clear and colourless	< 0.50	11.70	74.80	1.26	< 0.02	< 0.01	0.16	0.16	2.60	13.20	0.44	< 0.04	9450	0.01	6.63	219	43
73-3-1	FR2	Y	2024-05-23	Clear and colourless	< 0.50	11.60	75.70	1.25	< 0.02	< 0.01	0.16	0.16	2.49	11.90	0.44	< 0.04	9560	< 0.01	6.58	218	43
73-3-1	FRM	Y	2023-05-23	Mean of duplicates	< 0.50	11.65	75.25	1.26	< 0.02	< 0.01	0.16	0.16	2.55	12.55	0.44	< 0.04	9505	0.01	6.61	219	43
73-3-1	RPD	Y	2023-05-23	RPD of duplicates	0.0%	0.86%	1.2%	0.8%	0.0%	0.0%	0.0%	0.0%	4.3%	10.4%	0.5%	0.0%	1.2%	**31.9%** b	0.8%	0.5%	0.0%
73-3-1	FR1	Y	2024-09-10	Clear and colourless	< 0.50	11.60	193.00	1.05	< 0.02	< 0.01	< 0.02	< 0.02	1.23	14.90	0.48	< 0.04	9410	< 0.01	6.52	215	45
73-3-1	FR2	Y	2024-09-10	Clear and colourless	< 0.50	11.70	195.00	1.07	< 0.02	< 0.01	< 0.02	< 0.02	1.29	14.90	0.49	< 0.04	9400	< 0.01	6.56	212	45
73-3-1	FRM	Y	2023-09-10	Mean of duplicates	< 0.50	11.65	194.00	1.06	< 0.02	< 0.01	< 0.02	< 0.02	1.26	14.90	0.49	< 0.04	9405	< 0.01	6.54	214	45
73-3-1	RPD	Y	2023-09-10	RPD of duplicates	0.0%	1%	1.0%	1.9%	0.0%	0.0%	0.0%	0.0%	4.8%	0.0%	1.8%	0.0%	0.1%	0.0%	0.6%	1.4%	0.0%
73-3-1	FR1	Y	2024-11-28	Clear and colourless	< 0.50	12.10	206.00	1.11	< 0.02	< 0.01	0.08	0.08	1.64	13.60	0.49	< 0.04	9670	< 0.01	6.82	199	50
73-3-1	FR2	Y	2024-11-28	Clear and colourless	< 0.50	12.30	206.00	1.13	< 0.02	< 0.01	0.08	0.08	1.63	15.00	0.51	< 0.04	9930	< 0.01	6.76	201	51
73-3-1	FRM	Y	2023-11-28	Mean of duplicates	< 0.50	12.20	206.00	1.12	< 0.02	< 0.01	0.08	0.08	1.64	14.30	0.50	< 0.04	9800	< 0.01	6.79	200	51
73-3-1	RPD	Y	2023-11-28	RPD of duplicates	0.0%	1.64%	0.0%	1.8%	0.0%	0.0%	7.4%	7.4%	0.6%	9.8%	3.2%	0.0%	2.7%	0.0%	0.9%	1.0%	2.0%
73-3-1	FR1	Y	2025-03-03	Clear and colourless	< 0.50	11.90	82.60	1.01	< 0.02	< 0.01	0.09	0.09	1.19	13.70	0.51	< 0.04	9320	< 0.01	6.14	221	46
73-3-1	FR2	Y	2025-03-03	Clear and colourless	< 0.50	11.70	83.10	0.99	< 0.02	< 0.01	0.10	0.10	1.09	14.20	0.50	< 0.04	9140	< 0.01	6.04	218	46
73-3-1	FRM	Y	2025-03-03	Mean of duplicates	< 0.50	11.80	82.85	1.00	< 0.02	< 0.01	0.09	0.09	1.14	13.95	0.50	< 0.04	9230	< 0.01	6.09	220	46
73-3-1	RPD	Y	2025-03-03	RPD of duplicates	0.0%	1.69%	0.6%	2.5%	0.0%	0.0%	4.3%	4.3%	8.8%	3.6%	2.4%	0.0%	2.0%	0.0%	1.6%	1.4%	0.0%
95-1-1	FR1	N	2024-05-15	Slightly turbid, very slightly grey	< 0.50	10.40	25.70	10.30	< 0.02	< 0.01	1.68	1.68	2.29	5.30	0.40	0.09	6110	< 0.01	6.79	288	180
95-1-1	FR2	N	2024-05-15	Slightly turbid, very slightly grey	< 0.50	9.93	25.10	10.30	< 0.02	< 0.01	1.69	1.69	2.26	5.20	0.39	0.10	6210	< 0.01	6.55	288	180
95-1-1	FRM	N	2024-05-15	Mean of duplicates	< 0.50	10.17	25.40	10.30	< 0.02	< 0.01	1.69	1.69	2.28	5.25	0.39	0.09	6160	< 0.01	6.67	288	180
95-1-1	RPD	N	2024-05-15	RPD of duplicates	0.0%	4.62%	2.4%	0.0%	0.0%	0.0%	0.6%	0.6%	1.3%	1.9%	1.8%	4.3%	1.6%	0.0%	3.6%	0.0%	0.0%
95-1-1	FR1	N	2024-09-24	Slightly turbid, slightly grey	< 0.50	13.00	32.90	1.69	< 0.02	0.01	8.64	8.65	1.69	2.40	0.43	0.24	8030	< 0.01	6.84	360	250
95-1-1	FR2	N	2024-09-24	Slightly turbid, slightly grey	< 0.50	13.30	33.10	1.67	0.02	0.01	8.77	8.78	< 2.00	2.00	0.43	0.22	7920	< 0.01	6.94	357	250
95-1-1	FRM	N	2024-09-24	Mean of duplicates	< 0.50	13.15	33.00	1.68	0.02	0.01	8.71	8.72	1.70	2.20	0.43	0.23	7975	< 0.01	6.89	359	250
95-1-1	RPD	N	2024-09-24	RPD of duplicates	0.0%	2%	0.6%	1.2%	**37.8%** b	4.9%	1.5%	1.5%	0.6%	18.2%	1.4%	6.1%	1.4%	0.0%	1.5%	0.8%	0.0%
95-1-1	FR1	N	2024-11-14	Very turbid, moderately grey	< 0.50	12.20	6.56	1.07	< 0.02	< 0.01	11.00	11.00	1.59	2.00	0.28	0.46	8870	< 0.01	6.83	304	220
95-1-1	FR2	N	2024-11-14	Very turbid, moderately grey	< 0.50	12.60	6.48	1.20	< 0.02	< 0.01	11.00	11.00	1.55	< 2.00	0.28	0.46	7320	< 0.01	7.13	306	220
95-1-1	FRM	N	2024-11-14	Mean of duplicates	< 0.50	12.40	6.52	1.14	< 0.02	< 0.01	11.00	11.00	1.57	2.00	0.28	0.46	8095	< 0.01	6.98	305	220
95-1-1	RPD	N	2024-11-14	RPD of duplicates	0.0%	3.23%	1.2%	11.5%	0.0%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	1.3%	19.1%	0.0%	4.3%	0.7%	0.0%
95-1-1	FR1	N	2025-03-13	Turbid, slightly grey	< 0.50	19.00	8.89	0.52	0.08	< 0.01	5.68	5.68	1.80	2.30	0.31	0.39	7520	< 0.01	7.72	491	410
95-1-1	FR2	N	2025-03-13	Turbid, slightly grey	< 0.50	19.20	9.01	0.55	0.08	< 0.01	5.64	5.64	1.80	2.80	0.31	0.39	7760	< 0.01	7.99	490	410
95-1-1	FRM	N	2025-03-13	Mean of duplicates	< 0.50	19.10	8.95	0.54	0.08	< 0.01	5.66	5.66	1.80	2.55	0.31	0.39	7640	< 0.01	7.86	491	410
95-1-1	RPD	N	4572900%	RPD of duplicates	0%	1%	1%	5%	8%	0%	1%	1%	0%	20%	1%	1%	3%	0%	3%	0%	0%
104-1-1	FR1	N	2024-05-23	Moderatley turbid, moderately yellow	< 0.50	17.7	3030.0	7.13	0.15	< 0.01	3.95	3.95	6.80	12.90	0.65	0.26	6880	0.02	35.00	380	200
104-1-1	FR2	N	2024-05-23	Moderatley turbid, moderately yellow	< 0.50	17.7	3020.0	7.18	0.15	< 0.01	3.94	3.94	6.77	10.90	0.64	0.25	7490	0.03	35.00	381	200
104-1-1	FRM	N	2024-05-23	Mean of duplicates	< 0.50	17.7	3025.0	7.16	0.15	< 0.01	3.95	3.95	6.79	11.90	0.64	0.25	7185	0.02	35.00	381	200
104-1-1	RPD	N	2024-05-23	RPD of duplicates	0.0%	0.00%	0.3%	0.7%	0.0%	0.0%	0.3%	0.3%	0.4%	16.8%	0.2%	5.9%	8.5%	**34.6%** b	0.0%	0.3%	0.0%
109-1-1	FR1	N	2024-05-24	Very slightly turbid, very slightly grey	5.48	3.78	8.07	35.10	0.30	< 0.01	< 0.02	< 0.02	0.17	23.00	0.92	0.09	14800	< 0.01	78.10	149	61
109-1-1	FR2	N	2024-05-24	Very slightly turbid, very slightly grey	5.33	3.99	8.14	32.40	0.30	< 0.01	< 0.02	< 0.02	0.20	22.40	0.94	0.08	16100	< 0.01	78.90	153	59
109-1-1	FRM	N	2024-05-24	Mean of duplicates	5.41	3.89	8.11	33.75	0.30	< 0.01	< 0.02	< 0.02	0.19	22.70	0.93	0.08	15450	< 0.01	78.50	151	60
109-1-1	RPD	N	4543600%	RPD of duplicates	3%	5%	1%	8%	0%	0%	0%	0%	14%	3%	3%	12%	8%	0%	1%	3%	3%
109-1-1	FR1	N	2024-12-06	Very slightly turbid, slightly grey	6.09	2.23	5.68	20.20	0.27	< 0.01	< 0.02	< 0.02	0.45	25.70	1.01	0.10	13700	< 0.01	105.00	82	73
109-1-1	FR2	N	2024-12-06	Very slightly turbid, slightly grey	6.14	2.12	5.50	19.60	0.26	< 0.01	0.09	0.09	0.45	25.90	0.98	0.09	13500	< 0.01	102.00	79	73
109-1-1	FRM	N	2024-12-06	Mean of duplicates	6.12	2.18	5.59	19.90	0.27	< 0.01	0.06	0.06	0.45	25.80	0.99	0.09	13600	< 0.01	103.50	81	73
109-1-1	RPD	N	2024-12-06	RPD of duplicates	0.8%	5.06%	3.2%	3.0%	3.8%	0.0%	**129.8%** b	**129.8%** b	1.1%	0.8%	3.4%	3.2%	1.5%	0.0%	2.9%	3.3%	0.0%
109-1-1	FR1	N	2025-03-13	Moderately turbid, slightly grey	7.22	1.06	2.96	16.10	0.29	< 0.01	< 0.02	< 0.02	0.44	27.20	0.91	0.09	12100	< 0.01	105.00	41	81
109-1-1	FR2	N	2025-03-13	Moderately turbid, slightly grey	7.39	1.08	3.40	16.10	0.29	< 0.01	< 0.02	< 0.02	0.66	25.70	0.90	0.09	11800	< 0.01	104.00	43	79
109-1-1	FRM	N	2025-03-13	Mean of duplicates	7.31	1.07	3.18	16.10	0.29	< 0.01	< 0.02	< 0.02	0.55	26.45	0.91	0.09	11950	< 0.01	104.50	42	80
109-1-1	RPD	N	2025-03-13	RPD of duplicates	2.3%	1.87%	13.8%	0.0%	0.0%	0.0%	0.0%	0.0%	**40.5%** a	5.7%	0.7%	0.0%	2.5%	0.0%	1.0%	5.0%	2.5%
111-1-1	FR1	Y	2024-11-13	Clear and colourless	< 0.50	6.31	18.90	0.38	0.02	0.16	13.80	13.90	0.23	2.80	0.67	0.20	5560	< 0.01	4.82	168	52
111-1-1	FR2	Y	2024-11-13	Clear and colourless	< 0.50	6.43	18.90	0.35	< 0.02	0.16	13.90	14.00	0.21	4.00	0.63	0.22	5550	< 0.01	4.69	166	51
111-1-1	FRM	Y	2024-11-13	Mean of duplicates	< 0.50	6.37	18.90	0.36	0.02	0.16	13.85	13.95	0.22	3.40	0.65	0.21	5555	< 0.01	4.76	167	52
111-1-1	RPD	Y	2024-11-13	RPD of duplicates	0.0%	1.88%	0.0%	9.6%	18.2%	0.0%	0.7%	0.7%	10.4%	**35.3%** b	5.4%	7.2%	0.2%	0.0%	2.7%	1.2%	1.9%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a - *Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b - *Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-1 Groundwater Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Sulfur	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Zirconium
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	3	0.002	0.2	0.5	0.002	0.2	0.1	0.1
				Limit of Quantification (5x DL)	15	0.01	1	2.5	0.01	1	0.5	0.5
72-1-1	FR1	Y	2024-09-12	Clear and colourless	15.40	< 0.002	< 0.20	< 0.50	0.02	< 0.20	0.20	< 0.10
72-1-1	FR2	Y	2024-09-12	Clear and colourless	14.80	< 0.002	< 0.20	< 0.50	0.02	< 0.20	0.80	< 0.10
72-1-1	FRM	Y	2024-09-12	Mean of duplicates	15.10	< 0.002	< 0.20	< 0.50	0.02	< 0.20	0.50	< 0.10
72-1-1	RPD	Y	2024-09-12	RPD of duplicates	4.0%	0.0%	0.0%	0.0%	11.5%	0	**120.0%** b	0.0%
72-1-1	FR1	Y	2024-11-26	Clear and colourless	16.10	< 0.002	< 0.20	< 0.50	0.01	< 0.20	0.27	< 0.10
72-1-1	FR2	Y	2024-11-26	Clear and colourless	16.10	< 0.002	< 0.20	< 0.50	0.02	< 0.20	< 0.10	< 0.10
72-1-1	FRM	Y	2024-11-26	Mean of duplicates	16.10	< 0.002	< 0.20	< 0.50	0.01	< 0.20	0.19	< 0.10
72-1-1	RPD	Y	2024-11-26	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	7.5%	0%	**91.9%** b	0.0%
72-1-1	FR1	Y	2025-03-05	Clear and colourless	14.80	< 0.002	< 0.20	< 0.50	0.02	< 0.20	0.34	< 0.10
72-1-1	FR2	Y	2025-03-05	Clear and colourless	14.80	< 0.002	< 0.20	< 0.50	0.01	< 0.20	0.32	< 0.10
72-1-1	FRM	Y	2025-03-05	Mean of duplicates	14.80	< 0.002	< 0.20	< 0.50	0.01	< 0.20	0.33	< 0.10
72-1-1	RPD	Y	2025-03-05	RPD of duplicates	0.0%	0.0%	0.0%	0.0%	22.4%	0%	6.1%	0.0%
73-1-1	FR1	Y	2024-05-23	Clear and colourless	13.40	0.006	< 0.20	0.54	0.25	0.55	0.91	< 0.10
73-1-1	FR2	Y	2024-05-23	Clear and colourless	13.70	0.005	< 0.20	< 0.50	0.23	0.51	1.05	< 0.10
73-1-1	FRM	Y	2024-05-23	Mean of duplicates	13.55	0.006	< 0.20	0.52	0.24	0.53	0.98	< 0.10
73-1-1	RPD	Y	2024-05-23	RPD of duplicates	2.2%	10.5%	0.0%	7.7%	4.6%	8%	14.3%	0.0%
73-1-1	FR1	Y	2024-09-10	Clear and colourless	13.90	0.006	< 0.20	< 0.50	0.24	0.40	1.49	< 0.10
73-1-1	FR2	Y	2024-09-10	Clear and colourless	14.80	0.005	< 0.20	< 0.50	0.25	0.40	1.46	< 0.10
73-1-1	FRM	Y	2024-09-10	Mean of duplicates	14.35	0.006	< 0.20	< 0.50	0.25	0.40	1.48	< 0.10
73-1-1	RPD	Y	2024-09-10	RPD of duplicates	6.3%	15.4%	0.0%	0.0%	2.0%	0%	2.0%	0.0%
73-1-1	FR1	Y	2024-11-28	Clear and colourless	16.90	0.006	< 0.20	< 0.50	0.24	0.56	1.10	< 0.10
73-1-1	FR2	Y	2024-11-28	Clear and colourless	18.60	0.005	< 0.20	< 0.50	0.24	0.55	0.86	< 0.10
73-1-1	FRM	Y	2024-11-28	Mean of duplicates	17.75	0.006	< 0.20	< 0.50	0.24	0.56	0.98	< 0.10
73-1-1	RPD	Y	2024-11-28	RPD of duplicates	9.6%	18.2%	0.0%	0.0%	0.8%	2%	24.5%	0.0%
73-1-1	FR1	Y	2025-03-03	Clear and colourless	15.30	0.007	< 0.20	< 0.50	0.25	0.71	1.02	< 0.10
73-1-1	FR2	Y	2025-03-03	Clear and colourless	14.70	0.007	< 0.20	< 0.50	0.24	0.72	1.10	< 0.10
73-1-1	FRM	Y	2025-03-03	Mean of duplicates	15.00	0.007	< 0.20	< 0.50	0.24	0.72	1.06	< 0.10
73-1-1	RPD	Y	2025-03-03	RPD of duplicates	4.0%	0.0%	0.0%	0.0%	1.6%	1%	7.5%	0.0%
73-3-1	FR1	Y	2024-05-23	Clear and colourless	13.40	0.006	< 0.20	0.54	0.25	0.55	0.91	< 0.10
73-3-1	FR2	Y	2024-05-23	Clear and colourless	13.70	0.005	< 0.20	< 0.50	0.23	0.51	1.05	< 0.10
73-3-1	FRM	Y	2023-05-23	Mean of duplicates	13.55	0.006	< 0.20	0.52	0.24	0.53	0.98	< 0.10
73-3-1	RPD	Y	2023-05-23	RPD of duplicates	2.2%	10.5%	0.0%	7.7%	4.6%	8%	14.3%	0.0%
73-3-1	FR1	Y	2024-09-10	Clear and colourless	13.90	0.006	< 0.20	< 0.50	0.24	0.40	1.49	< 0.10
73-3-1	FR2	Y	2024-09-10	Clear and colourless	14.80	0.005	< 0.20	< 0.50	0.25	0.40	1.46	< 0.10
73-3-1	FRM	Y	2023-09-10	Mean of duplicates	14.35	0.006	< 0.20	< 0.50	0.25	0.40	1.48	< 0.10
73-3-1	RPD	Y	2023-09-10	RPD of duplicates	6.3%	15.4%	0.0%	0.0%	2.0%	0	2.0%	0.0%
73-3-1	FR1	Y	2024-11-28	Clear and colourless	16.90	0.006	< 0.20	< 0.50	0.24	0.56	1.10	< 0.10
73-3-1	FR2	Y	2024-11-28	Clear and colourless	18.60	0.005	< 0.20	< 0.50	0.24	0.55	0.86	< 0.10
73-3-1	FRM	Y	2023-11-28	Mean of duplicates	17.75	0.006	< 0.20	< 0.50	0.24	0.56	0.98	< 0.10
73-3-1	RPD	Y	2023-11-28	RPD of duplicates	9.6%	18.2%	0.0%	0.0%	0.8%	2%	24.5%	0.0%
73-3-1	FR1	Y	2025-03-03	Clear and colourless	15.30	0.007	< 0.20	< 0.50	0.25	0.71	1.02	< 0.10
73-3-1	FR2	Y	2025-03-03	Clear and colourless	14.70	0.007	< 0.20	< 0.50	0.24	0.72	1.10	< 0.10
73-3-1	FRM	Y	2025-03-03	Mean of duplicates	15.00	0.007	< 0.20	< 0.50	0.24	0.72	1.06	< 0.10
73-3-1	RPD	Y	2025-03-03	RPD of duplicates	4.0%	0.0%	0.0%	0.0%	1.6%	1%	7.5%	0.0%
95-1-1	FR1	N	2024-05-15	Slightly turbid, very slightly grey	59.10	0.008	< 0.20	< 0.50	2.53	0.39	0.88	< 0.10
95-1-1	FR2	N	2024-05-15	Slightly turbid, very slightly grey	58.50	0.007	< 0.20	< 0.50	2.49	0.38	0.88	< 0.10
95-1-1	FRM	N	2024-05-15	Mean of duplicates	58.80	0.007	< 0.20	< 0.50	2.51	0.39	0.88	< 0.10
95-1-1	RPD	N	2024-05-15	RPD of duplicates	1.0%	24.3%	0.0%	0.0%	1.6%	3%	0.0%	0.0%
95-1-1	FR1	N	2024-09-24	Slightly turbid, slightly grey	80.30	0.007	< 0.20	< 0.50	0.98	0.41	1.00	< 0.10
95-1-1	FR2	N	2024-09-24	Slightly turbid, slightly grey	81.30	0.007	< 0.20	< 0.50	0.96	0.40	1.31	< 0.10
95-1-1	FRM	N	2024-09-24	Mean of duplicates	80.80	0.007	< 0.20	< 0.50	0.97	0.41	1.16	< 0.10
95-1-1	RPD	N	2024-09-24	RPD of duplicates	1.2%	1.5%	0.0%	0.0%	1.4%	2%	26.8%	0.0%
95-1-1	FR1	N	2024-11-14	Very turbid, moderately grey	75.90	0.006	< 0.20	< 0.50	0.56	0.57	0.76	< 0.10
95-1-1	FR2	N	2024-11-14	Very turbid, moderately grey	71.10	0.006	< 0.20	< 0.50	0.56	0.51	0.85	< 0.10
95-1-1	FRM	N	2024-11-14	Mean of duplicates	73.50	0.006	< 0.20	< 0.50	0.56	0.54	0.81	< 0.10
95-1-1	RPD	N	2024-11-14	RPD of duplicates	6.5%	0.0%	0.0%	0.0%	0.5%	11%	11.2%	0.0%
95-1-1	FR1	N	2025-03-13	Turbid, slightly grey	133.00	0.005	< 0.20	< 0.50	0.60	0.44	1.05	< 0.10
95-1-1	FR2	N	2025-03-13	Turbid, slightly grey	137.00	0.005	< 0.20	< 0.50	0.62	0.44	1.21	< 0.10
95-1-1	FRM	N	2025-03-13	Mean of duplicates	135.00	0.005	< 0.20	< 0.50	0.61	0.44	1.13	< 0.10
95-1-1	RPD	N	4572900%	RPD of duplicates	3%	4%	0%	0%	3%	0%	14%	0%
104-1-1	FR1	N	2024-05-23	Moderatley turbid, moderately yellow	60.90	0.033	< 0.20	4.98	1.11	5.46	2.20	0.21
104-1-1	FR2	N	2024-05-23	Moderatley turbid, moderately yellow	60.10	0.033	< 0.20	4.67	1.11	5.62	2.13	0.21
104-1-1	FRM	N	2024-05-23	Mean of duplicates	60.50	0.033	< 0.20	4.83	1.11	5.54	2.17	0.21
104-1-1	RPD	N	2024-05-23	RPD of duplicates	1.3%	2.4%	0.0%	6.4%	0.0%	3%	3.2%	0.0%
109-1-1	FR1	N	2024-05-24	Very slightly turbid, very slightly grey	19.50	0.002	< 0.20	< 0.50	1.02	0.21	0.14	< 0.10
109-1-1	FR2	N	2024-05-24	Very slightly turbid, very slightly grey	20.60	0.003	< 0.20	< 0.50	0.97	< 0.20	0.20	< 0.10
109-1-1	FRM	N	2024-05-24	Mean of duplicates	20.05	0.002	< 0.20	< 0.50	1.00	0.21	0.17	< 0.10
109-1-1	RPD	N	4543600%	RPD of duplicates	5%	25%	0%	0%	5%	5%	**35%** b	0%
109-1-1	FR1	N	2024-12-06	Very slightly turbid, slightly grey	25.30	0.004	< 0.20	0.55	1.27	0.76	0.29	< 0.10
109-1-1	FR2	N	2024-12-06	Very slightly turbid, slightly grey	23.90	0.004	< 0.20	< 0.50	1.26	0.75	0.14	< 0.10
109-1-1	FRM	N	2024-12-06	Mean of duplicates	24.60	0.004	< 0.20	0.53	1.27	0.76	0.22	< 0.10
109-1-1	RPD	N	2024-12-06	RPD of duplicates	5.7%	4.9%	0.0%	9.5%	0.8%	1%	**69.8%** b	0.0%
109-1-1	FR1	N	2025-03-13	Moderately turbid, slightly grey	24.40	0.003	< 0.20	< 0.50	1.19	0.45	0.36	< 0.10
109-1-1	FR2	N	2025-03-13	Moderately turbid, slightly grey	24.40	0.004	< 0.20	< 0.50	1.19	0.45	2.74	< 0.10
109-1-1	FRM	N	2025-03-13	Mean of duplicates	24.40	0.003	< 0.20	< 0.50	1.19	0.45	1.55	< 0.10
109-1-1	RPD	N	2025-03-13	RPD of duplicates	0.0%	12.1%	0.0%	0.0%	0.0%	0%	**153.5%** b	0.0%
111-1-1	FR1	Y	2024-11-13	Clear and colourless	14.50	0.007	< 0.20	< 0.50	0.58	< 0.20	0.77	< 0.10
111-1-1	FR2	Y	2024-11-13	Clear and colourless	15.40	0.007	< 0.20	< 0.50	0.59	< 0.20	0.89	< 0.10
111-1-1	FRM	Y	2024-11-13	Mean of duplicates	14.95	0.007	< 0.20	< 0.50	0.59	< 0.20	0.83	< 0.10
111-1-1	RPD	Y	2024-11-13	RPD of duplicates	6.0%	0.0%	0.0%	0.0%	1.2%	0%	14.5%	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-2 Surface Water Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Aluminum	Arsenic	Boron	Cadmium	Chloride	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead	Manganese	Molybdenum	Nitrogen - Ammonia	Nitrogen - Nitrite
				Fraction	TOT	TOT	TOT	TOT	DIS	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	DIS
				Unit	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	3	0.02	10	0.005	1	0.005	0.05	0.5	5	0.02	0.1	0.05	0.03	0.005
				Limit of Quantification (5x DL)	15	0.1	50	0.025	5	0.025	0.25	2.5	25	0.1	0.5	0.25	0.15	0.025
SW-N-05	FR1	Y	2024-06-04	Very low flow, clear and colourless	34.90	0.17	165.00	0.02	7.70	0.10	4.75	305.00	34.20	0.01	1.68	4.71	< 0.02	< 0.01
SW-N-05	FR2	Y	2024-06-04	Very low flow, clear and colourless	41.50	0.17	166.00	0.02	7.80	0.11	4.86	305.00	42.00	0.01	1.97	4.68	< 0.02	< 0.01
SW-N-05	FRM	Y	2024-06-04	Mean of duplicates	38.20	0.17	165.50	0.02	7.75	0.10	4.81	305.00	38.10	0.01	1.83	4.70	< 0.02	< 0.01
SW-N-05	RPD	Y		RPD Calculation	17.3%	4.1%	0.6%	6.9%	1.3%	5.1%	2.3%	0.0%	20.5%	8.6%	15.9%	0.6%	0.0%	0.0%
SW-N-05	FR1	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	69.10	0.16	111.00	0.02	11.00	0.20	3.43	430.00	81.90	0.04	6.24	2.61	< 0.02	< 0.01
SW-N-05	FR2	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	64.80	0.16	107.00	0.02	11.00	0.19	3.38	414.00	74.60	0.03	4.84	2.56	< 0.02	< 0.01
SW-N-05	FRM	Y	2024-10-23	Mean of duplicates	66.95	0.16	109.00	0.02	11.00	0.19	3.41	422.00	78.25	0.03	5.54	2.59	< 0.02	< 0.01
SW-N-05	RPD	Y		RPD Calculation	6.4%	0.6%	3.7%	4.0%	0.0%	5.2%	1.5%	3.8%	9.3%	21.5%	25.3%	1.9%	0.0%	0.0%
SW-N-05	FR1	Y	2024-12-17	Clear and colourless, moderate flow	46.30	0.16	114.00	0.03	10.00	0.16	3.27	429.00	39.70	< 0.02	2.49	3.28	< 0.02	< 0.01
SW-N-05	FR2	Y	2024-12-17	Clear and colourless, moderate flow	52.50	0.17	111.00	0.02	9.60	0.17	3.35	403.00	46.90	< 0.02	2.93	3.18	< 0.02	< 0.01
SW-N-05	FRM	Y	2024-12-17	Mean of duplicates	49.40	0.16	112.50	0.03	9.80	0.17	3.31	416.00	43.30	< 0.02	2.71	3.23	< 0.02	< 0.01
SW-N-05	RPD	Y		RPD Calculation	12.6%	6.7%	2.7%	16.0%	4.1%	6.5%	2.4%	6.3%	16.6%	0.0%	16.2%	3.1%	0.0%	0.0%
SW-N-05	FR1	Y	2025-02-21	Moderate flow, clear and colourless	88.80	0.24	101.00	0.02	27.00	0.34	3.49	381.00	89.90	0.08	23.30	2.56	0.02	< 0.01
SW-N-05	FR2	Y	2025-02-21	Moderate flow, clear and colourless	46.90	0.23	98.00	0.02	26.00	0.21	3.24	384.00	56.70	0.03	7.88	2.57	< 0.02	< 0.01
SW-N-05	FRM	Y	2025-02-21	Mean of duplicates	67.85	0.24	99.50	0.02	26.50	0.27	3.37	382.50	73.30	0.05	15.59	2.57	< 0.02	< 0.01
SW-N-05	RPD	Y		RPD Calculation	**61.8%** a	2.5%	3.0%	3.9%	3.8%	**48.3%** a	7.4%	0.8%	**45.3%** a	**85.2%** b	**98.9%** a	0.4%	28.6%	0.0%
SW-N-16	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	380.00	0.21	92.00	0.02	19.00	0.67	5.47	182.00	756.00	0.07	56.90	0.58	0.02	0.01
SW-N-16	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	359.00	0.19	93.00	0.02	19.00	0.66	5.38	175.00	718.00	0.07	55.80	0.59	0.02	0.01
SW-N-16	FRM	Y	2024-05-02	Mean of duplicates	369.50	0.20	92.50	0.02	19.00	0.66	5.43	178.50	737.00	0.07	56.35	0.58	0.02	0.01
SW-N-16	RPD	Y		RPD Calculation	5.7%	6.0%	1.1%	8.5%	0.0%	0.3%	1.7%	3.9%	5.2%	10.2%	2.0%	1.5%	9.5%	0.9%
SW-N-16	FR1	Y	2024-10-23	Moderately-high flow. Clear and colourless sample.	68.20	0.25	82.00	0.02	15.00	0.47	8.85	230.00	198.00	0.06	61.30	0.84	0.20	0.11
SW-N-16	FR2	Y	2024-10-23	Moderately-high flow. Clear and colourless sample.	60.20	0.25	77.00	0.02	15.00	0.46	8.74	213.00	182.00	0.04	61.40	0.83	0.20	0.11
SW-N-16	FRM	Y	2024-10-23	Mean of duplicates	64.20	0.25	79.50	0.02	15.00	0.46	8.80	221.50	190.00	0.05	61.35	0.84	0.20	0.11
SW-N-16	RPD	Y		RPD Calculation	12.5%	1.2%	6.3%	1.8%	0.0%	2.2%	1.3%	7.7%	8.4%	**35.1%** b	0.2%	1.1%	0.0%	0.9%
SW-N-16	FR1	Y	2024-12-17	Clear and slightly yellow, high flow	430.00	0.24	74.00	0.02	15.00	0.86	13.20	184.00	834.00	0.12	49.80	0.71	0.04	0.01
SW-N-16	FR2	Y	2024-12-17	Clear and slightly yellow, high flow	478.00	0.24	74.00	0.02	14.00	0.89	13.00	175.00	893.00	0.13	50.80	0.67	0.04	0.01
SW-N-16	FRM	Y	2024-12-17	Mean of duplicates	454.00	0.24	74.00	0.02	14.50	0.88	13.10	179.50	863.50	0.13	50.30	0.69	0.04	0.01
SW-N-16	RPD	Y		RPD Calculation	10.6%	0.4%	0.0%	10.0%	6.9%	3.4%	1.5%	5.0%	6.8%	8.8%	2.0%	5.4%	0.0%	4.8%
SW-N-16	FR1	Y	2025-02-21	moderately high flow, clear and colourless	74.70	0.20	57.00	0.01	40.00	0.51	15.30	144.00	226.00	0.04	46.90	0.69	0.05	< 0.01
SW-N-16	FR2	Y	2025-02-21	Moderately high, clear and colourless	74.50	0.19	57.00	0.01	40.00	0.50	15.00	154.00	238.00	0.04	46.70	0.66	0.05	< 0.01
SW-N-16	FRM	Y	2025-02-21	Mean of duplicates	74.60	0.19	57.00	0.01	40.00	0.50	15.15	149.00	232.00	0.04	46.80	0.67	0.05	< 0.01
SW-N-16	RPD	Y		RPD Calculation	0.3%	4.7%	0.0%	6.7%	0.0%	0.2%	2.0%	6.7%	5.2%	8.2%	0.4%	4.3%	0.0%	0.0%
SW-N-41S1	FR1	Y	2024-05-03	Low flow, nil turbidity, clear colourless	65.60	0.23	22.00	0.01	5.70	0.10	0.39	149.00	153.00	0.06	67.70	0.27	< 0.02	< 0.01
SW-N-41S1	FR2	Y	2024-05-03	Low flow, nil turbidity, clear colourless	59.70	0.24	20.00	0.01	5.30	0.10	0.34	148.00	146.00	0.06	65.60	0.24	< 0.02	< 0.01
SW-N-41S1	FRM	Y	2024-05-03	Mean of duplicates	62.65	0.23	21.00	0.01	5.50	0.10	0.37	148.50	149.50	0.06	66.65	0.25	< 0.02	< 0.01
SW-N-41S1	RPD	Y		RPD Calculation	9.4%	1.7%	9.5%	24.3%	7.3%	1.0%	13.7%	0.7%	4.7%	8.7%	3.2%	12.7%	0.0%	0.0%
SW-N-41S1	FR1	Y	2024-10-21	Low flow. Clear and colourless sample.	76.80	0.25	23.00	0.01	7.10	0.15	0.51	197.00	219.00	0.11	114.00	0.28	0.04	< 0.01
SW-N-41S1	FR2	Y	2024-10-21	Low flow. Clear and colourless sample.	81.00	0.28	21.00	0.01	7.20	0.16	0.45	203.00	231.00	0.08	114.00	0.30	< 0.02	< 0.01
SW-N-41S1	FRM	Y	2024-10-21	Mean of duplicates	78.90	0.26	22.00	0.01	7.15	0.15	0.48	200.00	225.00	0.09	114.00	0.29	< 0.03	< 0.01
SW-N-41S1	RPD	Y		RPD Calculation	5.3%	10.3%	9.1%	18.2%	1.4%	6.6%	12.5%	3.0%	5.3%	33.9%	0.0%	7.3%	84.6%	0.0%
SW-N-41S1	FR1	Y	2024-12-16	Clear and colourless, moderate flow	25.90	0.08	66.00	< 0.01	20.00	0.07	0.60	191.00	69.90	0.03	19.30	0.54	< 0.02	< 0.01
SW-N-41S1	FR2	Y	2024-12-16	Clear and colourless, moderate flow	26.20	0.07	64.00	< 0.01	20.00	0.07	0.55	182.00	64.00	0.03	18.00	0.47	< 0.02	< 0.01
SW-N-41S1	FRM	Y	2024-12-16	Mean of duplicates	26.05	0.07	65.00	< 0.01	20.00	0.07	0.58	186.50	66.95	0.03	18.65	0.51	< 0.02	< 0.01
SW-N-41S1	RPD	Y		RPD Calculation	1.2%	22.8%	3.1%	0.0%	0.0%	0.0%	8.7%	4.8%	8.8%	0.0%	7.0%	13.6%	0.0%	0.0%
SW-N-41S1	FR1	Y	2025-02-20	Moderately low, very low turbidity, colourless	139.00	0.23	18.00	< 0.01	9.00	0.16	0.55	165.00	297.00	0.10	96.00	0.27	< 0.02	< 0.01
SW-N-41S1	FR2	Y	2025-02-20	Moderately low, very low turbidity, colourless	121.00	0.21	17.00	< 0.01	9.00	0.15	0.49	152.00	227.00	0.09	89.90	0.24	< 0.02	< 0.01
SW-N-41S1	FRM	Y	2025-02-20	Mean of duplicates	130.00	0.22	17.50	< 0.01	9.00	0.15	0.52	158.50	262.00	0.09	92.95	0.25	< 0.02	< 0.01
SW-N-41S1	RPD	Y		RPD Calculation	13.8%	7.8%	5.7%	0.0%	0.0%	6.6%	11.5%	8.2%	26.7%	8.8%	6.6%	10.3%	0.0%	0.0%
SW-N-42S1	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	14.30	0.07	47.00	< 0.01	32.00	0.06	0.35	208.00	38.70	0.02	18.90	0.55	< 0.02	< 0.01
SW-N-42S1	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	11.00	0.06	47.00	< 0.01	32.00	0.06	0.35	200.00	33.10	0.02	18.90	0.60	< 0.02	< 0.01
SW-N-42S1	FRM	Y	2024-05-02	Mean of duplicates	12.65	0.06	47.00	< 0.01	32.00	0.06	0.35	204.00	35.90	0.02	18.90	0.58	< 0.02	< 0.01
SW-N-42S1	RPD	Y		RPD Calculation	26.1%	3.1%	0.0%	0.0%	0.0%	0.8%	0.3%	3.9%	15.6%	12.0%	0.0%	9.5%	0.0%	0.0%
SW-N-42S1	FR1	Y	2024-10-22	Moderate-low flow. Clear and colourless sample.	50.70	0.10	40.00	< 0.01	29.00	0.13	0.77	206.00	128.00	0.06	52.50	0.50	< 0.02	< 0.01
SW-N-42S1	FR2	Y	2024-10-22	Moderate-low flow. Clear and colourless sample.	47.20	0.11	41.00	< 0.01	29.00	0.13	1.03	210.00	124.00	0.07	58.10	0.48	< 0.02	< 0.01
SW-N-42S1	FRM	Y	2024-10-22	Mean of duplicates	48.95	0.10	40.50	< 0.01	29.00	0.13	0.90	208.00	126.00	0.06	55.30	0.49	< 0.02	< 0.01
SW-N-42S1	RPD	Y		RPD Calculation	7.2%	4.8%	2.5%	0.0%	0.0%	3.9%	28.9%	1.9%	3.2%	12.5%	10.1%	4.9%	0.0%	0.0%
SW-N-42S1	FR1	Y	2024-12-16	Clear and colourless, moderate flow	134.00	0.28	19.00	0.01	4.90	0.16	0.55	169.00	273.00	0.09	111.00	0.28	0.06	< 0.01
SW-N-42S1	FR2	Y	2024-12-16	Clear and colourless, moderate flow	144.00	0.28	18.00	0.01	5.20	0.17	0.62	159.00	276.00	0.10	111.00	0.29	0.04	< 0.01
SW-N-42S1	FRM	Y	2024-12-16	Mean of duplicates	139.00	0.28	18.50	0.01	5.05	0.16	0.59	164.00	274.50	0.10	111.00	0.28	0.05	< 0.01
SW-N-42S1	RPD	Y		RPD Calculation	7.2%	0.0%	5.4%	**75.0%** b	5.9%	5.5%	12.0%	6.1%	1.1%	14.4%	0.0%	6.0%	**45.2%** b	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-2 Surface Water Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Nitrogen - Nitrate	Nickel	Selenium	Silver	Sodium	Sulphate	TSS	Zinc	pH	Conductivity	Temperature	Aluminum	Arsenic	Boron
				Fraction	DIS	TOT	TOT	TOT	TOT	DIS	TOT	TOT	TOT	TOT	TOT	DIS	DIS	DIS
				Unit	mg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	µg/L	pH	µS/cm	°C	µg/L	µg/L	µg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	0.02	0.02	0.04	0.005	0.05	1	1	0.1	0.01	0.1	0	0.5	0.02	10
				Limit of Quantification (5x DL)	0.1	0.1	0.2	0.025	0.25	5	5	0.5	0.05	0.5	0	2.5	0.1	50
SW-N-05	FR1	Y	2024-06-04	Very low flow, clear and colourless	5.98	1.29	0.35	< 0.01		210.00	1.20	4.10	8.37	660.00	10.90	22.60	0.21	155.00
SW-N-05	FR2	Y	2024-06-04	Very low flow, clear and colourless	5.85	1.44	0.36	< 0.01		210.00	1.20	4.15	8.37	670.00	10.90	23.00	0.20	163.00
SW-N-05	FRM	Y	2024-06-04	Mean of duplicates	5.92	1.37	0.36	< 0.01		210.00	1.20	4.13	8.37	665.00	10.90	22.80	0.20	159.00
SW-N-05	RPD	Y		RPD Calculation	2.2%	11.0%	1.7%	0.0%		0.0%	0.0%	1.2%	0.0%	1.5%	0.0%	1.8%	3.5%	5.0%
SW-N-05	FR1	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	13.00	1.17	0.74	< 0.01	10.50	360.00	2.00	4.00	7.20	723.00	12.30	16.60	0.18	125.00
SW-N-05	FR2	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	13.00	1.20	0.69	< 0.01	10.30	360.00	1.60	3.80	7.20	723.00	12.30	15.80	0.17	127.00
SW-N-05	FRM	Y	2024-10-23	Mean of duplicates	13.00	1.19	0.71	< 0.01	10.40	360.00	1.80	3.90	7.20	723.00	12.30	16.20	0.18	126.00
SW-N-05	RPD	Y		RPD Calculation	0.0%	2.5%	6.6%	0.0%	1.92%	0.0%	22.2%	5.1%	0.0%	0.0%	0.0%	4.9%	5.1%	1.6%
SW-N-05	FR1	Y	2024-12-17	Clear and colourless, moderate flow	8.52	1.23	0.54	< 0.01	8.35	320.00	1.60	3.20	7.23	612.00	9.50	25.90	0.14	113.00
SW-N-05	FR2	Y	2024-12-17	Clear and colourless, moderate flow	8.71	1.24	0.50	< 0.01	8.28	320.00	< 1.00	3.30	7.23	612.00	9.50	24.30	0.14	119.00
SW-N-05	FRM	Y	2024-12-17	Mean of duplicates	8.62	1.24	0.52	< 0.01	8.32	320.00	< 1.30	3.25	7.23	612.00	9.50	25.10	0.14	116.00
SW-N-05	RPD	Y		RPD Calculation	2.2%	0.8%	9.1%	0.0%	0.84%	0.0%	**46.2%** b	3.1%	0.0%	0.0%	0.0%	6.4%	2.1%	5.2%
SW-N-05	FR1	Y	2025-02-21	Moderate flow, clear and colourless	6.38	1.28	0.34	< 0.01	7.59	340.00	1.20	5.00	7.87	602.00	7.90	17.70	0.24	153.00
SW-N-05	FR2	Y	2025-02-21	Moderate flow, clear and colourless	6.42	1.13	0.37	< 0.01	7.47	330.00	2.00	3.50	7.87	602.00	7.90	17.60	0.24	142.00
SW-N-05	FRM	Y	2025-02-21	Mean of duplicates	6.40	1.21	0.35	< 0.01	7.53	335.00	1.60	4.25	7.87	602.00	7.90	17.65	0.24	147.50
SW-N-05	RPD	Y		RPD Calculation	0.6%	12.4%	7.1%	0.0%	1.59%	3.0%	**50.0%** b	**35.3%** a	0.0%	0.0%	0.0%	0.6%	0.0%	7.5%
SW-N-16	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	7.01	2.31	0.08	< 0.01		39.00	7.60	7.60	6.95	386.00	13.10	7.65	0.22	107.00
SW-N-16	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	6.98	2.46	0.07	< 0.01		39.00	5.20	7.00	6.95	386.00	13.10	8.68	0.22	109.00
SW-N-16	FRM	Y	2024-05-02	Mean of duplicates	7.00	2.39	0.08	< 0.01		39.00	6.40	7.30	6.95	386.00	13.10	8.17	0.22	108.00
SW-N-16	RPD	Y		RPD Calculation	0.4%	6.3%	21.3%	0.0%		0.0%	**37.5%** a	8.2%	0.0%	0.0%	0.0%	12.6%	2.7%	1.9%
SW-N-16	FR1	Y	2024-10-23	Moderately-high flow. Clear and colourless sample.	9.02	2.57	0.21	< 0.01	12.10	120.00	2.40	13.20	7.50	394.00	9.50	23.40	0.26	93.00
SW-N-16	FR2	Y	2024-10-23	Moderately-high flow. Clear and colourless sample.	9.17	2.57	0.20	< 0.01	12.00	120.00	< 1.00	12.50	7.50	394.00	9.50	14.20	0.26	93.00
SW-N-16	FRM	Y	2024-10-23	Mean of duplicates	9.10	2.57	0.20	< 0.01	12.05	120.00	< 1.70	12.85	7.50	394.00	9.50	18.80	0.26	93.00
SW-N-16	RPD	Y		RPD Calculation	1.6%	0.0%	5.4%	0.0%	0.83%	0.0%	**82.4%** b	5.4%	0.0%	0.0%	0.0%	**48.9%** a	1.5%	0.0%
SW-N-16	FR1	Y	2024-12-17	Clear and slightly yellow, high flow	8.53	3.77	0.17	< 0.01	11.60	85.00	9.60	7.50	7.73	470.00	7.00	13.90	0.19	83.00
SW-N-16	FR2	Y	2024-12-17	Clear and slightly yellow, high flow	8.39	3.70	0.17	< 0.01	11.10	85.00	12.00	7.70	7.73	303.00	7.00	16.50	0.19	86.00
SW-N-16	FRM	Y	2024-12-17	Mean of duplicates	8.46	3.74	0.17	< 0.01	11.35	85.00	10.80	7.60	7.73	386.50	7.00	15.20	0.19	84.50
SW-N-16	RPD	Y		RPD Calculation	1.7%	1.9%	1.7%	0.0%	4.41%	0.0%	22.2%	2.6%	0.0%	**43.2%** a	0.0%	17.1%	1.6%	3.6%
SW-N-16	FR1	Y	2025-02-21	moderately high flow, clear and colourless	8.58	3.86	0.14	< 0.01	17.40	60.00	1.60	5.50	7.78	325.00	6.10	18.50	0.20	87.00
SW-N-16	FR2	Y	2025-02-21	Moderately high, clear and colourless	8.60	3.88	0.15	< 0.01	17.60	61.00	1.20	5.50	7.78	325.00	6.10	17.10	0.19	84.00
SW-N-16	FRM	Y	2025-02-21	Mean of duplicates	8.59	3.87	0.15	< 0.01	17.50	60.50	1.40	5.50	7.78	325.00	6.10	17.80	0.20	85.50
SW-N-16	RPD	Y		RPD Calculation	0.2%	0.5%	6.9%	0.0%	1.14%	1.7%	28.6%	0.0%	0.0%	0.0%	0.0%	7.9%	3.5%	3.5%
SW-N-41S1	FR1	Y	2024-05-03	Low flow, nil turbidity, clear colourless	0.39	0.26	0.05	< 0.01	4.45	55.00	4.80	< 1.00	7.59	270.70	9.10	5.07	0.17	21.00
SW-N-41S1	FR2	Y	2024-05-03	Low flow, nil turbidity, clear colourless	0.39	0.14	0.05	< 0.01	4.19	53.00	4.00	< 1.00	7.59	270.70	9.10	5.22	0.17	21.00
SW-N-41S1	FRM	Y	2024-05-03	Mean of duplicates	0.39	0.20	0.05	< 0.01	4.32	54.00	4.40	< 1.00	7.59	270.70	9.10	5.15	0.17	21.00
SW-N-41S1	RPD	Y		RPD Calculation	0.5%	**60.0%** a	0.0%	0.0%	6.02%	3.7%	18.2%	0.0%	0.0%	0.0%	0.0%	2.9%	2.4%	0.0%
SW-N-41S1	FR1	Y	2024-10-21	Low flow. Clear and colourless sample.	0.87	0.26	0.14	< 0.01	5.15	77.00	4.00	1.70	7.64	323.00	10.80	5.46	0.21	22.00
SW-N-41S1	FR2	Y	2024-10-21	Low flow. Clear and colourless sample.	0.83	0.23	0.16	< 0.01	5.22	77.00	3.20	1.60	7.64	323.00	10.80	5.44	0.21	22.00
SW-N-41S1	FRM	Y	2024-10-21	Mean of duplicates	0.85	0.25	0.15	< 0.01	5.19	77.00	3.60	1.65	7.64	323.00	10.80	5.45	0.21	22.00
SW-N-41S1	RPD	Y		RPD Calculation	4.3%	12.2%	13.8%	0.0%	1.35%	0.0%	22.2%	6.1%	0.0%	0.0%	0.0%	0.4%	1.5%	0.0%
SW-N-41S1	FR1	Y	2024-12-16	Clear and colourless, moderate flow	0.26	0.16	0.07	< 0.01	9.87	80.00	2.40	1.30	7.63	250.00	7.00	7.74	0.05	69.00
SW-N-41S1	FR2	Y	2024-12-16	Clear and colourless, moderate flow	0.26	0.15	0.07	< 0.01	9.46	81.00	2.80	< 1.00	7.63	250.00	7.00	7.35	0.06	66.00
SW-N-41S1	FRM	Y	2024-12-16	Mean of duplicates	0.26	0.16	0.07	< 0.01	9.67	80.50	2.60	< 1.15	7.63	250.00	7.00	7.55	0.06	67.50
SW-N-41S1	RPD	Y		RPD Calculation	0.8%	6.5%	4.3%	0.0%	4.24%	1.2%	15.4%	26.1%	0.0%	0.0%	0.0%	5.2%	10.9%	4.4%
SW-N-41S1	FR1	Y	2025-02-20	Moderately low, very low turbidity, colourless	0.75	0.27	0.11	< 0.01	4.42	53.00	8.80	< 1.00	9.22	241.00	7.80	7.51	0.13	18.00
SW-N-41S1	FR2	Y	2025-02-20	Moderately low, very low turbidity, colourless	0.76	0.24	0.10	< 0.01	4.27	53.00	7.60	1.00	9.22	241.00	7.80	6.12	0.15	19.00
SW-N-41S1	FRM	Y	2025-02-20	Mean of duplicates	0.75	0.26	0.11	< 0.01	4.35	53.00	8.20	< 1.00	9.22	241.00	7.80	6.82	0.14	18.50
SW-N-41S1	RPD	Y		RPD Calculation	1.2%	11.8%	13.1%	0.0%	3.45%	0.0%	14.6%	0.0%	0.0%	0.0%	0.0%	20.4%	10.7%	5.4%
SW-N-42S1	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.15	0.20	0.06	< 0.01		67.00	2.00	0.54	7.42	480.00	11.70	4.85	0.08	49.00
SW-N-42S1	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.35	0.16	0.06	< 0.01		66.00	2.00	0.34	7.42	366.00	11.70	4.98	0.07	50.00
SW-N-42S1	FRM	Y	2024-05-02	Mean of duplicates	0.25	0.18	0.06	< 0.01		66.50	2.00	0.44	7.42	423.00	11.70	4.92	0.08	49.50
SW-N-42S1	RPD	Y		RPD Calculation	**78.6%** a	21.6%	10.3%	0.0%		1.5%	0.0%	**45.5%** b	0.0%	27.0%	0.0%	2.6%	5.3%	2.0%
SW-N-42S1	FR1	Y	2024-10-22	Moderate-low flow. Clear and colourless sample.	0.13	0.27	0.08	< 0.01	9.29	96.00	4.40	< 1.00	7.25	392.00	9.60	5.52	0.11	47.00
SW-N-42S1	FR2	Y	2024-10-22	Moderate-low flow. Clear and colourless sample.	0.13	0.79	0.08	< 0.01	9.16	96.00	5.60	< 1.00	7.25	392.00	9.60	5.89	0.10	47.00
SW-N-42S1	FRM	Y	2024-10-22	Mean of duplicates	0.13	0.53	0.08	< 0.01	9.23	96.00	5.00	< 1.00	7.25	392.00	9.60	5.71	0.11	47.00
SW-N-42S1	RPD	Y		RPD Calculation	0.8%	**98.1%** a	1.3%	0.0%	1.41%	0.0%	24.0%	0.0%	0.0%	0.0%	0.0%	6.5%	5.7%	0.0%
SW-N-42S1	FR1	Y	2024-12-16	Clear and colourless, moderate flow	0.94	0.25	0.10	< 0.01	4.74	67.00	7.60	< 1.00	7.51	287.00	6.30	7.57	0.15	26.00
SW-N-42S1	FR2	Y	2024-12-16	Clear and colourless, moderate flow	0.96	0.30	0.09	< 0.01	4.42	68.00	7.60	5.80	7.51	390.00	6.30	7.45	0.16	23.00
SW-N-42S1	FRM	Y	2024-12-16	Mean of duplicates	0.95	0.28	0.09	< 0.01	4.58	67.50	7.60	< 3.40	7.51	338.50	6.30	7.51	0.15	24.50
SW-N-42S1	RPD	Y		RPD Calculation	1.9%	18.2%	3.2%	0.0%	6.99%	1.5%	0.0%	**141.2%** a	0.0%	**30.4%** a	0.0%	1.6%	3.2%	12.2%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-2 Surface Water Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Cadmium	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Sodium	Zinc	Dissolved Organic Carbon
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	Dissolved
				Unit	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	45%
				Detection Limit (DL)	0.005	0.005	0.05	0.5	1	0.005	0.05	0.05	0.02	0.04	0.005	0.05	0.1	0.5
				Limit of Quantification (5x DL)	0.025	0.025	0.25	2.5	5	0.025	0.25	0.25	0.1	0.2	0.025	0.25	0.5	2.5
SW-N-05	FR1	Y	2024-06-04	Very low flow, clear and colourless	0.02	0.09	4.63	304.00	10.30	< 0.01	0.68	4.74	1.32	0.40	< 0.01		3.78	4.80
SW-N-05	FR2	Y	2024-06-04	Very low flow, clear and colourless	0.02	0.09	4.63	306.00	16.70	0.01	1.12	4.81	1.39	0.38	< 0.01		4.65	5.00
SW-N-05	FRM	Y	2024-06-04	Mean of duplicates	0.02	0.09	4.63	305.00	13.50	< 0.01	0.90	4.78	1.36	0.39	< 0.01		4.22	4.90
SW-N-05	RPD	Y		RPD Calculation	10.4%	2.5%	0.0%	0.7%	**47.4%** a	**88.9%** b	**48.9%** a	1.5%	5.2%	6.4%	0.0%		20.6%	4.1%
SW-N-05	FR1	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	0.02	0.15	3.25	461.00	15.80	< 0.01	0.53	2.91	1.17	0.75	< 0.01	11.30	3.23	5.80
SW-N-05	FR2	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	0.02	0.15	3.27	459.00	11.70	0.01	0.54	2.84	1.21	0.76	< 0.01	11.40	3.50	5.70
SW-N-05	FRM	Y	2024-10-23	Mean of duplicates	0.02	0.15	3.26	460.00	13.75	< 0.01	0.53	2.88	1.19	0.75	< 0.01	11.35	3.37	5.75
SW-N-05	RPD	Y		RPD Calculation	7.4%	1.4%	0.6%	0.4%	29.8%	**62.1%** b	2.6%	2.4%	3.4%	1.5%	0.0%	1%	8.0%	1.7%
SW-N-05	FR1	Y	2024-12-17	Clear and colourless, moderate flow	0.03	0.15	3.77	427.00	18.70	0.01	1.49	3.28	1.37	0.48	< 0.01	8.45	4.07	5.70
SW-N-05	FR2	Y	2024-12-17	Clear and colourless, moderate flow	0.02	0.14	3.44	428.00	16.30	0.01	1.46	3.24	1.33	0.52	< 0.01	8.14	3.39	5.70
SW-N-05	FRM	Y	2024-12-17	Mean of duplicates	0.02	0.15	3.61	427.50	17.50	0.01	1.48	3.26	1.35	0.50	< 0.01	8.30	3.73	5.70
SW-N-05	RPD	Y		RPD Calculation	11.2%	1.4%	9.2%	0.2%	13.7%	**34.2%** b	2.0%	1.2%	3.0%	9.0%	0.0%	4%	18.2%	0.0%
SW-N-05	FR1	Y	2025-02-21	Moderate flow, clear and colourless	0.02	0.14	3.21	477.00	9.20	0.01	0.21	2.96	1.16	0.39	< 0.01	9.61	2.83	5.50
SW-N-05	FR2	Y	2025-02-21	Moderate flow, clear and colourless	0.02	0.14	3.26	468.00	10.20	< 0.01	0.25	2.94	1.16	0.42	< 0.01	9.30	2.82	5.40
SW-N-05	FRM	Y	2025-02-21	Mean of duplicates	0.02	0.14	3.24	472.50	9.70	< 0.01	0.23	2.95	1.16	0.41	< 0.01	9.46	2.83	5.45
SW-N-05	RPD	Y		RPD Calculation	8.1%	0.7%	1.5%	1.9%	10.3%	2.0%	18.0%	0.7%	0.0%	7.6%	0.0%	3%	0.4%	1.8%
SW-N-16	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.02	0.28	5.09	204.00	50.60	< 0.01	49.70	0.68	1.86	0.09	< 0.01		5.04	8.40
SW-N-16	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.01	0.28	5.08	205.00	51.70	0.01	49.30	0.72	1.95	0.08	< 0.01		5.26	8.60
SW-N-16	FRM	Y	2024-05-02	Mean of duplicates	0.01	0.28	5.09	204.50	51.15	< 0.01	49.50	0.70	1.91	0.09	< 0.01		5.15	8.50
SW-N-16	RPD	Y		RPD Calculation	21.2%	0.7%	0.2%	0.5%	2.2%	**49.6%** b	0.8%	6.0%	4.7%	11.2%	0.0%		4.3%	2.4%
SW-N-16	FR1	Y	2024-10-23	Moderately-high flow. Clear and colourless sample.	0.02	0.44	8.79	235.00	90.30	0.04	65.30	0.94	2.71	0.22	0.01	12.90	13.90	15.00
SW-N-16	FR2	Y	2024-10-23	Moderately-high flow. Clear and colourless sample.	0.02	0.43	8.59	236.00	80.10	0.02	64.40	0.91	2.63	0.22	0.01	12.80	12.40	14.00
SW-N-16	FRM	Y	2024-10-23	Mean of duplicates	0.02	0.43	8.69	235.50	85.20	0.03	64.85	0.93	2.67	0.22	0.01	12.85	13.15	14.50
SW-N-16	RPD	Y		RPD Calculation	13.2%	3.5%	2.3%	0.4%	12.0%	**61.2%** b	1.4%	3.7%	3.0%	0.5%	19.7%	1%	11.4%	6.9%
SW-N-16	FR1	Y	2024-12-17	Clear and slightly yellow, high flow	0.02	0.41	11.60	192.00	62.20	0.02	32.60	0.73	3.29	0.17	< 0.01	11.70	4.95	10.00
SW-N-16	FR2	Y	2024-12-17	Clear and slightly yellow, high flow	0.01	0.42	11.70	193.00	63.30	0.02	34.10	0.73	3.24	0.17	< 0.01	11.80	4.82	10.00
SW-N-16	FRM	Y	2024-12-17	Mean of duplicates	0.02	0.41	11.65	192.50	62.75	0.02	33.35	0.73	3.27	0.17	< 0.01	11.75	4.89	10.00
SW-N-16	RPD	Y		RPD Calculation	15.3%	1.7%	0.9%	0.5%	1.8%	**33.9%** b	4.5%	0.3%	1.5%	1.8%	0.0%	1%	2.7%	0.0%
SW-N-16	FR1	Y	2025-02-21	moderately high flow, clear and colourless	0.02	0.50	14.90	200.00	135.00	0.01	54.00	0.76	4.38	0.15	< 0.01	22.40	5.77	13.00
SW-N-16	FR2	Y	2025-02-21	Moderately high, clear and colourless	0.01	0.49	14.90	199.00	136.00	0.01	53.80	0.77	4.32	0.17	< 0.01	22.80	5.56	12.00
SW-N-16	FRM	Y	2025-02-21	Mean of duplicates	0.01	0.49	14.90	199.50	135.50	0.01	53.90	0.77	4.35	0.16	< 0.01	22.60	5.67	12.50
SW-N-16	RPD	Y		RPD Calculation	26.0%	0.8%	0.0%	0.5%	0.7%	12.6%	0.4%	1.7%	1.4%	11.9%	0.0%	2%	3.7%	8.0%
SW-N-41S1	FR1	Y	2024-05-03	Low flow, nil turbidity, clear colourless	< 0.01	0.07	0.17	170.00	29.10	< 0.01	35.00	0.31	0.09	0.06	< 0.01	5.15	0.13	1.60
SW-N-41S1	FR2	Y	2024-05-03	Low flow, nil turbidity, clear colourless	< 0.01	0.07	0.26	175.00	25.70	< 0.01	35.10	0.30	0.11	0.06	< 0.01	5.64	0.34	1.60
SW-N-41S1	FRM	Y	2024-05-03	Mean of duplicates	< 0.01	0.07	0.22	172.50	27.40	< 0.01	35.05	0.30	0.10	0.06	< 0.01	5.40	0.24	1.60
SW-N-41S1	RPD	Y		RPD Calculation	0.0%	9.9%	**39.3%** b	2.9%	12.4%	0.0%	0.3%	3.6%	14.8%	3.3%	0.0%	9%	**89.4%** b	0.0%
SW-N-41S1	FR1	Y	2024-10-21	Low flow. Clear and colourless sample.	0.01	0.06	0.35	210.00	25.70	< 0.01	54.90	0.37	0.16	0.14	< 0.01	5.50	1.67	3.00
SW-N-41S1	FR2	Y	2024-10-21	Low flow. Clear and colourless sample.	0.01	0.06	0.30	211.00	26.70	< 0.01	54.70	0.36	0.13	0.14	< 0.01	5.47	1.69	2.60
SW-N-41S1	FRM	Y	2024-10-21	Mean of duplicates	0.01	0.06	0.33	210.50	26.20	< 0.01	54.80	0.36	0.15	0.14	< 0.01	5.49	1.68	2.80
SW-N-41S1	RPD	Y		RPD Calculation	12.1%	2.0%	14.4%	0.5%	3.8%	0.0%	0.4%	4.9%	20.5%	3.6%	0.0%	1%	1.2%	14.3%
SW-N-41S1	FR1	Y	2024-12-16	Clear and colourless, moderate flow	< 0.01	0.05	0.99	194.00	32.40	0.02	12.60	0.51	0.38	0.06	< 0.01	10.10	2.40	4.80
SW-N-41S1	FR2	Y	2024-12-16	Clear and colourless, moderate flow	< 0.01	0.06	1.08	193.00	33.30	0.02	13.80	0.50	0.25	0.07	< 0.01	10.10	1.26	4.60
SW-N-41S1	FRM	Y	2024-12-16	Mean of duplicates	< 0.01	0.06	1.04	193.50	32.85	0.02	13.20	0.50	0.32	0.07	< 0.01	10.10	1.83	4.70
SW-N-41S1	RPD	Y		RPD Calculation	0.0%	10.6%	8.7%	0.5%	2.7%	12.8%	9.1%	2.0%	**41.1%** a	24.2%	0.0%	0%	**62.3%** a	4.3%
SW-N-41S1	FR1	Y	2025-02-20	Moderately low, very low turbidity, colourless	< 0.01	0.04	0.88	168.00	25.20	0.01	21.20	0.28	0.10	0.10	< 0.01	4.76	0.95	1.70
SW-N-41S1	FR2	Y	2025-02-20	Moderately low, very low turbidity, colourless	< 0.01	0.04	2.81	167.00	27.20	< 0.01	20.40	0.34	0.10	0.10	< 0.01	4.64	2.17	1.70
SW-N-41S1	FRM	Y	2025-02-20	Mean of duplicates	< 0.01	0.04	1.85	167.50	26.20	< 0.01	20.80	0.31	0.10	0.10	< 0.01	4.70	1.56	1.70
SW-N-41S1	RPD	Y		RPD Calculation	0.0%	5.6%	**104.4%** a	0.6%	7.6%	**57.1%** b	3.8%	19.1%	5.1%	1.0%	0.0%	3%	**78.2%** a	0.0%
SW-N-42S1	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	< 0.01	0.08	0.73	208.00	18.60	0.01	12.10	0.69	0.20	0.05	< 0.01		1.17	3.10
SW-N-42S1	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	< 0.01	0.08	2.71	208.00	37.90	0.01	12.20	0.64	0.42	0.05	< 0.01		3.22	3.00
SW-N-42S1	FRM	Y	2024-05-02	Mean of duplicates	< 0.01	0.08	1.72	208.00	28.25	0.01	12.15	0.67	0.31	0.05	< 0.01		2.20	3.05
SW-N-42S1	RPD	Y		RPD Calculation	0.0%	1.4%	**115.6%** a	0.0%	**68.3%** a	18.8%	0.8%	7.9%	**71.2%** a	3.8%	0.0%		**93.4%** a	3.3%
SW-N-42S1	FR1	Y	2024-10-22	Moderate-low flow. Clear and colourless sample.	< 0.01	0.08	0.57	242.00	36.70	0.01	29.90	0.63	0.29	0.09	< 0.01	10.60	1.07	3.90
SW-N-42S1	FR2	Y	2024-10-22	Moderate-low flow. Clear and colourless sample.	< 0.01	0.09	0.78	239.00	34.70	0.01	30.00	0.64	0.32	0.09	< 0.01	10.60	0.87	3.70
SW-N-42S1	FRM	Y	2024-10-22	Mean of duplicates	< 0.01	0.08	0.67	240.50	35.70	0.01	29.95	0.64	0.30	0.09	< 0.01	10.60	0.97	3.80
SW-N-42S1	RPD	Y		RPD Calculation	0.0%	7.7%	**31.0%** a	1.2%	5.6%	12.9%	0.3%	1.7%	11.3%	6.8%	0.0%	0%	20.6%	5.3%
SW-N-42S1	FR1	Y	2024-12-16	Clear and colourless, moderate flow	0.01	0.04	0.68	175.00	29.50	0.01	25.80	0.34	0.16	0.10	< 0.01	4.86	0.68	2.20
SW-N-42S1	FR2	Y	2024-12-16	Clear and colourless, moderate flow	< 0.01	0.04	0.60	177.00	30.20	0.01	25.70	0.33	0.14	0.09	< 0.01	4.84	0.71	2.20
SW-N-42S1	FRM	Y	2024-12-16	Mean of duplicates	< 0.01	0.04	0.64	176.00	29.85	0.01	25.75	0.33	0.15	0.09	< 0.01	4.85	0.70	2.20
SW-N-42S1	RPD	Y		RPD Calculation	**80.2%** b	0.7%	13.6%	1.1%	2.3%	4.1%	0.4%	4.5%	13.4%	11.9%	0.0%	0%	4.3%	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-2 Surface Water Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Aluminum	Arsenic	Boron	Cadmium	Chloride	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead	Manganese	Molybdenum	Nitrogen - Ammonia	Nitrogen - Nitrite
				Fraction	TOT	TOT	TOT	TOT	DIS	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	DIS
				Unit	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
				Detection Limit (DL)	3	0.02	10	0.005	1	0.005	0.05	0.5	5	0.02	0.1	0.05	0.03	0.005
				Limit of Quantification (5x DL)	15	0.1	50	0.025	5	0.025	0.25	2.5	25	0.1	0.5	0.25	0.15	0.025
SW-N-42S1	FR1	Y	2025-02-20	High flow, clear colourless	23.60	0.06	49.00	< 0.01	26.00	0.05	0.49	159.00	48.10	0.03	10.30	0.52	< 0.02	< 0.01
SW-N-42S1	FR2	Y	2025-02-20	High flow, clear colourless	23.70	0.05	48.00	< 0.01	26.00	0.06	0.57	157.00	46.80	0.03	9.73	0.51	< 0.02	< 0.01
SW-N-42S1	FRM	Y	2025-02-20	Mean of duplicates	23.65	0.06	48.50	< 0.01	26.00	0.06	0.53	158.00	47.45	0.03	10.02	0.51	< 0.02	< 0.01
SW-N-42S1	RPD	Y		RPD Calculation	0.4%	7.1%	2.1%	0.0%	0.0%	7.3%	15.1%	1.3%	2.7%	0.0%	5.7%	2.5%	0.0%	0.0%
SW-S-04	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	29.10	0.07	61.00	0.02	43.00	0.08	1.07	114.00	36.20	0.03	3.93	0.14	< 0.02	< 0.01
SW-S-04	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	17.10	0.07	65.00	0.01	43.00	0.07	0.98	111.00	15.80	0.02	2.50	0.11	< 0.02	< 0.01
SW-S-04	FRM	Y	2024-05-02	Mean of duplicates	23.10	0.07	63.00	0.01	43.00	0.07	1.03	112.50	26.00	0.03	3.22	0.13	< 0.02	< 0.01
SW-S-04	RPD	Y		RPD Calculation	**51.9%** a	8.7%	6.3%	24.2%	0.0%	22.6%	8.6%	2.7%	**78.5%** b	**36.7%** b	**44.5%** a	22.9%	0.0%	0.0%
SW-S-04	FR1	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	22.40	0.10	64.00	0.01	33.00	0.08	1.72	134.00	24.40	0.06	2.60	0.12	0.03	< 0.01
SW-S-04	FR2	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	24.60	0.10	62.00	0.01	32.00	0.09	1.72	131.00	31.30	0.04	2.70	0.12	< 0.02	< 0.01
SW-S-04	FRM	Y	2024-10-21	Mean of duplicates	23.50	0.10	63.00	0.01	32.50	0.08	1.72	132.50	27.85	0.05	2.65	0.12	< 0.02	< 0.01
SW-S-04	RPD	Y		RPD Calculation	9.4%	3.9%	3.2%	20.0%	3.1%	8.3%	0.0%	2.3%	24.8%	**35.3%** b	3.8%	5.0%	**60.5%** b	0.0%
SW-S-04	FR1	Y	2024-12-17	Moderate turbidity, grey, very high flow	7380.00	1.26	66.00	0.15	11.00	8.15	30.70	90.40	14900.00	9.19	562.00	0.55	0.14	0.02
SW-S-04	FR2	Y	2024-12-17	Moderate turbidity, grey, very high flow	6780.00	1.20	67.00	0.14	11.00	7.69	29.70	90.20	13000.00	9.31	553.00	0.53	0.14	0.02
SW-S-04	FRM	Y	2024-12-17	Mean of duplicates	7080.00	1.23	66.50	0.14	11.00	7.92	30.20	90.30	13950.00	9.25	557.50	0.54	0.14	0.02
SW-S-04	RPD	Y		RPD Calculation	8%	5%	2%	4%	0%	6%	3%	0%	14%	1%	2%	4%	0%	1%
SW-S-04	FR1	Y	2025-02-21	High flow, turbid, very grey	2960.00	0.80	39.00	0.08	59.00	3.51	17.50	89.90	5760.00	5.36	184.00	0.42	0.12	0.02
SW-S-04	FR2	Y	2025-02-21	High flow, turbid, very grey	3030.00	0.79	37.00	0.08	58.00	3.55	17.40	86.60	5750.00	5.23	189.00	0.42	0.13	0.02
SW-S-04	FRM	Y	2025-02-21	Mean of duplicates	2995.00	0.79	38.00	0.08	58.50	3.53	17.45	88.25	5755.00	5.30	186.50	0.42	0.13	0.02
SW-S-04	RPD	Y		RPD Calculation	2.3%	1.9%	5.3%	6.2%	1.7%	1.1%	0.6%	3.7%	0.2%	2.5%	2.7%	1.2%	8.0%	2.9%
SW-S-12	FR1	Y	2024-05-02	Moderate flow, nil turbidity, clear colourless	152.00	0.32	82.00	0.01	22.00	0.82	5.14	109.00	1840.00	0.22	297.00	0.13	3.00	0.09
SW-S-12	FR2	Y	2024-05-02	Moderate flow, nil turbidity, clear colourless	162.00	0.32	82.00	0.01	22.00	0.87	5.26	109.00	1860.00	0.21	307.00	0.14	3.00	0.09
SW-S-12	FRM	Y	2024-05-02	Mean of duplicates	157.00	0.32	82.00	0.01	22.00	0.85	5.20	109.00	1850.00	0.21	302.00	0.13	3.00	0.09
SW-S-12	RPD	Y		RPD Calculation	6%	1%	0%	4%	0%	6%	2%	0%	1%	0%	3%	10%	0%	1%
SW-S-12	FR1	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	104.00	0.26	48.00	0.06	9.50	0.48	11.50	192.00	240.00	0.11	61.10	0.11	0.13	0.01
SW-S-12	FR2	Y	2024-10-21		108.00	0.27	50.00	0.07	10.00	0.51	12.30	207.00	245.00	0.14	65.40	0.10	0.09	0.01
SW-S-12	FRM	Y	2024-10-21	Mean of duplicates	106.00	0.26	49.00	0.06	9.75	0.50	11.90	199.50	242.50	0.13	63.25	0.11	0.11	0.01
SW-S-12	RPD	Y		RPD Calculation	3.8%	4.9%	4.1%	3.1%	5.1%	6.5%	6.7%	7.5%	2.1%	22.2%	6.8%	6.5%	**33.2%** b	0.9%
SW-S-12	FR1	Y	2024-12-17	Clear, slightly yellow, high flow	2790.00	3.52	216.00	0.19	14.00	2.79	46.90	119.00	4660.00	32.00	211.00	1.09	0.93	0.03
SW-S-12	FR2	Y	2024-12-17		3270.00	3.77	222.00	0.18	14.00	3.09	47.80	115.00	5190.00	32.00	218.00	1.19	0.95	0.03
SW-S-12	FRM	Y	2024-12-17	Mean of duplicates	3030.00	3.65	219.00	0.18	14.00	2.94	47.35	117.00	4925.00	32.00	214.50	1.14	0.94	0.03
SW-S-12	RPD	Y		RPD Calculation	15.8%	6.9%	2.7%	4.4%	0.0%	10.2%	1.9%	3.4%	10.8%	0.0%	3.3%	8.8%	2.1%	1.0%
SW-S-12	FR1	Y	2025-02-24	Moderately high flow, clear and colourless	82.70	0.27	52.00	0.06	71.00	0.75	13.50	141.00	294.00	0.17	244.00	0.14	1.50	0.02
SW-S-12	FR2	Y	2025-02-24		68.40	0.26	51.00	0.04	70.00	0.69	12.40	141.00	282.00	0.10	229.00	0.11	1.50	0.02
SW-S-12	FRM	Y	2025-02-24	Mean of duplicates	75.55	0.26	51.50	0.05	70.50	0.72	12.95	141.00	288.00	0.13	236.50	0.12	1.50	0.02
SW-S-12	RPD	Y		RPD Calculation	18.9%	5.0%	1.9%	**30.2%** b	1.4%	8.4%	8.5%	0.0%	4.2%	**51.3%**	6.3%	20.2%	0.0%	0.0%

Notes:

FR1 *Field replicate 1*

FR2 *Field replicate 2*

FRM *Average of field replicates*

RPD *Relative percent difference of field replicates*

Bold *RPD greater than 30%*

a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*

b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-2 Surface Water Quality QA/QC - Relative Percent Difference 2024-2025

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Nitrogen - Nitrate		Nickel		Selenium		Silver		Sodium		Sulphate		TSS		Zinc		pH		Conductivity		Temperature		Aluminum		Arsenic		Boron	
				Fraction	DIS		TOT		TOT		TOT		TOT		DIS		TOT		TOT		TOT		TOT		TOT		DIS		DIS		DIS	
				Unit	mg/L		µg/L		µg/L		µg/L		mg/L		mg/L		mg/L		µg/L		pH		µS/cm		°C		µg/L		µg/L		µg/L	
				MAX Acceptable RPD	30%		30%		30%		30%		30%		30%		30%		30%		30%		30%		30%		30%		30%		30%	
				Detection Limit (DL)	0.02		0.02		0.04		0.005		0.05		1		1		0.1		0.01		0.1		0		0.5		0.02		10	
				Limit of Quantification (5x DL)	0.1		0.1		0.2		0.025		0.25		5		5		0.5		0.05		0.5		0		2.5		0.1		50	
SW-N-42S1	FR1	Y	2025-02-20	High flow, clear colourless	0.27		0.13		0.07	<	0.01		7.95		76.00		2.80		1.20		7.67		309.00		7.80		4.28		0.06		64.00	
SW-N-42S1	FR2	Y	2025-02-20	High flow, clear colourless	0.27		0.13		0.07	<	0.01		7.91		74.00		1.60		1.10		7.67		309.00		7.80		3.94		0.06		63.00	
SW-N-42S1	FRM	Y	2025-02-20	Mean of duplicates	0.27		0.13		0.07	<	0.01		7.93		75.00		2.20		1.15		7.67		309.00		7.80		4.11		0.06		63.50	
SW-N-42S1	RPD	Y		RPD Calculation	0.4%		0.0%		5.9%		0.0%		0.50%		2.7%		**54.5%**	b	8.7%		0.0%		0.0%		0.0%		8.3%		10.2%		1.6%	
SW-S-04	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.52		0.29		0.06	<	0.01				21.00	<	1.00		1.29		7.74		240.80		8.80		8.86		0.07		61.00	
SW-S-04	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.51		0.25		0.05	<	0.01				20.00	<	1.00		1.12		7.74		240.80		8.80		21.40		0.07		62.00	
SW-S-04	FRM	Y	2024-05-02	Mean of duplicates	0.51		0.27		0.05	<	0.01				20.50	<	1.00		1.21		7.74		240.80		8.80		15.13		0.07		61.50	
SW-S-04	RPD	Y		RPD Calculation	1.4%		18.2%		15.7%		0.0%				4.9%		0.0%		14.1%		0.0%		0.0%		0.0%		**82.9%**	a	1.4%		1.6%	
SW-S-04	FR1	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	4.62		0.41		0.10	<	0.01		18.90		59.00	<	1.00		2.60		7.15		303.00		11.50		10.40		0.12		70.00	
SW-S-04	FR2	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	4.60		0.46		0.10	<	0.01		18.00		60.00	<	1.00		2.40		7.15		303.00		11.50		10.70		0.11		70.00	
SW-S-04	FRM	Y	2024-10-21	Mean of duplicates	4.61		0.44		0.10	<	0.01		18.45		59.50	<	1.00		2.50		7.15		303.00		11.50		10.55		0.11		70.00	
SW-S-04	RPD	Y		RPD Calculation	0.4%		11.5%		0.0%		0.0%		4.88%		1.7%		0.0%		8.0%		0.0%		0.0%		0.0%		2.8%		6.3%		0.0%	
SW-S-04	FR1	Y	2024-12-17	Moderate turbidity, grey, very high flow	1.22		11.70		0.12		0.06		8.11		20.00		180.00		93.20		7.77		135.00		7.80		36.70		0.30		79.00	
SW-S-04	FR2	Y	2024-12-17	Moderate turbidity, grey, very high flow	1.18		10.90		0.11		0.05		8.23		20.00		180.00		91.90		7.77		200.00		7.80		40.50		0.29		83.00	
SW-S-04	FRM	Y	2024-12-17	Mean of duplicates	1.20		11.30		0.11		0.05		8.17		20.00		180.00		92.55		7.77		167.50		7.80		38.60		0.30		81.00	
SW-S-04	RPD	Y		RPD Calculation	3%		7%		9%		21%		1%		0%		0%		1%		0%		**39%**	a	0%		10%		3%		5%	
SW-S-04	FR1	Y	2025-02-21	High flow, turbid, very grey	1.21		5.64		0.08		0.03		22.80		20.00		73.00		49.30		7.08		235.00		7.10		51.80		0.22		56.00	
SW-S-04	FR2	Y	2025-02-21	High flow, turbid, very grey	1.20		5.92		0.08		0.03		22.50		20.00		72.00		49.70		7.08		235.00		7.10		46.50		0.21		50.00	
SW-S-04	FRM	Y	2025-02-21	Mean of duplicates	1.21		5.78		0.08		0.03		22.65		20.00		72.50		49.50		7.08		235.00		7.10		49.15		0.22		53.00	
SW-S-04	RPD	Y		RPD Calculation	0.8%		4.8%		1.3%		3.0%		1.32%		0.0%		1.4%		0.8%		0.0%		0.0%		0.0%		10.8%		4.1%		11.3%	
SW-S-12	FR1	Y	2024-05-02	Moderate flow, nil turbidity, clear colourless	2.75		1.72		0.07	<	0.01				18.00		8.80		3.74		7.12		252.10		12.50		11.90		0.28		85.00	
SW-S-12	FR2	Y	2024-05-02	Moderate flow, nil turbidity, clear colourless	2.81		1.78		0.08	<	0.01				18.00		6.40		3.80		7.12		252.10		12.50		11.80		0.29		85.00	
SW-S-12	FRM	Y	2024-05-02	Mean of duplicates	2.78		1.75		0.07	<	0.01				18.00		7.60		3.77		7.12		252.10		12.50		11.85		0.28		85.00	
SW-S-12	RPD	Y		RPD Calculation	2%		3%		9%		0%				0%		**32%**	a	2%		0%		0%		0%		1%		2%		0%	
SW-S-12	FR1	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	6.29		5.26		0.14	<	0.01		11.10		160.00		2.80		6.10		6.89		418.00		14.40		22.80		0.28		54.00	
SW-S-12	FR2	Y	2024-10-21		6.32		5.46		0.15	<	0.01		11.80		150.00		2.40		6.50		6.89		418.00		14.40		22.20		0.28		53.00	
SW-S-12	FRM	Y	2024-10-21	Mean of duplicates	6.31		5.36		0.15	<	0.01		11.45		155.00		2.60		6.30		6.89		418.00		14.40		22.50		0.28		53.50	
SW-S-12	RPD	Y		RPD Calculation	0.5%		3.7%		11.0%		0.0%		6.11%		6.5%		15.4%		6.3%		0.0%		0.0%		0.0%		2.7%		0.7%		1.9%	
SW-S-12	FR1	Y	2024-12-17	Clear, slightly yellow, high flow	2.84		6.69		0.17		0.07		11.50		52.00		85.00		91.20		6.58		310.00		8.60		67.00		1.39		242.00	
SW-S-12	FR2	Y	2024-12-17		2.95		7.28		0.16		0.09		11.30		52.00		79.00		93.40		6.58		320.00		8.60		65.40		1.35		261.00	
SW-S-12	FRM	Y	2024-12-17	Mean of duplicates	2.90		6.99		0.17		0.08		11.40		52.00		82.00		92.30		6.58		315.00		8.60		66.20		1.37		251.50	
SW-S-12	RPD	Y		RPD Calculation	3.8%		8.4%		3.0%		22.8%		1.75%		0.0%		7.3%		2.4%		0.0%		3.2%		0.0%		2.4%		2.9%		7.6%	
SW-S-12	FR1	Y	2025-02-24	Moderately high flow, clear and colourless	3.49		3.56		0.10	<	0.01		28.50		35.00		1.20		13.50		7.18		365.00		9.10		28.50		0.25		69.00	
SW-S-12	FR2	Y	2025-02-24		3.53		3.38		0.10	<	0.01		28.80		36.00		3.20		10.60		7.18		365.00		9.10		28.50		0.25		66.00	
SW-S-12	FRM	Y	2025-02-24	Mean of duplicates	3.51		3.47		0.10	<	0.01		28.65		35.50		2.20		12.05		7.18		365.00		9.10		28.50		0.25		67.50	
SW-S-12	RPD	Y		RPD Calculation	1.1%		5.2%		1.0%		0.0%		1.05%		2.8%		**90.9%**	b	24.1%		0.0%		0.0%		0.0%		0.0%		2.4%		4.4%	

Notes:

FR1 *Field replicate 1*
FR2 *Field replicate 2*
FRM *Average of field replicates*
RPD *Relative percent difference of field replicates*
Bold *RPD greater than 30%*
a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*
b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-2 Surface Water Quality QA/QC - Relative Percent Difference 2024-2025

AECOM

Station	Sample Type	Complance Well (Y/N)?	Date Sampled	Parameter	Cadmium	Cobalt	Copper	Hardness (As Caco3)	Iron	Lead	Manganese	Molybdenum	Nickel	Selenium	Silver	Sodium	Zinc	Dissolved Organic Carbon
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	Dissolved
				Unit	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L
				MAX Acceptable RPD	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	45%
				Detection Limit (DL)	0.005	0.005	0.05	0.5	1	0.005	0.05	0.05	0.02	0.04	0.005	0.05	0.1	0.5
				Limit of Quantification (5x DL)	0.025	0.025	0.25	2.5	5	0.025	0.25	0.25	0.1	0.2	0.025	0.25	0.5	2.5
SW-N-42S1	FR1	Y	2025-02-20	High flow, clear colourless	< 0.01	0.04	1.17	191.00	14.70	0.01	5.97	0.59	0.26	0.08	< 0.01	9.70	1.37	2.60
SW-N-42S1	FR2	Y	2025-02-20	High flow, clear colourless	< 0.01	0.04	0.86	190.00	12.20	0.01	6.10	0.59	0.20	0.08	< 0.01	9.32	1.19	2.60
SW-N-42S1	FRM	Y	2025-02-20	Mean of duplicates	< 0.01	0.04	1.02	190.50	13.45	0.01	6.04	0.59	0.23	0.08	< 0.01	9.51	1.28	2.60
SW-N-42S1	RPD	Y		RPD Calculation	0.0%	7.0%	**30.4%** a	0.5%	18.6%	11.5%	2.2%	0.8%	25.5%	1.3%	0.0%	4%	14.1%	0.0%
SW-S-04	FR1	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.01	0.07	0.94	110.00	2.70	< 0.01	0.66	0.13	0.26	0.04	< 0.01		1.01	2.20
SW-S-04	FR2	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.03	0.08	1.00	110.00	3.70	0.02	6.09	0.15	0.28	0.05	< 0.01		2.99	2.20
SW-S-04	FRM	Y	2024-05-02	Mean of duplicates	0.02	0.07	0.97	110.00	3.20	< 0.01	3.38	0.14	0.27	0.04	< 0.01		2.00	2.20
SW-S-04	RPD	Y		RPD Calculation	**87.5%** b	17.2%	6.2%	0.0%	**31.3%** b	**112.7%** b	**160.8%** a	9.3%	9.2%	4.5%	0.0%		**99.0%** a	0.0%
SW-S-04	FR1	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	0.01	0.07	1.66	139.00	3.70	< 0.01	0.82	0.14	0.38	0.09	< 0.01	19.40	2.76	3.50
SW-S-04	FR2	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	0.01	0.07	1.63	137.00	4.00	0.01	0.78	0.13	0.39	0.09	< 0.01	19.50	2.28	3.50
SW-S-04	FRM	Y	2024-10-21	Mean of duplicates	0.01	0.07	1.65	138.00	3.85	< 0.01	0.80	0.14	0.38	0.09	< 0.01	19.45	2.52	3.50
SW-S-04	RPD	Y		RPD Calculation	7.1%	3.1%	1.8%	1.4%	7.8%	11.3%	5.2%	5.2%	3.6%	8.9%	0.0%	1%	19.0%	0.0%
SW-S-04	FR1	Y	2024-12-17	Moderate turbidity, grey, very high flow	0.01	0.12	3.41	70.30	59.00	0.17	12.10	0.41	0.71	0.06	< 0.01	8.80	5.05	5.60
SW-S-04	FR2	Y	2024-12-17	Moderate turbidity, grey, very high flow	0.01	0.12	3.49	68.00	68.30	0.18	12.60	0.41	0.75	0.04	< 0.01	8.81	5.22	5.70
SW-S-04	FRM	Y	2024-12-17	Mean of duplicates	0.01	0.12	3.45	69.15	63.65	0.17	12.35	0.41	0.73	0.05	< 0.01	8.81	5.14	5.65
SW-S-04	RPD	Y		RPD Calculation	7%	3%	2%	3%	15%	6%	4%	0%	5%	**32%** b	0%	0%	3%	2%
SW-S-04	FR1	Y	2025-02-21	High flow, turbid, very grey	0.01	0.12	3.45	95.00	77.10	0.19	10.00	0.41	0.80	0.05	< 0.01	28.00	5.83	4.80
SW-S-04	FR2	Y	2025-02-21	High flow, turbid, very grey	0.01	0.12	3.32	87.50	76.80	0.18	9.73	0.40	0.79	0.05	< 0.01	26.00	5.38	4.80
SW-S-04	FRM	Y	2025-02-21	Mean of duplicates	0.01	0.12	3.39	91.25	76.95	0.18	9.87	0.40	0.79	0.05	< 0.01	27.00	5.61	4.80
SW-S-04	RPD	Y		RPD Calculation	13.9%	0.0%	3.8%	8.2%	0.4%	6.1%	2.7%	3.5%	2.0%	6.3%	0.0%	7%	8.0%	0.0%
SW-S-12	FR1	Y	2024-05-02	Moderate flow, nil turbidity, clear colourless	0.01	0.65	3.43	106.00	616.00	0.05	298.00	0.13	1.57	0.05	< 0.01		2.51	5.00
SW-S-12	FR2	Y	2024-05-02	Moderate flow, nil turbidity, clear colourless	0.01	0.66	3.27	109.00	617.00	0.05	303.00	0.15	1.58	0.06	< 0.01		2.87	4.90
SW-S-12	FRM	Y	2024-05-02	Mean of duplicates	0.01	0.65	3.35	107.50	616.50	0.05	300.50	0.14	1.58	0.06	< 0.01		2.69	4.95
SW-S-12	RPD	Y		RPD Calculation	11%	2%	5%	3%	0%	2%	2%	9%	1%	11%	0%		13%	2%
SW-S-12	FR1	Y	2024-10-21	Moderate-high flow. Clear and colourless sample.	0.07	0.44	11.10	209.00	31.50	0.01	68.00	0.10	5.64	0.17	< 0.01	12.10	6.03	5.60
SW-S-12	FR2	Y	2024-10-21		0.06	0.43	11.10	211.00	31.20	0.01	67.80	0.12	5.66	0.15	< 0.01	12.30	6.06	5.50
SW-S-12	FRM	Y	2024-10-21	Mean of duplicates	0.07	0.43	11.10	210.00	31.35	0.01	67.90	0.11	5.65	0.16	< 0.01	12.20	6.05	5.55
SW-S-12	RPD	Y		RPD Calculation	2.0%	3.2%	0.0%	1.0%	1.0%	18.0%	0.3%	13.7%	0.4%	11.5%	0.0%	2%	0.5%	1.8%
SW-S-12	FR1	Y	2024-12-17	Clear, slightly yellow, high flow	0.06	0.75	14.70	113.00	220.00	1.25	153.00	0.92	3.35	0.11	< 0.01	12.10	32.00	21.00
SW-S-12	FR2	Y	2024-12-17		0.06	0.74	14.50	111.00	219.00	1.20	153.00	0.92	3.28	0.09	< 0.01	12.00	30.60	20.00
SW-S-12	FRM	Y	2024-12-17	Mean of duplicates	0.06	0.74	14.60	112.00	219.50	1.23	153.00	0.92	3.32	0.10	< 0.01	12.05	31.30	20.50
SW-S-12	RPD	Y		RPD Calculation	2.0%	0.7%	1.4%	1.8%	0.5%	4.1%	0.0%	0.0%	2.1%	21.5%	0.0%	1%	4.5%	4.9%
SW-S-12	FR1	Y	2025-02-24	Moderately high flow, clear and colourless	0.05	0.61	11.00	151.00	170.00	0.04	239.00	0.14	3.30	0.09	< 0.01	31.60	9.90	6.40
SW-S-12	FR2	Y	2025-02-24		0.04	0.61	11.00	148.00	171.00	0.03	236.00	0.12	3.25	0.08	< 0.01	31.60	9.87	6.40
SW-S-12	FRM	Y	2025-02-24	Mean of duplicates	0.04	0.61	11.00	149.50	170.50	0.03	237.50	0.13	3.28	0.09	< 0.01	31.60	9.89	6.40
SW-S-12	RPD	Y		RPD Calculation	16.3%	0.8%	0.0%	2.0%	0.6%	19.1%	1.3%	16.6%	1.5%	9.4%	0.0%	0%	0.3%	0.0%

Notes:

FR1 *Field replicate 1*
FR2 *Field replicate 2*
FRM *Average of field replicates*
RPD *Relative percent difference of field replicates*
Bold *RPD greater than 30%*
a *- Coefficient of variation greater than 30% and all replicates greater than the limit of quantitation.*
b *- Coefficient of variation greater than 30% with some replicates less than the limit of quantitation.*

Table 3-3 Leachate Quality QA/QC - Relative Percent Difference 2024-2025

AECOM

State	Parameter	Units	Detection Limit	LOQ	Maximum Acceptable RPD	Hartland Valve Chamber FR1 13-Apr-2023	Hartland Valve Chamber FR2 13-Apr-2023	Hartland Valve Chamber FR2 13-Apr-2023	RPD %	Hartland Valve Chamber FR1 24-Aug-2023	Hartland Valve Chamber FR2 24-Aug-2023	Hartland Valve Chamber FR2 13-Apr-2023	RPD %	Hartland Valve Chamber FR1 09-Nov-2024	Hartland Valve Chamber FR2 09-Nov-2024	Hartland Valve Chamber FR2 13-Apr-2023	RPD %	Hartland Valve Chamber FR1 24-Feb-2024	Hartland Valve Chamber FR2 24-Feb-2024	Hartland Valve Chamber FR2 13-Apr-2023	RPD %
Conventionals																					
TOT	Total Sulphide	mg/L	0.002	0.009	30%	0.015	0.0094	0.01220	**45.9%** a	0.015	0.041	0.03	**92.9%** a	0.025	0.022	0.024	12.8%	0.049	0.029	0.029	
DISS	Dissolved Sulphide	mg/L	0.01	0.05	30%	0.013	0.019	0.016	**37.5%** b	0.020	< 0.008	0.01	**81.7%** b	0.024	0.033	0.029	**31.6%** b	0.029	0.058	0.054	16.8%
TOT	TSS	mg/L	1	5	30%	9.20	8.40	8.80	9.1%	56.00	47.00	51.50	17.5%	42.00	55.00	48.50	26.8%	42.00	55.00	48.50	**26.8%** a
TOT	BOD	mg/L	2	10	30%	10	10	10		70	64	67	9.0%	24	27	26	11.8%	24	27	26	11.8%
TOT	COD	mg/L	10	50	30%	254	261	258	2.7%	597	609	603	2.0%	445	1040	743	**80.1%** a	445	1040	743	**80.1%** a
DISS	Chloride	mg/L	1	5	30%	180	180	180		360	370	365	2.7%	260	260	260		260	260	260	
DISS	Sulphate	mg/L	1	5	30%	61	64	63	4.8%	< 1	110	56	**196.4%** b	57	60	59	5.1%	57	60	59	5.1%
TOT	Oil & Grease, Total	mg/L	1	5	30%	1.0	< 1.0	1.0		1.0	< 1.0	1.0		2.2	1.6	1.9	**31.6%**	2.2	1.6	1.9	**31.6%** b
TOT	Oil & Grease, Mineral	mg/L	2	10	45%	< 2.0	< 2.0	< 2.0		< 2.0	< 2.0	< 2.0		< 2.0	< 2.0	2.0		< 2.0	< 2.0	2.0	
TOT	Cyanide - SAD (total)	mg/L	0.001	0.003	30%	0.01	0.01	0.01	22.6%	0.02	0.01	0.01	**83.0%**	0.01	0.01	0.01	19.2%	0.01	0.01	0.01	19.2%
TOT	Cyanide - WAD	mg/L	0.0005	0.003	30%	0.0062	0.0026	0.0044	**81.8%** b	0.0086	< 0.0005	0.0046	**178.1%** a	< 0.0025	0.0040	0.0033	**46.2%** b	< 0.0025	0.0040	0.0033	**46.2%** b
TOT	Phenols	mg/L	0.02	0.08	45%	< 0.01	< 0.01	< 0.01	13.7%					0.01	0.01	0.01	7.4%	0.01	0.01	0.01	7.4%
TOT	Ammonia	mg/L	2	8	30%	84	57	70.5	**38.3%** a	320	310	315	3.2%	270	250	260	7.7%	270	250	260	7.7%
TOT	Nitrite	mg/L	0.01	0.03	30%	0.94	0.99	0.96	4.9%	0.34	0.18	0.26	**58.7%** a	0.80	0.80	0.80	1.0%	0.80	0.80	0.80	1.0%
TOT	Nitrate	mg/L	0.02	0.1	30%	5.36	5.24	5.30	2.3%	0.74	0.68	0.71	8.5%	6.62	6.71	6.67	1.4%	6.62	6.71	6.67	1.4%
TOT	pH	pH	0.01	0.05	30%	7.50	7.50	7.50		7.68	7.68	7.68		8.12	8.12	8.12		8.12	8.12	8.12	
TOT	Conductivity	µS/cm	0.1	1	30%	3120	3120	3120		5012	5012	5012		1693	1693	1693		1693	1693	1693	
TOT	Temperature	°C	0.1	1	30%	14.20	14.20	14.20		17.60	17.60	17.60		17.10	17.10	17.10		17.10	17.10	17.10	
TOT	Dissolved Oxygen	mg/L	0.01	0.05	30%	3.45	3.45	3.45		0.83	0.83	0.83		2.16	2.16	2.16		2.16	2.16	2.16	
TOT	ORP	mV	1	5	30%	135	135	135		102.1	102.1	102.1		111.2	111.2	111.2		111.2	111.2	111.2	
Total Metals																					
TOT	Arsenic	µg/L	0.04	0.2	30%	4.89	4.71	4.80	3.7%	11.00	10.60	10.80	3.7%	7.81	7.54	7.68	3.5%	7.81	7.54	7.68	3.5%
TOT	Cadmium	µg/L	0.01	0.05	30%	0.16	0.11	0.13	**39.4%** a	0.03	0.03	0.03	3.0%	0.06	0.05	0.06	9.0%	0.06	0.05	0.06	9.0%
TOT	Chromium	µg/L	0.2	1.0	30%	27.00	27.40	27.20	1.5%	69.60	67.70	68.65	2.8%	58.30	55.30	56.80	5.3%	58.30	55.30	56.80	5.3%
TOT	Cobalt	µg/L	0.02	0.1	30%	6.47	6.66	6.57	2.9%	15.90	15.30	15.60	3.8%	11.70	11.50	11.60	1.7%	11.70	11.50	11.60	1.7%
TOT	Copper	µg/L	0.2	1.0	30%	7.60	7.77	7.69	2.2%	7.77	7.29	7.53	6.4%	9.49	9.16	9.33	3.5%	9.49	9.16	9.33	3.5%
TOT	Iron	µg/L	10	50	30%	960	1010	985	5.1%	2700	2590	2645	4.2%	1480	1450	1465	2.0%	1480	1450	1465	2.0%
TOT	Lead	µg/L	0.04	0.2	30%	0.78	0.72	0.75	7.3%	0.77	0.74	0.76	4.2%	0.83	0.82	0.82	1.9%	0.83	0.82	0.82	1.9%
TOT	Manganese	µg/L	0.2	1.0	30%	404	413	408.5	2.2%	392	376	384	4.2%	445	441	443	0.9%	445	441	443	0.9%
TOT	Mercury	µg/L	0.02	0.1	30%	< 0.03	< 0.03	< 0.03		< 0.01	< 0.01	0.01	16.4%	< 0.02	0.02	0.02	19.0%	< 0.02	0.02	0.02	19.0%
TOT	Molybdenum	µg/L	0.1	0.5	30%	5.94	5.48	5.71	8.1%	1.25	1.29	1.27	3.1%	2.47	2.16	2.32	13.4%	2.47	2.16	2.32	13.4%
TOT	Nickel	µg/L	0.2	1	30%	17.00	17.60	17.30	3.5%	45.00	42.70	43.85	5.2%	33.40	33.10	33.25	0.9%	33.40	33.10	33.25	0.9%
TOT	Selenium	µg/L	0.08	0.4	30%	0.31	0.41	0.36	29.1%	0.55	0.5	0.52	9.2%	0.50	0.49	0.49	1.0%	0.50	0.49	0.49	1.0%
TOT	Sodium	µg/L	50	250	30%	220	222	221	0.9%	294	290	292	1.4%	206	214	210	3.8%	128	122	125	4.8%
TOT	Silver	µg/L	0.02	0.1	30%	0.04	0.04	0.04	12.3%	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	0.02		< 0.02	< 0.02	0.02	
TOT	Zinc	µg/L	2	10	30%	13.30	16.70	15.00	22.7%	18.30	61.40	39.85	**108.2%** a	16.30	20.00	18.15	20.4%	16.30	20	18.15	20.4%
BTEX																					
DISS	Benzene	µg/L	0.4	2	45%	< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	0.4		0.4	< 0.4	0.4	
DISS	Toluene	µg/L	0.4	2	45%	< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	< 0.4		0.95	0.71	0.83	28.9%	0.95	0.71	0.83	28.9%
DISS	Ethylbenzene	µg/L	0.4	2	45%	< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	0.4		< 0.4	< 0.4	0.4	
DISS	Xylenes	µg/L	0.4	2	45%	< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	< 0.4		< 0.4	< 0.4	0.4		< 0.4	< 0.4	0.4	
PAH																					
TOT	Total PAH	µg/L	0.01	0.05	45%	1.90	1.90	1.90		2.40	2.80	2.60	15.4%	14.00	14.00	14.00		14.00	14.00	14.00	
TOT	Acenaphthene	µg/L	0.01	0.05	45%	0.13	0.10	0.11	27.1%	0.22	0.22	0.22		3.20	3.30	3.25	3.1%	3.20	3.30	3.25	3.1%
TOT	Acenaphthylene	µg/L	0.01	0.05	45%	0.014	0.010	0.012	33.3%	0.020	0.024	0.022	18.2%	0.026	0.025	0.026	3.9%	0.026	0.025	0.026	3.9%
TOT	Anthracene	µg/L	0.01	0.05	45%	0.09	0.09	0.09	2.2%	0.20	0.22	0.21	9.5%	0.37	0.37	0.37		0.37	0.37	0.37	
TOT	Benzo(a)anthracene	µg/L	0.01	0.05	45%	0.11	0.12	0.12	8.7%	0.10	0.12	0.11	20.2%	0.15	0.16	0.16	6.5%	0.15	0.16	0.16	6.5%
TOT	Benzo(a)pyrene	µg/L	0.005	0.025	45%	0.031	0.031	0.031		0.032	0.037	0.035	14.5%	0.039	0.043	0.041	9.8%	0.039	0.043	0.041	9.8%
TOT	Benzo(b,j)fluoranthene	µg/L	0.01	0.05	45%	0.066	0.062	0.064	6.3%	0.061	0.064	0.063	4.8%	0.058	0.068	0.063	15.9%	0.058	0.068	0.063	15.9%
TOT	Benzo(g,h,i)perylene	µg/L	0.02	0.1	45%	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	0.02		< 0.02	< 0.02	0.02	
TOT	Benzo(k)fluoranthene	µg/L	0.01	0.05	45%	0.024	0.020	0.022	18.2%	0.024	0.018	0.021	28.6%	0.029	0.026	0.028	10.9%	0.029	0.026	0.028	10.9%
TOT	Chrysene	µg/L	0.01	0.05	45%	0.13	0.12	0.125	8.0%	0.13	0.14	0.135	7.4%	0.13	0.16	0.145	20.7%	0.13	0.16	0.145	20.7%
TOT	Dibenzo(a,h)anthracene	µg/L	0.02	0.1	45%	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	0.02		< 0.02	< 0.02	0.02	
TOT	Fluoranthene	µg/L	0.01	0.05	45%	0.69	0.69	0.69		0.48	0.64	0.56	28.6%	1.10	1.10	1.10		1.10	1.10	1.10	
TOT	Fluorene	µg/L	0.01	0.05	45%	0.11	0.11	0.11		0.19	0.19	0.19		1.90	2.00	1.95	5.1%	1.90	2.00	1.95	5.1%
TOT	Indeno(1,2,3-c,d)pyrene	µg/L	0.02	0.1	45%	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	0.02		< 0.02	< 0.02	0.02	
TOT	Naphthalene	µg/L	0.01	0.05	45%	0.02	0.02	0.02	5.4%	0.20	0.17	0.19	16.2%	3.50	3.40	3.45	2.9%	3.50	3.40	3.45	2.9%
TOT	Phenanthrene	µg/L	0.01	0.05	45%	0.013	0.024	0.019	**59.5%** b	0.086	0.1	0.093	15.1%	0.91	0.93	0.92	2.2%	0.91	0.93	0.92	2.2%
TOT	Pyrene	µg/L	0.01	0.05	45%	0.49	0.47	0.48	4.2%	0.65	0.68	0.67	4.5%	0.71	0.76	0.74	6.8%	0.71	0.76	0.74	6.8%
Chlorinated Phenols																					
TOT	Chlorinated phenols (total)	µg/L	0.41	2.05	45%	< 0.1	< 0.1	< 0.1													
TOT	Total Dichlorophenols	µg/L	0.22	1.1	45%	< 0.1	< 0.1	< 0.1													
TOT	Total Monochlorophenols	µg/L	0.09	0.45	45%	< 0.08	< 0.08	< 0.08													
TOT	Total Nonchlorinated phenols	µg/L	1.6	8	45%	< 10	< 10	< 10													
TOT	Total Phenolic Compounds	µg/L	0.17	0.85	45%	< 0.1	< 0.1	< 0.1													
TOT	Total Tetrachlorophenols	µg/L	0.17	0.85	45%	< 0.1	< 0.1	< 0.1													
TOT	Total Trichlorophenols	µg/L	0.24	1.2	45%	< 0.08	< 0.08	< 0.08													
TOT	2-Chlorophenol	µg/L	0.05	0.25	45%	< 0.1	< 0.1	< 0.1													
TOT	2,4 + 2,5 Dichlorophenol	µg/L	0.1	0.5	45%	< 0.1	< 0.1	< 0.1													
TOT	2,4,6-Trichlorophenol	µg/L	0.1	0.5	45%	< 0.1	< 0.1	< 0.1													
TOT	Pentachlorophenol	µg/L	0.1	0.5	45%	< 0.1	< 0.1	< 0.1													
TOT	2,3,4,5-Tetrachlorophenol	µg/L	0.1	0.5	45%	< 0.1	< 0.1	< 0.1													
TOT	2,3,4,6-Tetrachlorophenol	µg/L	0.1	0.5	45%	< 0.1	< 0.1	< 0.1													

Notes:

FR1, FR2 - Field replicates 1 and 2.

FRM - Mean of field replicates.

MDL - Method detection limit.

COV - Coefficient of Variation

LOQ - Limit of quantification.

RPD - Relative percent difference.

na - Not applicable, some replicates less than the detection limit.

a - *Relative Standard Difference greater than 30% for general inorganic parameters/metals and 45% for organic parameters and all replicates greater than the limit of quantitation.*

b - *Relative Standard Difference greater than 30% for general inorganic parameters/metals and 45% for organic parameters, with some replicates less than the limit of quantitation.*

3.4 Summary

In summary, the 2024/25 quality assurance (QA) analysis indicates the following:

- Duplicate sampling frequencies of 17.9% (60/335 samples) for groundwater, 26.4% (24/91 samples) for surface water, 25% (4/16 samples) for the Hartland Valve Chamber, and 7.27% (4/55 samples) for the overall leachate sampling program. Overall, duplicate samples were collected at a frequency of approximately 18.3% (88/481), exceeding the targeted duplicate sampling rate of 10%.
- Groundwater sampling and the laboratory analysis produced reliable results. The QA results indicated a total of 24 samples and 32 analytical results across 41 parameters exceeded the RPD alert limits when all parameter concentrations were above the LOQ. Dissolved aluminum, copper, and zinc concentrations exhibited a relatively high number RPD exceedances (6 to 13 analytical results each) and should be interpreted with caution.
- Surface water sampling and laboratory analysis produced reliable results. The QA results indicated a total of 51 samples and 45 analytical results across 42 parameters exceeded the RPD alert limits when all parameters were above the LOQ. Dissolved copper and zinc concentrations exhibited a relatively high number RPD exceedances (4 analytical results each) and should be interpreted with caution.
- Leachate sampling and laboratory analysis produced reliable results. A total of 4 samples and 10 analytical results across 69 parameters had RPD values that exceeded alert limits when concentrations in both replicates were above the LOQ.
- A Mann-Kendall statistical trend analyses was conducted to evaluate temporal trends in water quality at the landfill. The analysis is targeted at parameters that are known indicators of leachate and aggregate influences. Water quality data collected from 91 groundwater monitoring wells, 10 leachate purge wells, 29 surface water stations, and one (1) leachate compliance monitoring point were included in the analysis. The results of trend analyses are discussed in the groundwater and surface water quality sections of this report.

4. Groundwater Flow

4.1 Data

Interpretation of groundwater flow patterns at the landfill is based on analysis and synthesis of several data sources. Groundwater levels are impacted primarily by the regional geology, drawdown induced by the North and South Purge wells, drawdown induced by the Phase 2 leachate collection system, and the presence of bedrock fractures and faults.

In 2024/25, the following data was provided:

- Continuous water and leachate level monitoring from the SCADA system installed in the Lower Leachate Lagoon, Upper Leachate Lagoon, Phase 2 basin (i.e., Heal Basin), wells GW-36-1-1 and GW-37-1-1, and one monitoring well located north of Phase 1 (GW-40-1-1).
- Continuous groundwater level monitoring using the SCADA system installed in five purge wells south of Phase 1 (P1, P2, P3, P4 and P10).
- Continuous water level monitoring in four monitoring wells east of Phase 1 (GW-17-1-1, GW-18-1-1, GW-54-1-1 and GW-76-1-1).
- Continuous groundwater level and flow monitoring using the SCADA system installed in the North Purge Wells (GW-80-1-0-P8, GW-81-1-0-P9 and GW-52-4-0-P7) and two monitoring wells located north of Phase 1 (GW-52-3-0 and GW-52-1-1).
- Continuous water level monitoring in 10 wells north of Phase 2 (GW-41-1-1, GW-43-1-1, GW-44-1-1, GW-62-1-1, GW-77-1-1, GW-87-1-1, GW-87-2-1, GW-88-1-1 and GW-88-2-1).
- Continuous water level monitoring in four wells installed in the Hartland North Ridge area (GW-91-1-1, GW-92-1-1, and GW-94-1-1).
- The presence and elevation of topography, refuse, engineered covers, temporary tarps, ditches, and surface water features.
- Daily precipitation data collected from the Hartland Climate Station (Victoria Hartland CS).

Manually measured groundwater elevations from 2024/25 are presented in Appendix A.3. The groundwater flow patterns illustrated in Figure 4-1 were interpreted based on the groundwater elevations measured in September 2024. The data indicate that there are two separate groundwater flow systems at the landfill. One is a regional groundwater flow system in the bedrock surrounding and underlying the landfill; the second is a perched system contained within Phase 1. Although the flow systems are separate, the presence of the leachate mound within Phase 1 influences groundwater flow in underlying bedrock. Understanding these two flow systems is important for evaluating the effectiveness of leachate control and containment systems.

In September 2024, monitoring wells GW-111-1-1, GW-111-2-1, GW-112-1-1, and GW-112-2-1 were installed downgradient of the Northeast Stockpile, and manual water level measurements were collected at these wells from November onward. During the same drilling program, GW-113-1-1 and GW-113-2-1 were installed along the North Ridge to replace monitoring wells GW-78-1-1 and GW-78-2-1, which were decommissioned in Q1 of 2024. Water level measurements were collected from these wells in November and late-January. Monitoring groundwater levels along the North Ridge is critical for assessing the structure of the hydraulic trap, so these wells should be instrumented with pressure transducers.

4.2 Regional Groundwater Flow in the Bedrock

Figure 4-1 presents an interpretation of the regional groundwater flow regime based on groundwater level measurements collected from wells screened in bedrock and deep wells completed in refuse, as observed in September 2024. Figure 4-2 is a cross-section that extends from north of the leachate lagoons to the south of Phase 1 and depicts groundwater flow in a north-south direction. Figure 4-3 shows groundwater flow in section along an east-west transect extending from the bedrock ridge northwest of Phase 2 to the eastern property boundary.

Within the landfill footprint, several wells (GW-75-1-1, VLGW-02-D, VLGW-03-D, VLGW-08-D, VLGW-15-D, VLGW-16-D and VLGW-17-D) are screened at or near the bottom of the waste and their water levels are interpreted as being partly

representative of the regional groundwater flow system within bedrock underlying the landfill. Geological structures including the Highland Fault and another inferred fault near monitoring well GW-77-1-1 are shown in plan on Figure 4-1 and in cross section in Figure 4-2 and Figure 4-3. Measured groundwater elevations and hydrogeologic testing indicated that these structures influence local-scale groundwater flow patterns.

Regional groundwater flow near the landfill is influenced by bedrock structures, topography, and the presence of surface water features. The regional groundwater flow direction is from southwest to northeast (i.e. from Mount Work toward the north-south trending valley that underlies the northern portions of the Phase 1 and Phase 2 landfills). Leachate-impacted groundwater in the landfill is collected and discharged to the Lower Leachate Lagoon via the Phase 2 basin leachate collection system, micro-tunnel, and the North Purge Wells located north of Phase 1 (GW-52-4-0-P7, GW-80-1-0-P8, and GW-81-1-0-P9).

As shown on Figure 4-1, there is an inferred groundwater flow divide located near the south end of the landfill and a small portion of groundwater below the south portion Phase 1 flows toward the southeast. This flow divide trends roughly along a bedrock high in the valley floor beneath the landfill. Southeastward groundwater flow below the landfill is constrained by a constructed clay berm/bedrock grout curtain that was installed at the south end of the landfill in the 1980s, and by five purge wells (P1, P2, P3, P4 and P10) that began pumping leachate in 2001. Leachate collected by the south purge well network is pumped from the south pumping station to the Lower Leachate Lagoon.

From the North Ridge, groundwater flows radially from north to south. Groundwater flowing north and northeast migrates offsite, and the remaining groundwater is captured by the Phase 2 leachate collection system. North of the Site, groundwater flows toward Durrance Creek.

East of the landfill, along the bedrock ridge between the Site and Kiowa Place Road, groundwater flows toward the northern portion of the Phase 1 landfill. Further east, the topography begins to slope eastward towards the Tod Creek valley, and the groundwater flow direction is eastward toward Tod Creek.

4.3 Leachate Elevations in Phase 1 and Phase 2

4.3.1 Phase 1

Groundwater monitoring wells installed at varying depths in Phase 1 allow for measurement of leachate levels and interpretation of flow directions within the refuse. In addition to the monitoring wells, groundwater level data is collected manually from selected landfill gas wells in Phase 1. The leachate plume in in Phase 1 is depicted along a north-south cross section (transect A-A') in Figure 4-2**,** based on groundwater and leachate level measurements collected in September 2024. Many wells shown in section on Figure 4-2 are located into and out of the page by tens of metres, and leachate levels fluctuate in both directions. Furthermore, leachate levels rise both into and out of the section around the purge wells because of the drawdown cone they induce.

During the operating years of the Phase 1 landfill, the leachate mound within Phase 1 reached an elevation of approximately 160 m asl. A final cover that incorporated a geomembrane liner was installed on Phase 1 in 1997 to limit infiltration. As shown on Figure 4-2, the leachate mound in the refuse is above the regional bedrock groundwater flow system, and the hydraulic gradient is downward. The downward gradient in the central portion of the landfill reverse to inward/upward gradients due to pumping at the leachate collection purge wells in the north and south areas of the landfill. In 2024/25, leachate elevations within Phase 1 were generally below 155 m asl, reflecting an approximate 5 m decrease in the elevation of the leachate mound since capping of the Phase 1 landfill.

Figure 4-5 presents leachate elevations in seven (7) landfill gas monitors in the Phase 1 landfill. The leachate levels at most monitoring points (e.g., VLGW-04-D and VLGW-18-D) exhibited greater variability in 2024/25 than in previous monitoring years. Like previous years, leachate levels in the deep gas monitors (VLGW-02-D, VLGW-03-D, VLGW-08-D, VLGW-15-D, VLGW-16-D and VLGW-17-D) fluctuated in response to seasonal variability in groundwater recharge, indicating that the lower portions of the Phase 1 landfill are connected hydraulically to the regional groundwater flow system.

In March 2019, a pressure transducer was installed in GW-89-2-1 to record leachate levels continuously, but the pressure transducer malfunctioned in March 2022 and has not been replaced. Manual measurements were collected from GW-89-2-1 to monitor leachate levels from March 2022 onward. As shown on Figure 4-5, leachate elevations in GW-89-2-1 have decreased since 2022, averaging about 148.5 m asl in 2024/25.

In November 2018, well GW-89-1-1 was completed at the bottom of the refuse to facilitate monitoring of the leachate mound and replace the decommissioned well GW-74-1-1. The pressure transducer installed in GW-89-1-1 has malfunctioned occasionally over the past few monitoring years, but data collected from the transducer in 2024/25 indicated that the average leachate elevation was approximately 151.5 m asl, and the maximum leachate elevation was 152.24 masl.

Well GW-75-1-1 is located on the north end of Phase 1, downgradient of wells GW-89-1-1 and GW-89-2-1 and is used to monitor the deep regional water table. At this location, groundwater levels have decreased slowly over the past several monitoring years. In 2024/25, groundwater elevations in GW-75-1-1 averaged of 127.9 m asl, and in 2023/24, the annual average was 129.01 m asl.

VLGW-21-D and VLGW-26-D were completed approximately 50 m upgradient of GW-75-1-1. Historically, groundwater elevations were higher at VLGW-26-D than they were at VLGW-21-D, but in early 2023, groundwater levels at VLGW-21-D increased and have remained elevated since then. This trend indicates a greater component of groundwater flow toward the Phase 1 landfill from topographic high east of Phase 1, as illustrated by the potentiometric contours in Figure 4-1.

4.3.2 Phase 2 Basin

The Phase 2 landfill is in a bedrock basin situated immediately west of the Phase 1 landfill. Phase 2 is segregated into multiple cells: Cell 1 and Cell 2 are complete, cells 3 and 4 are active, and Cell 5 is under construction. Leachate from Cell 1 and Cell 2 is captured in a 350 mm diameter micro-tunnel that drains by gravity to the Lower Leachate Lagoon. All leachate from the Lower Lagoon is discharged to the sanitary sewer via the leachate pipeline. A geomembrane liner separates Cell 2 and Cell 3. Leachate from Cell 3 is captured via the Toutle Drain, which discharges to the Upper Leachate Lagoon. Groundwater in Cell 4 is captured by the Phase 2 basin and the Leachate Drain, which convey leachate to the Lower Lagoon.

Figure 4-8 presents hydrographs for the groundwater monitoring wells and leachate wells located north of the Phase 2 basin, as well as leachate elevations in the Upper and Lower Leachate lagoons and the Phase 2 Basin. Groundwater levels north of Phase 2 must be higher than leachate levels within Phase 2 for the hydraulic trap to operate. Leachate elevations within the Phase 2 basin are typically around 113-114 m asl, or 8 to 10 m lower than groundwater elevations outside the basin (AECOM 2020b). In 2024/25, the average leachate elevation in Phase 2 was 114.11 m asl, as indicated by the SCADA system.

Important groundwater level monitoring points north of Phase 2 include locations 38, 39, 62, 77, and 113. Groundwater elevations in all monitoring wells north of Phase 2 continued to exceed leachate elevations within Phase 2, indicating that the leachate collection system functioned effectively. Since 2022, groundwater levels in GW-62-1-1 and GW-77-1-1 have decreased slowly, likely in response to quarrying in the Toutle Valley. Groundwater elevations in this area and along the North Ridge should be monitored closely in 2025/26 to assess whether the Cell 4 liner impacts groundwater elevations and hydraulic gradients.

Leachate monitoring wells GW-82-1-1, GW-83-1-1, GW-90-1-1, and GW-90-2-1 were installed in the Phase 2 Basin to investigate and verify leachate capture. Drilling observations and long-term monitoring have indicated that the waste mass was moist but largely unsaturated. In 2024/25, leachate levels were lower at GW-90-1-1, and GW-90-2-1 than they were in 2023/24, and downward hydraulic gradients persisted. Leachate levels in GW-82-1-1 and GW-83-1-1 were consistent with historical measurements. These observations suggest that leachate levels were low and leachate was contained by the Phase 2 basin.

It is imperative that leachate levels in each phase of the landfill are closely monitored to verify seismic stability, confirm that the Leachate Collection System and the Phase 2 hydraulic trap are functioning effectively, and determine if additional leachate containment measures should be implemented. AECOM previously recommended investigating leachate mounding in Phase 2 on a five-year basis, with the next investigation scheduled for 2025.

4.4 Groundwater Flow in the Bedrock Aquifer Near the Landfill

4.4.1 East of Phase 1

Figure 4-4 shows groundwater elevations at monitoring locations 17, 18, 54, and 76, which are situated on the bedrock ridge east of Phase 1. Changes in water levels at monitoring location 18 have occurred occasionally since 2001. In 2016/17, groundwater levels at location 18 increased by approximately 8 m relative to years prior, resulting in lower westward hydraulic gradients. In 2018, groundwater levels at monitoring location 18 returned to historical values, indicating that westward hydraulic gradients restabilized. As per the 2018/19 annual monitoring report recommendations (AECOM 2019a), pressure

transducers were installed in wells GW-18-1-1, GW-76-1-1, GW-17-1-1, and GW-54-1-1 to monitor groundwater elevations continuously and confirm groundwater flow toward the landfill.

In 2024/25, groundwater levels in GW-18-1-1 were approximately 6 to 7 m lower than those observed in GW-76-1-1, and groundwater levels at GW-54-1-1 were consistently higher than those in GW-17-1-1, confirming a westward component of groundwater flow east of Phase 1. Like previous years, downward hydraulic gradients were observed at monitoring locations 18 and 76.

4.4.2 North of Phase 1

Historically, groundwater quality data collected from wells located downgradient of the North Purge Wells (e.g., monitoring locations 20 and 30) has been used to verify that the purge well system prevented northward migration of leachate from Phase 1. The drawdown cone induced by the purge wells is highlighted by the 120 m asl contour in Figure 4-1.

Figure 4-6 presents precipitation and groundwater elevation data for monitoring wells located near the North Purge Well System. Leachate discharge rates from the North Purge Wells (GW-52-4-0-P7, GW-80-1-0-P8 and GW-81-1-0-P9) are presented to illustrate the volume of leachate extracted in response to precipitation events. Well GW-52-3-0-P52 is the oldest purge well (installed in 1998), and it is located within 2 m of well GW-52-4-0-P7. Water levels in well GW-52-3-0-P52 are affected by pumping of GW-52-4-0-P7 and seasonal variations in groundwater recharge. Pressure transducers connected to SCADA are installed in wells GW-40-1-1, GW-52-3-0-P52, GW-52-4-0-P7, GW-80-1-0-P8, and GW-81-1-0-P9 to provide long-term monitoring of purge well performance north of Phase 1.

In 2024/25, leachate discharge volumes from the North Purge Wells continued to decline; a total of 4,826.5 m^3 of leachate was discharged in 2024/25, as compared to 14,277 m^3 in 2022/23. The greatest leachate flow rate (22.4 m^3/day) was observed in April 2024, and the average daily leachate flow was approximately 13.2 m^3/day. In 2023/24, the average daily leachate flow was 20.2 m^3/day, and in 2022/23, the average daily leachate flow rate was 39.1 m^3/day. Hence, average daily leachate flows have decreased by about 66% since 2022/23. These trends likely reflect diminishing pump performance or biofouling of the wells, especially in GW-52-3-0-P52, where groundwater levels have been increasing since 2021 (Figure 4-6). Specific capacity testing should be performed on GW-52-3-0-P52 to determine if well performance has degraded. It is possible that this well requires rehabilitation as it has several times in the past.

In 2024/25, groundwater elevations in GW-80-1-0-P8 and GW-81-1-0-P9 were consistent with the historical values, with annual averages of 113.4 and 115.78 m asl, respectively. Groundwater elevations in GW-52-4-0-P7 were consistent historical values, with some fluctuations attributed to maintenance performed throughout the monitoring period. The average groundwater elevation in GW-52-4-0-P7 was 112.02 m asl.

4.4.3 South of Phase 1

In August 2000, the CRD installed six leachate collector wells at the south end of the Phase 1 landfill to intercept leachate migrating south. Pneumatic pumps were installed in four of the wells (P1, P2, P3, and P4), and they began operating in September 2001. The remaining two wells (P5 and P6) were not outfitted with pumps due to low well yields. An additional well (P10) was installed in 2010 and outfitted with a pneumatic pump to augment pumping capacity south of the landfill. P1 has since been altered and outfitted with an electric submersible pump.

Groundwater elevations in the South Purge Wells have fluctuated since 2007. Although elevations have remained somewhat higher than the targeted pumping elevations, the installation of P10 in September 2010 and the pump upgrades to P1 between 2015 and 2017 resulted in significantly improved drawdown. Unfortunately, P1 required considerable maintenance due to well fouling by leachate due to the well/pump design. In November 2018, P1 was re-installed and produced approximately of 1.01 L/s of leachate. The replacement well was screened in refuse from 6.10 to 12.19 m below ground surface (bgs). Despite the shallower installation depth, the well removes a similar volume of leachate. In November 2020, the pump in P1 was rebuilt and the pressure transducer was re-installed. The lower set point was changed to 147.3 m asl, which is the lowest possible depth that could be achieved without overheating the pump.

Groundwater elevations in five of the South Purge Wells (P1, P2, P3, P4, and P10) are plotted on Figure 4-7 and generally ranged from approximately 131 to 148 m asl. Groundwater levels were similar to historical values among all the purge wells, but P10 exhibited some fluctuations attributed to pump failures and maintenance in late-2024/early-2025. The pump in P10 was replaced in March 2025.

In 2024/25, a total of 35,530.7 m^3 of leachate was collected from the South Purge Wells, which is approximately 26.5% more than in 2023/24. Furthermore, the average daily flow in 2024/25 was 97.08 m^3/day, and the maximum daily flow was 379.5 m^3/day, as observed in December 2024. Overall, the 2024/25 groundwater elevation and flow data indicated that the South Purge Well System functioned effectively.

4.4.4 North of Phase 2

A detailed assessment of hydrogeologic conditions below the North Ridge was conducted in 2016, culminating in a hydrogeological conceptual model (AECOM 2016). The report stated that subvertical strike-slip faults (e.g., the Highland Fault) near groundwater monitoring stations 87 and 88 and an inferred fault near station 77 behave as barriers to groundwater flow, creating a compartmentalized groundwater flow system in the North Ridge area. Conversely, sub-horizontal tensile fractures behave as preferential conduits for groundwater flow. It is likely that bedrock discontinuities contribute to the large fluctuations in groundwater elevations beneath the North Ridge in response to seasonal precipitation and infiltration events. Geologic mapping of exposed bedrock on the North Ridge (AECOM 2018a) revealed an undulating bedrock surface with several closed depressions that allow for surface water pooling and enhanced recharge during wet weather.

Figure 4-9 presents groundwater elevations in North Ridge area. Since 2006, groundwater levels have been recorded continuously at monitoring locations GW-77-1-1, GW-87-1-1, GW-87-2-1, GW-88-1-1, and GW-88-2-1 to better understand the temporal and spatial variability in groundwater elevations over time and across the Highland Fault. Since 2019, groundwater levels have been recorded continuously at monitoring locations GW-91-1-1, GW-92-1-1, and GW-94-1-1. Since 2021, groundwater elevations along the North Ridge have lowered, especially in the dry seasons, and these patterns have been attributed to quarrying and expansion of the Phase 2 landfill into the Toutle Valley. The largest decreases in groundwater elevations have been observed at monitoring locations 77, 87, 88, and 94, where dry season groundwater levels have decreased by several metres.

Historically, groundwater elevations at GW-88-1-1 and GW-87-1-1 have ranged between 166 and 185 m asl, and since 2022, water levels in these wells have been relatively low during the dry season and have not reached 185 m asl during the wet season. Furthermore, wet season and dry season water levels differed by about 25 m in 2023 and 31 m in 2024, whereas water levels in these wells have historically differed by less than 20 m. Similar patterns have been observed among GW-94-1-1, GW-92-1-1, GW-77-1-1, and GW-62-1-1. Despite the lower groundwater levels, groundwater flow patterns were consistent with previous years, and the hydraulic trap remained in-tact in 2024/25.

In August 2022, two purge wells (P11 and P12) were installed immediately south of the NWSP. P11 was completed in bedrock, and P12 was screened in overburden approximately 2 m above the upper surface of the bedrock. Groundwater levels were measured quarterly in P12, but P11 was dry and/or undergoing maintenance throughout the monitoring year, so no groundwater levels were recorded. Groundwater levels in P12 ranged from 120.76 m asl in May 2024 to 127.98 m asl in January 2025.

4.5 Summary

4.5.1 Leachate Flow

In 2024/25, leachate elevations and flow patterns at Hartland were consistent with historical interpretations. The perched leachate mound in Phase 1 persisted, but leachate levels continued to decrease slowly. The most notable change in leachate flow patterns occurred at the North Purge Wells, where leachate discharge volumes continued to decrease. Groundwater levels at GW-52-3-0-P52, adjacent to GW-52-4-0-P7, have been increasing for five years, so P7 should be tested to confirm that the pump is performing adequately. Based on historical data and the 2024/25 leachate flow data, AECOM has made the following interpretations:

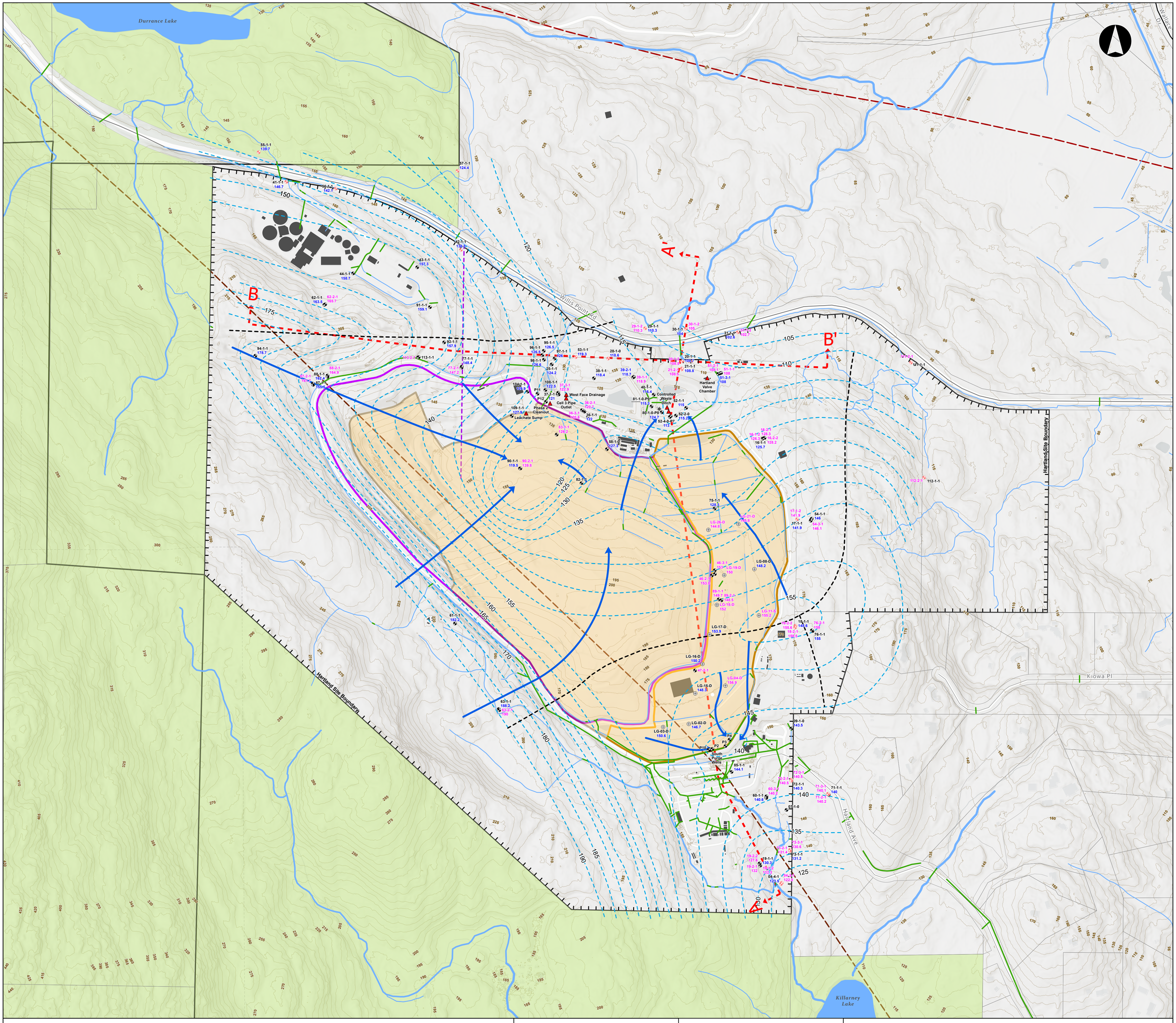
- The highest leachate elevations (approximately 154 to 161m asl) were observed in the east/southeast area of the Phase 1 (GW-46-2-1, VLGW-004D and VLGW-017D), an area with elevated topography and refuse heights.
- Leachate elevations observed at monitoring stations within the Heal Basin (i.e., Phase 2) were comparable to historical values, implying that leachate levels were stable and the hydraulic trap was maintained.
- Groundwater levels at critical monitoring locations north of the Phase 2 Basin were consistently higher than leachate levels in Phase 2, indicating that the hydraulic trap was maintained.

- A total of 35,530.7 m^3 of leachate was collected from the South Purge Wells, which is approximately 26.5% more than in 2023/24. The average daily leachate flow from the South Purge Wells was 97.08 m^3/day in 2024/25, and the maximum daily flow was 379.5 m^3/day, as observed after heavy rainfall in December 2024. Overall, the 2024/25 groundwater elevation and leachate flow data indicated that the South Purge Well System functioned effectively.
- A total of 4,826.5 m^3 of leachate was collected from the North Purge Wells, which is considerably lower than the past two years. The greatest leachate flow rate (22.4 m^3/day) was observed in April 2024, and the average daily flow rate was approximately 13.2 m^3/day. These trends may reflect diminishing pump performance or biofouling of the collector wells, especially in GW-52-3-0-P52, where groundwater levels have been increasing since 2021.
- Standard leachate elevations and discharge rates recorded at the two purge well systems indicate that they performed adequately throughout the 2024/25 monitoring period.

4.5.2 Groundwater Flow

In 2024/25 groundwater flow patterns at Hartland were consistent with historical interpretations. The most notable change in groundwater flow patterns was the continued decrease in groundwater levels along the North Ridge, observed, particularly in the dry season. We believe that most groundwater in the bedrock below the landfill was captured by the Toutle Valley Underdrain, Phase 2 Basin Leachate Collection System, springs discharging to the Lower Lagoon, or the north and south purge well systems. Based on the 2024/25 groundwater flow data, AECOM has made the following interpretations:

- Groundwater monitors east of Phase 1 (e.g., GW-54-1-1, GW-76-1-1, GW-17-1-1, and GW-18-1-1) confirmed that groundwater flows west (toward the landfill), suggesting that there was no offsite migration to the east.
- From 2021 to 2024, quarrying and blasting activities performed in the Toutle Valley have resulted in substantive changes to the topography and lowering of the Toutle Valley ground surface. These landscape alterations resulted in lowering of the potentiometric surface in the bedrock comprising the North Ridge and High-Wall, particularly in the dry season, as observed at monitoring locations 62, 77, 87, 88, 82, and 94. Despite these impacts, inward hydraulic gradients were maintained throughout the 2024/25.
- We did not observe any substantive changes to hydraulic gradients in the Cell 4 area after the liner was installed, but hydraulic gradients in this area should be monitored closely in 2025/26 to determine if the liner has an impact on the groundwater flow regime.



LEGEND

- Monitoring Well
- Compliance Well
- Leachate Collection Well
- Gas Well
- Cross Sections
- 109-1-1 Groundwater Level (m ASL)
  127.9 Measured September 2024
- 18-2-1 Highlight Data Indicates Data
  158.5 Was Not Used In Bedrock Groundwater Flow Analysis

- Primary Stream or Ditch
- Secondary Stream or Ditch
- Tertiary Stream or Ditch
- Gravity Main
- Contours (5m)
- Inferred Water Table Contour
- Inferred Groundwater Flow Direction
- Inferred Groundwater Divide
- Inferred Fault (AECOM, 2020)
- Durrance Lake Fault (Muller, 2020)
- Highland Fault (Muller, 2020)

- Phase 1 Closure (1997)
- Phase 2 Base
- Existing Waste Footprint
- Lot Lines
- Structure
- Park
- Local Government Boundary
- Site Boundary

Groundwater Elevations and Flow Directions in Bedrock (September 2024)

Figure 4-1

P:60740388

AECOM

Hartland Landfill Monitoring Report

1:3,500
NAD83 UTM Zone 10N

June 2025

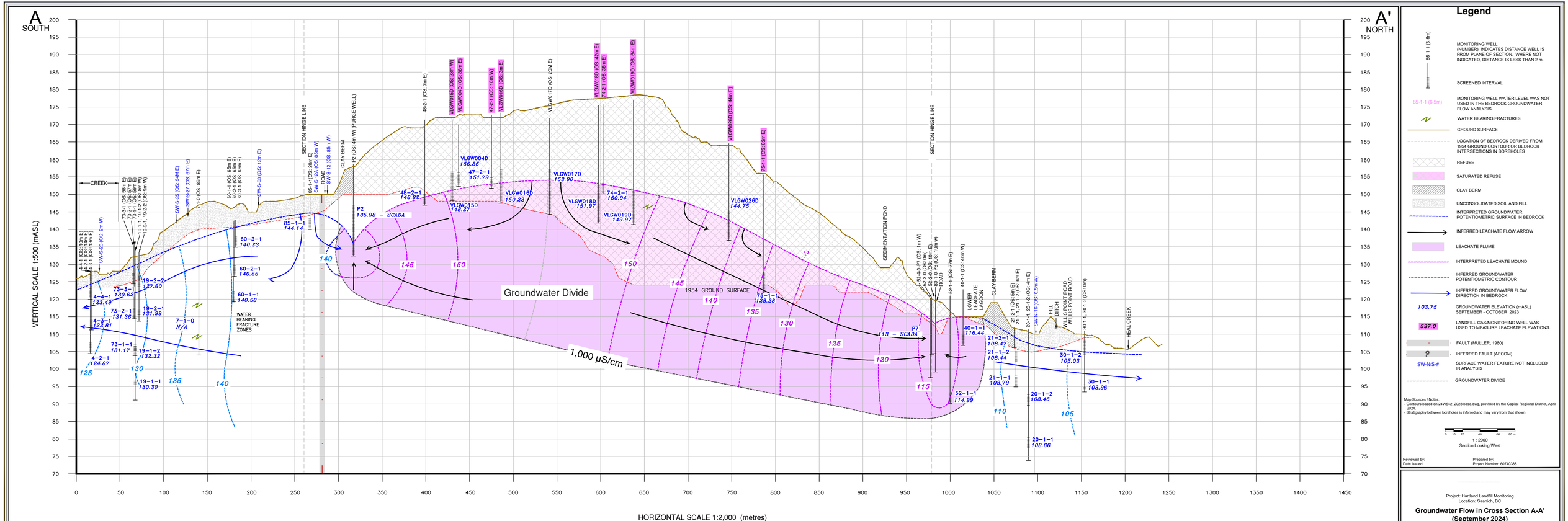
CRD
Making a difference...together

0 125 250 500 M

Basemaps provided by: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Sources: Esri, Maxar, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community and Capital Regional District

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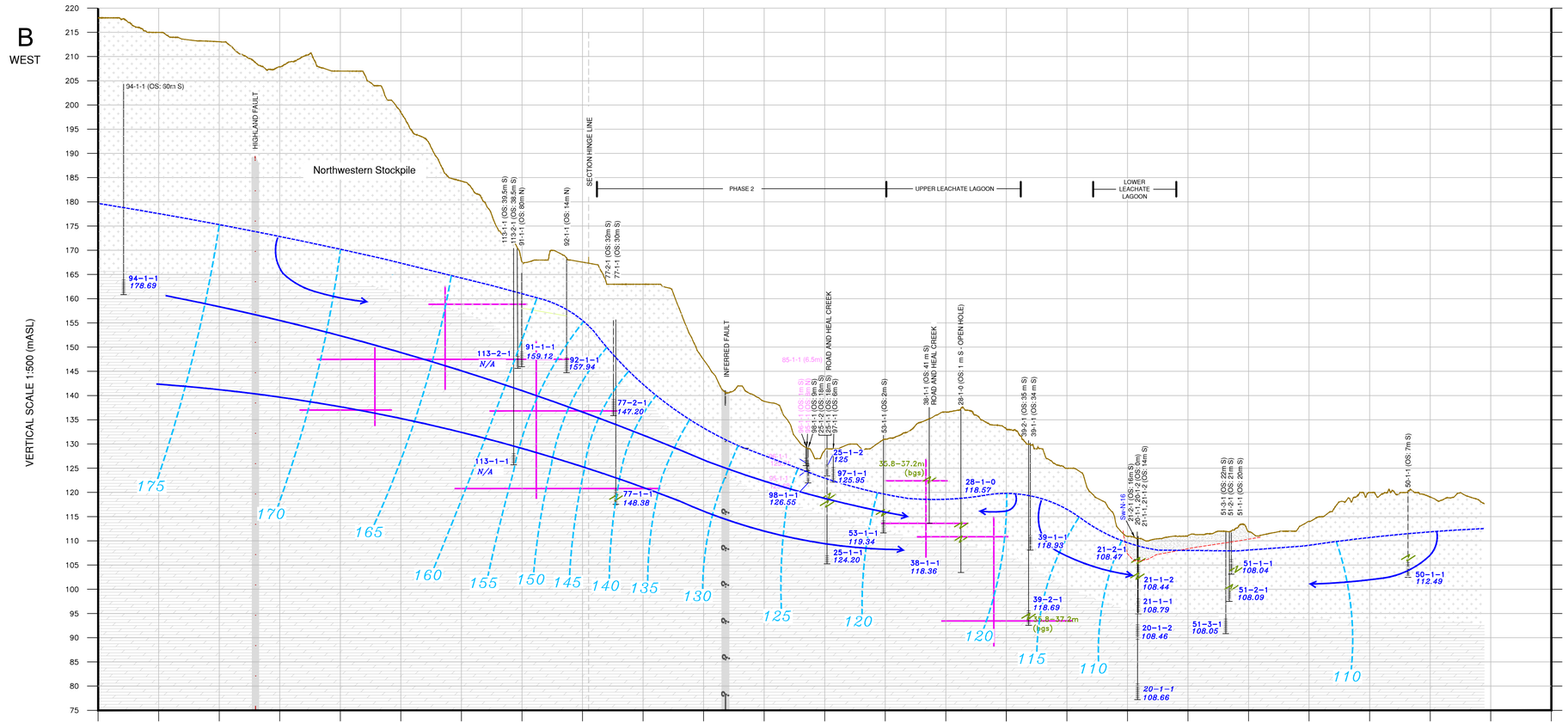


Legend

- 85-1-1 (6.5m): MONITORING WELL (NUMBER) INDICATES DISTANCE WELL IS FROM PLANE OF SECTION. WHERE NOT INDICATED, DISTANCE IS LESS THAN 2 m.
- SCREENED INTERVAL
- 85-1-1 (6.5m): MONITORING WELL WATER LEVEL WAS NOT USED IN THE BEDROCK GROUNDWATER FLOW ANALYSIS
- WATER BEARING FRACTURES
- GROUND SURFACE
- LOCATION OF BEDROCK DERIVED FROM 1954 GROUND CONTOUR OR BEDROCK INTERSECTIONS IN BOREHOLES
- REFUSE
- SATURATED REFUSE
- CLAY BERM
- UNCONSOLIDATED SOIL AND FILL
- INTERPRETED GROUNDWATER POTENTIOMETRIC SURFACE IN BEDROCK
- INFERRED LEACHATE FLOW ARROW
- LEACHATE PLUME
- INTERPRETED LEACHATE MOUND
- INFERRED GROUNDWATER POTENTIOMETRIC CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION IN BEDROCK
- 103.75: GROUNDWATER ELEVATION (mASL) SEPTEMBER - OCTOBER 2023
- 537.0: LANDFILL GAS/MONITORING WELL WAS USED TO MEASURE LEACHATE ELEVATIONS.
- FAULT (MULLER, 1980)
- ?: INFERRED FAULT (AECOM)
- SW-N/S-#: SURFACE WATER FEATURE NOT INCLUDED IN ANALYSIS
- GROUNDWATER DIVIDE

Map Sources / Notes:
- Contours based on 24W542_2023 base.dwg, provided by the Capital Regional District, April 2024
- Stratigraphy between boreholes is inferred and may vary from that shown

0 10 20 40 60 80 m
1 : 2000
Section Looking West



Legend

- 85-1-1 (6.5m) — MONITORING WELL (NUMBER) INDICATES DISTANCE WELL IS FROM PLANE OF SECTION. WHERE NOT INDICATED, DISTANCE IS LESS THAN 2 m.
- SCREENED INTERVAL
- 85-1-1 (6.5m) — MONITORING WELL WATER LEVEL WAS NOT USED IN THE BEDROCK GROUNDWATER FLOW ANALYSIS
- OBSERVED FRACTURES ON DRILLED LOGS
- GROUND SURFACE
- LOCATION OF BEDROCK DERIVED FROM 1954 GROUND CONTOUR OR BEDROCK INTERSECTIONS IN BOREHOLES
- 95-1-1 — ACTIVE GROUNDWATER WELL
- 95-1-1 — DECOMMISSIONED GROUNDWATER WELL
- OVERBURDEN
- UNCONSOLIDATED SOIL AND FILL
- CLAY BERM
- SHALLOW WEATHERED AND BLAST ALTERED BEDROCK
- DEEP BEDROCK
- INTERPRETED GROUNDWATER POTENTIOMETRIC SURFACE IN BEDROCK
- INFERRED GROUNDWATER POTENTIOMETRIC CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION IN BEDROCK
- 112.50 — GROUNDWATER ELEVATION (mASL) SEPTEMBER 2023
- INFERRED HYDRAULIC CONNECTIONS
- GROUNDWATER DIVIDE
- FAULT (MULLER, 1980)
- INFERRED FAULT (AECOM)
- SW-N/S-# — SURFACE WATER FEATURE NOT INCLUDED IN ANALYSIS

Map Sources / Notes:
- Contours based on 24W542_2023 base.dwg, provided by the Capital Regional District, April 2024.
- Stratigraphy between boreholes is inferred and may vary from that shown

0 10 20 40 60 80 m

1 : 2000

Section Looking North

Reviewed by:
Date Issued:

Prepared by:
Project Number: 60740388

Project: Hartland Landfill Monitoring
Location: Saanich, BC

Groundwater Flow in Cross Section B-B' (September 2024)

AECOM

Figure 4-3

File Location: C:\USERS\HARTH1\DESKTOP\CAD_FILES\FIG4.3-GW SECTION B-60740388-2025.DWG Date Plotted: July 24, 2025 Saved By: harth1

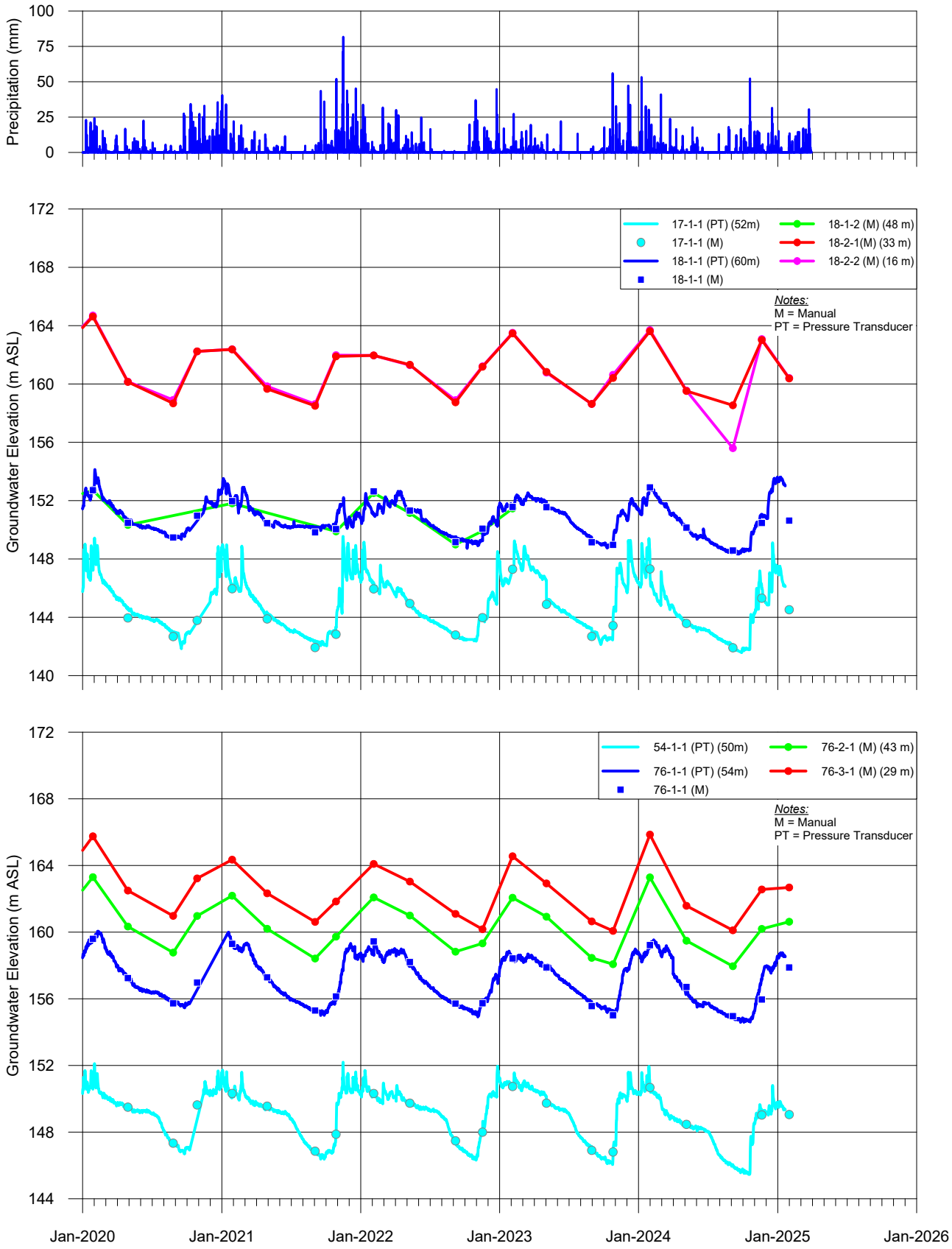


Figure 4-4. Groundwater Elevations East of Phase 1

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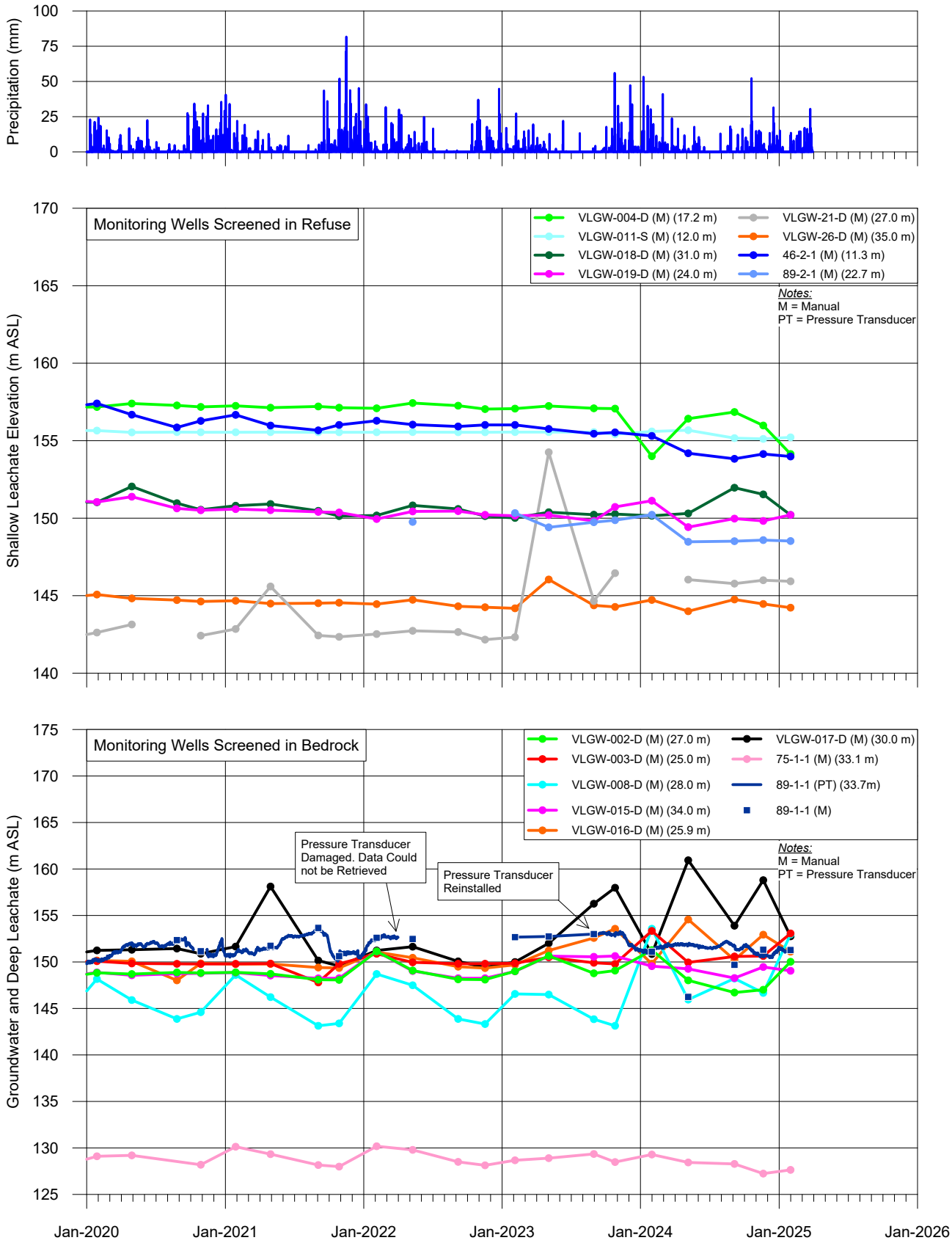


Figure 4-5. Leachate and Groundwater Elevations Within Phase 1

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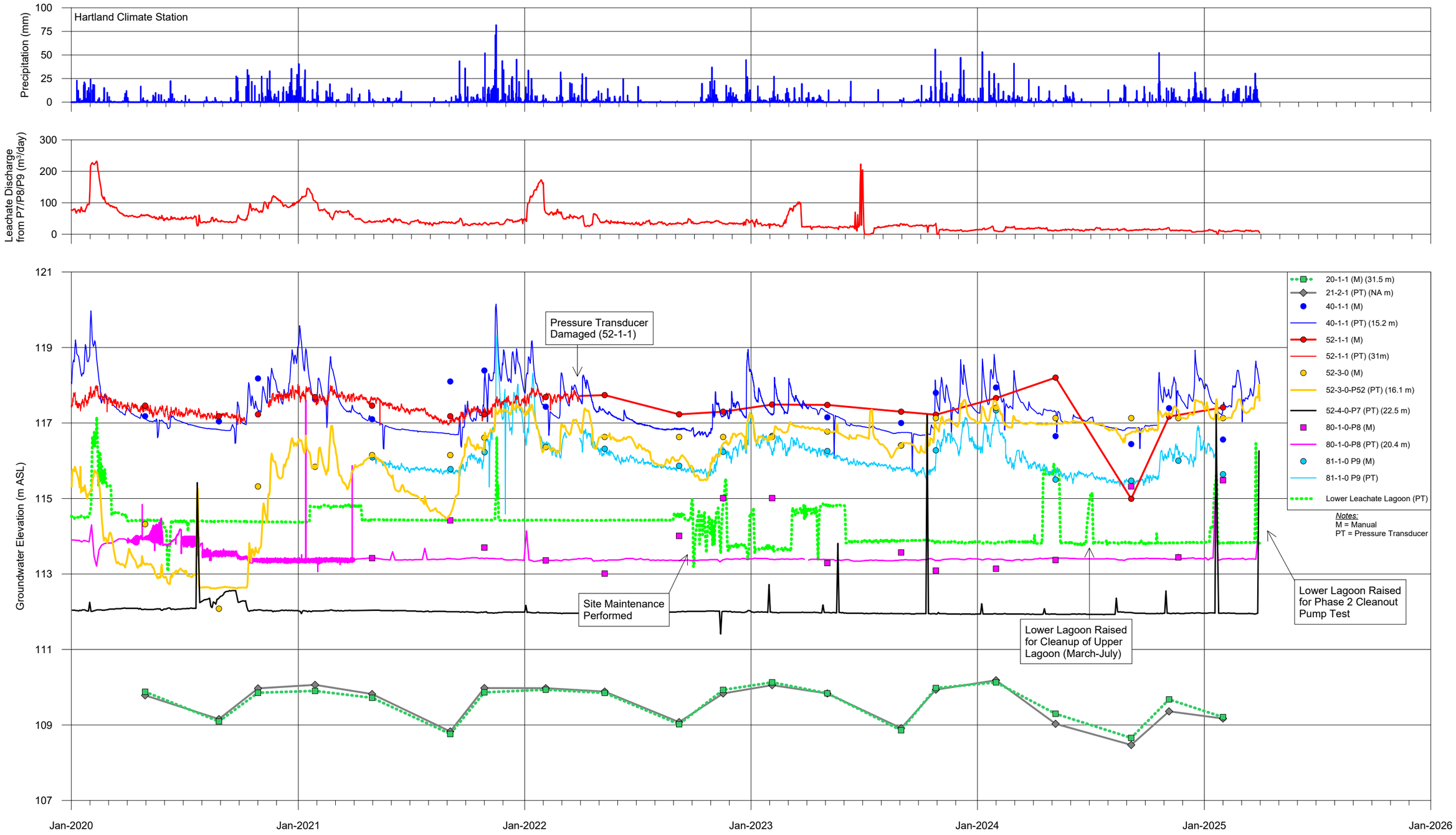


Figure 4-6. Groundwater Elevations Surrounding the North Purge Wells

AECOM

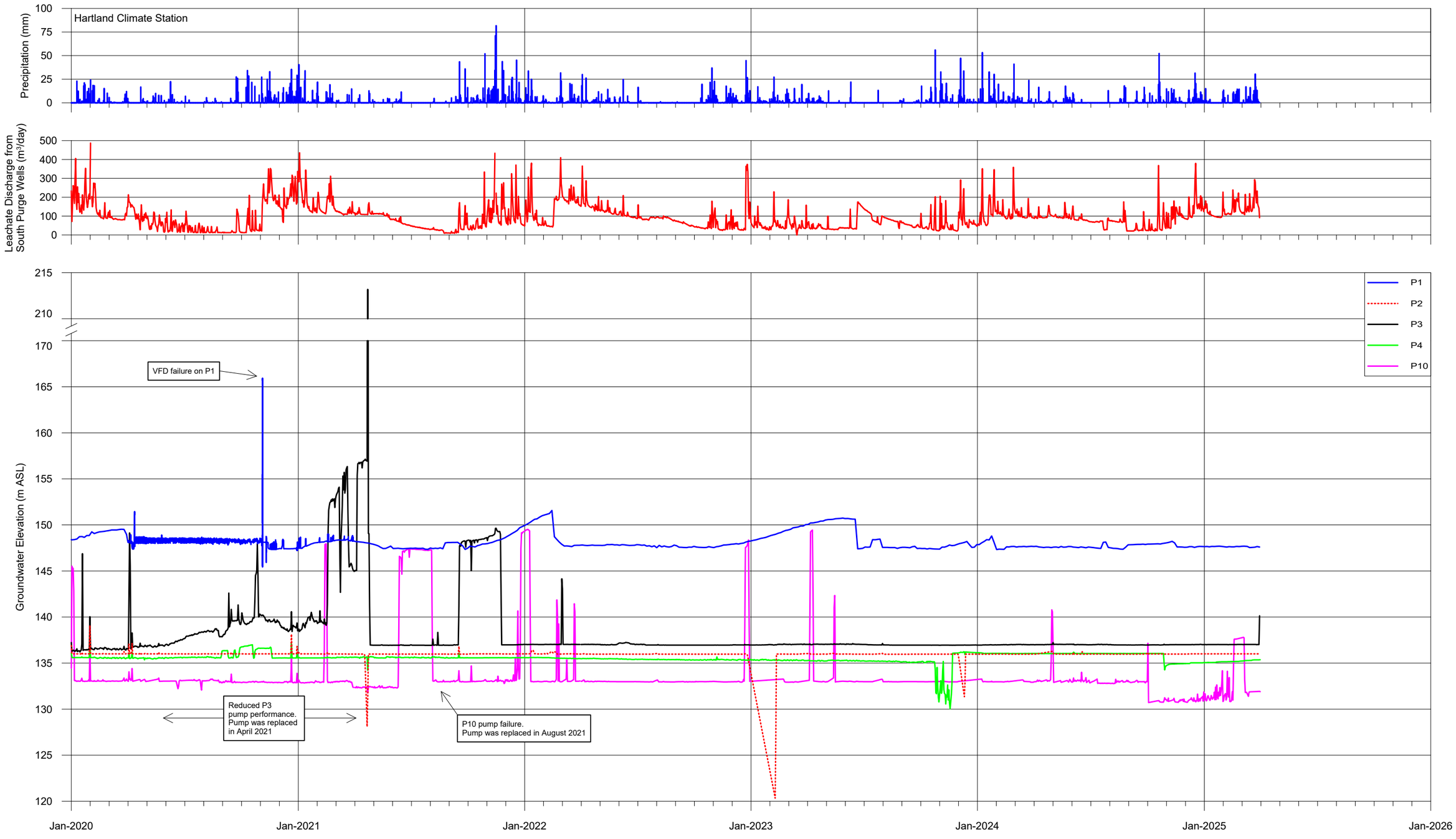


Figure 4-7. Groundwater Elevations in the South Purge Wells

AECOM

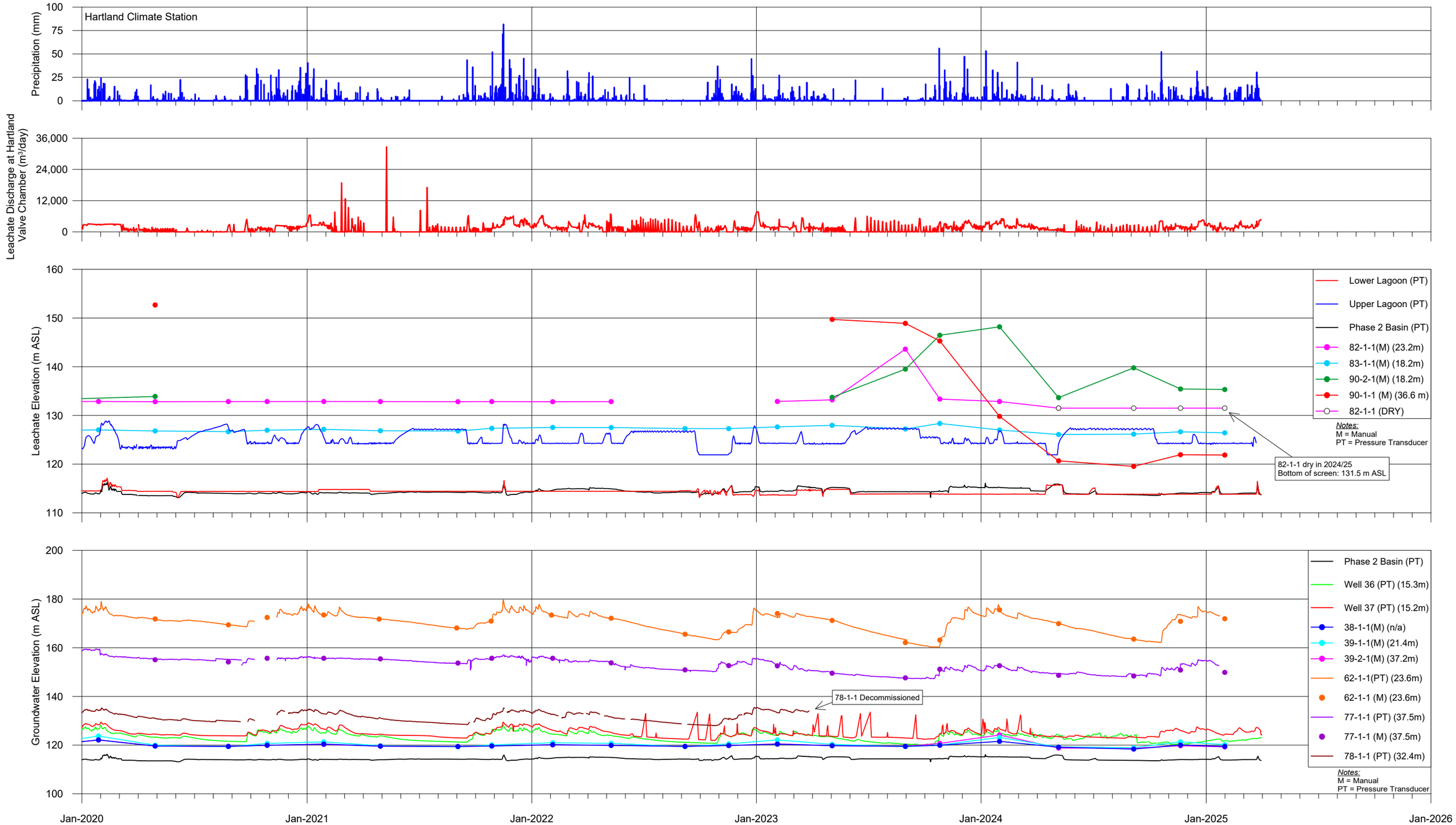


Figure 4-8. Water Elevations Within the Leachate Conveyance System and Surrounding the Phase 2 Basin

AECOM

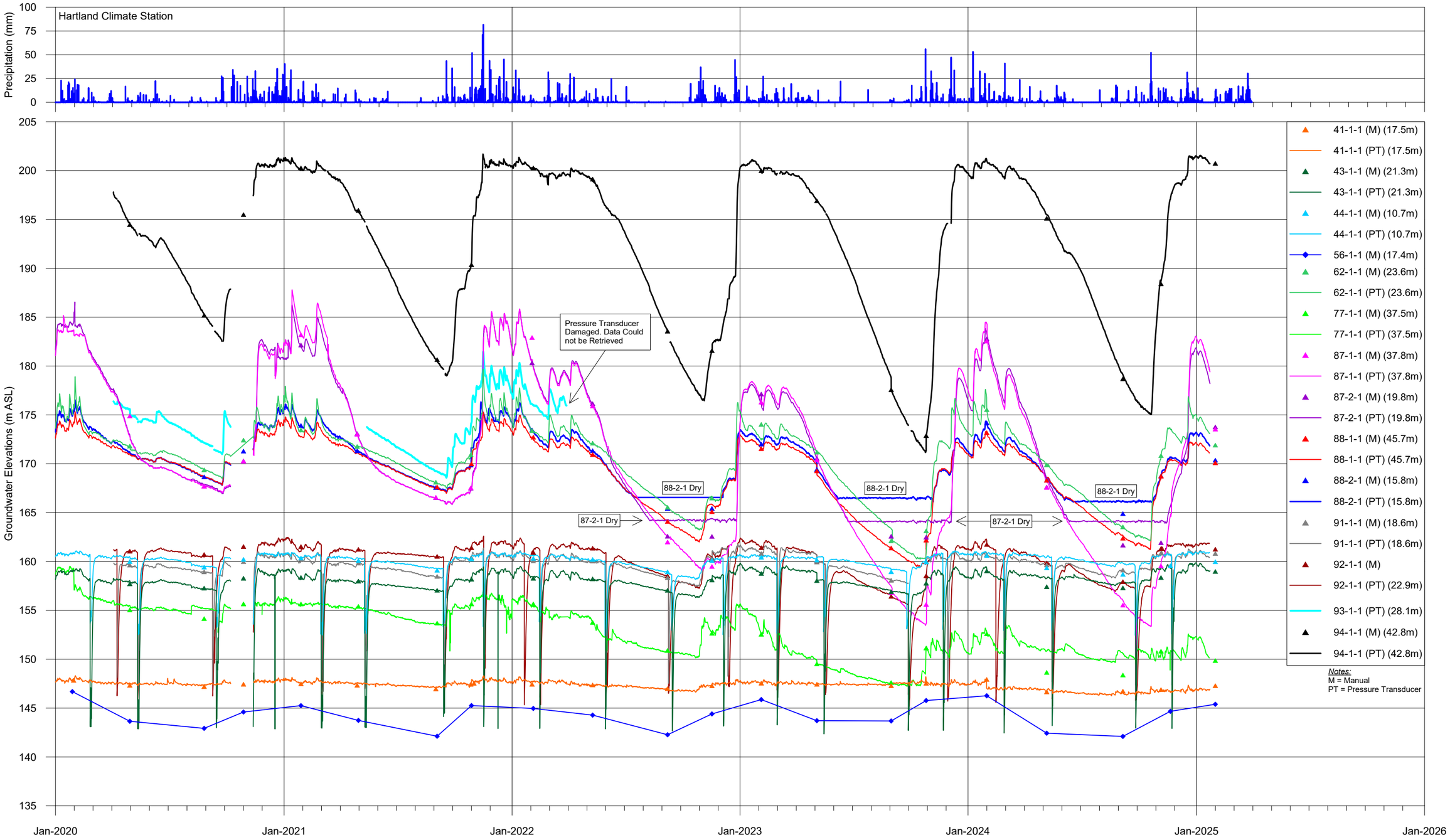


Figure 4-9. Groundwater Elevations in the North Ridge Area

AECOM

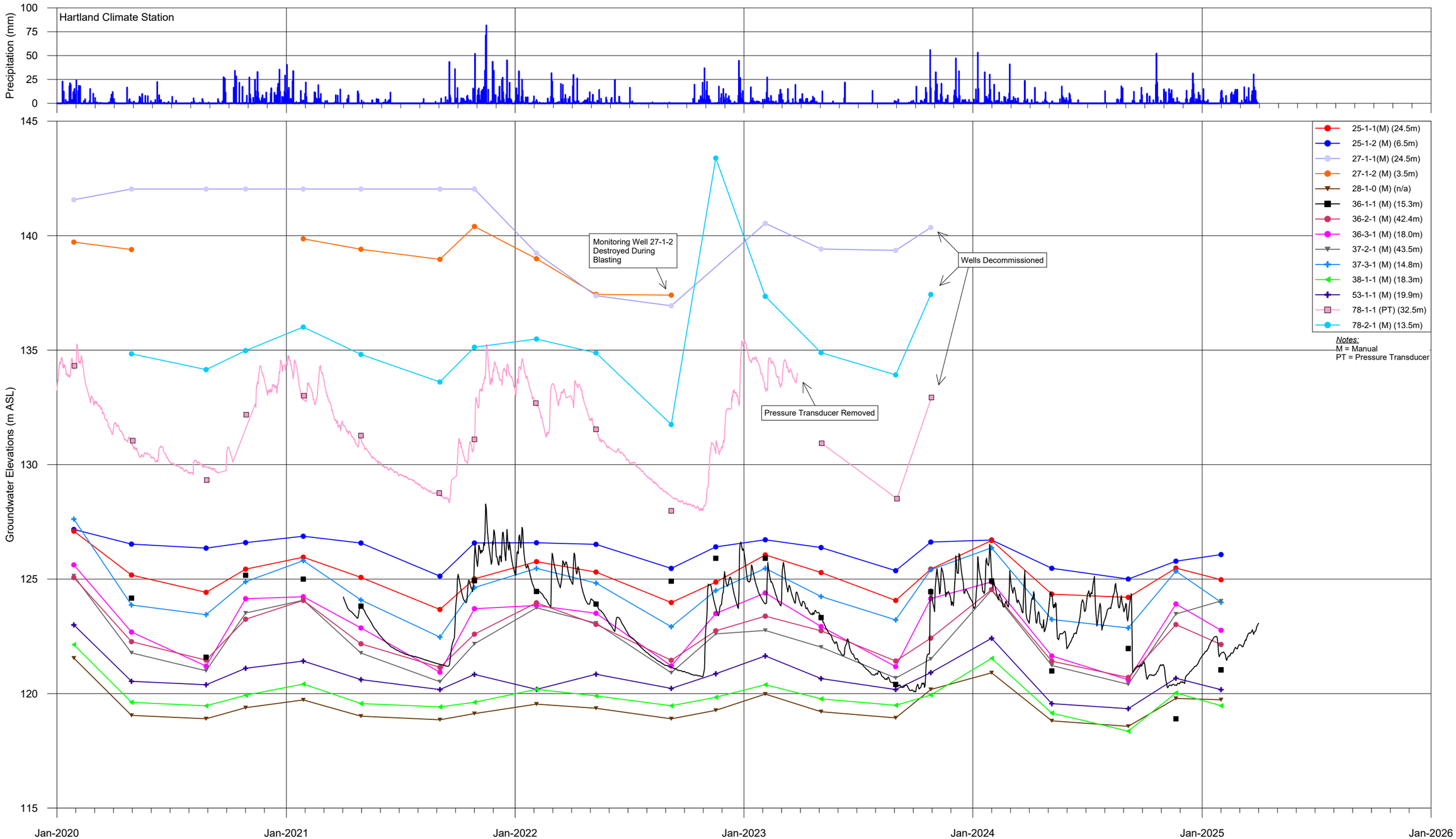


Figure 4-10. Groundwater Elevations North of the Phase 2 Landfill

5. Groundwater Quality

5.1 Data

The groundwater monitoring network at the Site is broad, consisting of 146 active groundwater monitoring wells in 86 locations, ten active purge wells, and 13 landfill gas wells (Appendix A.1). Of the 146 monitoring wells, 35 are used to monitor landfill compliance with the Operational Certificate, and the rest are used to monitor groundwater quality at strategic locations within the Site. The CRD collects groundwater samples from the monitoring wells quarterly.

A detailed review of the groundwater sampling network was conducted by AECOM in 2024. We recommended installing nested groundwater wells to replace decommissioned wells at monitoring location 78, and two sets of nested monitoring wells downgradient of the Northeast Stockpile to monitor groundwater quality along the northeast property boundary. We expected to see elevated conductivity, nitrate, and sulphate concentrations in these wells because the Northeast Stockpile was recently developed. In September 2024, AECOM supervised a sonic drilling program where we installed two wells (GW-113-1-1 and GW-113-2-1) on the North Ridge to replace monitoring wells GW-78-1-1 and GW-78-2-1, and we installed two sets of nested monitoring wells (GW-111-1-1, GW-111-2-1, GW-112-1-1, and GW-112-2-1) at two locations downgradient of the Northeast Stockpile. Most of the new wells were sampled in October and November 2024, and February 2025.

5.2 Compliance Monitoring Locations

Thirty-five (35) boundary compliance monitoring wells have been established in 19 locations at the Hartland Landfill (see Figure 4-1). These wells are concentrated along the south, east, and northern property boundaries, and downgradient of areas that have the potential to be impacted by leachate or runoff from the site. The CRD's annual monitoring program includes quarterly monitoring of the compliance monitoring wells listed below and many non-compliance locations within the Site. In 2024, a new compliance monitoring location (111) was added to the monitoring program. Compliance monitoring point 111 is at the northern property boundary, downgradient of the Northeast Stockpile.

South of the Landfill (10)

- 04-3-1, 04-4-1
- 71-1-1, 71-2-1, 71-3-1
- 72-1-1, 72-3-1
- 73-1-1, 73-2-1, 73-3-1

East of the Landfill (6)

- 17-1-1, 17-1-2, 17-1-3
- 18-1-1, 18-2-1, 18-2-2
- 111-1-1, 111-2-1
- 112-1-1, 112-2-1

North of the Landfill (13)

- 20-1-1, 20-1-2
- 21-1-1, 21-1-2, 21-2-1
- 28-1-0
- 29-1-1, 29-1-2
- 30-1-1, 30-1-2
- 31-1-1, 31-1-2
- 53-1-1

North of the Hartland North Pad (5)

- 41-1-1
- 42-1-1
- 55-1-1
- 56-1-1
- 57-1-1

All groundwater quality data collected in 2024/25 is presented in Appendix B.1. The results were screened against BC CSR Drinking Water (DW) and Freshwater Aquatic Wildlife (AW) standards. Values that exceeded the AW standard are labelled with an "a", and values that exceeded the DW standard are labelled with a "b". Table 5-1 presents a summary of the exceedances.

5.3 Assessment of Groundwater Quality Impacts

The primary causes of groundwater quality degradation at the Site include leachate, road salt, aggregate runoff, and the use of a magnesium lignosulphonate dust suppressant. The parameters used to identify impacts from various landfill activities include electrical conductivity, ammonia, chloride, sulphate, and nitrate concentrations. Professional judgement is used to differentiate between different contaminant sources and assess the nature and severity of any impacts. Groundwater quality may be judged to be impacted relative to background without exceeding regulatory criteria.

If solute concentrations exceed CSR AW or DW groundwater quality standards at the property boundary, standard protocols for notification of the affected property owners should be followed. Note that, based on the Stage 8 Amendments to the CSR, DW and AW standards for iron and manganese concentrations are no longer applied to municipal landfills.

The 2024/25 groundwater quality data was interpreted with consideration for the following:

Background Conditions:

- Background conductivity is typically below 500 µS/cm but has been observed in some background wells at concentrations up to 1,000 µS/cm immediately after well installation or following prolonged dry periods.
- Background ammonia and nitrate concentrations are typically below 0.1 mg/L but occasionally reach 0.5 mg/L downgradient of wetland areas.
- Background chloride concentrations are typically below 20 mg/L.
- Background sulphate concentrations are typically below 50 mg/L but are regularly observed at concentrations up to 100 mg/L in wells screened within weathered bedrock and near mineralized zones in the bedrock.

Impact Criteria:

- Leachate: Groundwater is considered to be impacted by leachate when conductivity is above 1,000 µS/cm, ammonia concentrations are above 1 mg/L, and chloride concentrations are above 20 mg/L. Peak concentrations in leachate impacted wells are typically observed during the dry summer and early fall months, when there is limited dilution by precipitation.
- Aggregate Runoff: Surface water is considered impacted by aggregate (e.g., production, stockpiling or site construction works) when nitrate concentrations are greater than background levels (~0.1 mg/L) and leachate indicator concentrations are low. In recent years, elevated nitrate concentrations have been observed in the absence of elevated sulphate concentrations, so sulphate may not be a reliable indicator of aggregate runoff. However, elevated sulphate concentrations may occur over a greater period and potentially after nitrate concentrations have subsided. Peak nitrate and sulphate concentrations are typically observed during the first sampling event following the onset of wet weather in the fall months after recent blasting and aggregate stockpiling.
- Road Salt: Groundwater is considered impacted by road salt when chloride concentration is elevated above background levels (i.e., 20 mg/L), and the molar ratio of chloride to sodium is around 1.0. Cl/Na molar ratios in road salt are generally 1:1, assuming 100% compositional purity. Road salt-impacted sites must also be located downgradient (or downstream) of surfaces where road salt is known to be applied. Conductivity and chloride concentrations typically exhibit peaks following cold weather periods when de-icing salt is often applied to roadways.
- Magnesium Lignosulphonate: Magnesium lignosulphonate has been used as a dust suppressant at the Site and likely has an impact on groundwater quality similar to aggregate runoff because it contains nitrogen and sulphur. Additionally, it exhibits elevated iron and manganese concentrations. Laboratory testing indicated that the dust suppressant exhibited elevated conductivity (520 µS/cm), ammonia (51 mg/L), and total sulphur concentrations (83.7 mg/L) in the aqueous phase (Appendix I). AECOM is not aware of the volume of magnesium lignosulphonate that has been applied at the Site.

The CRD determined that ammonia concentration data collected throughout 2023 was invalid because the bottles used to collect the samples were over-preserved. Hence, ammonia concentration data collected in 2023 has been excluded from any interpretation/analysis and removed from groundwater and surface water quality plots over that timeframe.

5.4 Overview of Exceedances

The 2024/25 groundwater quality data were compared to BC CSR AW and DW standards (Appendix B-1). A summary of exceedances is presented in Table 5-1. Most AW/DW exceedances were observed in groundwater samples collected from leachate purge wells or near leachate collection infrastructure. No CSR AW exceedances were reported at any compliance monitoring locations, but boron concentration exceeded the DW standard at GW-20-1-1 during one sampling event, and nitrate concentrations exceeded the DW standard at GW-31-1-1, GW-31-1-2, GW-111-1-1, GW-111-2-1, GW-112-1-1, and GW-112-2-1, downgradient of the Northeast Stockpile. Antimony and nitrite concentration also exceeded the DW standard during one sampling event at GW-112-1-1.

The boron concentrations observed at compliance monitoring location 20 were higher than those observed in the North Purge Wells and correlated with very low conductivity (180 µS/cm) and low leachate and aggregate runoff parameters, suggesting it may originate from a natural source. AECOM analyzed the 2023/24 and 2024/25 boron concentration data from monitoring location 20, 52, and the North and South Purge wells, and determined that all of these wells exhibit a localized and distinct chemical signature characterized by elevated boron and silicon concentrations. At these locations, silicon concentrations are very high for shallow groundwater. We believe that the elevated silicon and boron concentrations were caused by leachate reacting with the bedrock below the Phase 1 landfill. Silicate mineral dissolution of the clays is likely to result in elevated silicon concentrations, and the mobility of boron is pH/redox-dependent. At this point, we cannot determine the source of the boron but recommend continued monitoring of boron concentrations and oxidation reduction potential (ORP) in this area.

In 2023/24, elevated and non-compliant nitrate concentrations reported at compliance monitoring location 31 prompted the CRD to submit a Notice of Offsite Contaminant Migration to the BC Ministry of Environment. Elevated nitrate concentrations persisted at this location through 2024/25, as well as the new compliance monitoring wells installed along the northeast property boundary downgradient of the Northeast Stockpile (GW-111-1-1, GW-111-2-1). In general, elevated nitrate concentrations were focused in areas immediately downgradient of aggregate stockpiles.

Table 5-1. Groundwater Quality Exceedances 2024-2025

AECOM

BC CSR				AW Maximum (1)	90	50	10000	12000	1500	1.31-18.4 (3)	0.2-2 (4)	400	400	1280-4290 (5)
				DW Maximum (2)	6	10	1000	5000	250		1	10	10	500
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter	Antimony	Arsenic	Barium	Boron	Chloride	Nitrogen - ammonia	Nitrogen - nitrite	Nitrogen - nitrate	Nitrogen - nitrate plus nitrite	Sulphate
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
				Method Detection Limit	0.02	0.02	0.02	10	1	0.015	0.005	0.02	0.02	1
Gw-20-1-1	SS	Y	2024-09-20	Clear and colourless	< 0.100	< 0.100	2.52	5390 b	6.00	0.041	< 0.005	< 0.020	< 0.020	13.0
Gw-31-1-1	FRM	Y	2024-05-21	Mean of duplicates	0.088	0.209	5.70	58.5	14.0	< 0.015	< 0.005	16.1 b	16.1 b	210
Gw-31-1-1	FRM	Y	2024-09-13	Mean of duplicates	0.092	0.233	6.04	53.0	13.0	< 0.015	0.007	12.3 b	12.3 b	195
Gw-31-1-2	SS	Y	2024-05-21	Clear and colourless	0.046	0.125	4.61	54.0	14.0	< 0.015	< 0.005	14.2 b	14.2 b	180
Gw-31-1-2	SS	Y	2024-09-12	Clear and colourless	0.040	0.162	3.79	55.0	13.0	0.019	< 0.005	11.7 b	11.7 b	150
Gw-51-1-1	SS	N	2024-09-19	Clear and colourless	0.038	0.363	6.29	66.0	16.0	< 0.015	0.310	17.2 b	17.5 b	75.0
Gw-52-1-1	SS	N	2024-05-14	Clear and colourless	0.053	0.241	111	3060	170	28.0 a	< 0.005	< 0.020	< 0.020	< 1.00
Gw-52-1-1	SS	N	2024-09-19	Clear and colourless	0.054	0.221	114	2900	160	29.0 a	0.011	< 0.020	0.021	< 1.00
Gw-52-1-1	SS	N	2024-11-18	Clear and colourless	< 0.100	0.190	109	3560	170	28.0 a	< 0.005	< 0.020	< 0.020	< 1.00
Gw-52-1-1	SS	N	2025-03-05	Clear and colourless	0.054	0.210	108	3060	170	19.0 a	< 0.005	< 0.020	< 0.020	< 1.00
Gw-52-4-0 (P7)	SS	N	2024-05-14	Clear, very slightly yellow	0.100	4.92	466	2490	290 b	150 a	< 0.005	< 0.020	< 0.020	12.0
Gw-52-4-0 (P7)	SS	N	2024-09-20	Clear and colourless	0.116	5.62	515	3010	330 b	160 a	0.006	< 0.020	< 0.020	< 1.00
Gw-52-4-0 (P7)	SS	N	2024-11-18	Clear, very slightly yellow	0.141	3.69	309	2360	270 b	160 a	< 0.025	< 0.100	< 0.100	40.0
Gw-52-4-0 (P7)	SS	N	2025-03-05	Clear, very slightly yellow	0.105	3.82	451	2840	270 b	170 a	< 0.005	< 0.020	< 0.020	11.0
Gw-62-2-1	SS	N	2024-11-21	Moderately turbid, moderately grey	0.073	0.106	18.1	290	3.90	< 0.015	< 0.005	13.1 b	13.1 b	140
Gw-80-1-0 (P8)	SS	N	2024-09-20	Clear, moderately brown	0.99	12.3 b	118	3900	360 b	420 a	< 0.050	< 0.200	< 0.200	< 5.00
Gw-81-1-0 (P9)	SS	N	2024-05-14	Clear and colourless	1.93	11.1 b	91.8	3820	380 b	370 a	< 0.050	< 0.200	< 0.200	4.90
Gw-81-1-0 (P9)	SS	N	2025-03-05	Very slightly turbid, colourless	1.45	13.3 b	123	3800	320 b	340 a	< 0.050	< 0.200	< 0.200	41.0
Gw-88-2-1	SS	N	2024-11-21	Slightly turbid, slightly brown	0.302	0.110	11.7	28.0	5.00	< 0.015	< 0.005	1.25	1.25	670 b
Gw-95-1-1	FRM	N	2024-11-14	Mean of duplicates	0.172	0.247	7.28	253	8.70	< 0.015	< 0.005	11.0 b	11.0 b	220
Gw-96-1-1	SS	N	2024-11-14	Very turbid, moderately grey	0.033	0.053	6.07	86.0	8.00	< 0.015	< 0.005	15.9 b	15.9 b	300
Gw-98-1-1	SS	N	2024-11-14	Very turbid, very grey	0.126	0.154	10.9	99.0	6.90	0.043	< 0.005	15.0 b	15.0 b	330
Gw-111-1-1	SS	Y	2024-10-03	Clear and colourless	0.415	0.261	39.9	21.0	7.20	< 0.015	0.179	13.1 b	13.3 b	40.0
Gw-111-1-1	SS	Y	2024-01-05	Clear and colourless	0.582	0.213	26.3	13.5	7.65	0.017	0.161	13.9 b	14.0 b	51.5
Gw-111-2-1	SS	Y	2024-10-03	Very slightly turbid, colourless	0.066	0.222	23.9	22.0	8.30	< 0.015	0.025	11.8 b	11.8 b	64.0
Gw-112-1-1	SS	N	2024-10-03	Very slightly turbid, colourless	0.066	0.222	23.9	22.0	8.30	< 0.015	0.025	11.8 b	11.8 b	64.0
Gw-112-1-1	SS	N	2024-11-22	Very turbid, moderately grey	35.8 b	1.63	53.3	52.0	11.0	0.020	1.96 b	13.8 b	15.7 b	180
Gw-112-2-1	SS	N	2024-11-22	Very turbid, slightly grey	0.192	0.233	47.4	45.0	8.30	0.600	0.077	18.5 b	18.6 b	230
Gw-113-1-1	SS	N	2025-03-10	Clear and colourless	1.64	0.572	18.7	170	4.20	< 0.015	0.009	0.211	0.220	580 b
Gw-113-2-1	SS	N	2024-10-03	Clear and colourless	2.00	0.495	38.7	142	9.00	< 0.015	< 0.005	< 0.020	< 0.020	540 b
Gw-P1	SS	N	2024-05-24	Slightly turbid, colourless	0.082	7.58	1390 b	1420	71.0	36.0 a	< 0.005	< 0.020	< 0.020	< 1.00
Gw-P1	SS	N	2024-11-29	Clear, very slightly yellow	< 0.100	9.16	1670 b	1290	72.0	35.0 a	< 0.005	< 0.020	< 0.020	< 1.00
Gw-P1	SS	N	2025-02-28	Clear and colourless	0.063	6.85	1390 b	1120	62.0	32.0 a	< 0.005	< 0.020	< 0.020	1.00
Gw-P2	SS	N	2024-05-24	Slightly turbid, very slightly yellow	0.062	1.05	535	2940	160	90.0 a	0.006	1.03	1.04	< 1.00
Gw-P2	SS	N	2024-09-20	Very turbid, very slightly orange	0.063	0.760	523	3730	180	81.0 a	0.029	1.75	1.78	< 1.00
Gw-P2	SS	N	2024-11-29	Clear, very slightly yellow	0.048	0.696	471	2840	160	77.0 a	0.010	0.187	0.197	< 1.00
Gw-P2	SS	N	2025-02-28	Moderately turbid, very slightly orange	0.066	0.945	537	3410	170	81.0 a	0.012	0.108	0.120	< 1.00
Gw-P3	SS	N	2024-05-24	Moderately turbid, very slightly orange	0.069	2.30	719	3430	190	120 a	0.481	1.50	1.99	< 1.00
Gw-P3	SS	N	2024-09-20	Clear, very slightly yellow	0.061	1.76	757	3940	210	110 a	0.022	< 0.020	0.029	< 1.00
Gw-P3	SS	N	2024-11-29	Clear, very slightly yellow	0.060	2.00	593	3470	190	93.0 a	< 0.005	< 0.020	< 0.020	1.60
Gw-P3	SS	N	2025-02-28	Moderately turbid, very slightly yellow	0.082	2.41	784	3860	190	92.0 a	0.013	0.025	0.038	< 1.00
Gw-P4	SS	N	2024-05-24	Moderately turbid, very slightly orange	0.051	1.10	149	2630	190	110 a	< 0.005	0.022	0.022	< 1.00
Gw-P4	SS	N	2024-09-20	Clear, very slightly yellow	0.052	1.71	184	2490	200	84.0 a	0.011	0.209	0.220	< 1.00
Gw-P4	SS	N	2024-11-29	Clear, very slightly yellow	0.070	1.86	153	2170	200	86.0 a	0.008	0.039	0.046	5.40
Gw-P4	SS	N	2025-02-28	Clear and colourless	0.043	0.953	146	2210	160	83.0 a	0.013	0.052	0.066	11.0
Gw-P10	SS	N	2024-05-24	Slightly turbid, very slightly orange	0.033	0.717	641	1170	60.0	33.0 a	0.008	0.213	0.221	< 1.00
Gw-P10	SS	N	2024-09-20	Very slightly turbid, very orange. Filtered sampled was clear and colourless.	0.061	0.788	877	1510	99.0	40.0 a	0.010	0.204	0.213	< 1.00
Gw-P10	SS	N	2024-11-29	Clear, very slightly yellow	0.032	0.676	711	1180	77.0	34.0 a	< 0.005	< 0.020	< 0.020	< 1.00
Gw-P10	SS	N	2025-02-21	Very turbid, very orange	0.054	0.598	597	1440	60.0	33.0 a	0.020	0.99	1.01	< 1.00

Notes:

a	*Above CSR Schedule 3.2 AW Standard.*
b	*Above CSR Schedule 3.2 DW Standard.*
SS	*Single sample.*
FRM	*Field replicate mean (average of field replicates).*
NS	*No sample.*
BC CSR	*CSR-Sch3.2: BC Contaminated Site Regulation - Schedule 3.2 - Generic Numerical Water Standards, last amended March 1,*
(1)	*Aquatic Life (AW) Freshwater Standard, Column 3 in CSR-Sch3.2*
(2)	*Drinking Water (DW) Standard, Column 6 in CSR-Sch3.2*
(3)	*Standard varies with pH. Every ammonia result was compared to a standard based on the associated pH result for that sample.*
(4)	*Standard varies with chloride. Every nitrite result was compared to a standard based on the associated chloride result for that sample.*
(5)	*Standard varies with hardness. Every result was compared to a standard that was based on the associated hardness result for that sample.*
(6)	*BC CSR Schedule 3.2 criterion for iron and manganese were not applied as directed by the Stage 8 CSR Amendments.*
(7)	*Standard is based on the trivalent (Cr(III)) species.Cr(III) is the most common form of chromium.*
(8)	*Interim standard used.*
(9)	*CSR Stage 13 amendments, protocol 9, background concentration is higher than the applicable CSR DW and/or most stringent CSR a standard. A concentration above the CSR DW or most strigent CSR AW stanadard but below the regional background concentration (South Vancouver Island Region) is not considered contaminated and is not highlighted as a CSR DW or AW exceedance.*

5.5 Background Groundwater Quality

Background groundwater quality is monitored at location 63, south of Phase 2 and upgradient of the landfill. In 2024/25 background groundwater quality was characterized by low average conductivity (230 µS/cm), chloride (4.77 mg/L), nitrate (0.04 mg/L), and sulphate (9.73 mg/L) concentrations. Ammonia concentrations were non-detectable.

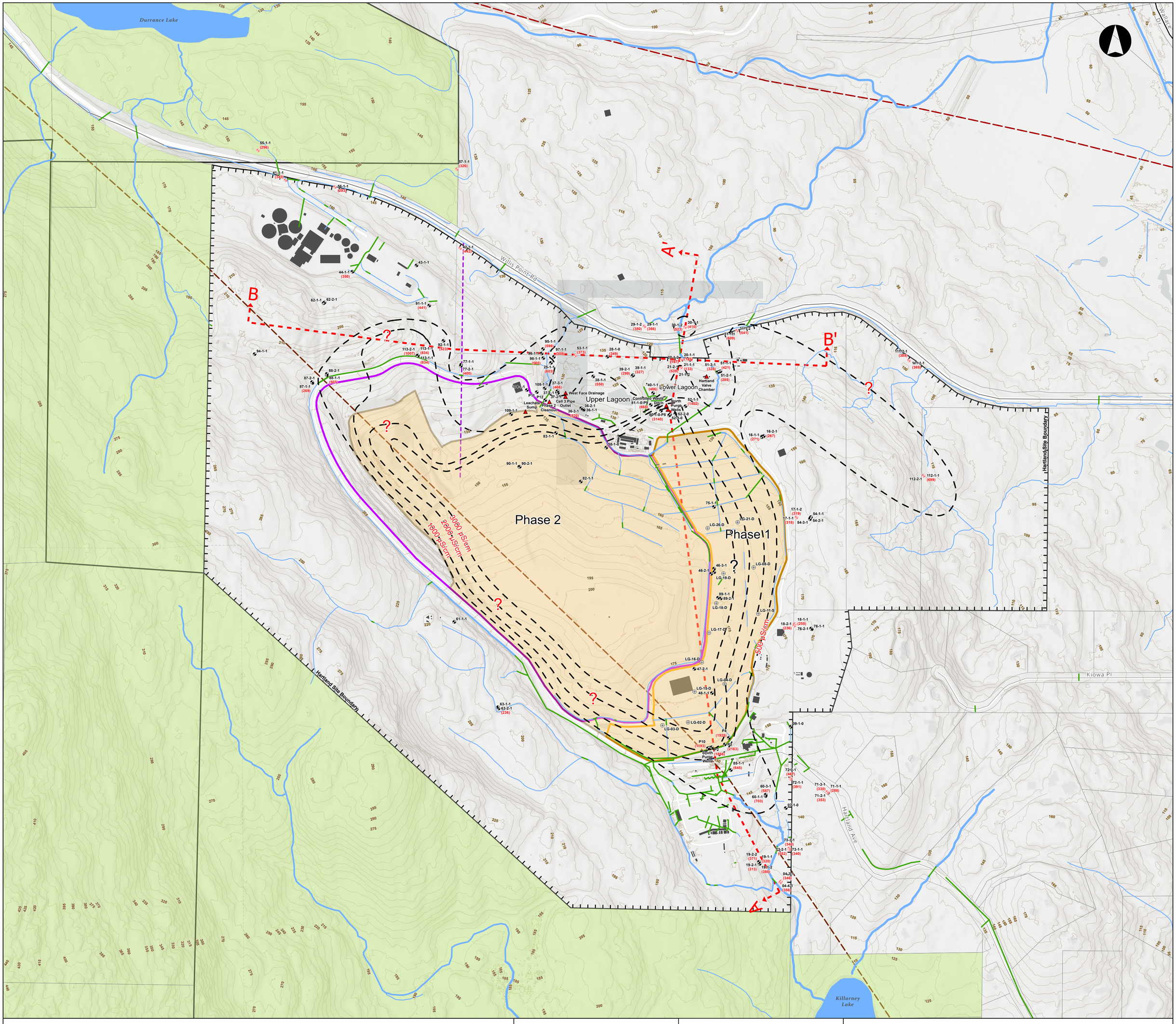
5.6 Electrical Conductivity

Figure 5-1 presents electrical conductivity values in plan, and figures 5-2 and 5-3 show north-south and east-west cross-sections showing conductivity through the landfill. The contours in these figures were plotted based on our interpretation of groundwater quality in late-September/early-October during dry season conditions. Electrical conductivity was plotted because it is a good indicator of leachate contamination when elevated ammonia and chloride are present, and it can also be used to identify aggregate runoff impacts associated with sulphide oxidation.

The 500 µS/cm conductivity contour is considered indicative of background groundwater quality. In 2024/25, the 500 µS/cm conductivity contour along the northern boundary of the landfill was expanded around the Northeast Stockpile, and one offsite well on the other side of Willis Point Road exhibited a conductivity >500 µS/cm. The 500 µS/cm contour also extended down Heal Creek, downgradient of GW-95-1-1 and GW-96-1-1. These changes to the 500 µS/cm were interpreted as aggregate runoff impacts because of their proximity to aggregate stockpiles and position along groundwater flow paths. Like previous years, the 500 µS/cm contour was extended above parts of the Northwest Stockpile.

Electrical conductivity values greater than 1,000 µS/cm in groundwater have been used to identify areas of the Site where leachate impacts are present. Figure 5-1 shows that the 1,000 µS/cm contour closely resembles the outline of current refuse disposal, indicating that groundwater in these areas has been affected by leachate. In figures 4-2 and 5-2, the 1,000 µS/cm contour was used to illustrate the interpreted extent of the Phase 1 leachate plume. North of Phase 2, at GW-113-2-1, at high conductivity value (1,002 µS/cm) was observed, so the 1,000 µS/cm contour was interpreted to extend to the Northwest Stockpile. Groundwater in this area reports to the Heal Basin.

Conductivity values in the North and South Purge Wells were generally above 1,000 µS/cm, except for in GW-81-1-0-P9 (668 µS/cm). Among the North Purge Wells, conductivity values were highest in 80-1-0-P8, reaching 5,057 µS/cm in March 2025. Conductivity values in the South Purge Wells were generally above 1,200 µS/cm, with the highest conductivity (2,253 µS/cm) observed at P4 in February 2025. Conductivity values at purge wells P11 and P12 were relatively low, ranging from 537 to 633 µS/cm. Like previous years, conductivity contours near the North and South Purge wells indicated that leachate-impacted groundwater was contained within the landfill.



LEGEND

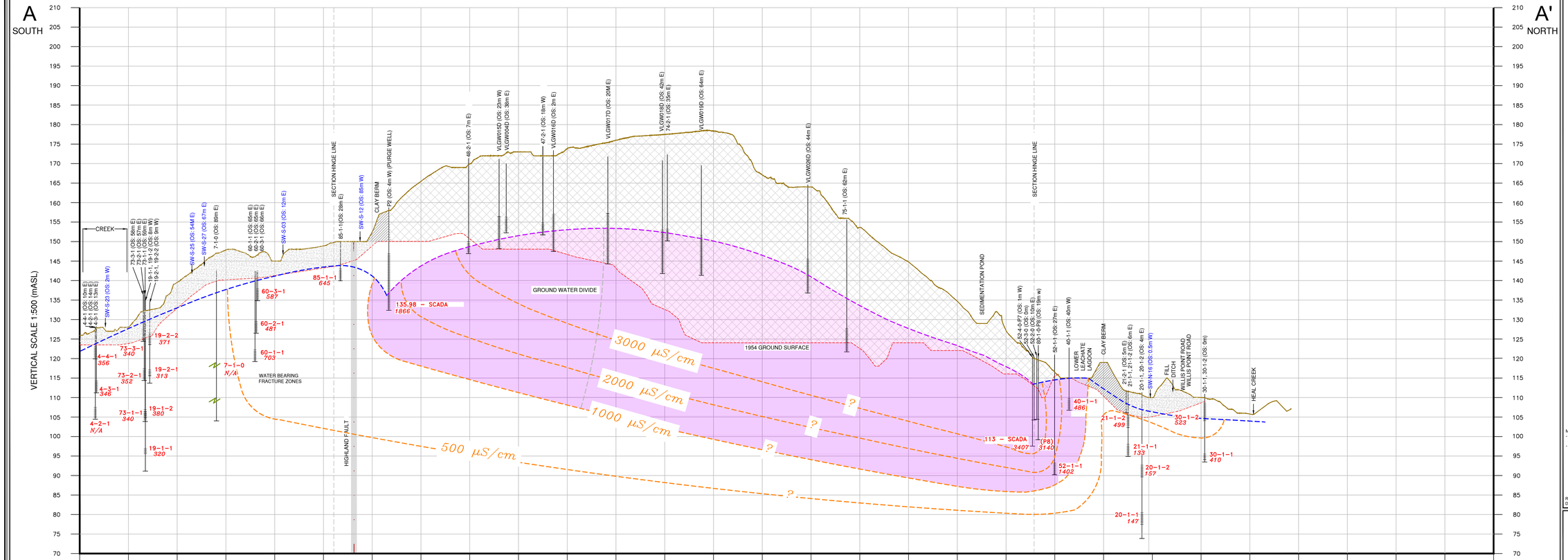
- Monitoring Well
- Compliance Well
- Gas Well
- Leachate Collection Well
- 18-1-1 (255) Groundwater Electrical Conductivity (µS/cm) Measured September/October 2024

Hydrology
- Primary Stream or Ditch
- Secondary Stream or Ditch
- Tertiary Stream or Ditch
- Gravity Main
- Contours (5m)
- Inferred Groundwater Electrical Conductivity Contour (µS/cm)
- Inferred Fault (AECOM, 2020)
- Durrance Lake Fault (Muller, 2020)
- Cross Sections
- Highland Fault (Muller, 2020)

- Phase 1 Closure (1997)
- Phase 2 Base
- Existing Waste Footprint
- Lot Lines
- Structure
- Park
- Local Government Boundary
- Site Boundary

Electrical Conductivity Plan (September - October 2024)	**Hartland Landfill Monitoring Report**	0 125 250 500 M
Figure 5-1	**1:3,500** **NAD83 UTM Zone 10N**	**Basemaps provided by:** Esri, NASA, NGA, USGS, FEMA, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community and Capital Regional District
P:60740388	**June 2025**	
AECOM	CRD Making a difference...together	This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.

Project Location: L:\DCS\Projects\ENV\60740388_Hartland_2025_Reporting\900_CAD_GIS\920_GIS\60740388_Hartland_ArcPro_Project\60740388_Hartland_ArcPro_Project.aprx **Layout:** Figure 5-1 v2
Date Saved: 2025-06-25 12:33 PM **User:** HartH1



Legend

- MONITORING WELL (NUMBER) INDICATES DISTANCE WELL IS FROM PLANE OF SECTION. WHERE NOT INDICATED, DISTANCE IS LESS THAN 2 m.
- SCREENED INTERVAL
- WATER BEARING FRACTURES
- GROUND SURFACE
- LOCATION OF BEDROCK DERIVED FROM 1954 GROUND CONTOUR OR BEDROCK INTERSECTIONS IN BOREHOLES
- REFUSE
- CLAY BERM
- UNCONSOLIDATED SOIL AND FILL
- INTERPRETED GROUNDWATER POTENTIOMETRIC SURFACE IN BEDROCK (SEPTEMBER 2024)
- INTERPRETED LEACHATE MOUND
- FAULT (MULLER 1980)
- SATURATED REFUSE
- LEACHATE PLUME
- GROUNDWATER DIVIDE
- INFERRED ELECTRICAL CONDUCTIVITY CONTOUR (SEPTEMBER 2024).
- 834.0 — ELECTRICAL CONDUCTIVITY SEPTEMBER-OCTOBER 2024 (µ S/cm)
- (N/A) — GROUNDWATER SAMPLE WAS NOT COLLECTED IN SEPTEMBER-OCTOBER 2024
- 537.0 — ELECTRICAL CONDUCTIVITY DATA WAS NOT USED TO INTERPRET CONDUCTIVITY CONTOUR
- SW-N/S-# — SURFACE WATER SAMPLING POINT (CONDUCTIVITY DATA NOT INCLUDED)

Map Sources / Notes:
- Contours based on 24W542_2023 base.dwg, provided by the Capital Regional District, April 2024.
- Stratigraphy between boreholes is inferred and may vary from that shown

0 10 20 40 60 80 m

1 : 2000

Section Looking West

Reviewed by:
Date Issued:

Prepared by:
Project Number: 60740388

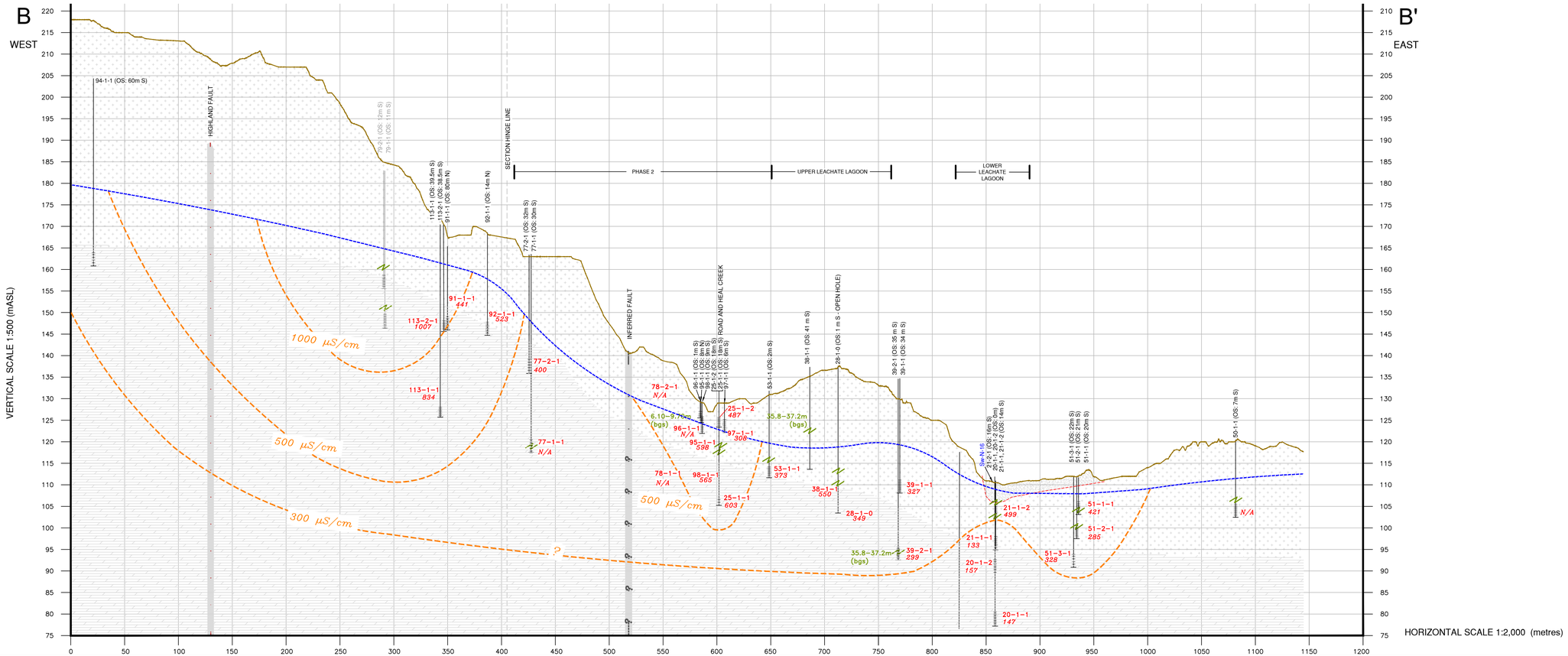
Project: Hartland Landfill Monitoring
Location: Saanich, BC

Electrical Conductivity in Cross Section A-A' (September - October 2024)

AECOM

Figure 5-2

File Location: L:\DCS\PROJECTS\ENV\60740388_HARTLAND_2025_REPORTING\900_CAD_GIS\920_GIS\2025 FIGURES\CAD_FILES\FIG5.2-5.3-GW SECTIONS-A&B-60740388-2025.DWG Date Plotted: July 31, 2025 Saved By: harth1



Legend

- MONITORING WELL (NUMBER) INDICATES DISTANCE WELL IS FROM PLANE OF SECTION. WHERE NOT INDICATED, DISTANCE IS LESS THAN 2 m.
- SCREENED INTERVAL
- WATER BEARING FRACTURES
- GROUND SURFACE
- LOCATION OF BEDROCK DERIVED FROM 1954 GROUND CONTOUR OR BEDROCK INTERSECTIONS IN BOREHOLES
- UNCONSOLIDATED SOIL AND FILL
- INTERPRETED GROUNDWATER POTENTIOMETRIC SURFACE IN BEDROCK (SEPTEMBER 2024)
- INFERRED ELECTRICAL CONDUCTIVITY CONTOUR (SEPTEMBER 2024).
- 834.0 — ELECTRICAL CONDUCTIVITY SEPTEMBER-OCTOBER 2024 (µ S/cm)
- (N/A) — GROUNDWATER SAMPLE WAS NOT COLLECTED IN SEPTEMBER-OCTOBER 2024
- SW-N-S-# — SURFACE WATER SAMPLING POINT (CONDUCTIVITY DATA NOT INCLUDED)
- FAULT (MULLER, 1980)
- ? INFERRED FAULT (AECOM, 2017)

Map Sources / Notes:
- Contours based on 24W542_2023 base.dwg, provided by the Capital Regional District, April 2024.
- Stratigraphy between boreholes is inferred and may vary from that shown

1 : 2000
Section Looking North

Reviewed by:
Date Issued:

Prepared by:
Project Number: 60740388

Project: Hartland Landfill Monitoring
Location: Saanich, BC

Electrical Conductivity in Cross Section B-B'
(September - October 2024)

AECOM

Figure 5-3

5.7 Groundwater Quality North of the Landfill

Figures 5-4 to 5-7 illustrate long-term groundwater quality trends north of the landfill.

5.7.1 Compliance Monitoring Locations North of Phase 1

5.7.1.1 Location 21

Monitoring location 21 consists of wells GW-21-1-1, GW-21-1-2, and GW-21-2-1, which were all screened in bedrock. These wells are north of Phase 1, immediately downgradient of the Lower Leachate Lagoon. The wells are positioned along the most probable path of subsurface leachate migration from Phase 1.

In 2024/25, conductivity was moderate to elevated in wells GW-21-1-2 and GW-21-2-1 but was low in GW-21-1-1. Similarly, ammonia, chloride, and nitrate concentrations were elevated in the shallow wells, and low to non-detectable concentrations were observed in the deep well (GW-21-1-1). At GW-21-1-2 and GW-21-2-1, ammonia concentrations ranged from 4.95 to 5.95 mg/L, chloride concentrations ranged from 47.5 to 69.5 mg/L, and nitrate concentrations ranged from below detection to 0.917 mg/L. The Mann-Kendall analysis detected significant increasing trends in conductivity and sulphate concentration at GW-21-1-2 and increasing trends in sulphate and nitrate concentrations at GW-21-2-1.

The elevated leachate indicator parameters observed at monitoring location 21 reflect dilute leachate impacts, whereas the elevated nitrate and sulphate concentrations reflect aggregate runoff impacts that have slowly worsened since 2023 (Figure 5-4). Nitrate and sulphate concentrations may continue to increase at this location as ANFO leaching ad sulphide oxidation occurs in the Northeast Stockpile. Nitrate concentrations are expected to subside before sulphate concentrations as sulphide oxidation will likely occur at a slower rate.

5.7.1.2 Location 20

Monitoring location 20 consist of wells GW-20-1-1 and GW-20-1-2, which were both screened in bedrock. These wells are north of Phase 1, immediately downgradient of the Lower Leachate Lagoon and monitoring location 21, and approximately 5 to 15 m from the landfill property boundary. The wells are positioned along the most probable path of subsurface leachate migration from Phase 1.

In 2024/25, groundwater quality at location 20 met CSR AW and DW standards, except for one boron concentration (5.39 mg/L) measured at GW-20-1-1 in September 2024. Average conductivity was low (155.5 µS/cm), as well as all other aggregate runoff and leachate indicator concentrations. The Mann-Kendall analysis detected significant decreasing trends in chloride concentrations at GW-20-1-1, GW-20-1-2, and GW-20-2-1, as well as a decreasing trend in ammonia concentrations at GW-20-1-2.

Groundwater quality at monitoring location 20 did not exhibit any evidence of leachate or aggregate runoff impacts, but boron concentrations have been slowly increasing at this location since sampling of boron began in 2016. Boron concentrations have exhibited seasonal fluctuations and exceeded the CSR DW standards on a dry-season sampling event since 2020. We believe that the boron originates from the bedrock below the Phase 1 landfill near the North and South Purge wells because nearby wells and the purge wells exhibit a distinct geochemical signature characterized by high silicon and boron concentrations and similar silicon-boron ratios. Boron concentrations should continue to be monitored at this location.

5.7.1.3 Location 30

Monitoring location 30 consists of wells GW-30-1-1 and GW-30-1-2, which are both screened in bedrock. These wells are located across Willis Point Road, beyond the northern property boundary of the Site, and downgradient of compliance monitoring locations 20 and 21.

In 2024/25, no CSR exceedances were reported at monitoring location 30, but nitrate concentrations (0.482 to 0.955 mg/L) were elevated during two sampling events at GW-30-1-2. Average chloride concentrations were elevated (52 mg/L), and sulphate concentrations were moderate, averaging 38.4 mg/L. Ammonia concentrations were low. The Mann-Kendall analysis detected a significant decreasing trend in chloride concentrations and an increasing trend in sulphate concentrations at GW-30-1-1. Overall, there was no sign of landfill leachate at location 30, but dilute aggregate runoff impacts were observed, particularly in the shallow bedrock.

5.7.1.4 Location 31

Monitoring location 31 consists of wells GW-31-1-1 and GW-31-1-2, screened in the deep bedrock and across the overburden-bedrock contact, respectively. Monitoring location 31 is downgradient and northeast of monitoring locations 20 and 21, just inside the northern property boundary. In 2023/24, nitrate concentrations at GW-31-1-1 and GW-31-1-2 exceeded the CSR

DW during two sampling events, so the CRD issued a Notice of Offsite Migration to the BC Ministry of Environment. The water quality impacts were attributed to aggregate runoff.

In 2024, CSR DW exceedances were reported for nitrate concentrations at GW-31-1-1 and GW-31-1-2 in May and September. Nitrate concentrations ranged from 6.37 to 16.1 mg/L at GW-31-1-1 and from 6.26 to 14.2 mg/L at GW-31-2-1, decreasing throughout the monitoring period. Conductivity and sulphate concentrations were elevated, averaging 534.38 µS/cm and 202.5 mg/L, respectively. The Mann-Kendall analysis detected a significant decreasing trend in ammonia concentration at GW-31-1-2 and increasing trends in nitrate concentrations at both GW-31-1-1 and GW-31-1-2. The groundwater quality trends at monitoring location 31 reflect aggregate runoff impacts, but no leachate impacts occurred.

5.7.1.5 Location 111

Monitoring location 111 consists of two wells, GW-111-1-1 and GW-111-2-1, which were completed in the bedrock and across the bedrock-overburden contact in September 2024. The purpose of installing these monitoring wells was to monitor groundwater quality immediately downgradient of the Northeast Stockpile, at the northern property boundary. The lowest groundwater elevations measured on Site occur at this location.

In 2024/25, nitrate concentrations (11.8 to 13.1 mg/L) exceeded the CSR DW standard at both GW-111-1-1 and GW-111-2-1 in October 2024. Nitrate concentration exceeded the CSR DW again at GW-111-1-1 in November. Conductivity, ammonia, and chloride concentrations were low to non-detectable in both wells, and sulphate concentrations were moderate in both. The groundwater quality was clearly impacted by aggregate runoff, but there was no evidence of leachate impacts.

5.7.2 Other Monitoring Locations North of Phase 1

5.7.2.1 Locations 39 and 40

Monitoring well GW-40-1-1 was screened in bedrock between the Upper and Lower Leachate Lagoons and adjacent to the North Purge Wells. Groundwater quality impacts associated with leachate have been investigated at this location and were subject of a previous report (AECOM 2009a). Monitoring wells GW-39-1-1 and GW-39-2-1 were screened in bedrock about 50 m northeast of GW-40-1-1.

In 2024/25, no CSR AW/DW exceedances were reported at monitoring locations 39 and 40. At GW-40-1-1, conductivity, sulphate, and chloride concentrations were moderate to elevated, ammonia concentrations were below 1 mg/L, and nitrate concentration was high. At monitoring location 39, elevated nitrate and sulphate concentrations were observed in both wells, with higher concentrations in the deep well. The Mann-Kendall analysis detected significant increasing trends in conductivity, chloride, sulphate, and nitrate concentrations in both wells at location 39, as well as an increasing trend in nitrate concentration at GW-40-1-1. Groundwater quality at this location was impacted by dilute leachate and likely some aggregate runoff, but the relatively low leachate indicator concentrations suggest that leachate impacts do not extend further north.

5.7.2.2 The North Purge Wells (P7, P8, and P9) and Location 52

Monitoring locations 52 (GW-52-1-1 and GW-52-4-0-P7), GW-80-1-0-P8, and GW-81-1-0-P9 (i.e., the North Purge Wells) are positioned at the edge of the Phase 1 leachate plume, south of the Lower Leachate Lagoon, and approximately 100 m from the property boundary (see Figure 4-2). Leachate flows along the bedrock/refuse interface underlying Phase 1 toward the Lower Leachate Lagoon and the North Purge Wells. At these wells, groundwater quality has been impacted by leachate since monitoring began in the 1980's. Monitoring well GW-52-1-1 is located immediately northeast of P7 and intercepts leachate-impacted groundwater from relatively deep bedrock.

In 2024/25, ammonia concentrations at the North Purge Wells and GW-52-1-1 were generally above the CSR AW standard, with the highest concentration (420 mg/L) observed at P8 in September. Chloride concentrations at P7, P8, and P9 were elevated and often exceeded the CSR DW standard, and arsenic exceeded the DW standard at P8 and P9. Conductivity was elevated in all four wells, averaging 705 µS/cm, and the highest conductivity was observed at P8 (5,057 µS/cm). Relatively low conductivity was observed at P9. The Mann-Kendall detected significant decreasing trends in conductivity and chloride concentrations at GW-52-1-1 and P9, and a decreasing trend in sulphate concentrations was also detected at P9. The groundwater in this area was impacted directly by landfill leachate, and nitrate concentrations were higher than previous monitoring years. The CRD reported that the pump was not fully operational at the time of sampling, so groundwater samples collected at P9 in 2024/25 are not reliable.

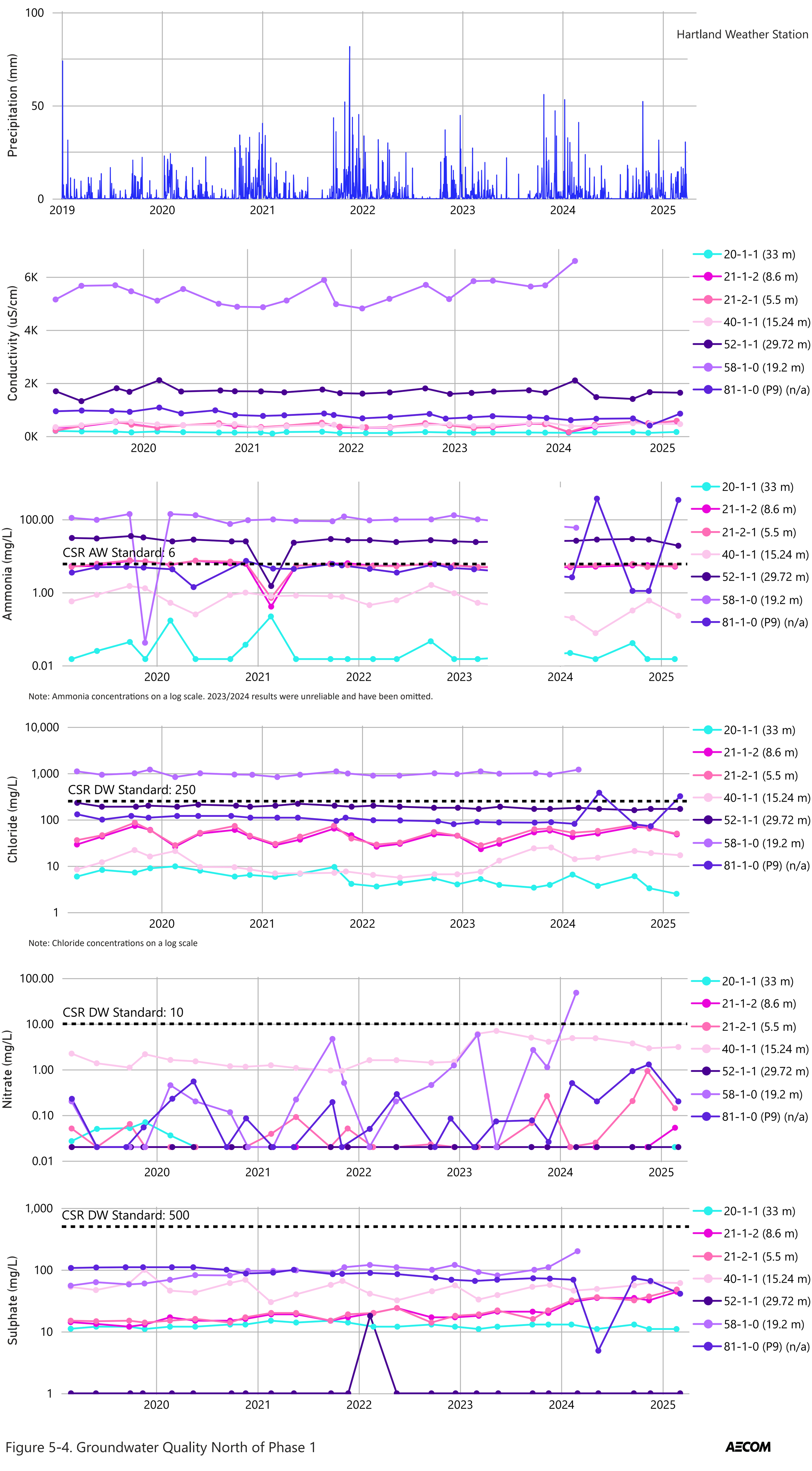
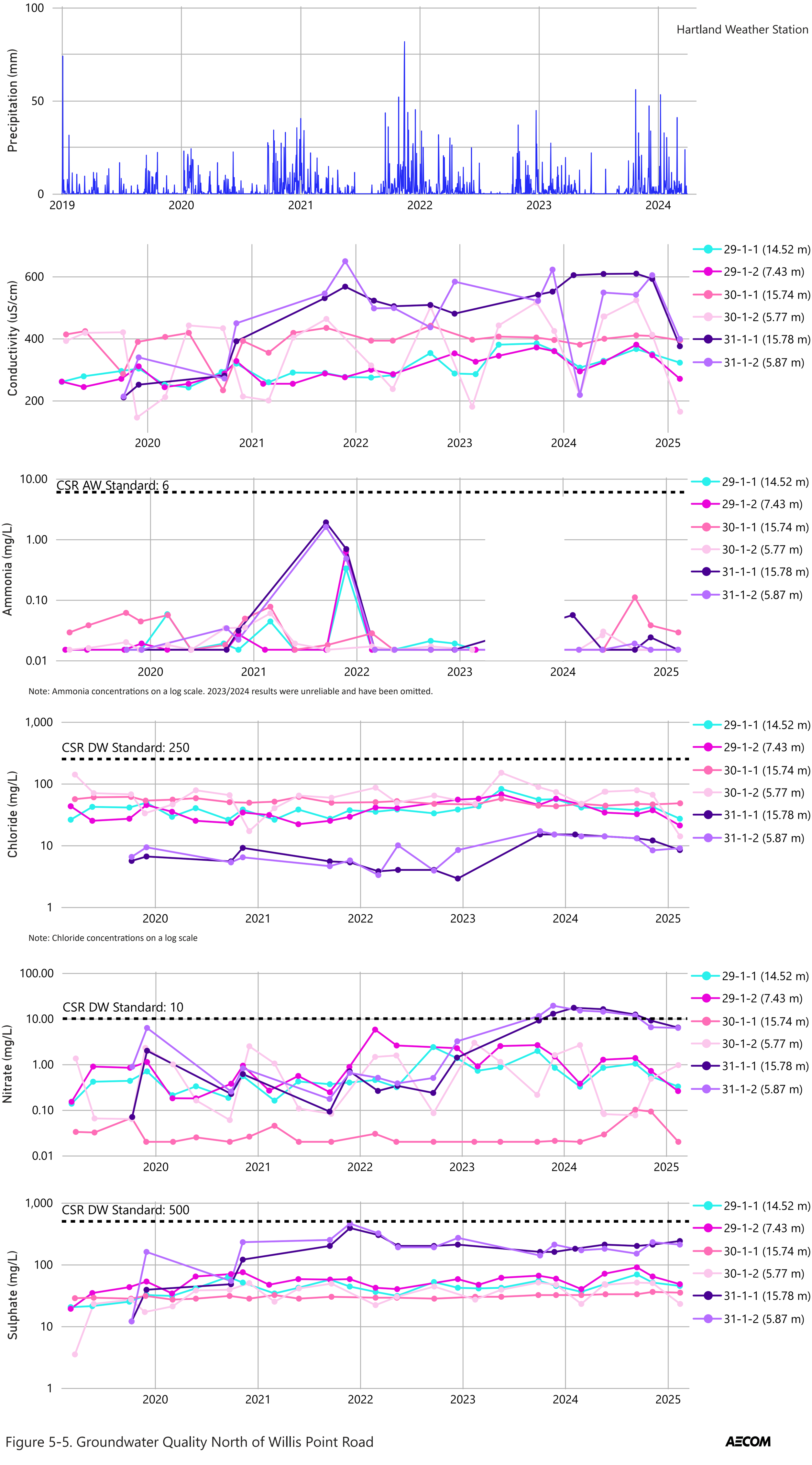


Figure 5-4. Groundwater Quality North of Phase 1

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Note: Ammonia concentrations on a log scale. 2023/2024 results were unreliable and have been omitted.

Note: Chloride concentrations on a log scale

Figure 5-5. Groundwater Quality North of Willis Point Road

5.7.3 Compliance Monitoring Locations North of Phase 2

5.7.3.1 Location 53

Monitoring location consists of a single monitoring well completed in relatively deep bedrock downgradient of Phase 2. The well is located on an east-west trending ridge about 100 m north of the Phase 2 basin, close to the northern property boundary. No leachate impacts have been observed at this location. In 2024/25, groundwater quality at GW-53-1-1 met all applicable CSR standards. Sulphate concentrations were moderate, reaching 67 mg/L in February 2025, and the Mann-Kendall analysis detected a significant increasing trend in sulphate concentrations. Nitrate and ammonia concentrations were very low to non-detectable. The elevated sulphate concentrations may reflect aggregate runoff.

5.7.3.2 Location 28

Monitoring location 28 consists of a single monitoring well completed in relatively deep bedrock downgradient of Phase 2, and east of monitoring location 53. In 2024/25, groundwater quality at GW-28-1-0 met all applicable CSR standards, and there no signs of leachate impacts. Elevated nitrate concentrations (e.g., 1.31 mg/L) were observed in September and November 2024, as well as moderate sulphate concentrations (45 to 47 mg/L). The Mann-Kendall analysis detected increasing trends in conductivity and nitrate concentrations. These trends indicate that aggregate runoff impacted the groundwater quality. The CRD constructed a road through this area of the Site to haul aggregate, and it is likely that runoff from the road impacted the groundwater quality in 2024/25.

5.7.3.3 Location 29

Monitoring location consists of two monitoring wells, GW-29-1-1 and GW-29-2-1, which were screened in bedrock and across the overburden-bedrock contact, respectively. These wells were installed north of Willis Point Road, beyond the northern property boundary of the Site, west of compliance monitoring location 30.

In 2024/25, groundwater quality at monitoring location 29 met all applicable CSR standards, and there was no evidence of leachate impacts. Nitrate concentrations were elevated, reaching 1.03 and 1.37 mg/L at GW-29-1-1 and GW-29-2-1, respectively. Sulphate concentrations were also elevated, reaching 90 mg/L in GW-29-2-1. The Mann-Kendall analysis detected significant increasing trends in nitrate concentrations and conductivity in GW-21-1-1, as well as increasing conductivity in GW-29-1-2. The trends indicate that groundwater quality at monitoring location 29 was impacted by aggregate runoff.

5.7.4 Other Monitoring Locations North of Phase 2

Groundwater quality was monitored in several areas north of Phase 2, in new and historical monitoring wells that are not used to monitor landfill compliance. In 2021/22, elevated nitrate and ammonia concentrations were observed in the Northwest Sedimentation Pond and Heal Creek. These impacts prompted an investigation (AECOM 2023), where we determined that a small amount of leachate likely escaped Phase 2 following heavy precipitation (atmospheric rivers) in November 2021. It was also apparent that large volumes of aggregate stored on Site (e.g., the Northwest Stockpile) were leaching dissolved nitrogen species into the local environment. Since then, no leachate impacts have been observed in this area of the landfill, but aggregate runoff impacts have persisted.

5.7.4.1 Locations 104, 108, and 109

Monitoring locations 104, 108, and 109 consist of individual monitoring wells all screened in relatively shallow bedrock immediately northwest of the Phase 2 basin. These wells were drilled during the NWSP Investigation. In 2024/25 groundwater quality at these locations met all applicable CSR standards. However, nitrate and sulphate concentrations were relatively high, with the highest concentrations observed at GW-104-1-1. Ammonia concentrations were elevated at locations 104 and 109, and conductivity was highest at location 104. The Mann-Kendall analysis detected a significant increasing trend in sulphate concentrations at location 104, as well as increasing trends in chloride concentrations at locations 108 and 109. Historically, groundwater quality in this area has been impacted by aggregate runoff and magnesium lignosulphonate (e.g., GW-104-1-1), and those impacts persisted in 2024/25.

5.7.4.2 Purge Wells P11 and P12

Purge wells P11 and P12 were installed immediately north of Phase 2 during the NWSP Investigation. Since installation, the wells have been dry intermittently but have exhibited aggregate runoff impacts when water levels are high enough to collect a sample. In May of 2023, pumping of P11 began, with an average discharge rate of 0.75 L/min. In 2024/25, groundwater quality at P11 and P12 met all applicable CSR standards. Conductivity was elevated on all successful sampling events, and nitrate and sulphate concentrations were elevated. Ammonia concentrations were low. The Mann-Kendall analysis detected significant decreasing trends in conductivity and nitrate concentration at P11. Overall, the groundwater quality was impacted by aggregate runoff, but no leachate impacts were apparent.

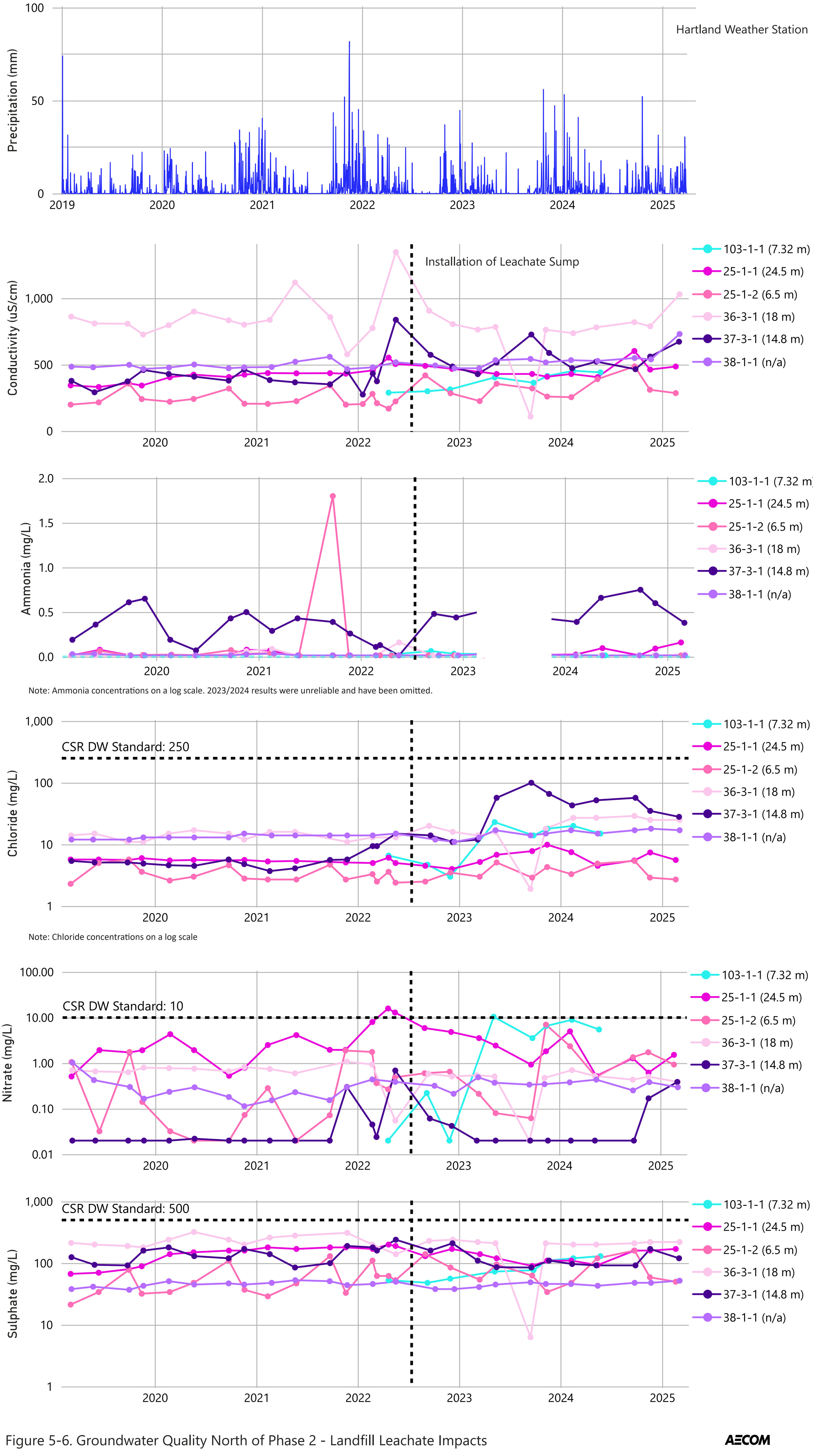


Figure 5-6. Groundwater Quality North of Phase 2 - Landfill Leachate Impacts

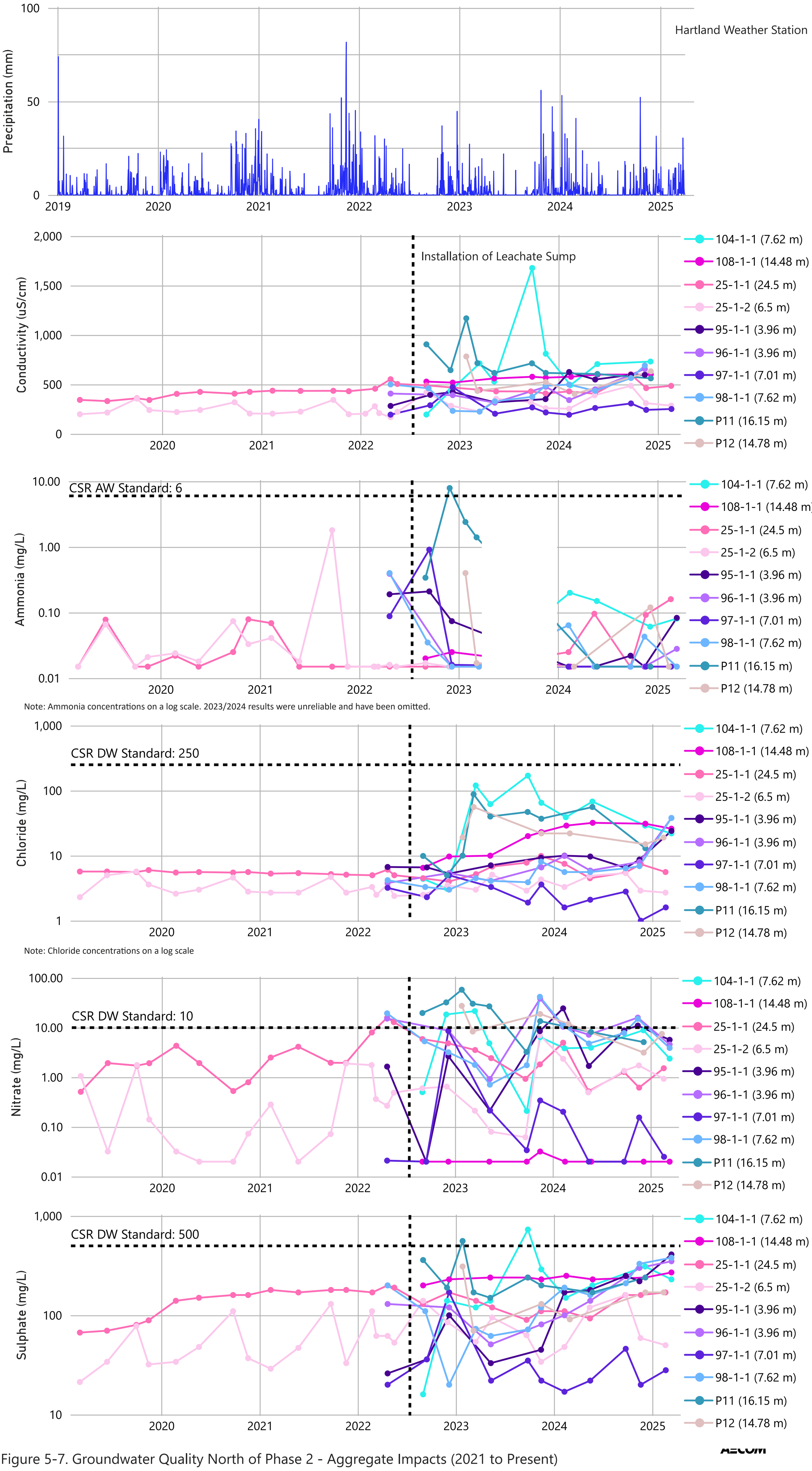


Figure 5-7. Groundwater Quality North of Phase 2 - Aggregate Impacts (2021 to Present)

5.7.4.3 Locations 36, 37, 38, and 58

Monitoring locations 36, 37, 38 and 58 are located immediately north of the Phase 2 basin. Monitoring locations 37 and 36 consist of two to three monitoring wells that were all completed in bedrock. Two wells at each location are integrated into the landfill's SCADA system, so groundwater quality is only monitored at GW-36-3-1 and GW-37-3-1. These monitoring locations are critical for monitoring hydraulic gradients at the Site, and they are good monitoring points for determining if leachate has migrated north of Phase 2. GW-38-1-1 is completed in bedrock downgradient of locations 36 and 37 and upgradient of compliance monitoring location 28. GW-58-1-1 was completed in Phase 2 refuse, just inside the northern edge of the Phase 2 basin and south of the Upper Leachate Lagoon. In 2024/25, no groundwater samples were collected at monitoring location 58 because it was inaccessible throughout the year.

In 2024/25, groundwater quality at locations 36, 37, and 38 met all applicable CSR standards. Conductivity, nitrate, and sulphate concentrations were elevated at all three locations, and elevated ammonia and chloride concentrations were also observed at GW-37-3-1. The Mann-Kendall analysis detected significant increasing trends in chloride concentrations at all three locations, increasing trends in conductivity and ammonia concentration at GW-37-3-1, and increasing trends in conductivity, chloride, and nitrate concentrations at GW-38-1-1. Groundwater quality in this area was impacted by aggregate runoff and there may have been dilute leachate impacts at GW-37-3-1. The dust suppressant used at the Site may have also impacted the groundwater quality.

5.7.4.4 Locations 25, 95, 96, 97 and 98

Monitoring location 25 consists of two wells (GW-25-1-1 and GW-25-1-2) that were both screened in bedrock. The wells are located on an east-west trending ridge about 100 m north of the Phase 2 basin, and about 10 m north of the NWSP. Wells GW-95-1-1 and GW-96-1-1 were installed meters apart, along the north edge of Heal Creek, east and downgradient of the NWSP. Wells GW-97-1-1 and GW-98-1-1 were installed metres apart, just south of Heal Creek and north of the NWSP.

In 2024/25, CSR DW exceedances were reported for nitrate concentrations at GW-95-1-1, GW-96-1-1, and GW-98-1-1. Conductivity, sulphate, and nitrate concentrations were moderate to elevated in all of the wells except GW-97-1-1. The highest nitrate concentration (15.9 mg/L) occurred at GW-96-1-1, and the highest sulphate concentration (410 mg/L) was recorded at GW-95-1-1. Leachate indicator concentrations were low in this area. The Mann-Kendall analysis detected significant increasing trends in sulphate concentrations at GW-95-1-1 and GW-96-1-1, an increasing trend in conductivity was observed at GW-95-1-1, and increasing trends in conductivity, sulphate, and chloride concentrations were observed at GW-98-1-1. Significant increasing trends in conductivity and nitrate concentrations were detected at GW-25-1-2, as well as a decreasing trend in ammonia concentrations. This area of the landfill was impacted by aggregate runoff.

5.8 Groundwater Quality Northwest of the Landfill

The Hartland North Pad has had a variety of uses including yard waste composting (1994 to 2004) and aggregate stockpiling (2006 to 2018). Currently, it accommodates the north trailer and Residuals Treatment Facility (RTF) associated with CRD's McLoughlin Point Wastewater Treatment Plant project. Figure 5-8 illustrates long-term groundwater quality trends in the northwest area of the Site and offsite in the receiving environment.

5.8.1 Compliance Monitoring Locations

5.8.1.1 Location 41

Monitoring location 41 consists of one monitoring well (GW-41-1-1) screened in shallow bedrock. The well is located in the northwest corner of the Site, at the edge of the northern property boundary and north of the RTF. In 2024/25, the groundwater quality at monitoring location 41 met all applicable CSR standards. Conductivity and chloride concentrations were low, and ammonia, nitrate, and sulphate concentrations were low to moderate. The highest nitrate concentration was 0.128 mg/L, and sulphate concentration reached 56 mg/L. The Mann-Kendall analysis detected a significant decreasing trend in sulphate concentrations and an increasing trend in nitrate concentrations at this monitoring point. The groundwater quality at this location likely exhibited aggregate runoff impacts, given the concurrently elevated nitrate and sulphate concentrations.

5.8.1.2 Location 56

Monitoring location 56 consists of one well (GW-56-1-1) screened in bedrock. The well is located at the northern property boundary, immediately downgradient of the RTF, about 100 m east of compliance monitoring location 41. In 2024/25, the groundwater quality at monitoring location 56 met all applicable CSR standards, and all aggregate and leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected a significant decreasing trend in sulphate concentrations at this location. Groundwater quality at this location showed no evidence of aggregate runoff or leachate impacts.

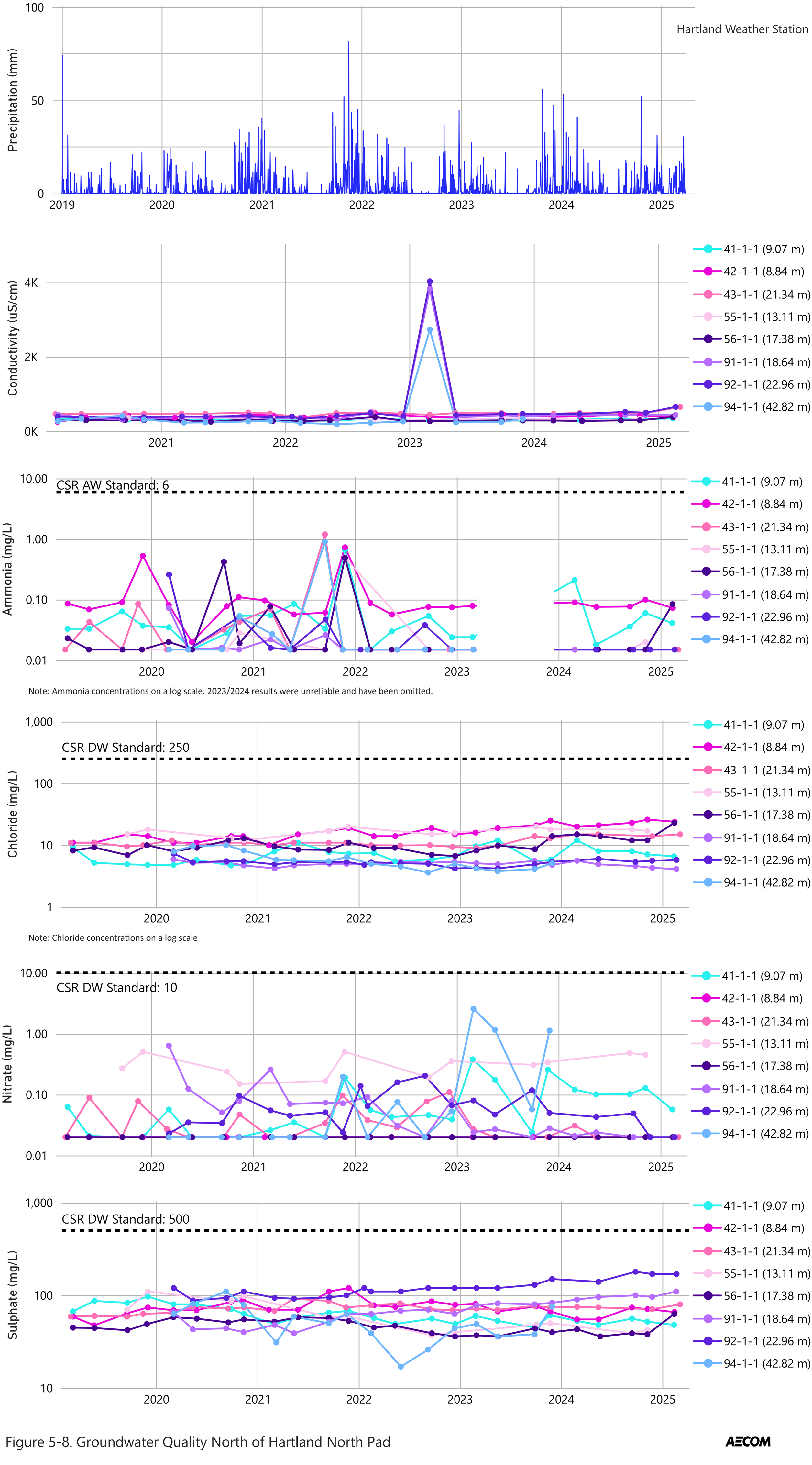


Figure 5-8. Groundwater Quality North of Hartland North Pad

5.8.1.3 Location 42

Monitoring location 42 consists of one monitoring well (GW-42-1-1) screened in shallow bedrock. The well is located northwest of Heal Creek, north of the RTF, at the northern property boundary. In 2024/25, the groundwater quality at monitoring location 42 met all applicable CSR standards. Chloride, ammonia, and nitrate concentrations were present in low to non-detectable concentrations. Conductivity and sulphate concentration were moderate, averaging 411.3 µS/cm and 66 mg/L, respectively. The Mann-Kendall analysis detected a significant increasing trend in chloride concentration at this location. The groundwater quality at this location may have been affected by dilute aggregate runoff impacts.

5.8.1.4 Location 55

Monitoring location 55 consists of one well (GW-55-1-1) screed in bedrock. The well is located offsite, across Willis Point Road, in the receiving environment (a wetland) downgradient of the RTF and compliance monitoring location 41. In 2024/25, the groundwater quality at monitoring location 55 met all applicable CSR standards, and leachate indicator parameters were present in low concentrations. Nitrate concentrations were elevated (0.451 to 0.483 mg/L), but conductivity and sulphate concentrations were low. The elevated nitrate could reflect aggregate runoff or a natural source in the wetland.

5.8.1.5 Location 57

Monitoring location 57 consists of one well (GW-57-1-1) screened in bedrock. The well is located offsite, across Willis Point Road, in the receiving environment downgradient of the RTF and compliance monitoring locations 56 and 42. GW-57-1-1 is a greater distance into the receiving environment than GW-55-1-1. In 2024/25, the groundwater quality at monitoring location 57 met all applicable CSR standards, and all aggregate runoff and leachate indicator parameters were present in low to non-detectable concentrations. The Mann-Kendall analysis detected a significant decreasing trend in sulphate concentrations at GW-57-1-1.

5.8.2 Other Monitoring Locations

5.8.2.1 Locations 43, 44, 62, and 91

Monitoring locations 43, 44, 62 and 91 surround the Hartland North Pad, north of the Northwest Stockpile and upgradient of compliance monitoring locations 41, 42, and 56. Monitoring locations 43, 44, and 91 consist of individual wells and location 62 consists of two wells, all of which were both completed bedrock. Monitoring location 62 is upgradient of the other monitoring wells, on the northern boundary of the Northwest Stockpile.

In 2024/25, nitrate concentration (13.1 mg/L) exceeded the CSR DW at GW-62-2-1 during one sampling event. Conductivity was moderate (406 µS/cm), and sulphate concentration was elevated (140 mg/L). Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected significant increasing trends in sulphate concentrations at GW-62-2-1 and nitrate concentrations at GW-62-1-1.

Downgradient of monitoring location 62, the groundwater at locations 43, 44, and 91 exhibited low leachate and aggregate runoff indicator concentrations, but sulphate concentrations were elevated at locations 43 and 91, averaging 75 and 100.5 mg/L, respectively. The Mann-Kendall analysis detected significant increasing trends in conductivity and sulphate concentrations at GW-44-1-1 and GW-91-1-1, as well as a decreasing trend in nitrate concentrations at GW-91-1-1.

Groundwater quality beneath the Northwest Stockpile (i.e., GW-62-1-) exhibited aggregate runoff impacts, but groundwater quality downgradient around the Hartland North Pad was considerably less impacted.

5.8.2.2 Locations 77, 92, and 113

Monitoring locations 77, 92, and 113 are located on the North Ridge, south of the groundwater divide (see Figure 4-1) running along the Northwest Stockpile. Groundwater in this area flows into the Phase 2 basin. Two monitoring wells are installed at locations 77 (GW-77-1-1 and GW-77-2-1) and 113 (GW-113-1-1 and GW-113-2-1), and one monitoring well was installed at location 92.

In 2024/25, sulphate concentrations (540 to 580 mg/L) exceeded the CSR DW standard on separate sampling events at GW-113-1-1 and GW-113-2-1. Conductivity and nitrate concentrations were also elevated, with the highest nitrate concentration (8.47 mg/L) occurring at GW-113-2-1. At monitoring location 92, sulphate concentrations were elevated, but nitrate concentrations were low. At location 77, sulphate was elevated on one sampling event in GW-77-2-1. The Mann-Kendall analysis detected significant increasing trends in sulphate concentrations and conductivity at GW-77-2-1, and an increasing trend in sulphate concentrations at GW-77-1-1. The analysis also detected significant increasing trends in conductivity and sulphate concentrations at GW-92-1-1, as well as a decreasing trend in ammonia concentrations. Overall, groundwater quality in this area of the landfill was impacted by aggregate runoff, with the most substantive impacts occurring at monitoring location 113, immediately downgradient of the Northwest stockpile.

5.8.2.3 Locations 87, 88, and 94

Monitoring locations 87 and 88 consist of two sets of wells (GW-87-1-1, GW-87-2-1, GW-88-1-1, and GW-88-2-1) that were completed in bedrock on opposite sides of the Highland Fault, immediately south of the Northwest Stockpile. Monitoring location 94 consists of a single well that was completed in bedrock upgradient of monitoring locations 87 and 88, adjacent to the Northwest Stockpile. Historically, GW-94-1-1 was used to monitoring background groundwater quality, but it has exhibited aggregate runoff impacts since 2021/22.

In 2024/25, sulphate concentration (670 mg/L) exceeded the CSR DW standard at GW-88-2-1. Sulphate was elevated at both monitoring locations 87 and 88, as well as nitrate concentrations, which averaged 6.84 mg/L at GW-88-2-1. Conductivity was moderate to elevated in all wells at these locations. The Mann-Kendall analysis detected a significant decreasing trend in chloride concentrations and an increasing trend in sulphate concentrations at GW-87-1-1. At GW-88-1-1, the analysis detected significant increasing trends in conductivity, sulphate, and nitrate concentrations, and a decreasing trend in chloride concentrations. Furthermore, at GW-88-2-1, the analysis detected a significant increasing trend in sulphate concentrations. This area of the landfill was clearly impacted by aggregate runoff from the Northwest Stockpile.

5.9 Groundwater Quality South of the Landfill

Figures 5-9 and 5-10 show long-term groundwater quality trends south and southeast of the landfill. Groundwater quality in these wells is sensitive to the performance of the South Purge Well System. When the system is functioning properly, concentrations of leachate indicator parameters have declined, and seasonal fluctuations have dampened.

5.9.1 Compliance Monitoring Locations

5.9.1.1 Location 72

Monitoring location 72 consists of three groundwater wells (GW-72-1-1, GW-72-2-1, and GW-72-3-1) completed at different depths of the bedrock. Only wells GW-72-1-1, GW-72-3-1 were sampled in 2024/25. The wells are located in the south area of the landfill, upgradient of compliance monitoring point 71.

In 2024/25, groundwater quality at monitoring location 72 met all applicable CSR standards. Chloride concentrations were elevated at GW-72-1-1, but all other leachate and aggregate runoff indicator concentrations were low. At GW-72-3-1, sulphate concentrations were moderate, and chloride concentrations were elevated, but Na/Cl molar ratios were almost exactly 1.0. The Mann-Kendall analysis detected significant decreasing trends in chloride concentrations in both wells. Overall, groundwater quality in at this location did not exhibit any evidence of leachate or aggregate runoff impacts.

5.9.1.2 Location 71

Monitoring location 71 consists of three groundwater wells (GW-71-1-1, GW-71-2-1, and GW-71-3-1) completed at different depths of the bedrock. The wells are located in the south area of the landfill, downgradient of compliance monitoring point 72, offsite and immediately west of Hartland Avenue.

In 2024/25, groundwater quality at monitoring location 71 met all applicable CSR standards, and all aggregate runoff and leachate indicator concentrations were low in wells GW-71-1-1 and GW-71-2-1. Monitoring well GW-71-3-1 exhibited elevated nitrate concentrations ranging from 1.04 to 1.31 mg/L, and sulphate concentrations and conductivity were moderate, averaging 37 mg/L and 341.5 µS/cm, respectively. The Mann-Kendall analysis detected significant increasing trends in sulphate concentrations and decreasing trends in chloride concentrations in wells GW-71-1-1 and GW-71-2-1, as well as increasing trends in conductivity at wells GW-71-2-1 and GW-71-3-1. Groundwater quality in GW-71-3-1 may have been impacted by aggregate runoff or windblown dust from the aggregate piles, given that there were elevated nitrate concentrations close to the surface and the well is next to a busy road. However, nitrate and sulphate concentrations observed at monitoring location 71 were consistent with historical values.

5.9.1.3 Location 73

Monitoring location 73 consists of three groundwater wells (GW-73-1-1, GW-73-2-1, and GW-73-3-1) completed at different depths of the bedrock. The wells are located in the south area of the landfill, downgradient of compliance monitoring points 71 and 72.

In 2024/25, groundwater quality at monitoring location 73 met all applicable CSR standards. Leachate indicator parameters were present in low concentrations, but nitrate concentrations were moderate (e.g., 0.335 mg/L), particularly in GW-73-2-1. Sulphate concentrations were moderate in all three wells, averaging 43.25 mg/L. The Mann-Kendall analysis detected significant increasing trends in conductivity and sulphate concentrations at GW-73-1-1 and GW-73-3-1, and an increasing

trend in nitrate concentration was also detected at GW-73-2-1. In general, solute concentrations were similar to historical values, and the groundwater quality did not exhibit clear evidence of landfill-related impacts.

5.9.1.4 Location 4

Monitoring location 4 is located at the south end of the landfill property and is the southern-most groundwater quality compliance monitoring point. In 2024/25, two wells (GW-04-3-1 and GW-04-4-1) were sampled at this location, and the groundwater quality met all applicable CSR standards. Conductivity, ammonia, and sulphate concentrations were low to moderate in both wells, but chloride and nitrate concentrations were elevated in GW-04-4-1, reaching 63 and 1.42 mg/L, respectively. Similar nitrate concentrations were observed at compliance monitoring well GW-71-3-1. The Mann-Kendall analysis detected significant increasing trends in conductivity in both wells, and an increasing trend in chloride concentrations in GW-04-3-1. At this monitoring point, the groundwater quality was impacted by aggregate runoff.

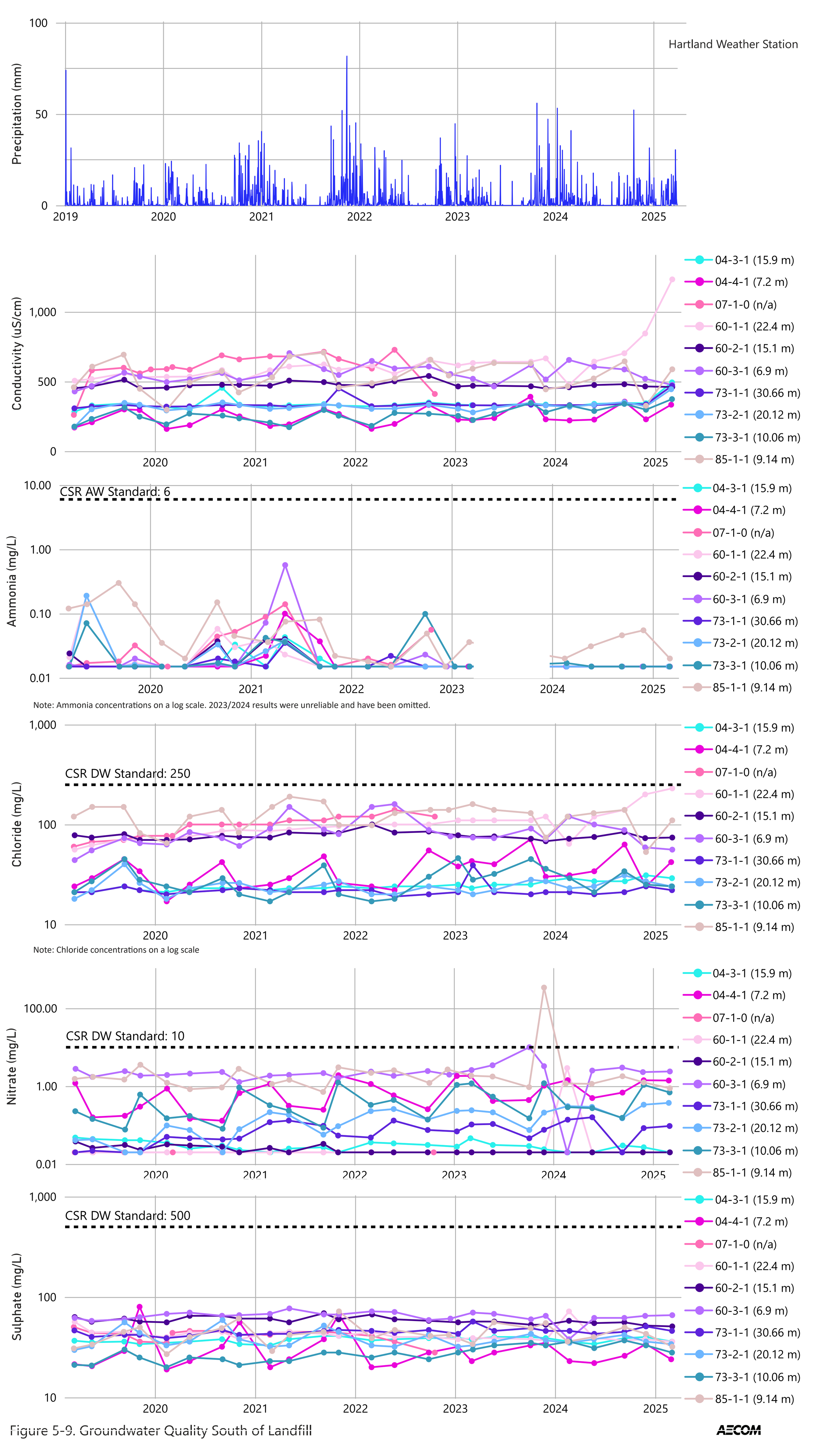


Figure 5-9. Groundwater Quality South of Landfill

5.9.2 Other Monitoring Locations

5.9.2.1 Locations 85, 60, and 19

Monitoring locations 85, 60, and 19 are located in the south area of the landfill, along a groundwater flow path originating from Phase 1. Monitoring location 85 consists of a single monitoring well completed in bedrock approximately 100 m upgradient of monitoring location 60. Monitoring location 60 consists of three monitoring wells (GW-60-1-1, GW-60-2-1, and GW-60-3-1) screened at different levels in the bedrock approximately 130 m upgradient of monitoring location 19. Monitoring location 19 consists of four wells (GW-19-1-1, GW-19-2-1, GW-19-1-2, and GW-19-2-2) screened at different elevations in the bedrock. In 2024/25, monitoring location 19 exhibited low aggregate runoff and leachate indicator concentrations.

In 2024/25, groundwater quality met all applicable CSR standards in this area of the landfill. Elevated conductivity, chloride, sulphate, and nitrate concentrations were observed at GW-85-1-1, but Na/Cl molar ratios were around 1.0, and there is heavy traffic in this area of the Site. Hence, the elevated chloride was likely caused by road salt. The elevated nitrate and sulphate may have been caused by aggregate runoff, windblown dust from the stockpiles, or magnesium lignosulphonate. Nitrite was detected in the groundwater, suggesting the source of nitrogen was proximal.

At monitoring location 60, chloride concentrations were elevated in all three wells, and nitrate concentrations were highly elevated (e.g., 3.0 mg/L) in GW-60-3-1. The highest chloride concentrations (e.g., 230 mg/L) were observed in the deepest well (GW-60-1-1) where nitrate and ammonia concentrations were consistently below detection. Na/Cl molar ratios were around 0.2. Sulphate concentrations were moderate to elevated in all three wells, with the highest concentrations occurring in GW-60-3-1. The Mann-Kendall analysis detected significant increasing trends in conductivity and chloride concentrations at GW-60-1-1, as well as decreasing trends in sulphate concentration at GW-60-1-1 and GW-60-2-1, and a decreasing trend in nitrate concentration at GW-60-2-1. At this location, the groundwater quality was impacted by aggregate runoff/dust, road salt, and potentially magnesium lignosulphonate.

5.9.2.2 The South Purge Wells (P1, P2, P3, P4 and P10)

The South Purge Wells consist of five leachate recovery wells that were designed to prevent southward migration of leachate from Phase 1 (see figures 4-1 and 4-2). In 2024/25, ammonia concentrations exceeded the CSR AW standard on all sampling events in all wells, and barium concentrations exceeded the CSR DW during all sampling events at P1. Groundwater quality at the South Purge Wells was clearly impacted by leachate, with average conductivity of 1,704 µS/cm, and average ammonia and chloride concentrations of 71.1 and 142.2 mg/L, respectively. Nitrate concentrations were moderate to elevated, but sulphate concentrations were non-detectable. The Mann-Kendall analysis detected a significant decreasing trend in chloride concentrations at P3. Overall, the highest leachate indicator concentrations occurred at P3 and P4, and all solute concentrations were similar to historical values.

5.10 Groundwater Quality East of the Landfill

Figure 5-11 shows long-term groundwater quality trends east of the landfill. Groundwater monitoring points along the eastern side of Phase 1 are critical for detecting leachate migration offsite to the east.

5.10.1 Compliance Monitoring Locations

5.10.1.1 Location 18

Monitoring location 18 consists of four wells completed at different levels in the bedrock immediately east of the peak of Phase 1. In 2024/25, groundwater was sampled from GW-18-1-1, GW-18-2-1, and GW-18-2-2, and the groundwater quality met all applicable CSR standards. Conductivity, ammonia, and chloride concentrations were low to non-detectible, but nitrate concentrations were elevated (e.g., 0.616 mg/L) in GW-18-2-1 and GW-18-2-2. Sulphate concentrations were moderate in all three wells. The Mann-Kendall analysis detected significant increasing trends in chloride concentrations at GW-18-2-1 and GW-18-2-2, a decreasing trend in chloride concentrations was observed at GW-18-1-1, as well as an increasing trend in sulphate concentrations. The groundwater quality at this location may have been impacted by aggregate runoff from the Northeast Stockpile, but there was no evidence of leachate impacts.

5.10.1.2 Locations 17

Monitoring location 17 consists of two wells (GW-17-1-1 and GW-17-1-2) screened at different levels in the bedrock immediately east of the northern half of Phase 1. In 2024/25, groundwater quality at monitoring location 17 met all applicable CSR standards. However, nitrate concentrations were elevated in both wells, with the highest concentrations occurring at GW-17-1-2. Sulphate concentrations were moderate. The Mann-Kendall analysis detected a significant decreasing trend in chloride concentration at GW-17-1-2. The groundwater quality at this location was likely impacted by aggregate runoff, but there was no evidence of leachate impacts.

5.10.1.3 Location 112

Monitoring location 112 consists of two wells (GW-112-1-1 and GW-112-2-1) that were completed within the bedrock and across the overburden-bedrock contact immediately east of the Northeast Stockpile. These wells were installed to monitor groundwater quality immediately downgradient of the stockpile.

In 2024/25, nitrate concentrations exceeded the CSR DW standard during two sampling events at GW-112-1-1 and one sampling event at GW-112-2-1. Nitrite and antimony concentrations also exceeded the CSR DW during one sampling event at GW-112-1-1. The nitrite indicates that the source of nitrogen was proximal. Sulphate concentrations were moderate to elevated, reaching 230 mg/L at GW-112-2-1. Leachate indicator parameters were present in low concentrations. Groundwater quality at this location was clearly impacted by aggregate runoff and should continue to be monitored closely.

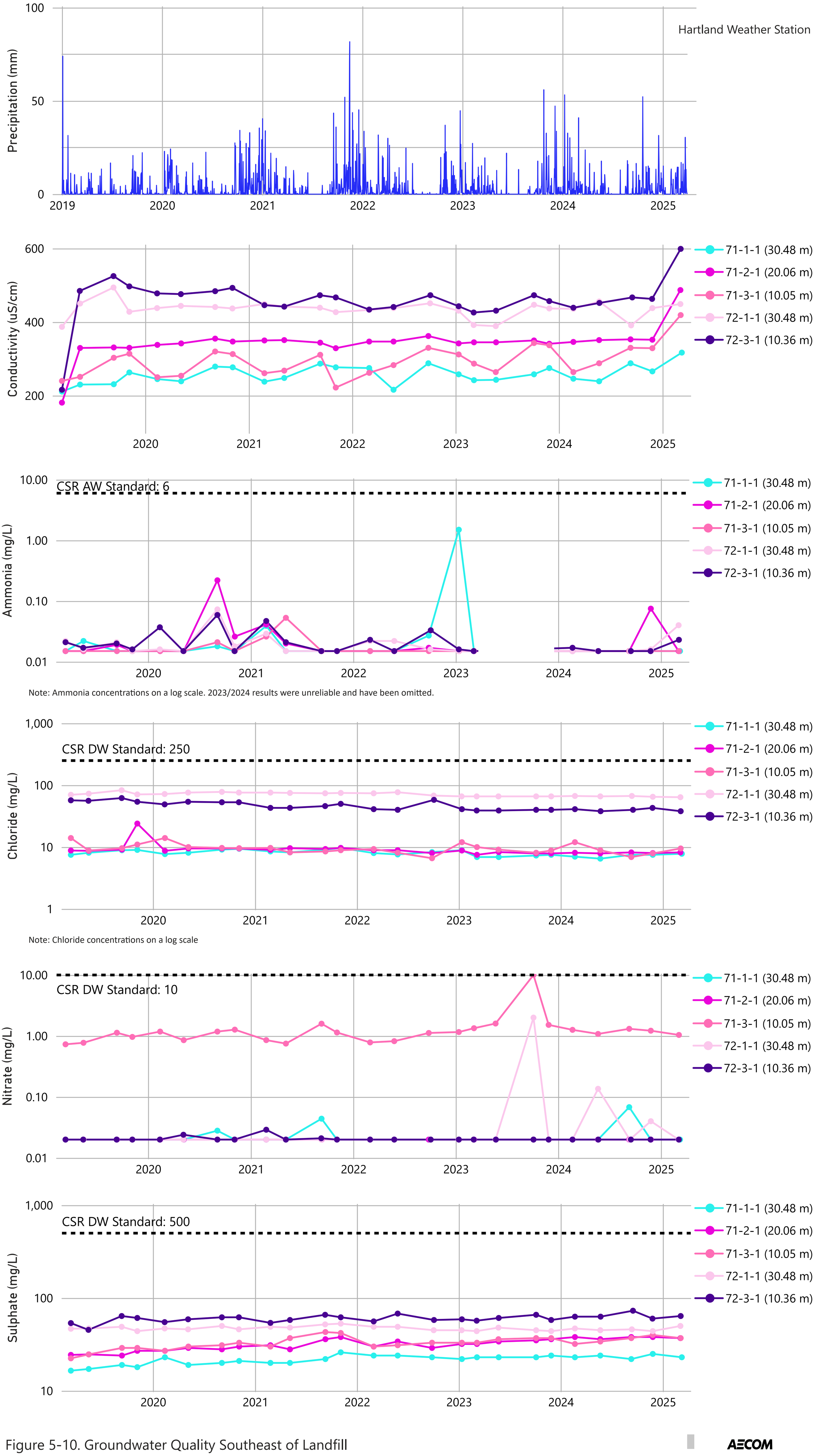


Figure 5-10. Groundwater Quality Southeast of Landfill

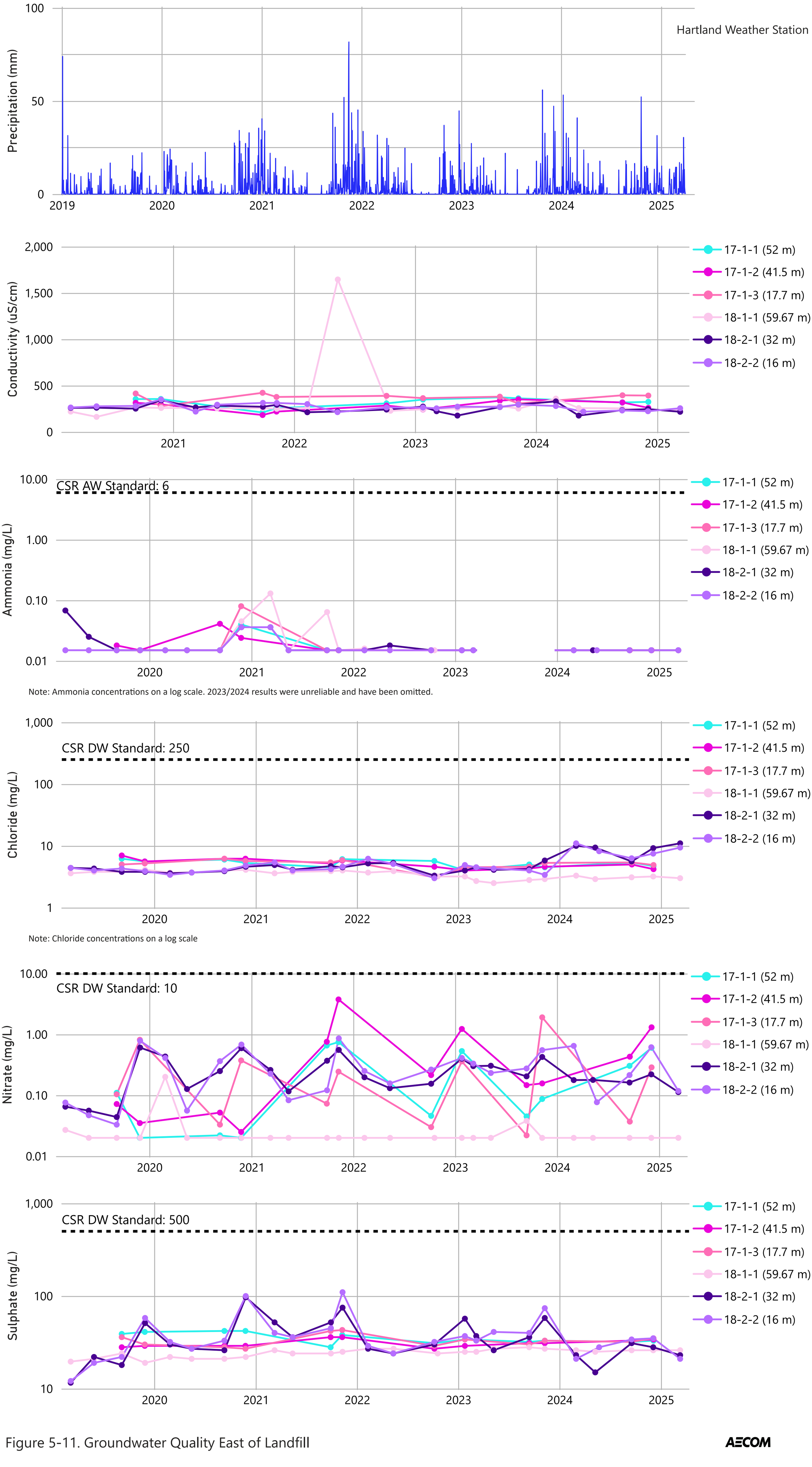


Figure 5-11. Groundwater Quality East of Landfill

5.10.2 Other Monitoring Locations

5.10.2.1 Location 16

Monitoring location 16 consists of four wells (GW-16-1-1, GW-16-1-2, GW-16-2-1, and GW-16-2-2) that were completed at different elevations in the bedrock immediately northeast of Phase 1. This monitoring location is critical for detecting northeastward migration of leachate from Phase 1.

In 2024/25, groundwater quality met all applicable CSR standards, and leachate indicator parameters were all present in low to non-detectable concentrations. However, nitrate and sulphate were elevated in all four wells. The highest nitrate concentration (2.86 mg/L) was observed at GW-16-1-1, where sulphate concentration reached 140 mg/L. The Mann-Kendall analysis detected significant increasing trends in conductivity and chloride concentrations at GW-16-1-1 and GW-16-2-1, as well as an increasing trend in sulphate concentration. Overall, this area of the landfill was impacted by aggregate runoff, but no leachate impacts were detected.

5.11 Summary

Based on our analysis and interpretation of the 2024/25 groundwater quality data:

- Leachate Containment: The groundwater quality data indicated that leachate-impacted groundwater was contained within the landfill property boundary. At the north end of the landfill, leachate impacts extended below the Lower Leachate Lagoon but were largely contained by the North Purge Wells. Groundwater quality at compliance monitoring locations 20 and 21 confirm that leachate did not migrate north. At the south end of the landfill, leachate-impacted groundwater was contained by the South Purge Wells, and no leachate impacts were observed downgradient. No leachate impacts were observed in monitoring wells installed along the eastern boundary of Phase 1.
- Aggregate Runoff Impacts: Aggregate runoff impacts (e.g., elevated conductivity, sulphate, and nitrate concentrations) are a pervasive issue at the Site, especially north of the landfill. Impacts were most severe at compliance monitoring locations 31, 111, 112, and in many areas of the Site immediately downgradient of stockpiles. Elevated nitrate and/or sulphate concentrations were also observed at the south end of the Site, at compliance monitoring locations 73 and 71. In the northwest area of the landfill, dilute aggregate runoff impacts were identified, but concentrations were low at the property boundary and low to non-detectable in the receiving environment.
- Elevated Boron Concentrations at GW-20-1-1: Boron concentrations have exceeded the CSR DW standard seasonally at compliance monitoring location 20 for several years, and historical data shows that boron concentrations have been increasing there since 2016. AECOM analyzed historical groundwater quality data and determined that groundwater at monitoring locations 20, 52, and in the North and South Purge wells exhibits a distinct geochemical signature characterized by highly elevated silicon and boron concentrations. We believe that the boron originates from silicate mineral dissolution/desorption in the bedrock at both ends of the Phase 1 landfill for three reasons: 1. clay mineral dissolution could slowly impart the high silicon concentrations observed in the wells, 2. boron could potentially be mobilized (i.e., desorbed) from the clay particles reacting with Phase 1 leachate, and 3. our groundwater flow interpretation is consistent with elevated silicon/boron concentrations and their proximity in wells situated in bedrock (see Figure 4-2). Boron concentrations should continue to be monitored at this location.
- Elevated Chloride Concentrations: Elevated chloride concentrations were observed in a few areas of the Site, particularly downgradient of the south entrance to the Landfill. Na/Cl ratios were generally around 0.5 to 1.5, and ammonia concentrations were generally low to non-detectable, suggesting that the chloride originates from road salt.

6. Groundwater Quality in Domestic Wells

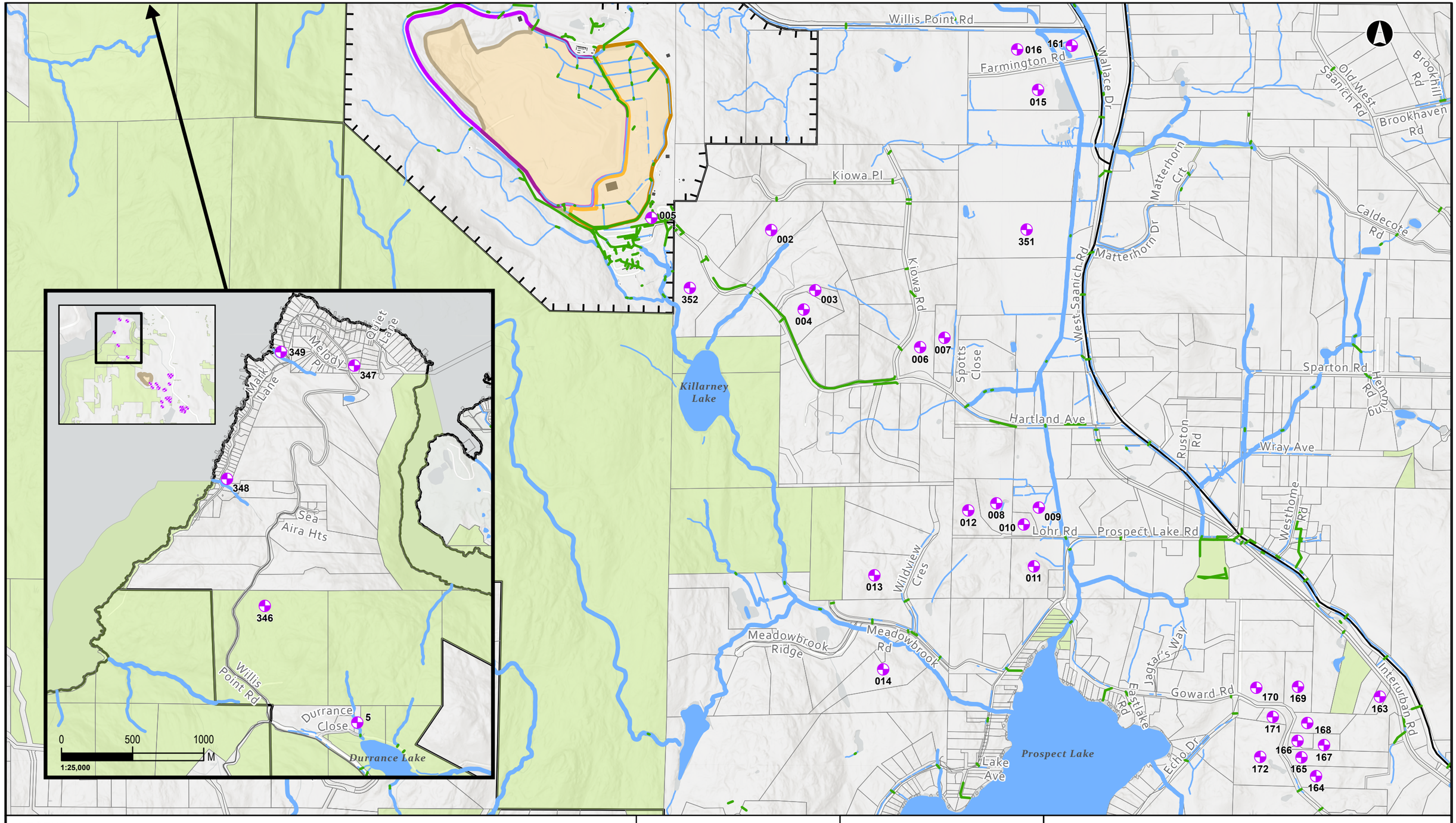
6.1 Monitoring Locations

Since the 1980s, the CRD has performed routine sampling and analysis of domestic wells near the landfill that are used as a primary source of drinking water. This section summarizes our interpretation of water quality data collected from 18 domestic wells located within a 2 km radius of Hartland Landfill. The number of wells included in the program have been reduced gradually as municipal water became available and residents chose to connect to the municipal service. Most of the domestic wells near Hartland Landfill are situated southeast of the landfill, as shown on Figure 6-1. The wells are primarily 0.15 m in diameter and penetrate between 30 m and 120 m into the underlying bedrock. Three of the wells are shallow dug wells completed in overburden. Well yields are generally low, and substantial drawdown occurs during pumping, particularly during the dry summer months.

Routine groundwater samples were collected in July 2024 and were analyzed for general water quality parameters, nutrients, and major ions. In 2024, the CRD removed total and dissolved metals from the domestic well analytical suite because metals are not used to identify leachate impacts and there have been few exceedances reported. The analytical results were compared to the *British Columbia Approved Source Drinking Water Quality Guidelines (SDWQGs)* and *Guidelines for Canadian Drinking Water Quality* (GCDWQ), which were last updated in September 2020 and March 2025, respectively.

6.2 Domestic Well Quality

Tabulated analytical results are presented in Appendix B.2. The groundwater quality met applicable regulatory criteria at all locations, except temperature exceeded the SDWQGs and GCDWQ aesthetic objectives at seven (7) locations, pH measurements were below the operational guideline set out by the GCDWQ at seven (7) locations. The five domestic wells located northwest of the landfill met CDWQ and SDWQG guidelines for chloride, ammonia, and conductivity, indicating that they were not impacted by leachate. In summary, groundwater quality in the domestic wells was consistent with historical results reported since 2000, and the groundwater quality is considered representative of natural conditions.



LEGEND

- Domestic Water Well
- Lot Lines
- Local Government Boundary
- Site Boundary
- Existing Waste Footprint
- Park
- Phase 1 Closure (1997)
- Phase 2 Base
- Structure
- Primary Stream or Ditch
- Secondary Stream or Ditch
- Tertiary Stream or Ditch
- Gravity Main

Domestic Well Locations

Figure 6-1

P:60740388

AECOM

Hartland Landfill Monitoring Report

1:10,000
NAD83 UTM Zone 10N

June 2025

CRD
Making a difference...together

0 125 250 500 750 1000 1250 M

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7. Surface Water Quality

7.1 Data

Hartland landfill is located within the Tod Creek watershed on a drainage divide between the Heal Creek drainage basin to the north and the Killarney Creek basin to the south. Surface water from both the Heal Creek drainage basin and Killarney Creek basin flow into Tod Creek, which discharges to Tod Inlet.

Surface water monitoring locations are shown on Figure 7-1. Sampling locations have been established on the landfill property boundary to monitor landfill compliance and identify changes in surface water quality that could be related to landfill operations. Surface water quality monitoring stations located offsite are used to monitor surface water quality around the landfill and in the receiving environment. Surface water quality monitoring points within the landfill are used to monitor water quality from distinct drainage areas and within the ditch network. Surface water samples are collected quarterly from compliance monitoring points and most non-compliance monitoring points, but samples cannot be collected when watercourses are dry.

In 2024/25, surface water monitoring locations SW-N-55 and SW-N-56 were reactivated to monitor water quality downstream of the Northeast Stockpile. SW-N-66 was reactivated to monitor background surface water quality upstream of the Northwest Stockpile. The CRD also provided an analytical result (SW-N-Agg Drain) of surface water runoff collected directly from the Northeast Stockpile.

In 2024/25, surface water samples were collected from 28 monitoring locations (six compliance and 22 additional locations), and the analytical results are presented in Appendix B.3. Surface water sampling points utilized in the 2024/25 monitoring program include:

North of Phase 1 and Phase 2

- SW-N-05 - compliance
- SW-N-14
- SW-N-15
- SW-N-16 - compliance
- SW-N-17
- SW-N-19
- SW-N-45
- SW-N-54
- SW-N-55 - compliance
- SW-N-56
- SW-N-57
- SW-N-63
- SW-N-64
- SW-N-65
- SW-N-Agg Drain

South and West of the Landfill

- SW-S-03
- SW-S-04 - compliance
- SW-S-12
- SW-S-20
- SW-S-21
- SW-S-24
- SW-S-27
- SW-N-66

North of the Hartland North Pad

- SW-N-41S1 - compliance
- SW-N-41S3
- SW-N-41S4
- SW-N-42S1 - compliance
- SW-N-CS2

7.2 Compliance Monitoring Locations

Six (6) surface water compliance monitoring stations surround Hartland Landfill (Figure 7.1). These stations are concentrated along the southern and northern property boundaries, downgradient of areas that could potentially be impacted by leachate or runoff from the landfill. SW-N-55 was reactivated in 2024/25 and has since been recognized as a compliance monitoring point. The following Boundary Compliance stations are monitored to assess landfill compliance with the Hartland's operating permit:

South of the Landfill

- SW-S-04

North of Phases 1 and 2

- SW-N-05

North of the Hartland North Pad

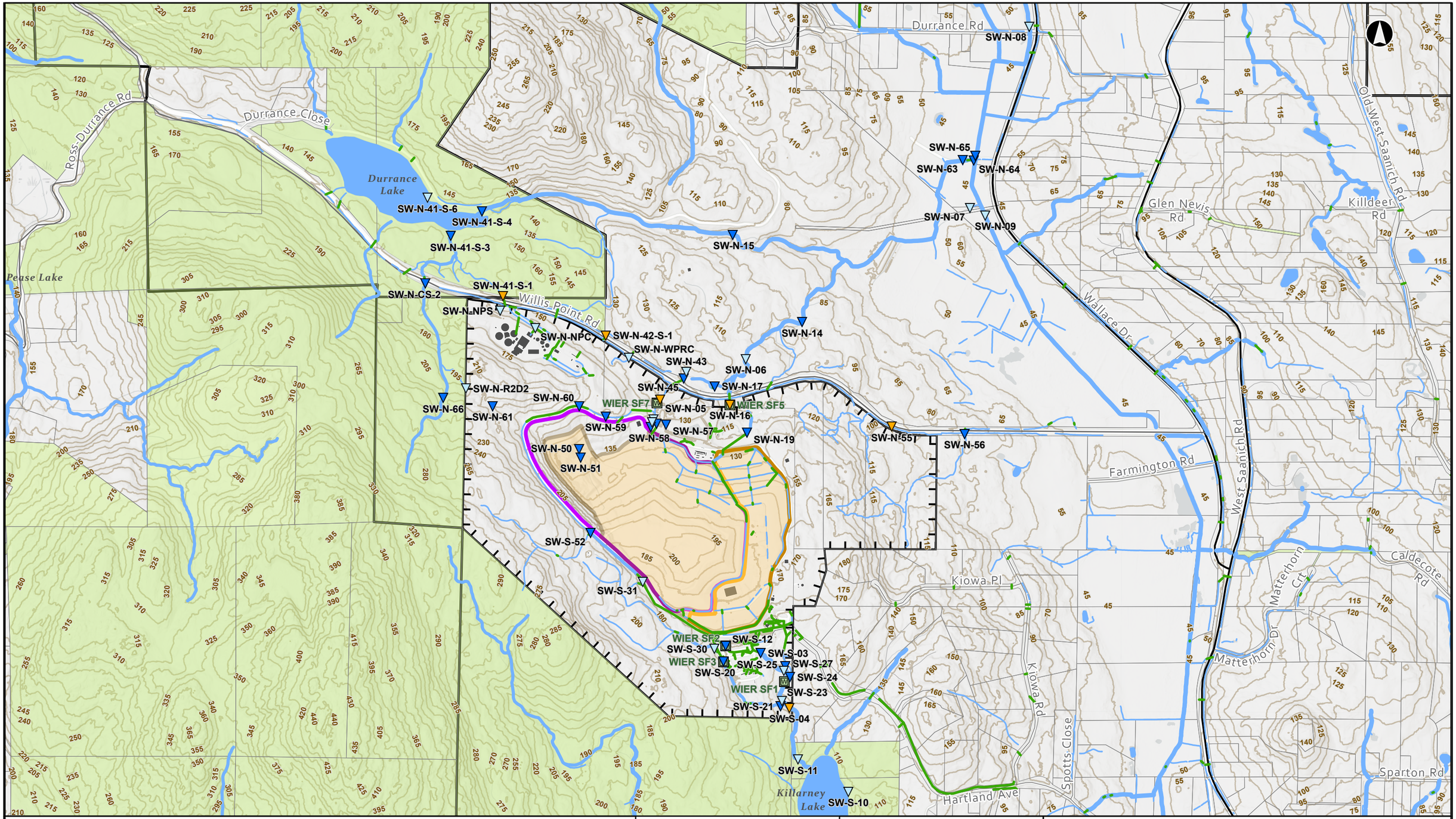
- SW-N-41S1
- SW-N-42S1

- SW-N-16
- SW-N-55

7.3 Regulatory Context

As discussed in Section 2.5.2, the surface water quality analytical results were compared to approved, short-term and long-term BCWQGs for the protection of freshwater aquatic wildlife (AW). Some parameters have variable guidelines, as noted below:

- The toxicity of ammonia is related to the temperature and pH of the water, so there is no distinct BCWQG for ammonia concentration. The ammonia guidelines were calculated based on the pH and temperature of each sample (as discussed in the footnotes of Table 7-1), with exceedances highlighted based on BCWQG-STAs.
- The BCWQG-STA for sulphate was calculated based on the hardness of each sample. A detailed description is presented in the footnotes of Appendix B.3.
- The BCWQG-STA and LTC values for total suspended solids (TSS) reference a “change from the background value” and the flow conditions (i.e., clear/turbid waters). Historical TSS values recorded at Sw-S-52 (typically <2.0 mg/L) were used to screen the TSS data.
- BCWQGs for cadmium, lead, manganese, sulphate, and silver are hardness dependent. Total metal concentrations were compared to guidelines based on the hardness of each sample.
- The dissolved copper and nickel BCWQGs vary with hardness, pH, dissolved organic carbon (DOC) concentration, and temperature, and are calculated using Biotic Ligand Models (BLMs).
- The total aluminum and dissolved zinc guidelines depend on the pH, hardness, and DOC concentration of each sample.



LEGEND

Surface Water Monitoring Well
- Active
- Inactive
- Compliance Point
- Weir Location

- Phase 1 Closure (1997)
- Phase 2 Base
- Local Government Boundary
- Existing Waste Footprint
- Park
- Structure

- Primary Stream or Ditch
- Secondary Stream or Ditch
- Tertiary Stream or Ditch
- Gravity Main
- Contour (10m)
- Lot Lines
- Site Boundary

Surface Water Bodies and Sampling Locations

Figure 7-1

P:60740388

AECOM

Hartland Landfill Monitoring Report

1:12,500
NAD83 UTM Zone 10N

June 2025

CRD
Making a difference...together

0 125 250 500 750 1000 1250 M

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7.4 Assessment of Surface Water Quality Impacts

The primary potential causes of surface water quality degradation at the Site include landfill leachate, road salt application, and aggregate runoff. The solutes used to identify impacts associated with these activities include ammonia, chloride, sulphate, nitrate, and electrical conductivity. Professional judgement is used to differentiate between different contaminant sources and assess the nature and severity of any impacts. Surface water quality may be judged to be impacted relative to background without exceeding regulatory criteria. If surface water quality at compliance monitoring points at the Site does not meet the BCWQG criteria for the protection of freshwater aquatic life, standard CSR protocols for notification of affected property owners should be followed.

The 2024/25 surface water quality data was interpreted with consideration for the following:

Background Conditions:

- Background conductivity in surface water is typically below 200 µS/cm but has been observed at higher levels at some locations during periods of low flow, or after periods of prolonged dry weather.
- Background ammonia and nitrate concentrations are typically below 0.01 mg/L, but occasionally exceed 0.1 mg/L in wetland areas.
- Background chloride concentrations are typically below 10 mg/L.
- Background sulphate concentrations are typically below 10 mg/L but often increase in the downstream direction as streams receive groundwater discharge.

Impact Criteria:

- Leachate: Surface water is considered impacted by leachate when electrical conductivity surpasses 500 µS/cm, ammonia concentrations exceed 0.5 mg/L and chloride concentrations exceed 20 mg/L. Peak concentrations of these parameters are typically observed during the dry summer and early fall months, when flows are low and there is limited dilution by precipitation.

  Aggregate Runoff: Surface water is considered impacted by aggregate (e.g., production, stockpiling or site construction works) when nitrate concentrations are greater than background levels (~0.1 mg/L) and leachate indicator concentrations are low. In recent years, elevated nitrate concentrations have been observed in the absence of elevated sulphate concentrations, so sulphate may not be a reliable indicator of aggregate runoff. However, elevated sulphate concentrations may occur over a greater period and potentially after nitrate concentrations have subsided. Peak nitrate and sulphate concentrations are typically observed during the first sampling event following the onset of wet weather in the fall months after recent blasting and aggregate stockpiling.
- Road Salt: Surface water is considered impacted by road salt when chloride concentration is elevated above background levels (i.e., 20 mg/L), and the molar ratio of chloride to sodium is around 1.0. Cl/Na molar ratios in road salt are generally 1:1, assuming 100% compositional purity. Road salt-impacted sites must also be located downgradient (or downstream) of surfaces where road salt is known to be applied. Conductivity and chloride concentrations typically exhibit peaks following cold weather periods when de-icing salt is often applied to roadways.
- Magnesium Lignosulphonate: Magnesium lignosulphonate has been used as a dust suppressant at the Site and likely has an impact on groundwater quality similar to aggregate runoff because it contains nitrogen and sulphur. Additionally, it exhibits elevated iron and manganese concentrations. Laboratory testing indicated that the dust suppressant exhibited elevated conductivity (520 µS/cm), ammonia (51 mg/L), and total sulphur concentrations (83.7 mg/L) in the aqueous phase (Appendix I). AECOM is not aware of the volume of magnesium lignosulphonate that has been applied at the Site.

The CRD determined that ammonia concentration data collected throughout 2023 was invalid because the bottles used to collect the samples were over-preserved. Hence, ammonia concentration data collected in 2023 has been excluded from any interpretation/analysis, and the concentrations are shaded in out in all surface water quality timeseries figures.

7.5 Background Surface Water Quality

Historically, background surface water quality has been monitored at locations SW-S-52 and SW-N-CSs2, but dilute aggregate runoff impacts (e.g., elevated nitrate concentrations) have been observed at these locations since 2022/23. Due to a lack of valid background surface water monitoring locations, the CRD began sampling surface water upstream of the Northwest

Stockpile at location SW-N-66 in 2023/24. SW-N-66 is at a relatively high elevation (~225 m asl) and is the only true "background" surface water quality monitoring location at the Site.

In 2024/25, one surface water sample was collected at SW-N-66. Dissolved copper concentration (3.6 µg/L) exceeded the BCWQG STA and LTC guidelines, but no other exceedances were reported at this location. Surface water at SW-N-66 exhibited low to non-detectable ammonia (<0.02 mg/L), nitrate (<0.02 mg/L), chloride (7.02 mg/L), and sulphate (6.62 mg/L) concentrations, and conductivity was 58 µS/cm. The surface water exhibited exceptionally low solute concentrations and no evidence of aggregate runoff impacts. Due to the relatively high elevation of SW-N-66, the surface water quality at this location is likely similar to that of local rainwater and may not capture the geochemical signatures of background gas-water-rock interactions.

SW-N-41S4 is at a relatively low elevation (~135 masl), at the discharge point from Durrance Lake, downstream of the landfill. In 2024/25, no aggregate runoff or leachate impacts were observed at this location. Compared to SW-N-66, SW-N-41S4 receives runoff from a relatively large area and is at the base of several flow paths and streams, so surface water quality at SW-N-41S4 is more evolved geochemically, exhibiting higher solute concentrations and conductivity. This monitoring location is not a standard background monitoring point, but the water quality observed there is a good proxy for a relatively evolved background water quality signature.

In 2024/25, four surface water samples were collected at SW-N-41S4, and conductivity, aggregate runoff, and leachate indicator parameters were present in low to non-detectable concentrations. No BCWQG exceedances were reported at this location. Average conductivity was 143.5 µS/cm, average chloride concentration was 8.9 mg/L, and average nitrate and sulphate concentrations were 0.02 and 6.8 mg/L, respectively. A relatively high ammonia concentration (0.11 mg/L) was observed in February 2025.

7.6 Overview of Exceedances

Surface water analytical results were compared to the approved and working BCWQG AW criteria in Appendix B.3. A summary of surface water exceedances is presented in Table 7-1. In 2024/25, surface water quality data met the BCWQG-STA for all parameters except for:

- Total iron (15 samples)
- Total zinc (3 samples)
- Dissolved copper (10 samples)
- TSS (9 samples)

Compliance monitoring point SW-S-04 exhibited elevated total iron and TSS concentrations that exceeded the BCWQG STA during two sampling events. These exceedances were attributed to a sump pump failure near the Recycling Facility at the south end of the landfill.

At Hartland, trace metal and TSS exceedances typically reflect low flow/turbulent sampling conditions at the time of sampling, and TSS exceedances coincided with trace metal exceedances in almost all cases. Furthermore, dissolved copper concentration exceedances are sometimes reported at background monitoring locations (e.g., SW-N-66) and other sampling locations with no evidence of water quality impacts associated with landfill operations. Elevated copper concentrations have been observed at several monitoring locations both onsite and in the downstream receiving environment, with the highest concentrations occurring north of the Phase 1 and 2 landfills.

Compliance monitoring point SW-N-55 exhibited elevated nitrate concentrations that exceeded the BCWQG LTC during two sampling events. The surface water quality at this monitoring location was clearly impacted by aggregate runoff from the Northeast Stockpile.

Table 7-1. Surface Water Quality Exceedances - 2024-2025

B.C. Water Quality Guidelines			BC WQG-STA (1)		1.9-24.9 (2)			0.06-0.6 (3)			32.8							1000			25 (5)							BC BLM (6)			350		
			BC WQG-LTC (1)		0.135-1.77 (2)			0.02-0.2 (3)			3			Variable (7)			0.06-0.98 (4)				5 (5)							BC BLM (6)					
BC CSR Protocol 11			AW Upper Cap Concentration (10)		13.1-184			2-20			4,000						400						750-24,000											
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter	Nitrogen Ammonia			Nitrogen Nitrite			Nitrogen Nitrate			Aluminum			Cobalt			Iron			TSS			Zinc			Aluminum			Copper			Iron		
				State	TOT			DIS			DIS			TOT			TOT			TOT			TOT			TOT			DIS			DIS			DIS		
				Unit	mg/L			mg/L			mg/L			µg/L			µg/L			µg/L			mg/L			µg/L			µg/L			µg/L			µg/L		
				Detection Limit	0.015			0.005			0.02			0.5			0.01			1			1			1			0.5			0.05			1		
SW-N-05	FRM	Y	2024-06-04	Very low flow, clear and colourless	<	0.02		<	0.01			5.92		b	38.2			0.10			38.1			1.20			4.13			22.8			4.63		b	13.5		
SW-N-05	FRM	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	<	0.02		<	0.01			13.00		b	67.0			0.19			78.3			1.80			3.90			16.2			3.26		b	13.8		
SW-N-05	FRM	Y	2024-12-17	Very low flow, clear and colourless	<	0.02		<	0.01			8.62		b	49.4			0.17			43.3		<	1.30			3.25			25.1			3.61		b	17.5		
SW-N-05	FRM	Y	2025-02-21	Very low flow, clear and colourless	<	0.02		<	0.01			6.40		b	67.9			0.27			73.3			1.60			4.25			17.65			3.24		b	9.7		
SW-N-14	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.	<	0.02		<	0.01			3.91		b	7.0			0.11			12.2		<	1.00			1.72			40.10			1.61			75.8		
SW-N-14	SS	N	2024-12-16	Clear and colourless, very high flow	<	0.02		<	0.01			3.74		b	389		b	0.48			756.0			9.20		b	5.20			10.20			2.21		b	15.7		
SW-N-14	SS	N	2025-02-20	High flow, clear and colourless	<	0.02		<	0.01			3.87		b	69.3			0.17			161.0			2.00			2.70			8.90			2.86			11.5		
SW-N-15	SS	N	2024-12-16	Clear and colourless, very high flow	<	0.02		<	0.01			0.17			18.5			0.02			21.3		<	1.00		<	1.00			4.66			0.86		b	6.8		
SW-N-15	SS	N	2025-02-20	High flow, clear and colourless	<	0.02		<	0.01			0.24			7.8			0.02			7.6		<	1.00		<	1.00			2.65			0.56		b	73.3		
SW-N-16	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless		0.02			0.01			7.00		b	369.5		b	0.66		b	737.0			6.40		b	7.30			8.17					b	51.2		
SW-N-16	FRM	Y	2024-10-23	Low flow, nil turbidity, clear colourless		0.20			0.11			9.10		b	64.2			0.46			190.0		<	1.70			12.85			18.8			8.69		b	85.2		
SW-N-16	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless		0.04			0.01			8.46		b	454			0.88		b	863.5			10.8		b	7.60			15.2			11.65		b	62.8		
SW-N-16	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless		0.05		<	0.01			8.59		b	74.6			0.50			232.0			1.40			5.50			17.8			14.90		b	135.5		
SW-N-17	SS	N	2024-11-01	Moderate flow, clear and colourless sample.	<	0.02		<	0.01			3.74		b	7.4			0.09			7.3			4.00			1.44			16.80			0.84			16.0		
SW-N-17	SS	N	2024-12-16	Clear and colourless, moderately high flow	<	0.02		<	0.01			2.43			17.3			0.07			26.3		<	1.00			1.60			7.3			0.71		b	12.4		
SW-N-19	SS	N	2024-10-23			0.10			0.32		b	7.93		b	53.9			0.83		b	171.0			2.40			3.10			12.6			10.40		b	81.0		
SW-N-19	SS	N	2024-12-17			0.04			0.02			9.07		b	507		b	0.96		b	845.0			5.60		b	5.10			19.8			17.30		b	30.7		
SW-N-19	SS	N	2025-02-21			0.03		<	0.01			9.45		b	101			0.54			168.0			1.20			3.50			24.0			23.70		a	b	44.7		
SW-N-41S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless	<	0.02		<	0.01			0.75			130.0			0.15			262.0			8.20		b	<	1.00		6.82			1.85		b	26.2		
SW-N-42S1	SS	Y	2024-05-03	Low flow, nil turbidity, clear colourless	<	0.02		<	0.01			0.25			12.7			0.06			35.9			2.00			0.44			4.92			1.72		b	28.3		
SW-N-42S1	SS	Y	2024-12-16	Low flow, nil turbidity, clear colourless		0.05		<	0.01			0.95			139			0.16			274.5			7.60		b	<	3.40		7.51			0.64			29.9		
SW-N-45	SS	N	2024-11-01	Moderate flow, clear and colourless sample.	<	0.02		<	0.01			9.46		b	7.5			0.17			6.9		<	1.00			1.62			12.9			1.50		b	10.0		
SW-N-45	SS	N	2024-12-16	Clear and colourless, high flow	<	0.02		<	0.01			6.56		b	15.7			0.12			17.6		<	1.00			1.10			6.87			1.22			6.4		
SW-N-45	SS	N	2025-02-20	High flow, clear and colourless	<	0.02		<	0.01			4.28		b	10.1			0.13			15.2			1.20			1.00			5.34			1.30			14.3		
SW-N-54	SS	N	2024-10-23	Moderate flow, clear and moderately yellow sample.		0.03			0.16		b	26.9		b	354			1.50		b	684.0			4.80			2.00			10.0			25.80		b	58.0		
SW-N-54	SS	N	2024-12-17	Clear and slightly yellow, moderately high flow		0.05			0.02			9.25		b	890		b	1.35		b	1630.0	a		8.80		b	4.40			13.5			19.50		b	27.8		
SW-N-54	SS	N	2025-02-21	Moderate flow, clear and colourless	<	0.02		<	0.01			13.1		b	119			0.28			209.0			2.00		<	1.00			8.95			23.10		b	13.9		
SW-N-55	SS	N	2024-12-18	Clear and colourless, moderately high flow		0.09		<	0.01			4.28		b	147			0.20			78.7			4.00			8.60			47.5			1.42		<	5.0		
SW-N-55	SS	N	2025-02-20	Moderately low, clear and colourless	<	0.02		<	0.01			9.17		b	24.9			0.13			18.2		<	1.00			28.00			11.4			1.30			7.2		
SW-N-57	SS	N	2024-05-02	Moderate flow, very white, moderately turbid		0.04			0.01			2.53			1850		b	2.46		b	3700	a		90.0	a	b	6.40			97.0			2.55		a	b	189.0		
SW-N-57	SS	N	2024-10-23	Moderate flow. Very high turbidity, very grey sample.		0.10			0.07		b	4.74		b	21900			31.50		b	39100	a		800		a	b	57.20			24.0			1.02		b	22.2		
SW-N-57	SS	N	2024-12-17	Clear and colourless, moderately high flow		0.05		<	0.01			2.77			713		b	0.96		b	1260	a		33.0		a	b	17.20			9.67			2.10		b	7.1		
SW-N-57	SS	N	2025-02-21	Moderate flow, clear and colourless	<	0.02		<	0.01			1.72			6.2			0.14			12.0			1.60			1.20			4.88			4.68		a	b	17.9		
SW-N-63	SS	N	2024-05-02	MOderate flow, nil turbidity, light tan		0.03		<	0.01			0.25			26.6			0.34			478.0		<	1.00			0.79			14.80			3.21		a	b	319.0		
SW-N-63	SS	N	2024-10-22	Moderate flow, clear and colourless sample.		0.05			0.01			2.09			99.0			0.38			406.0			1.20			1.50			30.0			4.26		b	295.0		
SW-N-63	SS	N	2024-12-16	Clear and colourless, very high flow		0.02		<	0.01			0.74			128			0.15			261.0			2.00			1.60			27.30			1.56		b	132.0		
SW-N-64	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan		0.11			0.01			0.19			197			2.92		b	3050	a		2.40			4.40			179.0			5.22		b	2850.0	a	
SW-N-64	SS	N	2024-10-22	Very low flow, clear and slightly yellow sample		0.09			0.09			0.89			275			0.61		b	1050	a		6.40		b	5.40			50.60		b	3.82			620.0	a	
SW-N-64	SS	N	2024-12-16	Slighlty turbid, slighlty yellow, moderately high flow		0.02		<	0.01			0.37			493		b	0.39			810.0			10.0		b	4.10			45.50			2.96		b	312.0		
SW-N-65	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan		0.10			0.01			0.20			162			2.42		b	2530	a		2.00			4.10			152.0			5.44		b	2390.0	a	
SW-N-65	SS	N	2024-10-22	Very low flow. Clear, slighlty yellow sample.		0.07			0.07			1.13			284			0.64		b	993.0			3.60			5.30			45.1			4.26			535.0	a	
SW-N-65	SS	N	2024-12-16	Clear and colourless, moderately high flow		0.02		<	0.01			0.40			428		b	0.32			730.0			10.0		b	3.90			32.5			3.14		b	235.0		
SW-N-66	SS	N	2025-02-24	Moderate high flow, clear and colourless	<	0.02		<	0.01		<	0.02			22.9			0.03			12.1			2.00		<	1.00			18.2			3.60		a	b	17.8		
SW-S-03	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless		0.04			0.02			1.92			33.1			0.18			282.0			4.80			2.75			6.78			2.64		b	121.0		
SW-S-03	SS	N	2024-10-21	Moderate flow. Clear and colourless sample.		0.04			0.01			5.10		b	49.3			0.24			134.0		<	1.00			5.60			10.1			6.66		b	28.0		
SW-S-03	SS	N	2024-12-17	Slighlty turbid, grey, very high flow		0.66			0.03			1.72			4010		b	3.74		b	6820	a		120		a	b	98.10	a	b	84.5			9.81		a	b	196.0		
SW-S-03	SS	N	2025-02-24	Moderately high flow, clear and colourless		0.98			0.02			2.79			55.3			0.48			187.0			2.40			11.30			22.5			8.39		b	109.0		
SW-S-04	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless	<	0.02		<	0.01			0.51			23.1			0.07			26.0		<	1.00			1.21			15.13			0.97		b	3.2		
SW-S-04	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless	<	0.02		<	0.01			4.61		b	23.5			0.08			27.9		<	1.00			2.50			10.55			1.65		b	3.9		
SW-S-04	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless		0.14			0.02			1.20			7080		b	7.92		b	13950	a		180		a	b	92.55			38.6			3.45		b	63.7		
SW-S-04	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless		0.13			0.02			1.21			2995			3.53		b	5755	a		72.5		a	b	49.50			49.15			3.39		b	77.0		
SW-S-12	FRM	N	2024-05-02	Moderate flow, nil turbidity, clear colourless		3.00	b		0.09			2.78			157			0.85		b	1850.0	a		7.60		b	3.77			11.85			3.35		b	616.5	a	
SW-S-12	FRM	N	2024-10-21	Moderate flow, nil turbidity, clear colourless		0.11			0.01			6.31		b	106			0.50			242.5			2.60			6.30			22.5			11.10		a	b	31.4		
SW-S-12	FRM	N	2024-12-17	Moderate flow, nil turbidity, clear colourless		0.94			0.03			2.90			3030		b	2.94		b	4925	a		82.0		a	b	92.30			66.2			14.60		a	b	219.5		
SW-S-12	FRM	N	2024-07-03	Clear and colourless sample.		2.00	b		0.01			2.46			66.9			0.51		b	764.5			1.70			4.30			20.75			5.46		a	b	654.5	a	
SW-S-20	SS	N	2023-11-02	Moderately low flow, clear and colourless.		0.68			0.01			1.32			256			0.29			357.0			12.0		b	13.0		b	88.0		b	3.26			b	85.3		
SW-S-20	SS	N	2024-12-17	Clear, slighlty yellow, moderately high flow		0.05		<	0.01			0.11			793		b	0.90		b	1480	a		13.0		b	9.1		b	63.8			1.57			b	77.2		
SW-S-21	SS	N	2024-12-17	Clear and colourless, moderately high flow	<	0.02		<	0.01			0.24			106			0.07			80.8			2.80			8.30		b	45.3			2.49			b	25.1		
SW-S-24	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	<	0.02		<	0.01			0.41			19.7			0.12			38.8			1.60			2.18			14.1			1.66			b	21.1		
SW-S-24	SS	N	2024-10-21	Clear and colourless sample.		0.08			0.01			2.22			80.3			0.20			168.0			9.20		b	7.7			7.85			2.80			b	6.4		
SW-S-24	SS	N	2024-12-17	Clear, slighlty grey, very high flow		0.21			0.02			1.20			6090		b	6.75		b	12400	a		150		a	b	78.4	a	b	35.5			3.60			b	69.7		
SW-S-24	SS	N	2025-02-24	High flow, clear and colourless		0.23			0.04			2.13			14.9			0.14			24.2			2.80			7.40			96.0		b	4.79			b	188.0		
SW-S-27	SS	N	2024-05-02	Low flow, nil turbidity, clear colourless	<	0.02		<	0.01			1.16			65.0			0.22			154.0			3.60			2.49			9.06			2.29			b	9.4		
SW-S-27	SS	N	2024-12-17	Clear, slighlty grey, very high flow		0.33			0.03			1.31			4760		b	5.15		b	8910	a		130		a	b	82.0	a	b	47.2			5.20		a	b	102.0		
SW-S-27	SS	N	2025-02-24	High flow, clear and colourless		0.47			0.07			2.96			108			0.37			238.0			2.00			11.7			17.3			6.75			b	37.8		
SW-N-Agg Drain	SS	N	2025-03-11		<	0.02		<	0.01			6.27		b	12.5			0.15			11.3		<	1.50			1.37			7.45			0.91			3.3		

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

7.7 Surface Water Quality North of Phase 1 and 2

Clean runoff from Phase 1 and the eastern perimeter of the landfill is directed to the NWSP and then into the wetland located north of the Lower Leachate Lagoon. The wetland discharges northward to Heal Creek. Heal Creek also receives drainage from the area north of Phase 2 (e.g., the High Level Road ditch), and from a stream draining a small wetland east of the Hartland North Pad. In June 2018, aggregate and piping were added to sections of the High Level Road ditch to protect the ditch from nearby construction and mitigate ponding, which may contribute to elevated concentrations of sulphate in surface drainage over time. Heal Creek flows northeast and into Durrance Creek, which discharges into Tod Creek. About 3 km north of the Site, Tod Creek discharges into Tod Inlet. Heal Creek is a small creek with a watershed area of approximately 128 ha. Heal Creek is mainly steep and rocky, although the creek passes through a few small wetlands. The creek dries up during the summer months except in the lower reaches where groundwater discharge maintains flow year-round.

Figures 7-2 and 7-3 present solute concentration and conductivity trends observed at surface water monitoring stations in the north area of the landfill and beyond the northern property boundary. In Figure 7-2, the distance of each station from the landfill boundary is shown in brackets in the legend. Surface water compliance monitoring points in this area of the landfill include SW-N-05 and SW-N-16.

7.7.1 Onsite Surface Water Quality

A considerable amount of quarrying and blasting has been performed northwest of Phase 2 to provide airspace for refuse and develop cells 4 and 5. Quarrying produced large quantities of aggregate that is stored at the Northwest Stockpile and Northeast Stockpile. Runoff from the Northwest Stockpile is captured predominantly by the Phase 2 leachate collection system and a ditch network surrounding Phase 2. However, some aggregate was placed outside of the Phase 2 basin catchment, so some of the runoff flows radially to the northeast. Aggregate runoff impacts (i.e., elevated conductivity, nitrate, and sulphate concentrations) caused by leaching of ANFO residue from the aggregate are prevalent around the Northwest Stockpile and north of Phase 1 and 2.

7.7.1.1 SW-N-54 and SW-N-57

SW-N-54 and SW-N-57 are located north of Phase 2. SW-N-54 monitors discharge from the freshwater retention pond at the northern boundary of Phase 2 to Cell 1 and the NWSP. SW-N-57 is a pipe outlet that is currently set to discharge into the leachate collection system at the west end of the Upper Leachate Lagoon. SW-N-57 collects runoff from Shane's Pond and the Toutle Valley. SW-N-57 was implemented to capture surface flow in the Toutle Valley and some runoff from the Northwest Stockpile to mitigate aggregate runoff impacts in the receiving environment. If/when the surface water at SW-N-57 meets regulatory criteria, the surface water will be diverted into the NWSP. In 2024/25, aggregate runoff impacts persisted at both SW-N-54 and SW-N-57.

In 2024/25, at SW-N-54, a BCWQG STA exceedance was reported for total iron concentration on one sampling event, and LTC exceedances were reported for TSS (1), nitrite (1), nitrate (3), total aluminum (1), cobalt (2), and dissolved copper concentrations (3). Average conductivity was elevated, at 451.7 µS/cm, as well as average nitrate (16.4 mg/L), dissolved copper (22.8 µg/L), and sulphate (96.7 mg/L) concentrations. Leachate indicator parameters were present in low concentrations throughout the monitoring period. The Mann-Kendall analysis detected significant increasing trends in conductivity, chloride, and nitrate concentrations.

At SW-N-57, BCWQG STA exceedances were reported for TSS (3), total iron (3), and dissolved copper (2) concentrations, and LTC exceedances were reported for nitrite (1), nitrate (1), total aluminum (2), cobalt (3), and dissolved copper (2) concentrations. Average conductivity was elevated, at 538.8 µS/cm, as well as average nitrate (2.9 mg/L) and sulphate (190 mg/L) concentrations. Total iron concentrations were high on most sampling events, reaching a maximum of 39.1 mg/L in October 2024. Leachate indicator parameters were present in low concentrations throughout the monitoring period. The Mann-Kendall analysis detected a significant decreasing trend in nitrate concentrations. Water quality impacts at SW-N-57 reflect aggregate runoff and magnesium lignosulphonate impacts.

7.7.1.2 SW-N-19

SW-N-19 is located within the landfill property below the northeast freshwater retention pond, approximately 80 m east of the Lower Leachate Lagoon and upstream of SW-N-16. This monitoring point receives runoff primarily from the bedrock/refuse interface adjacent to Phase 1. For several years, surface water at SW-N-19 has been impacted by aggregate runoff.

Three surface water samples were collected from SW-N-19 in 2024/25, and the surface water continued to exhibit elevated aggregate runoff parameters and trace metal concentrations. Copper concentrations exceeded the BCWQG STA on one

sampling event in February 2025, and the LTC guidelines for nitrate and copper were exceeded on all sampling events. LTC exceedances were also reported for aluminum, cobalt, and TSS. The average copper and nitrate concentrations were 17.1 µg/L and 8.8 mg/L, respectively. The average conductivity was 324 µS/cm, and the average sulphate concentration was 75 mg/L. Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected significant increasing trends in nitrate and chloride concentrations at this location.

7.7.1.3 SW-N-Agg Drain

The SW-N-Agg Drain sampling point is along a drainage channel that collects runoff from the Northeast Stockpile and conveys it to the Lower Lagoon. The SW-N-Agg Drain was implemented to collect contact water from the northeast stockpile and mitigate surface water quality impacts downstream. One surface water sample was collected from the channel in March 2025. The surface water quality exhibited elevated conductivity (569 µS/cm), nitrate (6.27 mg/L), and sulphate (260 mg/L) concentrations, and the nitrate concentration exceeded the BCWQG LTC. This surface water sample was directly impacted by aggregate in the Northeast Stockpile.

7.7.2 Compliance Monitoring Points

7.7.2.1 SW-N-05

West of the Upper Leachate Lagoon and north of Phase 2, Heal Creek collects runoff from the Phase 2 area, the Northwest Stockpile and North Ridge, and a small wetland just south of Willis Point Road. A culvert beneath the road directs surface water to the north, where it later converges with surface water flowing from the culvert at SW-N-16. In recent years, surface water quality at SW-N-05 has been impacted by aggregate runoff and potentially some landfill leachate, exhibiting elevated conductivity, sulphate, ammonia, nitrite, and nitrate concentrations.

No BCWQG STA exceedances were reported at SW-N-05, but the surface water continued to exhibit aggregate runoff impacts. Nitrate and dissolved copper concentrations exceeded the BCWQG LTC on all four sampling events, but no trace metal or TSS exceedances were reported. Dissolved copper concentrations were lower than at SW-N-16, with an average of 3.7 µg/L, and the average nitrate concentration was about the same, at 8.5 mg/L. In October 2024, conductivity and sulphate concentrations were highly elevated, reaching 723 µS/cm and 360 mg/L, respectively. Average conductivity and sulphate concentrations were 650.5 µS/cm and 306.3 mg/L, respectively. Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected significant increasing trends in conductivity, chloride, and sulphate concentrations at this location.

Since 2022/23, nitrate and ammonia concentrations at SW-N-05 have subsided, but sulphate concentrations and conductivity have increased. It is AECOM's interpretation that the bulk of ANFO residue in the Northwest Stockpile has been leached by precipitation, and a sulphate plume is now daylighting at this location. This trend likely reflects the differing reaction rates of ANFO leaching and sulphide oxidation in the stockpile. ANFO leaching occurs rapidly as precipitation contacts the aggregate, whereas sulphide oxidation is a slower process driven by oxygen influx and oxidation of sulphide minerals in the rock. Nitrate concentrations may continue to subside at SW-N-05, and sulphate concentrations and conductivity may continue to increase.

There is a small wetland north of Phase 1 and the Lower Leachate Lagoon where surface water flows north and through a weir (weir SF5) at SW-N-16 before discharging into a culvert beneath Willis Point Road and then to Heal Creek. SW-N-16 is located at the landfill property boundary and is utilized as a compliance monitoring point. In recent years, surface water at SW-N-16 has exhibited high conductivity, nitrate, sulphate, and trace metal concentrations, reflecting aggregate runoff impacts. Aggregate is stored just upgradient of SW-N-16 at the Northeast Stockpile and Triangle Stockpile, where aggregate products are processed and stored for construction purposes.

No BCWQG STA exceedances were reported at SW-N-16, but the surface water continued to exhibit aggregate runoff impacts. Nitrate and dissolved copper concentrations exceeded the BCWQG LTC on all four sampling events, and additional LTC exceedances were reported for total aluminum (1), cobalt (2), and TSS (2). Copper concentrations were highest in the winter, with an annual average of 11.7 µg/L. The average nitrate and sulphate concentrations were 8.3 and 76.1 mg/L, respectively, and the average conductivity was 372.9 µS/cm. Solute concentrations were generally highest in October 2024. Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected significant increasing trends in conductivity, chloride, and nitrate concentrations at this location.

Since 2022/23, conductivity and nitrate concentrations have increased at SW-N-16, but sulphate concentrations have been relatively stable, exhibiting seasonal fluctuations from moderate to elevated values. It is AECOM's interpretation that elevated nitrate and sulphate concentrations reflect ANFO leaching and sulphide oxidation in the Northeast Stockpile, similar what has

been observed downgradient of the Northwest Stockpile at SW-N-05. The difference in surface water quality among these locations likely reflects the timing of aggregate deposition and the volume of material stored in each stockpile.

7.7.2.2 SW-N-55

In 2024/25, the CRD reactivated surface water sampling location SW-N-55, north and immediately downstream of the Northeast Stockpile. This monitoring location predominantly receives runoff from the stockpile. AECOM recognized this sampling point as compliance monitoring location.

In 2024/25, two surface water samples were collected at SW-N-55, and nitrate concentrations exceeded the BCWQG LTC during both sampling events. Average conductivity (530 µS/cm) was elevated, as well as nitrate (6.7 mg/L) and sulphate (260 mg/L) concentrations. Leachate indicator parameters and copper concentrations were present in low to non-detectable concentrations. The surface water at this monitoring location was impacted by aggregate runoff.

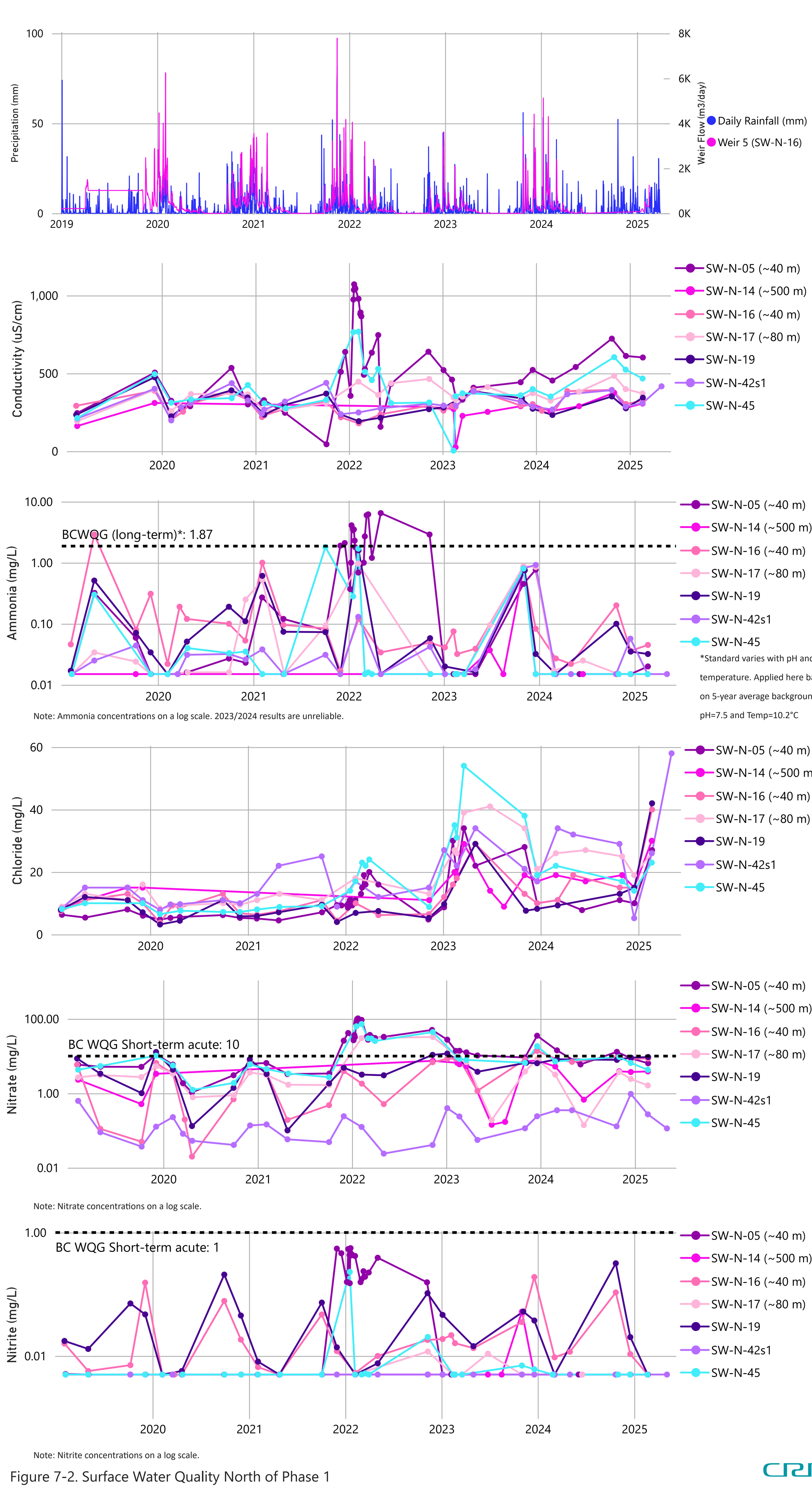


Figure 7-2. Surface Water Quality North of Phase 1

7.7.3 Surface Water Quality in the Receiving Environment

7.7.3.1 SW-N-45 and SW-N-17

SW-N-45 is located north of Phase 2, outside the landfill property boundary and on the north side of Willis Point Road, downstream of SW-N-05. Historically, SW-N-45 has exhibited aggregate runoff impacts.

In 2024/25, SW-N-45 was sampled three times, and aggregate runoff impacts persisted. No BCWQG STA exceedances were reported, but LTC exceedances were reported for nitrate on all sampling events, and dissolved copper on one sampling event. Average copper concentrations were low, but nitrate and sulphate concentrations were consistently elevated, with averages of 6.8 and 266.7 mg/L, respectively. Average conductivity was 531.7 µS/cm. Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected significant increases in conductivity and chloride concentration at this location.

SW-N-17 is located east, approximately 100 m downstream of SW-N-45, prior to where Heal Creek converges with surface water flowing from compliance monitoring point SW-N-16. Surface water quality at SW-N-17 was similar to SW-N-45, with elevated average conductivity (418 µS/cm), nitrate (2.6 mg/L) and sulphate concentrations (190 mg/L). No BCWQG STA exceedances were reported, but LTC exceedances were reported for nitrate on one sampling event, and dissolved copper concentrations on another. Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected a significant increasing trend in chloride concentrations at this location.

7.7.3.2 SW-N-14

Surface water monitoring location Sw-N-14 is located offsite, north of Willis Point Road and within the Heals Rifle Range, downstream of the confluence of Heal Creek and surface water flowing from SW-N-16. Similar to the upstream sampling locations (SW-N-05, SW-N-45, SW-N-17, and SW-N-16) surface water at SW-N-14 exhibited aggregate runoff impacts, with elevated average conductivity (320 µS/cm), nitrate (3.8 mg/L), and sulphate concentrations (116.3 mg/L). No BCWQG STA exceedances were reported, but LTC exceedances were reported for nitrate on all sampling events, and total aluminum, dissolved copper, and TSS on at least one other sampling event. Leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis did not detect any significant solute concentration trends.

7.7.3.3 SW-N-56

In 2024/25, the CRD reactivated surface water sampling location SW-N-56, east and downstream of the Northeast Stockpile. This monitoring location receives runoff from the Northeast Stockpile and a large area east of Phase 1. Surface water in this area flows east toward Tod Creek.

In 2024/25, two surface water samples were collected at SW-N-56, and no BCWQG STA or LTC exceedances were reported. Average conductivity (179.5 µS/cm) was low, but nitrate and sulphate concentrations were relatively high, averaging 1.1 and 46.5 mg/L, respectively. Leachate indicator parameters and copper concentrations were present in low to non-detectable concentrations. The surface water at this monitoring location was impacted by ANFO leaching, and sulphide oxidation

7.8 Surface Water Quality in the Northwest Area

The Hartland North Pad is in the northwest area of Hartland, as shown on Figure 7-1. Recent geologic mapping of the ridge to the south of the North Pad (AECOM 2018) revealed an undulating bedrock surface with extensive deformation, fracturing, and mineralization. The west side of the Hartland North Pad drains northward through an ephemeral channel that originates at the northwest corner of the Hartland North Pad. The water is conveyed through a culvert under Willis Point Road and into a drainage channel that eventually discharges into Durrance Lake approximately 450 m to the north. Flow through the channel only occurs during wet weather periods. During dry periods, several wetlands persist along the drainage course, but they are not connected by surface flows. In the downstream portions of the creek, flows increase due to groundwater discharge to the stream. Further downstream, a second creek of similar size joins the original creek. The “combined” creek has a well-defined channel in the area where it discharges to Durrance Lake. Figure 7-5 presents leachate and aggregate runoff indicator parameters at sampling locations along the ephemeral channel northwest of the Site.

7.8.1 Compliance Monitoring Points

7.8.1.1 SW-N-41s1

SW-N-41s1 is a compliance monitoring point located downstream and northwest of the Hartland North Pad, on the other side of a culvert that spans beneath Willis Point Road. This location receives runoff from the North Pad area and the Northwest Stockpile. In 2023/24, aggregate runoff impacts were observed at SW-N-41s1.

In 2024/25, no BCWQG STA exceedances were reported at SW-N-41s1, but LTC exceedances were reported for TSS (8.2 mg/L) and dissolved copper (1.85 µg/L) on one sampling event. The TSS exceedance was likely due to abundant foliage in the surface water. Aggregate runoff impacts persisted, with elevated average conductivity (271.2 µS/cm), nitrate (0.6 mg/L), and sulphate (66.1 mg/L) concentrations. Conductivity and nitrate concentrations were highest in October (323 µS/cm and 0.85 mg/L, respectively), and leachate indicator parameters were present in low concentrations throughout the monitoring period. The Mann-Kendall analysis detected a significant decreasing trend in ammonia concentrations and an increasing trend in nitrate concentrations at this location.

7.8.1.2 SW-N-42s1

SW-N-42s1 is a compliance monitoring point located downstream and northeast of the Hartland North Pad, on the other side of a culvert that spans beneath Willis Point Road. This location receives runoff from the North Pad area and potentially the Northwest Stockpile. In 2023/24, aggregate runoff impacts were observed at SW-N-42s1.

In 2024/25, no BCWQG STA exceedances were reported at SW-N-42s1, but LTC exceedances were reported for TSS (7.6 mg/L) and dissolved copper (1.72 µg/L) on separate sampling events. Aggregate runoff impacts persisted, with elevated average conductivity (365.6 µS/cm), nitrate (0.4 mg/L), and sulphate (76.3 mg/L) concentrations. Conductivity was highest in May (323 µS/cm), and nitrate concentration reached a maximum of 0.95 mg/L in December. Ammonia concentrations were low to non-detectable throughout the monitoring period, and chloride concentrations were slightly elevated, with an average of 23 mg/L. The Mann-Kendall analysis detected a significant increasing trend in chloride and nitrate concentrations at this location. We cannot be sure about the timing, but we hypothesize that nitrate concentrations will subside within the next few years, and sulphate concentrations may begin to increase based on what we have observed in other areas of the Site (e.g., SW-N-05, SW-N-16, and SW-N-42s1).

7.8.2 Other Monitoring Locations in the Receiving Environment

7.8.2.1 SW-N-41S3, SW-N-CSs2, and SW-N-41S4

Sw-N-CSs2 is located northwest of the Hartland North Pad, downstream of SW-N-66 and the Northwest Stockpile. At this location, surface water flows north toward Durrance Lake, passing through monitoring location SW-N-41S3. In 2024/25, no BCWQG STA or LTC exceedances were reported at these locations. Moderate nitrate concentrations ranging as high as 0.52 mg/L were observed at SW-N-CSs2 and SW-N-41S3, but all other aggregate runoff and leachate indicator parameters were present in low concentrations. The Mann-Kendall analysis detected a significant increasing trend in nitrate concentrations at SW-N-41s3, as well as significant increasing trends in conductivity and sulphate concentrations at SW-N-CSs2.

As stated in Section 7.16, conductivity, aggregate runoff, and leachate indicator parameters were present in low to non-detectable concentrations at SW-N-41S4 throughout the monitoring period. An anomalous ammonia concentration (0.11 mg/L) was observed in February 2025, but ammonia was non-detectable upstream at SW-N-41S3 during this sampling event.

7.9 Surface Water Quality in Durrance and Tod Creeks

7.9.1 SW-N-15

SW-N-15 is located in Durrance Creek, downstream of SW-N-41S4. Durrance Creek also receives discharge from a narrow stream that receives discharge from the landfill through SW-N-42S1. The narrow stream meets Durrance Creek upstream of SW-N-15. Downstream of SW-N-15, Durrance Creek converges with Heal Creek.

In 2024/25, two BCWQG LTC exceedances were reported for dissolved copper concentrations at SW-N-15, but no dissolved copper concentration exceedances were reported on the same sampling dates at upstream locations (SW-N-42S1 and SW-N-41S4). Conductivity was low ranging from 121 to 186 µS/cm, with an average of 147.7 µS/cm. Sulphate and ammonia concentrations were low, but nitrate concentrations were elevated, ranging from 0.15 to 0.94 mg/L. Nitrate concentrations were intermediate to those observed at SW-N-42S1 and SW-N-41S4, when sampling was performed at all three locations on the same dates. It is likely that the elevated nitrate concentrations reflect dilute aggregate runoff impacts.

7.9.2 SW-N-63, SW-N-64, and SW-N-65

Since 2022/23, surface water samples have been collected at three locations (SW-N-63, SW-N-64, and SW-N-65), approximately 900 m northeast of Hartland, near the confluence of Durrance Creek and Tod Creek. SW-N-63 is at the end of Durrance Creek, SW-N-64 is at the confluence of Durrance and Tod creeks, and SW-N-65 is downstream of the confluence of the creeks. Hence, surface water quality at SW-N-65 is intermediate to water quality at SW-N-63 and SW-N-63. In 2024/25,

aggregate runoff impacts and trace metal BCWQG exceedances were observed at these locations, but it is unclear if local agriculture has an impact on the water quality.

In 2024/25, at SW-N-63, one BCWQG STA and two LTC exceedances were reported for dissolved copper concentrations. At SW-N-64, STA exceedances were reported for total iron (2) and dissolved iron (2) concentrations, and LTC exceedances were reported for TSS (2), total aluminum (1), cobalt (2), dissolved aluminum (1), and copper (2) concentrations. At SW-N-65, one STA and two LTC exceedances were reported for total and dissolved iron concentrations, respectively, and LTC exceedances were reported for TSS (1), total aluminum (1), cobalt (2), and dissolved copper (2) concentrations.

Average conductivity at SW-N-63 and SW-N-64 were 204.1 and 179.3 µS/cm, respectively, with a high of 299 µS/cm observed at SW-N-64 in October 2024. Average conductivity (180.4 µS/cm) was similar at SW-N-65. Nitrate concentrations were elevated and fluctuated throughout the monitoring period, ranging from 0.19 mg/L at SW-N-64 to 2.09 mg/L at SW-N-63, with the highest concentrations occurring in October at all three locations. Sulphate concentrations were low to elevated, ranging from 9.5 mg/L at SW-N-64 to 83 mg/L at SW-N-63. Similarly, ammonia concentrations were low to elevated, ranging from 0.02 mg/L to 0.11 mg/L at SW-N-63. However, an equal ammonia concentration was observed at background monitoring location SW-N-42S4 (see Section 7.16). Chloride concentrations at all three locations were low, with averages ranging from 14.3 to 17.3 mg/L. Ultimately, aggregate runoff likely had an impact on the water quality at this location, but local agriculture may have contributed. Lower metal concentrations were observed upstream, so the elevated metal concentrations observed at this location likely reflect background water-rock interactions and not landfill activities.

7.10 Surface Water Quality South of the Landfill

In the south area of the landfill, an ephemeral stream flows southward into Killarney Lake, which subsequently drains into Prospect Lake. Surface water flow south of the landfill occurs mainly during wet periods, and groundwater seepage has been observed in the Killarney Creek channel during dry periods. Clean surface water runoff from the southern slope of Phase 1 runs westward in a ditch toward a culvert that discharges into a small wetland at SW-S-03 and then into the ephemeral stream that flows into Killarney Lake. The ephemeral stream receives surface water runoff from a drainage ditch running along the southwest perimeter of the Site, which receives surface water runoff and likely some groundwater discharge from Mount Work. The confluence of the southwest perimeter ditch and the ephemeral stream is compliance monitoring point SW-S-04.

7.10.1 Surface Water Quality Downstream of Phase 1

7.10.1.1 SW-S-12 and SW-S-03

SW-S-12 receives runoff from the ditch network on the southern slope of Phase 1 prior to the culvert that conveys the water to SW-S-03. SW-S-12 has been instrumented with a weir (weir SF2) to gauge surface water flow. SW-S-03 is located in the main channel of Killarney Creek, downstream of SW-S-12, where the culvert discharges into a small wetland area. This area also receives runoff from the Materials Diversion Transfer Station. Historically, water quality at SW-S-03 has been impacted by contaminated runoff from the south face of the landfill and the former truck wash area, and both locations have exhibited water quality impacts associated with aggregate runoff and potentially industrial activities and traffic passing through the south entrance of the landfill.

In 2024/25, at SW-S-12, BCWQG STA exceedances were reported for TSS (1), total iron (2), dissolved copper (3), and dissolved iron (2) concentrations, and LTC exceedances were reported for TSS (1), ammonia (2), nitrate (1), total aluminum (1), cobalt (3), and dissolved copper (1) concentrations. At SW-S-03, STA exceedances were reported for TSS (1), total iron (1), dissolved copper (1), and zinc (1) concentrations, all on one sampling event. LTC exceedances were reported for nitrate (1), total aluminum (1), cobalt (1), and dissolved copper (3) concentrations.

At SW-S-12, conductivity was low to elevated, fluctuating from 170 to 418 µS/cm throughout the monitoring year and peaking in October 2024. Nitrate and sulphate concentrations exhibited similar patterns, reaching 6.31 and 155 mg/L in October, respectively. Ammonia concentrations were also elevated, ranging from 0.11 to 3.0 mg/L, and the highest concentrations occurred in May. Chloride concentrations were moderate, with an average of 14.7 mg/L. Copper concentrations were moderate to high, ranging from 3.35 to 14.6 µg/L. Trace metal concentrations were generally highest in May and December 2024.

At SW-S-03, average conductivity was typically lower than at SW-S-12, but the average conductivity (293.8 µS/cm) was slightly higher. Nitrate and sulphate concentrations were elevated, peaking at 5.1 and 120 mg/L in October, respectively, and ammonia concentrations were low to elevated, averaging 0.4 mg/L. Chloride concentrations were low to elevated, reaching 74

mg/L in February 2025. The sodium concentration was elevated on that sampling date, but the Cl/Na molar ratio was >1.5, and the ammonia concentration was 0.98 mg/L. Dissolved copper concentrations were moderate, averaging 6.9 µg/L.

Overall, both SW-S-12 and SW-S-03 exhibited impacts from aggregate runoff and potentially dilute leachate throughout the monitoring year. Seasonal fluctuations in both aggregate and leachate indicator parameters have been observed at these locations for several years.

7.10.1.2 SW-S-27 and SW-S-24

SW-S-27 is located in a tributary that discharges into the ephemeral stream running toward SW-S-04. SW-S-27 is at the confluence of the tributary and the ephemeral stream, downstream of SW-S-27. Historically, both locations have exhibited aggregate runoff impacts, and both locations are downstream of a parking lot, which may contribute road salt to the local environment during snowy periods. In 2024/25, only three samples were collected at SW-S-27.

In 2024/25, at SW-S-27, BCWQG STA exceedances were reported for TSS (1), total iron (1), zinc (1), and dissolved copper (1) concentrations, all in December 2024, and LTC exceedances were reported for total aluminum (1), cobalt (1), and dissolved copper concentrations (2). At SW-S-24, STA exceedances were reported for TSS (1), total iron (1), and zinc (1) concentrations, all in December 2024, and LTC exceedances were reported for TSS (1), total aluminum (1), cobalt (1), dissolved aluminum (1), and copper (4) concentrations.

At SW-S-27, average conductivity (284.7 µS/cm) and nitrate concentrations (1.8 mg/L) were elevated. Chloride and ammonia concentrations were low to elevated, with averages of 43.3 and 0.3 mg/L, respectively. Sulphate concentrations were low, averaging 22.7 mg/L. At SW-S-24, average conductivity (261.6 µS/cm) and nitrate (1.5 mg/L) concentrations were elevated. Chloride and ammonia concentrations were low to elevated, with averages of 39.5 and 0.1 mg/L, respectively. Sulphate concentrations were low to elevated, averaging 39.3 mg/L. At both locations copper concentrations ranged from 1.66 to 6.75 µg/L. The Mann-Kendall analysis detected significant increasing trends in conductivity at SW-S-27 and chloride concentrations at SW-S-24. Overall, both locations exhibited aggregate runoff impacts and the CRD indicated that the elevated TSS and metal concentrations can be attributed to a sump pump failure near the Recycling Facility.

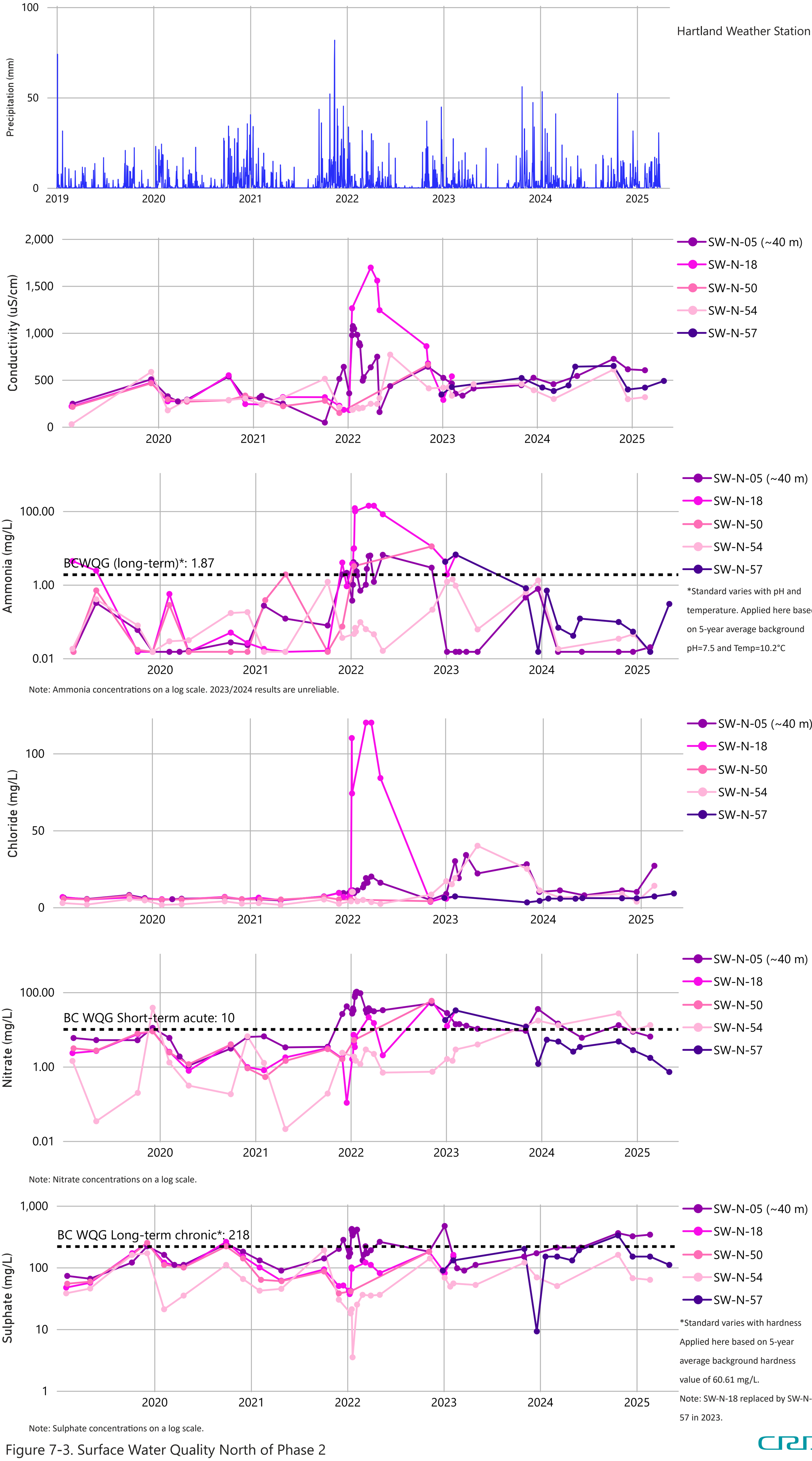


Figure 7-3. Surface Water Quality North of Phase 2

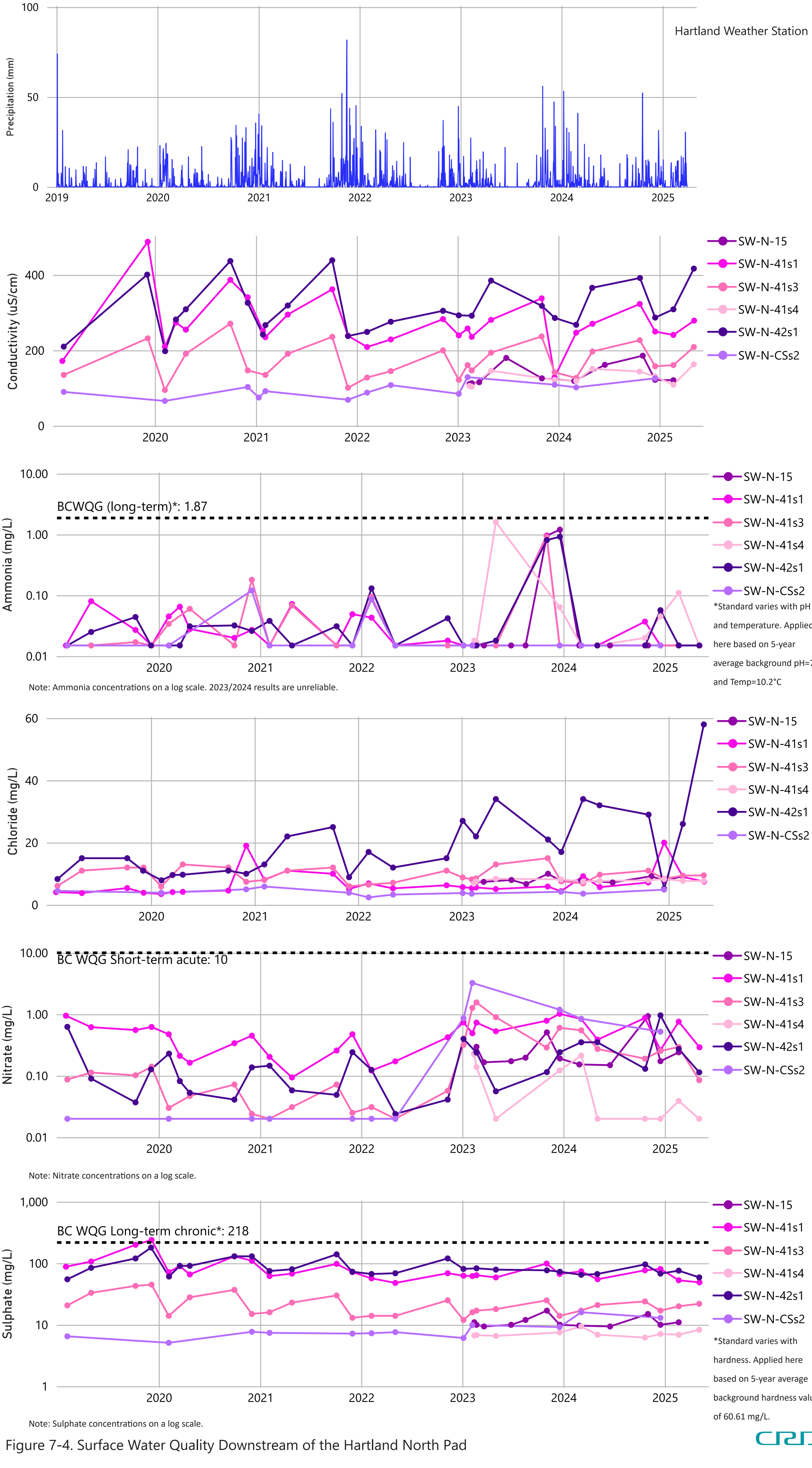


Figure 7-4. Surface Water Quality Downstream of the Hartland North Pad

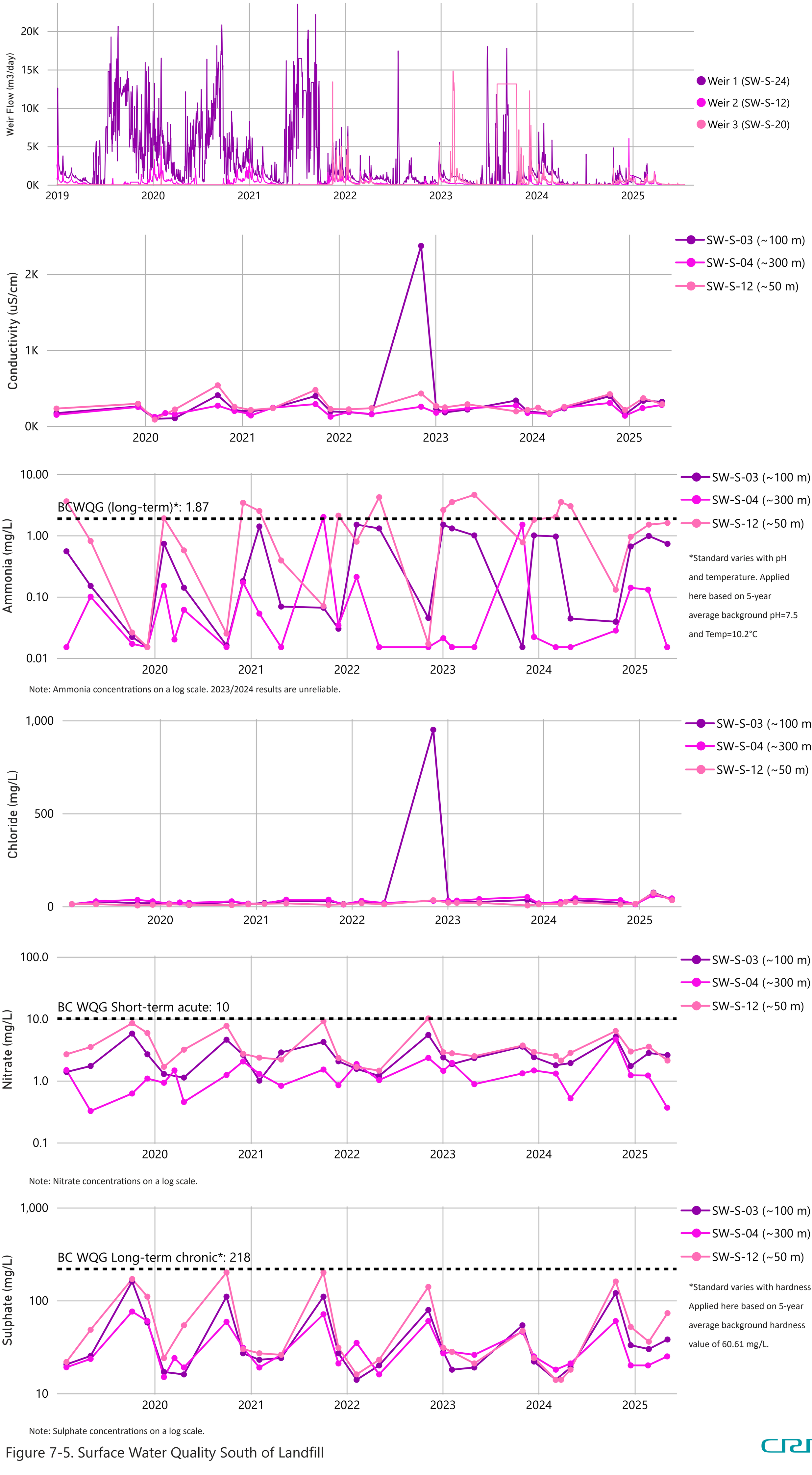


Figure 7-5. Surface Water Quality South of Landfill

7.10.2 Surface Water Quality in the Southwest Drainage Ditch

7.10.2.1 SW-S-20 and SW-S-21

SW-S-20 is upstream of the Recycling Centre in the southwest drainage ditch and has been instrumented with a weir to gauge surface water flow (weir SF3). SW-S-21 is downstream of SW-S-20 and receives surface water runoff and likely some groundwater discharge from Mount Work.

In 2024/25, two surface water samples were collected at SW-S-20. One BCWQG STA exceedance was reported for total iron concentration (1.48 mg/L), and LTC concentrations were reported for TSS (2), total aluminum (1), cobalt (1), zinc (2), dissolved aluminum (1), and dissolved copper (2) concentrations. Average conductivity (82 µS/cm), chloride (6.4 mg/L), and sulphate (5.3 mg/L) concentrations were low, but average nitrate and ammonia concentrations were elevated, at 0.7 and 0.4 mg/L, respectively. Nitrate and ammonia concentrations peaked in November, at 1.32 and 0.68 mg/L, respectively. At SW-S-21, total zinc and dissolved copper concentrations exceeded the BCWQG LTC on one sampling event, and the surface water quality was similar to but more dilute than SW-S-20. Average conductivity was 89.1 µS/cm, nitrate concentrations ranged from 0.11 to 0.24 mg/L, ammonia concentrations were below detection, and average chloride and sulphate concentrations were 5.6 and 2.6 mg/L, respectively. The Mann-Kendall analysis detected no significant water quality trends at either of these locations, but the surface water quality was indicative of dilute aggregate runoff impacts, which were likely caused by windblown dust originating from the landfill during routine aggregate production, stockpiling, processing, and ongoing construction activities.

7.10.3 Compliance Monitoring Point SW-S-04

Figure 7-6 illustrates surface water quality trends at sampling locations south of the landfill. The distance from each station to the landfill boundary is shown in brackets in the legend. SW-S-04 receives surface water from the southwest drainage ditch and the ephemeral stream at the south end of the Site.

In 2024/25, BCWQG STA exceedances were reported for TSS (2) and total iron concentration (2), and LTC exceedances were reported for nitrate (1), total aluminum (1), cobalt (2), and dissolved copper concentrations. Conductivity was moderate to elevated, with an average of 236.6 µS/cm, and chloride and nitrate concentrations were elevated, averaging 36.3 and 1.9 mg/L, respectively. Ammonia and sulphate concentrations were low to moderate, with averages of 0.1 and 30 mg/L, respectively. The highest solute concentrations were observed in October 2024. The elevated trace metal concentrations and TSS likely reflect low-flow conditions, which were noted in the CRD's field log. Additionally, there was a sump pump failure near the Recycling Facility which flushed turbid drainage toward SW-S-04 at the time of sampling. The Mann-Kendall analysis did not detect any statistically significant solute concentration trends at this location. Elevated ammonia and nitrate concentrations imparted by a wetland immediately upstream have been observed at this location for several years.

7.11 Summary

Based on our analysis and interpretation of the 2024/25 surface water quality data:

- BC Water Quality Guideline Exceedances: No BCWQG STA exceedances were reported at any compliance monitoring points, but many monitoring locations exhibited trace metal and TSS LTC exceedances. Trace metal exceedances correlated with TSS exceedances in almost all cases, suggesting turbid and/or low-flow conditions impacted surface water quality at the time of sampling. Relatively high trace metal concentrations were often observed downstream of the landfill, suggesting that some occurrences of elevated trace metals are caused by background gas-water-rock interactions.
- Background Surface Water Quality: Surface water quality at SW-N-66 exhibited low (i.e., <131 µS/cm) conductivity, and low to non-detectable aggregate runoff and leachate indicator concentrations. Copper concentrations (3.6 µg/L) exceeded the BCWQG STA, suggesting that elevated copper concentrations are typical of the local environment. This may reflect naturally unfavourable geochemical conditions (e.g., low hardness or DOC concentrations), which are used in the copper BLM model to calculate the copper guidelines.
- Copper Concentration Exceedances: Copper concentration LTC exceedances persisted in many areas of the Site, but as we stated above, a BCWQG STA copper concentration exceedance was reported at a background location. Additionally, copper concentration LTC exceedances were reported in other locations in the receiving environment, including SW-N-15 and all three surface water monitoring locations at the confluence of Durrance Creek and Tod Creek. Many of the copper concentrations that exceeded the guidelines were relatively low (i.e., <3.0 µg/L), considering that regional background copper concentrations in groundwater range from 13 to 14 µg/L.

Aggregate Runoff Impacts: Surface water across the landfill, at most compliance monitoring points, and in several areas of the offsite receiving environment continued to exhibit aggregate runoff impacts. Nitrate concentrations decreased in some areas (e.g., downstream of the Northwest Stockpile), but higher nitrate concentrations were observed around the Northeast Stockpile (e.g., location 19, and compliance monitoring locations 16 and 55). Despite the decrease in nitrate concentrations downstream of the Northwest Stockpile, higher sulphate concentrations and conductivity were observed along the same flow paths, which likely reflect sulphide oxidation in the Northwest Stockpile. The changes in relative concentrations of nitrate and sulphate likely reflect the differing reaction rates of ANFO leaching and sulphide oxidation in the stockpile.

Aggregate runoff impacts were observed north of the Site in Durrance Creek, and those impacts persisted into Tod Creek. The impacts in Durrance Creek likely begin where the narrow stream that passes through SW-N-42S1 meets Durrance Creek.

- Elevated Chloride Concentrations: Some monitoring locations south of the landfill were likely impacted by road salt and potentially dilute leachate, as indicated by moderate to elevated chloride and ammonia concentrations.

8. Leachate

8.1 Data

In 2024/25, CRD staff collected 55 leachate samples from the following locations:

- Hartland Valve Chamber (16 samples)
- Phase 1 North Purge Well System (combined discharge from 52-4-0-P7, 80-1-0-P8 and 81-1-0-P9; 9 samples)
- Phase 1 South Purge Well System (combined discharge from P1, P2, P3, P4 and P10; 8 samples)
- Controlled Waste Ditch (6 samples)
- West Face Drainage (7 samples)
- Cell 3 Pipe Outlet (9 samples)

These locations were sampled monthly, and the leachate was analyzed for conventional parameters, organic compounds, and metals. Additionally, Hartland Valve Chamber samples were analyzed quarterly for trace organic compounds, including polycyclic aromatic hydrocarbons (PAHs), BTEX, phthalate esters, ketones, aromatics, phenols, ethers, nitrosamines, alkanes, alkenes, and other select organic compounds. One sample from the Hartland Valve Chamber was sent for analysis of emerging contaminants including PFAS and PFOA.

In 2024/25, nine (9) leachate samples were collected at the Cell 3 Pipe Outlet, and sixteen (16) leachate samples were collected from the Hartland Valve Chamber. Six (6) leachate samples were collected from the Controlled Waste Ditch, and eight (8) leachate samples were collected from the South Purge Wells. Nine (9) leachate samples were collected from the West Face Drainage, and no leachate samples were collected from the Phase 2 Cleanout because of ongoing site maintenance.

8.2 Leachate Generation and Discharge

Leachate collected from the Phase 1 and Phase 2 landfills is discharged to the unlined Lower Leachate Lagoon. Leachate is pumped into the lined Upper Leachate Lagoon to minimize head build-up in the Lower Lagoon. Leachate from the lagoons is discharged from the Site through a 19.3 km Centrate Return Line that connects to the CRD trunk sewer system that ultimately discharges to the McLoughlin Point Wastewater Treatment Plant. The Centrate Return Line (CRL) was activated on December 30, 2020, and the formal switch from the previous leachate discharge line to the CRL occurred in March 2021, with flow rates ranging between 60 and 80 L/s.

Total monthly leachate flows discharged to sewer are provided in Appendix D. Average monthly leachate flow in 2024/25 was 14.6 L/s, which is comparable to historical rates. The highest monthly leachate volume (76,519 m^3) was observed in December 2024, in response to intense winter precipitation events. Changes in leachate discharge rates throughout the year may be related to the increased capacity of the CRL from the RTF, variability in precipitation, or operational improvements aimed at minimizing leachate generation.

8.3 Compliance Monitoring Locations

The compliance monitoring point for leachate at Hartland is the Hartland Valve Chamber (a flow detection chamber), which discharges leachate from the Site into a pipeline that conveys the leachate to the McLoughlin Point Wastewater Treatment Plant. Discharge from the leachate pipeline is subject to the CRD Regional Source Control Program (RSCP) Waste Discharge Authorization (Waste Discharge Authorization Number SC97.001). Leachate compliance data is reported to the CRD RSCP on a quarterly basis.

8.4 Leachate Quality

Sampling and testing of leachate quality have been carried out since the early 1970s. Since 2000, leachate samples have been collected primarily from the Hartland Valve Chamber. Analytical results from the routine monthly leachate sampling program are provided in Appendix B-4. Analysis of trace organics in the leachate discharge was conducted quarterly and is provided in Appendix B-5. The analytical results for samples collected from the leachate collection and conveyance network are presented in Appendices B-7, B-8, B-9, B-10, and B-11. No sampling was performed at the Phase 2 Cleanout, so Appendix B.6 was omitted from this report.

8.4.1 Routine Monthly Leachate Analyses and Sewer Use Bylaw Comparison

Figure 8-1 and Figure 8-2 present time series plots for selected parameters in leachate at the Hartland Valve Chamber, North Purge Wells, and Phase 2 Cleanout (not sampled since 2021). The Hartland Valve Chamber is the only leachate compliance monitoring point for the Site, but comparison of leachate quality at other monitoring points allows for an evaluation of individual leachate contributions to the combined leachate discharge. Concentrations above RSCP criteria at locations other than the Hartland Valve Chamber are not considered non-compliant, and the criteria are used for reference purposes only.

At all sampling locations, concentrations of inorganic parameters such as conductivity and chloride show a seasonal dilution effect when greater amounts of precipitation in the fall and winter months result in lower concentrations. Higher concentrations occur during drier periods from May to October. Historically, leachate discharge from the Phase 2 Basin has been significantly more concentrated than leachate generated in Phase 1, which was closed in 1996. Leachate samples have not been collected from the Phase 2 Basin since 2021 due to troubles with the sampling pump. Mixing of leachate from Phases 1 and 2 in the Hartland Valve Chamber results in a leachate that exhibits chemistry that is intermediate of the two sources.

In 2024/25, leachate quality at the Hartland Valve Chamber was consistent with previous years, with an average conductivity of approximately 3,390 µS/cm. The average ammonia and chloride concentrations were approximately 229 and 262 mg/L, respectively, and a marginal COD exceedance (1,020 mg/L) was reported in March 2025. Based on inspection and statistical analysis of the leachate quality data, AECOM noted the following:

- BOD concentrations were low, remaining below 70 mg/L throughout the monitoring period.
- Total sulphide, dissolved sulphide, and total PAH concentrations did not exceed the Waste Discharge Authorization during any sampling event.
- The Mann-Kendall analysis indicated that statistically significant decreasing trends in conductivity and chloride concentrations have been observed at the Hartland Valve Chamber over the past five years.

8.4.1.1 Phase 2 Cleanout

Leachate samples have not been collected from Phase 2 Basin since 2021 due to troubles with the sampling pump. The CRD confirmed that the pump is functional but not recovering leachate, and there is an ongoing investigation to determine why leachate samples cannot be recovered.

8.4.1.2 North Purge Wells

In 2024/25, leachate samples collected from the North Purge Wells (52-4-0-P7, 80-1-0-P8 and 81-1-0-P9) met all Waste Discharge Authorization criteria during all sampling events. Conductivity was elevated during the dry season, as it was in 2023/24. Groundwater quality data collected from P9 in 2024/25 are not reliable due to a sampling issue.

8.4.1.3 South Purge Wells

In 2024/25, leachate samples collected from the South Purge Wells (P1, P2, P3, P4 and P10) met all Waste Discharge Authorization criteria during all sampling events.

8.4.1.4 Controlled Waste Ditch

Leachate collected by the Controlled Waste Ditch is not as concentrated as leachate collected from Phase 2 Cleanout or the West Face Drainage. In 2024/25, all leachate samples collected from the Controlled Waste Drainage leachate met Waste Discharge Authorization criteria, except for one sample that exhibited elevated COD (4,650 mg/L), total iron (414 mg/L), manganese (38.6 mg/L), and zinc (8.64 mg/L) concentrations in April 2024.

8.4.1.5 West Face Drainage

Leachate from the West Face Drainage is strongly reduced with abundant organic content. A weir and flow monitor have been installed at the West Face Drainage to evaluate seasonal trends in flows. Historically, the West Face Drainage has contributed a relatively small volume of leachate and not had a substantive impact on leachate quality at the Hartland Valve Chamber. The CRD reported that leachate flows at the West Face Drainage have increased due to ongoing landfill development and routing of discharge from the Phase 2 Leachate Collector Sump.

In 2024/25, leachate discharged from the West Face Drainage was sampled on seven of 12 sampling events due to periodically dry conditions. Like previous years, the West Face Closure Toe Drain produced the most concentrated leachate at the Site, with the highest BOD, ammonia, conductivity, and chloride concentrations. All leachate quality parameters met Waste Discharge Authorization criteria, except for COD concentrations measured in April, June, October, and December 2024.

8.4.1.6 Cell 3 Pipe Outlet

Cell 3 includes new leachate containment and gravity flow conveyance infrastructure (i.e., the Toutle Drain), which discharges directly into the Upper Leachate Lagoon. The Cell 3 Pipe Outlet began discharging leachate in 2016, and leachate from this location is considered representative of newly deposited refuse.

In 2024/25, leachate samples were collected on eight of 12 sampling events due to periodically dry conditions, and all parameters except COD and chloride concentration met Waste Discharge Authorization criteria during all sampling events. COD concentration exceeded the sewer use criteria on all sampling events, and chloride concentrations exceeded the Sewer Use Bylaw criteria on two sampling events.

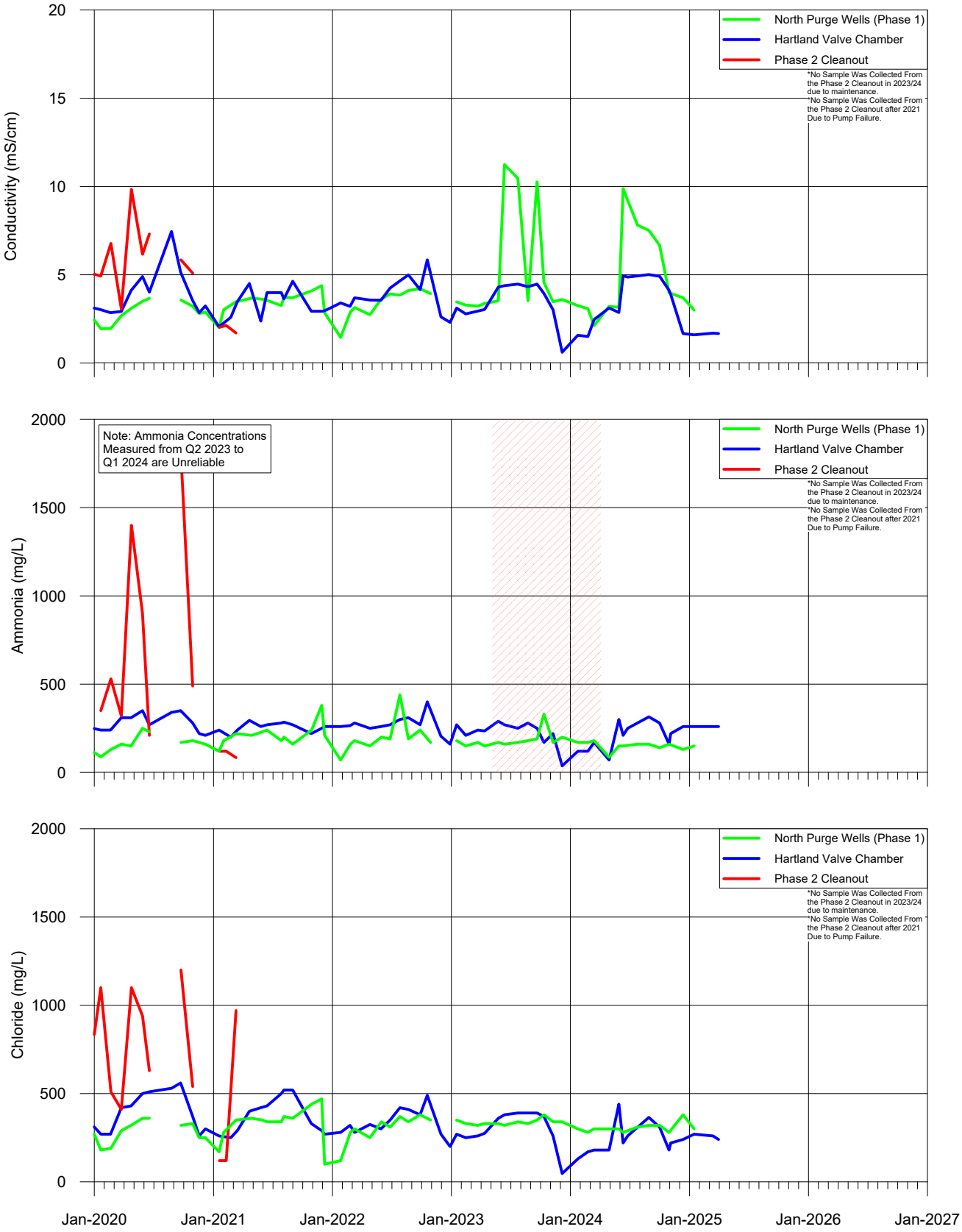


Figure 8-1. Hartland Valve Chamber Leachate Chemistry (Conductivity, Ammonia and Chloride)



Figure 8-2. Hartland Valve Chamber Leachate Chemistry (Sulphide, BOD and COD)

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8.4.2 Trace Organics, BTEX, and Emerging Contaminants

Since 1998, analysis of trace volatile and semi-volatile organic compounds have been performed on leachate samples collected quarterly from the Hartland Valve Chamber. Chlorinated phenol compound analytical results for combined leachate in 2024/25 are presented in Appendix B-5. BTEX analytical results are provided for each leachate monitoring point in appendices B-4, B-7, B-8, B-9, B-10, and B-11, and emerging contaminants analytical results from the Hartland Valve Chamber are tabulated in Appendix B-12. All trace organic compounds, BTEX, and emerging contaminants were present in low to non-detectible concentrations, and no exceedances were reported.

8.5 Summary

The leachate flow and quality data collected in 2024/25 indicated the following:

- Leachate flow and quality were like previous years, with no significant changes in discharge volumes or quality.
- The average daily leachate flow rate was 14.6 L/s, which is slightly higher than the long-term (1997 to 2024) average of approximately 12.5 L/s. This may be related to the expansion of the leachate containment footprint in the Phase 2 landfill and NE aggregate stockpile.
- The maximum monthly leachate discharge was 76,519 m^3, recorded in December 2024.
- COD concentrations exceeded the sewer use criteria at the Cell 3 Pipe Outlet (9 samples), West Face Drainage (5 samples), and the Controlled Waste Ditch (1 sample), and one marginal COD exceedance was reported at the Hartland Valve Chamber in March 2024.
- Two leachate samples exhibited non-compliant chloride concentrations at the Cell 3 Pipe Outlet.
- The West Face Drainage exhibited the most concentrated leachate.

9. Conclusions

9.1 Leachate Flow

In 2024/25, leachate levels and discharge at Hartland were consistent with historical interpretations. The leachate mound in Phase 1 persisted, but leachate levels continued to decrease slowly. The most notable change in leachate discharge patterns occurred at the North Purge Wells, where leachate discharge volumes continued to decrease. Groundwater levels at P52 have been increasing for five years, indicating diminishing performance of the purge wells in that area. The pump appears to be able to maintain leachate levels within the purge wells at the target elevation, so the well should be tested to confirm it is performing adequately, effecting a drawdown cone as designed, and rehabilitated as part of ongoing maintenance activities if it is not doing so.

Groundwater quality at wells installed north of the North Purge Wells confirmed that no leachate had migrated north of the landfill. The South Purge Wells performed adequately, and no leachate impacts were observed downgradient of the landfill.

Leachate elevations observed at monitoring stations within Phase 2 were comparable to historical values, indicating that the refuse was largely unsaturated. Groundwater levels at critical monitoring locations north of the Phase 2 Basin were consistently higher than leachate levels in Phase 2, implying that leachate levels were stable and the hydraulic trap was maintained.

9.2 Groundwater Flow

In 2024/25, groundwater flow patterns at Hartland were consistent with historical interpretations. Most groundwater in the bedrock underlying the landfill was captured by the Phase 2 leachate collection system, and groundwater levels along the North Ridge continued to be lower and show greater variability than historical values. We attributed these patterns to quarrying in the Toutle Valley and lowering of the valley floor. In early-2025, Cell 4 (within the Toutle Valley) was outfitted with a liner that may impact the groundwater flow regime, so groundwater levels along the North Ridge should be monitored closely in 2025/26. Despite the observed changes to the potentiometric surface in this area, the Phase 2 hydraulic trap was maintained in 2024/25.

9.3 Groundwater Quality

Groundwater quality was generally consistent with natural water quality surrounding the site and indicates the landfill is functioning as intended with a few exceptions as described below. Analysis of the groundwater quality data indicated:

- Leachate Containment: Leachate-impacted groundwater was contained within the landfill property boundary.
- Aggregate Runoff Impacts: Aggregate runoff impacts (e.g., elevated conductivity, sulphate, and nitrate concentrations) are a pervasive issue at the Site, especially north of the landfill. Impacts were most apparent at compliance monitoring locations 31, 111, 112, and in many areas of the Site immediately downgradient of stockpiles. Elevated nitrate and/or sulphate concentrations were also observed at the south end of the Site, at compliance monitoring locations 73 and 71. In the northwest area of the landfill, dilute aggregate runoff impacts were identified, but concentrations were low at the property boundary and low to non-detectable in the receiving environment.
- Elevated Boron Concentrations: Boron concentrations have exceeded the CSR DW standard seasonally at compliance monitoring location 20 for several years. AECOM analyzed historical groundwater quality data and determined that groundwater at monitoring locations 20, 52, and in the North Purge Wells and South Purge Wells exhibits a distinct geochemical signature characterized by highly elevated silicon and boron concentrations. We believe that the elevated boron originates from the silicate mineral dissolution in the bedrock at the north and south ends of the Phase 1 landfill.
- Elevated Chloride Concentrations: Elevated chloride concentrations observed in the area south of the Site likely reflect road salt impacts, as indicated by Na/Cl ratios around 1.0, and low to non-detectable ammonia concentrations.

9.4 Domestic Well Water Quality

The domestic groundwater quality met applicable regulatory criteria at all locations, except for temperature and pH aesthetic objectives. The data indicated that the wells were not impacted by leachate, and the water quality was consistent with background conditions as observed since the monitoring program began.

9.5 Surface Water Quality

Surface water quality is generally consistent with natural water quality surrounding the Site and indicates the landfill is functioning as intended with a few exceptions as described below. Analysis of the surface water quality data indicated:

- Elevated Trace Metal Concentrations: Several trace metal exceedances (e.g., aluminum, iron, dissolved copper) were reported, but the elevated metal concentrations correlated with TSS exceedances in almost all cases, suggesting turbid and/or low-flow conditions impacted the surface water quality. Relatively high trace metal concentrations were often observed downstream of monitoring locations downstream of the landfill, suggesting that elevated trace metal concentrations are the result of natural gas-water-rock interactions in contributing catchments.
- Background Surface Water Quality: Background surface water quality was monitored at SW-N-66, upstream of the Northwest Stockpile. The surface water exhibited low conductivity, and low to non-detectable aggregate runoff and leachate indicator concentrations. Copper concentrations exceeded the BCWQG STA at SW-N-66, suggesting that elevated copper concentrations are typical of the local environment.
- Copper Concentration Exceedances: Copper concentration LTC exceedances persisted in many areas of the Site, but as we stated above, a BCWQG STA copper concentration exceedance was reported at a background location. Additionally, copper concentration LTC exceedances were reported in other locations in the receiving environment, (e.g., SW-N-15) and at all three surface water monitoring locations at the confluence of Durrance Creek and Tod Creek. Many of the copper concentrations that exceeded the guidelines were relatively low (i.e., <3.0 µg/L), considering that regional background copper concentrations in groundwater range from 13 to 14 µg/L.
- Aggregate Runoff Impacts: Surface water across the landfill, at most compliance monitoring points and in several areas of the offsite receiving environment continued to exhibit aggregate runoff impacts. Nitrate concentrations decreased in some areas (e.g., downstream of the Northwest Stockpile), but higher nitrate concentrations were observed around the Northeast Stockpile (e.g., location 19, and compliance monitoring locations 16 and 55). Despite the decrease in nitrate concentrations observed downstream of the Northwest Stockpile, higher sulphate concentrations and conductivity were observed, which likely reflect sulphide mineral oxidation in the stockpile. The

temporal patterns observed among nitrate and sulphate concentrations likely reflect differing reaction rates of ANFO leaching and sulphide oxidation in the stockpile.

Aggregate runoff impacts were observed north of the Site in Durrance Creek, and those impacts persisted into Tod Creek. The impacts in Durrance Creek likely begin where the narrow stream that passes through SW-N-42S1 meets the Durrance Creek.

- Elevated Chloride Concentrations: Some monitoring locations south of the landfill were likely impacted by road salt, as indicated by moderate to elevated chloride concentrations coinciding with Na/Cl molar ratios around 1.0.

9.6 Leachate Quality

The Hartland Valve Chamber is the only leachate quality compliance monitoring point at the Site, but there are other leachate quality monitoring points that provide insight into leachate quality in various parts of the landfill. The leachate quality data was screened against local sewer use criteria. COD concentrations exceeded the sewer use criteria at the Cell 3 Pipe Outlet (9 samples), West Face Drainage (5 samples), and the Controlled Waste Ditch (1 sample), and one marginal COD exceedance was reported at the Hartland Valve Chamber in March 2024. The West Face Drainage exhibited the most concentrated leachate.

9.7 Quality Assurance and Quality Control

The quality analysis of the 2024/25 groundwater, surface water, and leachate quality data indicated that duplicate samples were collected at a frequency of approximately 18.3% (88/481 samples), exceeding the targeted duplicate sampling rate of 10%. It was determined that the water sampling and the laboratory analysis produced reliable results, but some trace metals concentrations (e.g., aluminum and copper) should be interpreted with caution.

9.8 Landfill Compliance with the Operating Certificate and Waste Discharge Authorization

The 2024/25 groundwater, surface water, and leachate quality data were used to assess compliance with the Amended Operational Certificate and Waste Discharge Authorization and are discussed individually below. Ultimately, the landfill did not meet all applicable regulatory criteria pertaining to groundwater, surface water, and leachate quality.

9.8.1 Leachate

Leachate quality met the Waste Discharge Authorization on all sampling events, except for one marginal COD exceedance that was reported at the Hartland Valve Chamber in March 2024.

9.8.2 Groundwater

Thirty-five (35) compliance monitoring wells have been established in 19 locations at the Hartland Landfill. Water quality data collected from these wells were compared to the CSR Aquatic Wildlife (AW) and Drinking Water (DW) quality standards to evaluate landfill compliance with the Operating Certificate. Groundwater quality exceedances reported at Boundary Compliance Stations are summarized in Table 9-1.

Table 9-1. Groundwater Quality Compliance at Boundary Compliance Stations

Station	General Parameters	Nutrients	Metals	Comments
GW-20-1-1	None	None	Boron (1)	• Boron is interpreted to originate from silicate mineral dissolution and/or changes to redox conditions near the bedrock below Phase 1.
GW-31-1-1	None	Nitrate (2)	None	• Nitrate exceedances are associated with aggregate production and stockpiling at Hartland. The nitrate originates from leaching of ANFO residue.
GW-31-1-2	None	Nitrate (2)	None	
GW-111-1-1	None	Nitrate (2)	None	
GW-111-2-1	None	Nitrate (1)	None	
GW-112-1-1	None	Nitrate (2), Nitrite (1)	Antimony (1)	
GW-112-2-1	None	Nitrate (1)	None	

9.8.3 Surface Water

Five (5) surface water monitoring locations have been identified as compliance monitoring points surrounding the landfill. These stations are concentrated along the southern and northern property boundaries, downgradient of areas that have the potential to be impacted by leachate or aggregate runoff. The surface water quality data were compared to the BCWQG-STA and BCWQG-LTC guidelines to assess compliance with the Landfill Operational Certificate. A summary of water quality guideline exceedances at the compliance monitoring points is provided in Table 9-2.

Table 9-2. Surface Water Quality Compliance at Property Boundary Stations

Station	General Parameters	Nutrients	Metals	Comments
SW-N-05	None	Nitrate (4)	Dissolved Copper (4)	• The TSS and metal concentration exceedances are anticipated to be related to turbid flow conditions following a prolonged dry period. It is unlikely that the elevated TSS and metal concentrations were influenced by landfill activities. • Nitrate exceedances are associated with aggregate production and stockpiling at Hartland. The nitrate originates from leaching of ANFO residue. • Elevated nitrate concentrations at SW-S-04 were attributed to an upstream wetland.
SW-N-16	TSS (2)	Nitrate (4)	Total Aluminum (1), Dissolved Copper (4)	
SW-N-41S1	TSS (1)	None	Dissolved Copper (1)	
SW-S-04	TSS (2)	Nitrate (1)	Total Aluminum (1), Cobalt (2), Iron (2), and Dissolved Copper (4)	
SW-N-55	None	Nitrate (2)	None	

10. Recommendations

Table 10-1 provides a summary of recommendations based on the findings presented in this report.

Table 10-1. Summary of Recommendations

	Leachate Collection System	Status
1	Closely monitor water levels and leachate quality in the North Purge Wells to verify the effectiveness of the leachate collection system. Water levels in well 52-3-0-P52, adjacent to 52-4-0-P7 have slowly increased since 2021/22 and may indicate diminished drawdown and leachate collection in this area. A step test should be conducted on each north purge well to measure the specific capacity, which is an indicator of well performance. All procedures should follow the Standard Operating Procedure (SOP) – North Purge Well Drawdown Cone Verification (AECOM 2016), with interpretation of results by a qualified professional. The results should be compared to historical assessments to determine the need for well rehabilitation.	New
2	Closely monitor water levels and leachate quality in the South Purge Wells to verify the effectiveness of the leachate collection system and identify opportunities for improvements. These wells have not been rehabilitated since they were installed in 2001 and have likely accumulated sediment, diminishing their performance and/or requiring excessive maintenance. Pumping elevations in the South Purge Wells should be maintained at elevations below 140 m asl. Pumping elevations in P1 should be maintained near the bottom of the screened interval around 146 m asl.	Ongoing
3	Groundwater monitoring wells in proximity to the Phase 2 Basin and Northwest Sedimentation Pond should be monitored closely to confirm the hydraulic trap leachate collection system is effectively containing leachate north of Phase 2. Quarrying in the Toutle Valley resulted in greater connection between the groundwater flow system on the west side of the Highland Fault and the Phase 2 hydraulic trap, resulting in lowering of the surrounding groundwater levels. This could lead to enhanced leachate generation.	Ongoing
4	Groundwater elevations around the Cell 4 liner should be monitored closely in 2025/26 to evaluate whether the liner has an impact on the hydraulic trap, particularly beneath the North Ridge. Both wells at monitoring location 113 should be instrumented with pressure transducers to monitor groundwater levels beneath the North Ridge continuously. The volume of groundwater discharge and groundwater quality in the Cell 4 underdrains should be monitored on a monthly basis.	New
	Aggregate Runoff Impacts	
5	Minimize the spatial extent and volume of aggregate stockpiles outside of the leachate collection system. Where this is not feasible, stockpiles should be covered with low permeability temporary tarps to minimize sulphate, ammonia, nitrate, and TSS impacts on downgradient groundwater and surface water quality. Direct runoff from aggregate stockpiles away from natural water courses as it is known to exceed BCWQ guidelines for sulphate and some nitrogenous compounds. This approach proved to be effective for mitigation of historical aggregate impacts at the Hartland North Pad. Aggregate run-off mitigation and control is currently underway by the CRD, and additional measures are being evaluated/planned as part of an overall aggregate management plan.	Ongoing
	Groundwater Monitoring Program	
6	Advance a network of boreholes into the bedrock west of Phase 2 to characterize and monitor groundwater levels and quality. This will also allow for establishment of a long-term groundwater monitoring network west and upslope of Phase 2 to support continued evaluations of hydraulic trap performance and monitor groundwater quality. This is required to monitor the lowering of the water table surrounding Phase 2 following completion of the Phase 2 Quarry. Water levels have dropped significantly over the past several years, and monitoring of the hydraulic trap is critical to confirming landfill performance.	Ongoing
7	An elevated and non-compliant boron concentration was observed at compliance monitoring location GW-20-1-1. Although it is presently thought to originate from bedrock at the north and south end of the Phase 1 landfill, boron concentrations should continue to be monitored at this location. The source of boron should be determined if concentrations continue to increase.	Ongoing
8	Resurvey all of the groundwater wells located within the refuse footprint. These wells are known to settle over time and should be periodically surveyed to ensure the resultant groundwater elevations are accurate	New
9	Leachate mounding should be investigated in Phase 1 and 2 because it has been over five years since they were assessed. It would be useful to construct a new cross section through the Phase 2 landfill to investigate and monitor this issue over time. If required, subsurface data can be obtained by drilling through the refuse to the base of the landfill and investigating leachate levels in new wells. Wells may need to periodically be replaced because the wells tend to shift and become damaged as the refuse settles over time.	New
10	As required by the Amended Operational Certificate, the results of the annual monitoring program should continue to be reviewed and interpreted by a Qualified Professional experienced in assessing the impacts of landfill leachate at large municipal landfills similar to Hartland.	Ongoing
11	Begin recording oxidation-reduction potential (ORP) when sampling groundwater to inform interpretation of oxidation-reduction conditions in different areas of the landfill. This would particularly be helpful for determining the source of boron north of Phase 1.	New
	Surface Water Monitoring	

12	Investigate water quality impacts associated with the application of magnesium lignosulphonate. Understanding the volume of magnesium lignosulphonate used at the Site will be important for determining the potential impact on local groundwater quality. Use of the dust suppressant should be limited to unpaved roads within leachate containment.	Ongoing
13	Repair and enhance the Site weirs so accurate surface water flow measurements can be collected.	Ongoing
14	Improve surface water management north of the Phase 2 landfill to minimize impacts of aggregate runoff on groundwater and surface water that is not captured by the leachate collection system.	Ongoing
Leachate Monitoring		
15	Characterize the chemistry of residual wastewater solids and stabilized biosolids (solids and leachate) to allow for establishment of indicator parameter thresholds and future evaluation of any impacts to leachate chemistry. This information may be available from pilot studies or operational monitoring programs.	Ongoing
16	Investigate the source of chloride in the area south of the landfill. Additional waste has been placed on the western and southern portions of Phase 2 over recent years and occasional leachate seeps and runoff from the truck wash facility have been noted in the past. Changes in activities at the south end of the landfill and management of impacted surface runoff may play a role.	Ongoing
17	Begin collecting quarterly leachate samples from the Lower Lagoon. The Phase 2 Cleanout pump is not operable, so this data is needed to track changes in leachate chemistry as Phase 2 Cell 4/5/6 are developed.	Ongoing
18	In addition to the Sewer Use Criteria, leachate quality results for trace organic compounds and emerging contaminants should be compared to CSR standards to identify parameters in leachate that exceed CSR standards and guide any refinements to the monitoring program in future years.	Ongoing
Construction Management		
19	The placement of aggregate, road salt, dust suppressant and herbicides should be carefully considered and documented to help understand the causes of potential future concentrations of conductivity, ammonia, chloride, nitrate, sulphate and select metals at groundwater and surface water monitoring locations.	Ongoing
Quality Assurance and Quality Control		
20	Quality assurance for laboratory analyses should continue to be evaluated quarterly, and any discrepancies should be resolved with the laboratory and CRD sampling personnel within one month of receiving the laboratory results. The appropriate notation should be added to the data files to explain the reason for the low precision and the steps taken, if any, to improve the sampling or laboratory procedures.	Ongoing

11. Qualifications of the Authors

Matt Martinolich, M.Sc., P.Geo. is a Hydrogeologist/Geochemist with five years of geoscience consulting experience. He has worked in mineral exploration, conducted research at Simon Fraser University, and now practices as a Hydrogeologist/Geochemist. He has been involved in several hydrogeological and geochemical investigations at Hartland landfill over the past four years. Matt performed the data analysis and was the primary author of this report.

Ryan Mills, M.Sc., P.Geo. is a Senior Hydrogeologist with over 23 years of experience interpreting and analyzing hydrogeological and water chemistry data for waste management, water resources, and mining related projects. Ryan has authored several groundwater monitoring reports and conducted numerous site investigations involving drilling and hydrogeologic testing at Hartland since 2004. He has also undertaken site investigations at numerous other municipal, industrial, and small rural landfills throughout British Columbia. Ryan was the senior reviewer of this report.

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Appendix A-1

Monitoring Well Coordinates

Appendix A-1. Monitoring Well Coordinates 2024-2025

AECOM

Station Name	Status	Location		Elevations					Depths				Survey Date	Monitor Class	Area of Landfill	Comments
		Northing (NAD 83)	Easting (NAD 83)	Ground Surface Elevation	Top of Casing Elevation	Top of Piezometer Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Stickup	Borehole Depth Below Ground Surface	Depth to Top of Screen Below Ground Surface	Depth to Bottom of Screen Below Ground Surface		Shallow (S), Intermediate (I), Deep (D)		
		m	m	m ASL	m ASL	m ASL	m ASL	m ASL	m AGL	m BGS	m BGS	m BGS				
GW-04-3-1	Active	5375469.0	466167.8	127.11	128.20	128.09	114.26	111.21	1.05	15.90	12.85	15.90	2005 Mar	I	SP1	
GW-04-4-1	Active	5375466.8	466166.1	127.13	128.08	128.01	122.98	119.93	0.88	7.20	4.15	7.20	2005 Mar	S	SP1	
GW-07-1-0	Active	5375613.3	466177.0	140.60	142.69	142.29	N/A	N/A	1.69	No monitor	No monitor	No monitor	2005 Mar	D	SP1	
GW-09-1-0	Active	5375774.0	466187.0	148.96	150.14	150.14	N/A	N/A	1.18	No monitor	No monitor	No monitor	Historic	D	EP1	
GW-16-1-1	Active	5376345.6	466130.2	143.48	144.28	144.06	101.98	100.48	0.58	43.00	41.50	43.00	2005 Mar	D	EP1	
GW-16-1-2	Active	5376345.6	466130.1	143.48	144.28	144.00	110.98	109.48	0.52	34.00	32.50	34.00	2005 Mar	D	EP1	
GW-16-2-1	Active	5376347.1	466133.7	143.31	144.09	143.67	119.81	118.81	0.36	24.50	23.50	24.50	2005 Mar	I	EP1	
GW-16-2-2	Active	5376347.0	466133.7	143.31	144.09	143.72	129.81	126.81	0.41	16.50	13.50	16.50	2005 Mar	I	EP1	
GW-17-1-1	Active	5376186.4	466198.0	150.99	152.17	152.08	100.49	98.99	1.09	52.00	50.50	52.00	2005 Mar	D	EP1	
GW-17-1-2	Active	5376186.5	466198.0	150.99	152.17	152.11	110.99	109.49	1.12	41.50	40.00	41.50	2005 Mar	D	EP1	
GW-17-1-3	Active	5376186.5	466198.0	150.99	152.17	152.04	136.49	133.29	1.05	17.70	14.50	17.70	2005 Mar	I	EP1	
GW-18-1-1	Active	5375976.5	466194.8	168.81	169.48	168.82	110.64	109.14	0.19	59.67	58.17	59.67	2005 Mar	D	EP1	
GW-18-1-2	Active	5375976.5	466194.7	168.81	169.48	169.33	122.61	121.11	0.52	47.70	46.20	47.70	2005 Mar	D	EP1	
GW-18-2-1	Active	5375973.0	466193.8	168.92	169.68	169.16	138.42	136.92	0.24	32.00	30.50	32.00	2005 Mar	D	EP1	
GW-18-2-2	Active	5375973.0	466193.7	168.92	169.68	169.12	155.92	152.92	0.20	16.00	13.00	16.00	2005 Mar	I	EP1	
GW-19-1-1	Active	5375503.2	466125.3	132.89	133.86	133.85	96.89	95.39	0.96	37.50	36.00	37.50	2005 Mar	D	SP1	
GW-19-1-2	Active	5375503.2	466125.3	132.89	133.86	133.87	106.39	104.89	0.98	28.00	26.50	28.00	2005 Mar	I	SP1	
GW-19-2-1	Active	5375507.6	466124.1	132.60	133.37	133.26	117.10	115.60	0.66	17.00	15.50	17.00	2005 Mar	I	SP1	
GW-19-2-2	Active	5375507.6	466124.1	132.60	133.37	133.32	126.60	123.60	0.72	9.00	6.00	9.00	2005 Mar	S	SP1	
GW-20-1-1	Active	5376498.3	465971.1	110.46	111.32	111.17	80.46	77.46	1.20	33.00	30.00	33.00	2005 Mar	D	NP1	Deactivated in 2010.
GW-20-1-2	Active	5376498.4	465971.0	110.46	111.32	111.19	92.66	89.66	1.21	20.80	17.80	20.80	2005 Mar	I	NP1	
GW-21-1-1	Active	5376483.9	465970.8	110.92	111.79	111.69	98.02	94.92	1.25	16.00	12.90	16.00	2005 Mar	I	NP1	
GW-21-1-2	Active	5376483.9	465970.9	110.92	111.79	111.68	105.42	102.32	1.24	8.60	5.50	8.60	2005 Mar	S	NP1	
GW-21-2-1	Active	5376482.3	465970.0	111.10	111.87	111.80	No log	No log	0.70	NA	NA	NA	2005 Mar	S	NP1	
GW-25-1-1	Active	5376491.7	465713.9	129.91	130.89	130.77	106.91	105.41	0.86	24.50	23.00	24.50	2005 Mar	I	NP2	
GW-25-1-2	Active	5376491.7	465714.0	129.91	130.89	130.78	125.61	123.41	0.87	6.50	4.30	6.50	2005 Mar	S	NP2	
GW-28-1-0	Active	5376503.6	465825.1	136.25	137.07	136.52	N/A	N/A	0.27	NA	NA	NA	2005 Mar	D	NP1	
GW-29-1-1	Active	5376563.3	465898.2	113.39	114.41	114.38	100.28	98.87	0.99	14.52	13.11	14.52	2005 Mar	S	NP1	
GW-29-1-2	Active	5376563.3	465898.3	113.39	114.41	114.39	110.39	105.96	1.00	7.43	3.00	7.43	2005 Mar	S	NP1	
GW-30-1-1	Active	5376562.2	465978.4	109.84	110.89	110.79	95.51	94.10	0.95	15.74	14.33	15.74	2005 Mar	I	NP1	
GW-30-1-2	Active	5376562.3	465978.5	109.84	110.89	110.79	108.56	104.07	0.95	5.77	1.28	5.77	2005 Mar	S	NP1	
GW-31-1-1	Active	5376555.2	466080.9	105.28	106.34	106.26	90.92	89.50	0.98	15.78	14.36	15.78	2005 Mar	I	NP1	
GW-31-1-2	Active	5376555.2	466080.9	105.28	106.34	106.26	103.84	99.41	0.98	5.87	1.44	5.87	2005 Mar	S	NP1	
GW-36-1-1	Active	5376398.9	465778.3	130.21	130.21	131.51	117.87	114.87	1.30	15.34	12.34	15.34	2005 Mar	I	NP2	
GW-36-2-1	Active	5376400.6	465776.5	130.00	131.11	131.07	90.68	87.63	1.07	42.37	39.32	42.37	2005 Mar	D	NP2	
GW-36-3-1	Active	5376401.7	465773.6	130.01	131.01	130.96	115.01	112.01	0.95	18.00	15.00	18.00	2005 Mar	I	NP2	
GW-37-1-1	Active	5376432.6	465725.6	129.59	130.12	129.98	117.35	114.35	0.39	15.24	12.24	15.24	2005 Mar	I	NP2	
GW-37-2-1	Active	5376432.5	465727.8	129.92	130.64	130.60	89.47	86.42	0.68	43.50	40.45	43.50	2005 Mar	D	NP2	
GW-37-3-1	Active	5376435.6	465726.8	129.95	130.75	130.63	119.72	115.15	0.68	14.80	10.23	14.80	2005 Mar	S	NP2	
GW-38-1-1	Active	5376464.6	465797.2	131.90	132.46	132.31	N/A	N/A	0.41	18.29	No monitor	18.29	2005 Mar	I	NP2	
GW-39-1-1	Active	5376467.2	465876.1	129.54	130.24	130.11	111.10	108.10	0.57	21.44	18.44	21.44	2005 Mar	I	NP2	
GW-39-2-1	Active	5376466.3	465874.7	129.75	130.72	130.58	95.56	92.56	0.83	37.19	34.19	37.19	2005 Mar	D	NP2	
GW-40-1-1	Active	5376432.1	465915.2	122.00	122.78	122.68	109.76	106.76	0.68	15.24	12.24	15.24	2005 Mar	I	NP1	
GW-41-1-1	Active	5376852.1	465190.4	149.48	150.30	150.16	143.41	140.41	0.68	9.07	6.07	9.07	2005 Mar	S	HNP	
GW-42-1-1	Active	5376717.6	465534.9	138.81	139.45	139.33	133.02	129.97	0.52	8.84	5.79	8.84	2005 Mar	S	HNP	
GW-43-1-1	Active	5376683.8	465448.7	162.60	163.05	163.10	144.31	141.26	0.50	21.34	18.29	21.34	2007 Apr	I	HNP	
GW-44-1-1	Active	5376671.5	465322.3	161.46	162.02	161.89	153.84	150.79	0.43	10.67	7.62	10.67	2005 Mar	S	HNP	
GW-46-2-1	Active	5376075.5	466029.9	169.97	171.25	171.70	161.69	158.69	1.73	11.28	8.28	11.28	2006 Apr	S	P1	
GW-46-3-1	Active	5376085.7	466035.7	169.83	172.46	172.38	137.83	134.78	2.55	35.05	32.00	35.05	2006 Apr	D	P1	Installed during 2005

Notes:

Datum Description

m BGL	*metres below ground level*
m AGL	*metres above ground level*
m ASL	*metres above mean sea leve*

Monitor Class

S	*Shallow well <15 m deep*
I	*Intermediate well between 15 and 30 m deep*
D	*Deep well >30 m deep*

Area of Landfill

SP1	*South of Phase 1 Landfill*
EP1	*East of Phase 1 Landfill*
NP1	*North of Phase 1 Landfill*
NP2	*North of Phase 2 Landfill*
BKGND - WP2	*Background Water Oualitv West of Phase 2*
HNP	*Hartland North Pad*
P1	*Phase 1*
P2	*Phase 2*

Appendix A-1. Monitoring Well Coordinates 2024-2025

AECOM

Station Name	Status	Location		Elevations					Depths				Survey Date	Monitor Class	Area of Landfill	Comments
		Northing (NAD 83)	Easting (NAD 83)	Ground Surface Elevation	Top of Casing Elevation	Top of Piezometer Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Stickup	Borehole Depth Below Ground Surface	Depth to Top of Screen Below Ground Surface	Depth to Bottom of Screen Below Ground Surface		Shallow (S), Intermediate (I), Deep (D)		
		m	m	m ASL	m ASL	m ASL	m ASL	m ASL	m AGL	m BGS	m BGS	m BGS				
GW-46-4-1	Active	5376078.5	466035.9	169.71	172.10	172.03	151.12	148.07	2.32	21.64	18.59	21.64	2006 Apr	I	P1	Installed during 2005
GW-47-2-1	Active	5375888.1	465996.7	171.84	174.46	174.40	154.78	151.73	2.55	20.11	17.06	20.11	2006 Apr	I	P1	Installed during 2005
GW-48-1-1	Active	5375840.5	466031.3	169.78	171.34	171.63	160.14	157.14	1.85	12.64	9.64	12.64	2006 Apr	S	P1	
GW-48-2-1	Active	537815.8	466031.6	168.87	171.28	171.22	149.97	146.92	2.35	21.95	18.90	21.95	2006 Apr	I	P1	Installed during 2005
GW-51-1-1	Active	5376475.1	466048.2	110.90	111.68	111.76	106.13	103.13	0.86	7.77	4.77	7.77	2005 Mar	S	NP1	
GW-51-2-1	Active	5376474.1	466045.6	110.90	111.83	111.89	100.49	97.49	0.99	13.41	10.41	13.41	2005 Mar	S	NP1	
GW-51-3-1	Active	5376473.3	466042.7	110.97	111.84	111.89	93.85	90.85	0.92	20.12	17.12	20.12	2005 Mar	I	NP1	
GW-52-1-1	Active	5376406.0	465979.1	119.91	120.94	120.90	93.19	90.19	0.99	29.72	26.72	29.72	Historic	I	NP1	
GW-52-2-0	Active	5376391.0	465959.0	119.99	120.65	120.65	N/A	N/A	0.66	NA	NA	NA	Historic	I	NP1	
GW-52-3-0	Active	5376389.9	465948.8	119.8	120.4	120.4	N/A	N/A	0.57	No monitor	No monitor	No monitor	Historic	I	NP1	
GW-52-4-0-P7	Active	5376388.0	465947.0	119.80	120.60	120.60	N/A	N/A	0.80	22.25	No monitor	No monitor	Historic	I	NP1	Purge well
GW-53-1-1	Active	5376506.2	465761.3	130.84	131.81	131.92	114.15	110.88	1.08	19.96	16.69	19.96	2005 Mar	I	NP2	
GW-54-1-1	Active	5376187.7	466226.9	154.63	155.58	155.65	107.91	104.91	1.02	49.72	46.72	49.72	2005 Mar	D	EP1	
GW-54-2-1	Active	5376185.6	466225.5	154.69	155.62	155.66	118.55	115.55	0.97	39.14	36.14	39.14	2005 Mar	D	EP1	
GW-54-3-1	Active	5376183.4	466224.7	154.66	155.50	155.53	138.05	135.05	0.87	19.61	16.61	19.61	2005 Mar	I	EP1	
GW-55-1-1	Active	5376910.6	465136.1	147.67	147.68	148.52	139.06	134.56	0.85	13.11	8.61	13.11	2005 Mar	S	HNP	
GW-56-1-1	Active	5376838.5	465287.8	148.67	149.69	149.61	139.92	131.29	0.94	17.38	8.75	17.38	2005 Mar	I	HNP	
GW-57-1-1	Active	5376873.9	465528.4	132.37	132.99	132.90	122.77	118.81	0.53	13.56	9.60	13.56	2005 Mar	S	HNP	
GW-58-1-0	Active	5376324.8	465822.9	137.17	138.30	138.23	N/A	N/A	1.06	19.20	No monitor	No monitor	2009 May	I	NP2	
GW-60-1-1	Active	5375636.9	466137.2	141.63	142.40	142.32	122.23	119.23	0.69	22.40	19.40	22.40	2005 Mar	I	SP1	
GW-60-2-1	Active	5375638.4	466137.4	141.61	142.46	142.40	129.51	126.51	0.79	15.10	12.10	15.10	2005 Mar	I	SP1	
GW-60-3-1	Active	5375640.0	466137.5	141.74	142.60	142.49	137.84	134.84	0.75	6.90	3.90	6.90	2005 Mar	S	SP1	
GW-61-1-1	Active	5375980.6	465523.1	212.00	213.06	212.95	146.40	143.40	0.95	68.60	65.60	68.60	2005 Mar	D	BKGND - WP2	
GW-62-1-1	Active	5376609.3	465265.5	183.44	184.25	184.25	161.32	159.82	N/A	23.70	22.12	23.62	2008 May	I	HNP	Survey elevations suspect.
GW-62-2-1	Active	5376610.5	465267.3	183.06	183.96	183.96	168.70	165.70	N/A	18.90	14.36	17.36	2008 May	I	HNP	Survey elevations suspect.
GW-63-1-1	Active	5375812.3	465609.5	197.24	198.18	198.09	168.44	165.44	0.85	31.80	28.80	31.80	2005 Mar	I	BKGND - WP2	
GW-63-2-1	Active	5375809.7	465610.5	197.21	198.11	198.03	186.71	183.71	0.82	13.50	10.50	13.50	2005 Mar	S	BKGND - WP2	
GW-71-1-1	Active	5375643.3	466260.6	144.04	144.93	144.82	116.61	113.56	0.81	31.24	27.43	30.48	2005 Mar	D	SP1	
GW-71-2-1	Active	5375644.1	466259.9	144.04	144.92	144.81	127.04	123.98	0.80	20.10	17.00	20.06	2005 Mar	I	SP1	
GW-71-3-1	Active	5375645.3	466259.1	144.05	144.95	144.90	137.04	134.00	0.85	10.10	7.01	10.05	2005 Mar	S	SP1	
GW-72-1-1	Active	5375670.6	466186.6	143.29	144.13	144.03	115.86	112.81	0.79	30.48	27.43	30.48	2005 Mar	D	SP1	
GW-72-2-1	Active	5375671.7	466186.7	143.32	144.09	144.04	126.56	123.20	0.72	20.12	16.76	20.12	2005 Mar	I	SP1	
GW-72-3-1	Active	5375672.7	466186.8	143.38	144.17	144.12	136.06	133.02	0.74	10.36	7.32	10.36	2005 Mar	S	SP1	
GW-73-1-1	Active	5375532.1	466184.1	134.52	135.47	135.31	106.91	103.86	0.86	30.66	27.61	30.66	2005 Mar	D	SP1	
GW-73-2-1	Active	5375533.2	466184.1	134.50	135.40	135.36	117.40	114.38	0.86	20.12	17.10	20.12	2005 Mar	I	SP1	
GW-73-3-1	Active	5375534.3	466184.1	134.48	135.37	135.31	127.46	124.42	0.83	10.06	7.02	10.06	2005 Mar	S	SP1	
GW-75-1-1	Active	5376207.5	466035.3	154.82	155.62	155.97	127.72	121.72	1.15	33.10	27.10	33.10	2007 Apr	D	P1	
GW-76-1-1	Active	5375966.0	466228.4	171.08	171.79	171.69	123.23	117.13	0.61	61.90	47.85	53.95	2005 Mar	D	EP1	
GW-76-2-1	Active	5375967.5	466227.1	171.00	171.77	171.66	133.81	127.72	0.66	43.60	37.19	43.28	2005 Mar	D	EP1	
GW-76-3-1	Active	466226.0	5375968.8	171.0	171.8	171.7	145.1	142.0	0.72	29.00	25.91	28.96	2005 Mar	I	EP1	
GW-77-1-1	Active	5376487.8	465536.8	155.04	155.66	155.63	120.60	117.55	0.59	40.26	34.44	37.49	2006 Apr	D	NP2	Installed in 2006
GW-77-2-1	Active	5376485.8	465536.2	154.90	155.51	155.45	139.16	135.87	0.55	20.67	15.74	19.03	2006 Apr	I	NP2	Installed in 2006
GW-80-1-0-P8	Active	5376397.4	465931.0	119.61	120.29	N/A	N/A	N/A	N/A	20.42	No monitor	No monitor	2008 May	I	NP1	Purge well
GW-81-1-0-P9	Active	5376409.0	465910.8	122.17	122.85	N/A	N/A	N/A	N/A	26.82	No monitor	No monitor	2008 May	I	NP1	Installed in 2007
GW-82-1-1	Active	5376257.5	465772.7	154.67	155.89	155.86	135.17	131.50	1.18	23.77	19.50	23.17	2009 May	I	P2	Installed in 2007
GW-83-1-1	Active	5376353.3	465723.8	140.09	141.40	141.44	124.97	121.92	1.35	18.90	15.12	18.17	2009 May	I	P2	Installed in 2007
GW-85-1-1	Active	5375688.3	466068.7	149.09	150.09	150.07	142.99	139.95	0.98	9.14	6.1	9.14	2009 May	S	SP1	Installed in March 2009
GW-87-1-1	Active	5376451.7	465243.4	182.32	183.22	183.16	147.62	144.52	0.84	37.80	34.70	37.80	2015 Feb	D	NP2	Installed in 2014

Notes:

Datum Description

m BGL	*metres below ground level*
m AGL	*metres above ground level*
m ASL	*metres above mean sea leve*

Monitor Class

S	*Shallow well <15 m deep*
I	*Intermediate well between 15 and 30 m deep*
D	*Deep well >30 m deep*

Area of Landfill

SP1	*South of Phase 1 Landfill*
EP1	*East of Phase 1 Landfill*
NP1	*North of Phase 1 Landfill*
NP2	*North of Phase 2 Landfill*
BKGND - WP2	*Background Water Oualitv West of Phase 2*
HNP	*Hartland North Pad*
P1	*Phase 1*
P2	*Phase 2*

Appendix A-1. Monitoring Well Coordinates 2024-2025

Station Name	Status	Location		Elevations					Depths				Survey Date	Monitor Class	Area of Landfill	Comments
		Northing (NAD 83)	Easting (NAD 83)	Ground Surface Elevation	Top of Casing Elevation	Top of Piezometer Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Stickup	Borehole Depth Below Ground Surface	Depth to Top of Screen Below Ground Surface	Depth to Bottom of Screen Below Ground Surface		Shallow (S), Intermediate (I), Deep (D)		
		m	m	m ASL	m ASL	m ASL	m ASL	m ASL	m AGL	m BGS	m BGS	m BGS				
GW-87-2-1	Active	5376453.8	465242.8	182.36	183.26	183.24	165.56	162.56	0.88	21.90	16.80	19.80	2015 Feb	I	NP2	Installed in 2014
GW-88-1-1	Active	5376467.2	465271.7	181.47	182.24	182.16	138.77	135.77	0.69	45.70	42.70	45.70	2015 Feb	D	NP2	Installed in 2014
GW-88-2-1	Active	5376470.1	465271.9	181.29	182.16	182.10	168.49	165.49	0.81	16.80	12.80	15.80	2015 Feb	I	NP2	Installed in 2014
GW-89-1-1	Active	5376028.4	466043.4	169.25	169.45	169.45	138.62	135.57	0.19	30.18	30.63	33.68	2018 Dec	D	P1	Installed in 208
GW-89-2-1	Active	5376026.8	466048.7	169.141	169.34	169.34	149.48	146.43	0.20	19.05	19.66	22.71	2018 Dec	I	P1	Installed in 2018
GW-90-1-1	Active	5376286.6	465651.3	151.876	152.69	152.69	118.34	115.30	0.81	38.40	33.54	36.58	2019 Oct	D	P2	leachate mound monitoring well
GW-90-2-1	Active	5376286.8	465652.3	152.00	152.75	152.75	136.84	133.79	0.75	14.94	15.16	18.21	2018 Dec	I	P2	leachate mound monitoring well
GW-91-1-1	Active	5376604.9	465473.7	164.61	165.33	165.33	149.01	145.97	0.72	18.64	15.60	18.64	2019 Nov	I	HNP	Installed in 2019
GW-92-1-1	Active	5376535.4	465501.9	167.68	168.57	168.57	147.76	144.72	0.88	22.96	19.92	22.96	2019 Nov	I	HNP	Installed in 2019
GW-94-1-1	Active	5376508.8	465129.5	203.65	204.32	204.32	163.87	160.83	0.67	42.82	39.78	42.82	2019 Dec	D	HNP	Installed in 2019
GW-95-1-1	Active	5376518.9	465698.3	128.44	129.36	129.36	126.00	124.48	0.92	4.84	2.44	3.96	2022 Apr	S	NP2	Installed in April 2022
GW-96-1-1	Active	5376510.3	465695.6	129.49	130.45	130.45	127.05	125.53	0.95	4.43	2.44	3.96	2022 Apr	S	NP2	Installed in April 2022
GW-97-1-1	Active	5376503.5	465719.6	129.12	130.00	130.00	125.16	122.11	0.88	7.95	3.96	7.01	2022 Apr	S	NP2	Installed in April 2022
GW-98-1-1	Active	5376501	465698.7	130.41	131.30	131.30	125.84	122.79	0.90	8.54	4.57	7.62	2022 Apr	S	NP2	Installed in April 2022
GW-104-1-1	Active	5376438.121	465666.3	135.52	135.46	135.46	129.36	127.84	-0.06	7.62	6.10	7.62	2022 Aug	S	NP2	Installed in August 2022
GW-108-1-1	Active	5376441.45	465701.6	129.80	130.69	130.69	119.26	116.21	0.89	15.24	11.43	14.48	2022 Aug	D	NP2	Installed in August 2022
GW-109-1-1	Active	5376390.117	465635.3	134.14	134.91	134.91	123.94	122.41	0.77	13.11	10.97	12.50	2022 Aug	S	NP2	Installed in August 2022
GW-111-1-1	Active	5376497.8	466422.4	98.60	99.40	99.30	84.10	82.60	0.80	16.00	14.50	16.00	2024 Sept	D	NP2	Installed in September 2024
GW-111-2-1	Active	5376499.7	466420.8	98.60	99.40	99.30	94.80	91.80	0.80	6.90	3.80	6.80	2024 Sept	S	NP2	Installed in September 2024
GW-112-1-1	Active	5376255.4	466450.9	117.70	118.50	118.40	99.80	98.30	0.80	19.50	17.90	19.40	2024 Sept	D	NP1	Installed in September 2024
GW-112-2-1	Active	5376256.4	466449.7	117.70	118.50	118.40	114.20	111.20	0.80	6.70	3.50	6.50	2024 Sept	S	NP1	Installed in September 2024
GW-113-1-1	Active	5376506.1	465451.7	165.40	166.20	166.10	128.70	125.70	0.80	40.00	36.70	39.70	2024 Sept	D	NP1	Installed in September 2024
GW-113-2-1	Active	5376505.7	465450.4	165.60	166.40	166.30	148.90	145.90	0.80	20.00	16.70	19.70	2024 Sept	S	NP1	Installed in September 2024
VLGW-02-D	Active	5375782.7	465984.2	168.58	168.93	168.79	155.58	151.58	0.21	22.00	13.00	17.00	2008 May	I	P1	Landfill gas well
VLGW-03-D	Active	5375776.6	465933.6	170.04	170.30	170.30	156.29	153.29	0.26	17.00	13.75	16.75	2014 Feb	I	P1	Landfill gas well
VLGW-04-D	Active	5375858.1	466056.5	169.24	169.95	169.90	156.24	152.24	0.65	19.00	13.00	17.00	2008 May	I	P1	Landfill gas well
VLGW-08-D	Active	5376088.1	466113.6	164.42	165.28	165.14	147.41	137.38	0.72	28.04	17.01	27.04	2008 May	I	P1	Landfill gas well
VLGW-11-S	Active	5375996.8	466122.6	166.06	166.53	166.48	160.42	155.78	0.42	11.28	5.64	10.28	2008 May	I	P1	Landfill gas well
VLGW-15-D	Active	5375842.9	465997.0	170.61	171.13	171.07	156.41	148.21	0.46	23.31	14.2	22.4	2008 May	D	P1	Landfill gas well
VLGW-16-D	Active	5375901.0	466011.3	172.47	173.38	173.31	157.02	147.48	0.84	25.90	15.45	24.99	2008 May	I	P1	Landfill gas well
VLGW-17-D	Active	5375959.1	466025.5	171.40	171.81	171.77	157.20	144.28	0.37	28.04	14.2	27.12	2008 May	D	P1	Landfill gas well
VLGW-18-D	Active	5376017.5	466039.7	170.14	170.78	170.61	152.94	141.80	0.47	29.25	17.2	28.34	2008 May	D	P1	Landfill gas well
VLGW-19-D	Active	5376076.2	466054.1	168.80	169.53	169.21	151.60	141.37	0.42	28.34	17.2	27.43	2008 May	I	P1	Landfill gas well
VLGW-20-D	Active	5376131.2	466062.8	167.88	169.05	168.93	148.03	140.76	1.05	28.04	19.85	27.12	2008 May	I	P1	Landfill gas well
VLGW-21-D	Active	5376177.2	466082.0	164.81	165.40	165.30	147.89	140.43	0.49	25.93	16.92	24.38	2008 May	I	P1	Landfill gas well
VLGW-26-D	Active	5376165.6	466022.9	163.94	164.57	164.45	145.50	136.82	0.51	28.04	18.44	27.12	2008 May	D	P1	Landfill gas well
P1	Active	5375732.0	466026.0	157.60	158.17	158.17	151.50	145.41	0.57	12.50	6.10	12.19	2018 Dec	S	P1	Purge well, to replace the old well installed in 2005
P2	Active	5375733.3	466030.9	157.37	158.72	158.62	146.87	132.37	1.25	25.00	10.5	25	2005 Mar	I	P1	Purge well
P3	Active	5375739.0	466056.7	157.25	158.51	158.41	143.18	132.25	1.16	25.00	14.07	25	2005 Mar	I	P1	Purge well
P4	Active	5375751.7	466064.7	157.73	158.88	158.78	146.21	132.73	1.05	25.00	11.52	25	2005 Mar	I	P1	Purge well
P10	Active	5375731.5	466023.5	157.89	N/A	158.01	144.79	129.89	0.12	28.00	13.1	28	2010 Oct	I	P1	Purge well
P11	Active	5376434.0	465685.9	135.01	135.69	135.69	134.33	117.94	0.68	17.07	13.87	16.51	2022 Aug	D	NP2	Installed in August 2022
P12	Active	5376418.0	465702.6	135.22	135.86	135.86	134.58	116.47	0.64	18.75	13.56	14.78	2022 Aug	D	NP2	Installed in August 2022

Notes:

Datum Description

m BGL	*metres below ground level*
m AGL	*metres above ground level*
m ASL	*metres above mean sea leve*

Monitor Class

S	*Shallow well <15 m deep*
I	*Intermediate well between 15 and 30 m deep*
D	*Deep well >30 m deep*

Area of Landfill

SP1	*South of Phase 1 Landfill*
EP1	*East of Phase 1 Landfill*
NP1	*North of Phase 1 Landfill*
NP2	*North of Phase 2 Landfill*
BKGND - WP2	*Backaround Water Oualitv West of Phase 2*
HNP	*Hartland North Pad*
P1	*Phase 1*
P2	*Phase 2*

Appendix A-1. Monitoring Well Coordinates 2024-2025

Station Name	Status	Location		Elevations					Depths				Survey Date	Monitor Class	Area of Landfill	Comments
		Northing (NAD 83)	Easting (NAD 83)	Ground Surface Elevation	Top of Casing Elevation	Top of Piezometer Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Stickup	Borehole Depth Below Ground Surface	Depth to Top of Screen Below Ground Surface	Depth to Bottom of Screen Below Ground Surface		Shallow (S), Intermediate (I), Deep (D)		
		m	m	m ASL	m ASL	m ASL	m ASL	m ASL	m AGL	m BGS	m BGS	m BGS				
VLGW-01-D	Inactive	5375802.0	466040.8	168.25	168.86	168.79	163.25	156.25	0.54	14.00	5.00	12.00	2008 May	I	P1	Landfill gas well
GW-01-1-1	Inactive	5375781.9	465852.0			168.56				55.54	42	44.5				
GW-01-1-2	Inactive	5375781.9	465852.0			168.53				40.10	24.4	24.8				
GW-01-1-3	Inactive	5375781.9	465852.0			168.53				29.53	13	14.75				
GW-01-2-1	Inactive	5375787.9	465859.0			168.25				20.50	4.7	5.1				
GW-01-3-1	Inactive	5375791.9	465851.0			167.81				21.02	5.11	5.91				
GW-02-1-1	Inactive	5375813.9	465996.0			166.90				48.58	33	33.5				
GW-02-1-2	Inactive	5375813.9	465996.0			166.90				39.29	23	24.6				
GW-02-1-3	Inactive	5375813.9	465996.0			166.90				28.79	12.2	13.8				
GW-02-2-1	Inactive	5375812.9	465990.0			167.14				22.53	6.25	7.5				
GW-03-1-1	Inactive	5375684.9	466042.0	147.41	148.21	148.05	122.91	122.21	0.64	26.03	24.5	25.2				
GW-03-1-2	Inactive	5375684.9	466042.0	147.41	148.21	148.05	134.11	133.61	0.64	16.33	13.3	13.8				
GW-03-1-3	Inactive	5375684.9	466042.0	147.41	148.21	148.05	143.41	141.61	0.64	7.03	4	5.8				
GW-03-2-1	Inactive	5375685.5	466037.7	149.20	150.01	149.28	145.15	142.10	0.08	7.10	4.05	7.1	2005 Mar	S	SP1	
GW-04-1-1	Inactive	5375464.0	466171.0	126.67	128.12	128.07	96.47	95.77	1.40	32.00	30.2	30.9				
GW-04-1-2	Inactive	5375464.0	466171.0	126.67	128.12	128.07	104.27	103.67	1.40	24.10	22.4	23				
GW-04-1-3	Inactive	5375464.0	466171.0	126.67	128.12	128.07	116.67	115.07	1.40	11.60	10	11.6				
GW-04-1-4	Inactive	5375464.0	466171.0	126.67	128.12	128.07	122.97	121.27	1.40	6.10	3.7	5.4				
GW-04-2-1	Inactive	5375468.5	466169.3	127.14	127.95	127.86	107.49	104.44	0.75	22.70	19.65	22.70	2005 Mar	I	SP1	
GW-05-1-1	Inactive	5376444.9	465813.9	126.29	127.49	127.49	112.59	110.59	1.20	16.90	13.7	15.7				
GW-05-1-2	Inactive	5376444.9	465813.9	126.29	127.49	127.49	118.69	116.69	1.20	10.80	7.6	9.6				
GW-05-1-3	Inactive	5376444.9	465813.9	126.29	127.49	127.49	122.89	121.89	1.20	5.60	3.4	4.4				
GW-05-2-1	Inactive	5376426.9	465774.9	126.00	126.80	126.80	125.20	124.20	0.80	2.60	0.8	1.8				
GW-06-1-1	Inactive	5376148.9	465661.9	127.70	128.41	128.40	107.00	104.90	0.70	23.50	20.7	22.8				
GW-06-1-2	Inactive	5376148.9	465661.9	127.70	128.41	128.40	115.20	113.20	0.70	15.20	12.5	14.5				
GW-06-1-3	Inactive	5376148.9	465661.9	127.70	128.41	128.40	120.80	118.80	0.70	9.60	6.9	8.9				
GW-06-2-1	Inactive	5376151.9	465669.9	127.46	127.76	127.76	125.86	124.86	0.30	2.90	1.6	2.6				
GW-08-1-1	Inactive	5375867.9	465738.0	159.26	160.28	160.26	145.86	143.76	1.00	16.50	13.4	15.5				
GW-08-1-2	Inactive	5375867.9	465738.0	159.26	160.28	160.26	152.11	150.11	1.00	10.15	7.15	9.15				
GW-08-1-3	Inactive	5375867.9	465738.0	159.26	160.28	160.26	156.76	155.76	1.00	4.50	2.5	3.5				
GW-10-1-1	Inactive	5376108.9	465701.9	135.11	135.41	135.41	133.61	132.61	0.30	2.80	1.5	2.5				
GW-11-1-1	Inactive	5376254.9	465770.9	134.13	135.13	135.13	131.23	130.23	1.00	4.90	2.9	3.9				
GW-12-1-0	Inactive	5375701.0	466189.0	143.02	143.82	143.82	N/A	N/A	0.80	3.40	No monitor	No monitor	Historic	S	SP1	Dug well, deactivated in 2010
GW-13-1-1	Inactive	5376166.9	466031.9	150.43	152.73	152.73	121.93	118.93	2.30	33.80	28.5	31.5				
GW-13-1-2	Inactive	5376166.9	466031.9	150.43	152.73	152.73	126.83	125.33	2.30	27.40	23.6	25.1				
GW-14-1-1	Inactive	5375968.9	465969.9	158.73	160.22	160.22	138.53	135.53	1.49	24.69	20.2	23.2				
GW-15-1-1	Inactive	5375754.9	466007.0	159.78	160.82	160.82	145.68	143.38	1.04	17.44	14.1	16.4				
GW-22-1-1	Inactive	5376290.1	465751.7	138.54	138.81	139.86	111.22	109.69	1.32	28.09	27.32	28.85				
GW-23-1-1	Inactive	5376260.7	465718.7	128.37	129.52	129.50	111.51	110.09	1.13	17.57	16.86	18.28				
GW-23-1-2	Inactive	5376260.7	465718.7	128.37	129.52	129.49	124.67	121.80	1.12	5.14	3.7	6.57				
GW-24-1-1	Inactive	5376421.9	465753.0	127.77	128.88	128.88	109.91	108.51	1.11	18.56	17.86	19.26				
GW-24-1-2	Inactive	5376421.9	465753.0	127.77	128.88	128.87	124.10	121.26	1.10	5.09	3.67	6.51				
GW-26-1-1	Inactive	5376319.8	465596.6	128.22	129.16	129.12	109.79	111.20	0.90	17.73	18.43	17.02				
GW-26-1-2	Inactive	5376319.8	465596.6	128.22	129.16	129.12	124.36	121.52	0.90	5.28	3.86	6.7				
GW-27-1-1	Inactive	5376358.2	465455.8	141.09	141.91	141.57	118.09	116.59	0.48	24.50	23.00	24.50	2005 Mar	I	BKGND - WP2	
GW-27-1-2	Inactive	5376358.2	465455.7	141.09	141.91	141.56	140.59	137.59	0.47	3.50	0.50	3.50	2005 Mar	S	BKGND - WP2	Destoryed in summer 2022
GW-32-1-1	Inactive	5376129.7	465569.9	165.41	166.44	166.34	123.85	122.44	0.93	42.27	41.56	42.97				
GW-32-1-2	Inactive	5376129.7	465569.9	165.41	166.44	166.37	157.93	152.04	0.96	10.43	7.48	13.37				

Notes:

Datum Description

m BGL	*metres below ground level*
m AGL	*metres above ground level*
m ASL	*metres above mean sea leve*

Monitor Class

S	*Shallow well <15 m deep*
I	*Intermediate well between 15 and 30 m deep*
D	*Deep well >30 m deep*

Area of Landfill

SP1	*South of Phase 1 Landfill*
EP1	*East of Phase 1 Landfill*
NP1	*North of Phase 1 Landfill*
NP2	*North of Phase 2 Landfill*
BKGND - WP2	*Background Water Quality West of Phase 2*
HNP	*Hartland North Pad*
P1	*Phase 1*
P2	*Phase 2*

Appendix A-1. Monitoring Well Coordinates 2024-2025

Station Name	Status	Location		Elevations					Depths				Survey Date	Monitor Class	Area of Landfill	Comments
		Northing (NAD 83)	Easting (NAD 83)	Ground Surface Elevation	Top of Casing Elevation	Top of Piezometer Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Stickup	Borehole Depth Below Ground Surface	Depth to Top of Screen Below Ground Surface	Depth to Bottom of Screen Below Ground Surface		Shallow (S), Intermediate (I), Deep (D)		
		m	m	m ASL	m ASL	m ASL	m ASL	m ASL	m AGL	m BGS	m BGS	m BGS				
GW-33-1-1	Inactive	5376296.5	465627.4	124.55	123.43	124.54	111.11	109.69	-0.01	14.15	13.44	14.86				
GW-33-1-2	Inactive	5376296.5	465627.4	124.55	123.43		N/A	N/A	-124.55		no monitor	no monitor				
GW-34-1-1	Inactive	5376216.8	465668.4	119.47			104.64	101.64	-119.47		14.83	17.83				
GW-34-2-1	Inactive	5376214.9	465668.9	119.67			115.97	112.97	-119.67		3.7	6.7				
GW-35-1-1	Inactive	5376207.9	465677.3	120.19			108.29	105.29	-120.19		11.9	14.9				
GW-35-1-2	Inactive	5376207.0	465675.9	120.33			117.13	114.13	-120.33		3.2	6.2				
GW-45-1-1	Inactive	5376163.1	466106.3	162.37			143.71	140.71	-162.37		18.66	21.66				
GW-46-1-1	Inactive	5376078.3	466029.2	170.48	171.65	171.96	140.68	134.68	1.48		29.8	35.8				
GW-47-1-1	Inactive	5375918.3	465992.6	174.85	177.24	177.37	155.09	152.09	2.52	22.55	19.76	22.758	2008 May	I	P1	
GW-49-1-0	Inactive	5376759.5	465218.7	160.00	159.81	159.81	N/A	N/A	-0.19	62.20						
GW-50-1-1	Inactive	5376480.9	466193.4	119.37	120.41	120.43	105.47	102.47	1.06	16.90	13.9	16.9	2005 Mar	I	EP1	
GW-59-1-1	Inactive	5376254.5	465636.2	125.62	126.40	126.40	113.72	112.22	0.78	13.40	11.9	13.4				
GW-64-1-1	Inactive	5375855.0	465849.0	172.00		172.78	156.20	154.50	0.78	17.50	15.8	17.5				
GW-65-1-1	Inactive	5375831.0	465820.0	172.09		172.79	159.79	153.69	0.70	18.40	12.3	18.4				
GW-66-1-1	Inactive	5376088.0	465902.0	164.23		165.08	157.03	150.93	0.85	13.30	7.2	13.3				
GW-67-1-1	Inactive	5376256.2	465774.0	155.85	N/A	157.55	133.95	127.85	1.70	28.00	21.90	28.00	2005 Mar	I	P2	Destroyed. Replaced by GW-82-1-1
GW-67-2-1	Inactive	5376256.2	465774.0	155.85		157.55	133.95	127.85	1.70	28.00	21.9	28	2005 Mar	I	P2	
GW-68-1-1	Inactive	5376353.0	465718.0	141.56		142.74	130.36	124.26	1.18	17.30	11.2	17.3				
GW-68-2-1	Inactive	5376353.0	465718.0	141.56	N/A	142.29	123.76	120.76	0.73	20.80	17.80	20.80	Historic	I	P2	Destroyed. Replaced by GW-83-1-1
GW-69-1-1	Inactive	5376267.6	465665.8	140.64		142.50	127.64	121.54	1.86	19.10	13	19.1	2005 Mar	I	P2	
GW-69-2-1	Inactive	5376269.9	465667.0	140.67		142.11	121.67	115.67	1.44	25.20	19	25	2005 Mar	I	P2	
GW-70-1-1	Inactive	5376019.0	465891.0	167.00		167.59	149.50	143.40	0.59	23.60	17.5	23.6				
GW-74-1-1	Inactive	5376013.43	466018.38	170.94	171.56	171.60	138.04	132.04	0.66	38.90	32.90	38.90	2007 Apr	D	P1	
GW-74-2-1	Inactive	5376021.60	466032.50	170.29	172.25	172.40	153.19	150.19	2.11	20.10	17.10	20.10	2006 Apr	I	P1	Installed during 2005
GW-78-1-1	Inactive	5376498.8	465648.8	142.66	143.46	143.38	113.46	110.18	0.72	33.79	29.20	32.48	2006 Apr	D	NP2	Installed in 2006
GW-78-2-1	Inactive	5376500.3	465646.7	142.59	143.40	143.36	132.42	129.14	0.77	14.11	10.17	13.45	2006 Apr	S	NP2	Installed in 2006
GW-79-1-1	Inactive	5376522.5	465404.3	182.87	183.63	183.59	147.82	144.77	0.72	39.62	35.05	38.10	2007 Apr	D	NP2	Installed during 2007, decommissioned in May 2018
GW-79-2-1	Inactive	5376521.9	465403.1	182.96	183.69	183.59	157.05	154.00	0.64	30.48	25.91	28.96	2007 Apr	I	NP2	Installed during 2007, decommissioned in May 2018
GW-84-1-1	Inactive	5376225.9	465646.9	158.20	158.86	158.79	120.64	117.58	0.59	27.74	37.56	40.62	2009 Feb	I	P2	Installed during 2007
GW-84-2-1	Inactive	5376224.8	465648.5	158.43	159.06	161.36	133.14	130.09	2.93	15.24	25.29	28.34	2009 Feb	S	P2	Installed during 2007
GW-86-1-1	Inactive	5376228.4	465651.4	160.55	N/A	N/A	N/A	N/A	N/A	42.98	N/A	N/A	2010 October	D	P2	SG piezo - 42.42 mBGS
GW-86-1-2	Inactive	5376228.4	465651.4	160.55	N/A	N/A	N/A	N/A	N/A	42.98	N/A	N/A	2010 October	I	P2	SG piezo - 20.85 mBGS
GW-86-2-1	Inactive	5376224.8	465651.8	160.55	N/A	N/A	N/A	N/A	N/A	30.78	N/A	N/A	2010 October	D	P2	SG piezo - 29.69 mBGS
GW-86-2-2	Inactive	5376224.8	465651.8	160.55	N/A	N/A	N/A	N/A	N/A	30.78	N/A	N/A	2010 October	I	P2	SG piezo - 8.67 mBGS
GW-93-1-1	Inactive	5376556.5	465260.0	183.42	184.24	184.24	159.34	156.29	0.83	28.04	24.08	27.13	2019 Nov	D	HNP	Installed in 2019
GW-99-1-1	Inactive	5376427.6	465668.9	135.40	135.30	135.30	132.96	131.44	-0.10	3.88	2.44	3.96	2022 Apr	S	NP2	Installed in April 2022
GW-100-1-1	Inactive	5376419.7	465668.6	135.50	135.44	135.44	130.01	128.49	-0.06	7.02	5.49	7.01	2022 Apr	S	NP2	Installed in April 2022
GW-101-1-1	Inactive	5376414	465669.1	135.46	135.33	135.33	129.97	126.93	-0.12	8.51	5.49	8.53	2022 Apr	S	NP2	Installed in April 2022
GW-102-1-1	Inactive	5376399.4	465663.5	134.46	135.01	135.01	129.89	128.36	0.56	6.65	5.47	6.10	2022 Apr	S	NP2	Installed in April 2022, decomissioned in Q3 2022
GW-103-1-1	Inactive	5376400.9	465626.0	135.74	136.67	136.67	129.95	128.42	0.92	8.25	5.79	7.32	2022 Apr	S	NP2	Installed in April 2022
GW-105-1-1	Inactive	5376431.992	465673.0	135.51	135.42	135.42	126.58	123.53	-0.09	12.19	8.84	11.89	2022 Aug	I	NP2	Installed in August 2022
GW-106-1-1	Inactive	5376423.369	465679.7	135.43	135.34	135.34	123.15	121.62	-0.09	13.72	12.19	13.72	2022 Aug	I	NP2	Installed in August 2022
GW-107-1-1	Inactive	5376417.266	465684.4	135.54	135.40	135.40	121.88	120.35	-0.14	16.76	13.52	15.05	2022 Aug	D	NP2	Installed in August 2022
GW-107-1-2	Inactive	5376417.266	465684.4	135.54	135.43	135.43	129.33	128.27	-0.11	16.76	6.10	7.16	2022 Aug	S	NP2	Installed in August 2022
GW-110-1-1	Inactive	5376365.13	465593.6	137.61	138.32	138.32	134.21	132.68	0.71	5.94	4.11	5.64	2022 Aug	S	NP2	Installed in August 2022
P5	Inactive	5375775.2	466079.9	158.35	159.46	159.36	144.43	133.35	1.01	25.00	13.92	25	2005 Mar	I	P1	Purge well
P6	Inactive	5375803.6	466098.0	159.88	161.65	161.55	147.74	134.88	1.67	25.00	12.14	25	2005 Mar	I	P1	Purge well

Notes:

Datum Description

m BGL — *metres below ground level*
m AGL — *metres above ground level*
m ASL — *metres above mean sea leve*

Monitor Class

S — *Shallow well <15 m deep*
I — *Intermediate well between 15 and 30 m deep*
D — *Deep well >30 m deep*

Area of Landfill

SP1 — *South of Phase 1 Landfill*
EP1 — *East of Phase 1 Landfill*
NP1 — *North of Phase 1 Landfill*
NP2 — *North of Phase 2 Landfill*
BKGND - WP2 — *Backgroung Water Quality West of Phase 2*
HNP — *Hartland North Pad*
P1 — *Phase 1*
P2 — *Phase 2*

AECOM

Appendix A-2

Groundwater Monitoring Plan

Appendix A-2. Groundwater Monitoring Plan 2024-2025

Station Name	Status	Pipe Diameter (mm)	Groundwater Quality Samples		Groudwater Level Measurements		Development Method	Sampling Method	Comments
			Quarterly (4/yr)	Bi-annual (2/yr)	Manual measurement (4/yr)	Pressure transducer (continuous)			
GW-04-2-1	Active	50			Y		NA	NA	Dedicated submersible pump installed January 2012. Well recharges very slowly since 2014, so it is no longer sampled.
GW-04-3-1	Active	50	Y		Y		footvalve	footvalve	Submersile pump removed. Sampled using waterra from May 2019 onwards.
GW-04-4-1	Active	50	Y		Y		footvalve	footvalve	
GW-09-1-0	Active	150			Y		NA	NA	Sampling discontinued in 2010 due to outdated pump and redundancy. Water levels only.
GW-16-1-1	Active	50		Y	Y		footvalve	footvalve	
GW-16-1-2	Active	50		Y	Y		footvalve	footvalve	
GW-16-2-1	Active	50		Y	Y		footvalve	footvalve	
GW-16-2-2	Active	50		Y	Y		footvalve	footvalve	
GW-17-1-1	Active	50		Y	Y	Y	footvalve	footvalve	Pressure transducer installed in March 2019.
GW-17-1-2	Active	50		Y	Y		footvalve	footvalve	
GW-17-1-3	Active	50		Y	Y		footvalve	footvalve	
GW-18-1-1	Active	50	Y		Y	Y	sample pump	footvalve	Dedicated submersible pump installed May 2009, failed in September and November 2018. Pressure transducer installed in March 2019.
GW-18-1-2	Active	50			Y		sample pump	sample pump	Pump damaged and stuck in well since 2004. Not sampled, only water levels.
GW-18-2-1	Active	50	Y		Y		footvalve	footvalve	
GW-18-2-2	Active	50	Y		Y		footvalve	footvalve	
GW-19-1-1	Active	50	Y		Y		footvalve	footvalve	19-1-1 sometimes flows artesian.
GW-19-1-2	Active	50	Y		Y		footvalve	footvalve	19-1-2 sometimes flows artesian.
GW-19-2-1	Active	50	Y		Y		footvalve	footvalve	19-2-1 sometimes flows artesian.
GW-19-2-2	Active	50	Y		Y		footvalve	footvalve	
GW-20-1-1	Active	50	Y		Y		sample pump	footvalve	Dedicated submersible pump installed January 2012. Pump ceased functioning in Nov 2019
GW-20-1-2	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2012. Recharges completely in under 1 hour
GW-21-1-1	Active	50	Y		Y		sample pump	footvalve	Dedicated submersible pump installed January 2012. Pump replaced with waterra.
GW-21-1-2	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2012.
GW-21-2-1	Active	50	Y		Y		footvalve	footvalve	
GW-25-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-25-1-2	Active	50	Y		Y		footvalve	footvalve	
GW-28-1-0	Active	150	Y		Y		sample pump	sample pump	Open borehole. Dedicated submersible pump installed January 2011.
GW-29-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-29-1-2	Active	50	Y		Y		footvalve	footvalve	
GW-30-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-30-1-2	Active	50	Y		Y		footvalve	footvalve	30-1-2 almost dry in summer, bailer used occasionally.
GW-31-1-1	Active	50		Y	Y		footvalve	footvalve	
GW-31-1-2	Active	50		Y	Y		footvalve	footvalve	
GW-36-1-1	Active	50				Y	NA	NA	Pressure transducer installed June 1997 records water levels continuously.
GW-36-2-1	Active	50			Y		footvalve	footvalve	
GW-36-3-1	Active	50	Y		Y		footvalve	footvalve	
GW-37-1-1	Active	50				Y	NA	NA	Pressure transducer installed June 1997 records water levels continuously.
GW-37-2-1	Active	50			Y		footvalve	footvalve	
GW-37-3-1	Active	50	Y		Y		footvalve	footvalve	
GW-38-1-1	Active	50	Y		Y		footvalve	footvalve	Recharges very slowly, 48 hours required after purging to sample.
GW-39-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-39-2-1	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2011.
GW-40-1-1	Active	50	Y		Y	Y	footvalve	footvalve	Pressure transducer installed in September 2008 records water levels continuously.
GW-41-1-1	Active	50	Y		Y	Y	footvalve	footvalve	Pressure transducer installed in May 2018.
GW-42-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-43-1-1	Active	50	Y		Y	Y	footvalve	footvalve	Pressure transducer installed in May 2018.
GW-44-1-1	Active	50	Y		Y	Y	footvalve	footvalve	Pressure transducer installed in May 2018.
GW-46-2-1	Active	50			Y		NA	NA	
GW-46-3-1	Active	50			Y		NA	NA	
GW-46-4-1	Active	50			Y		NA	NA	
GW-47-2-1	Active	50			Y		NA	NA	
GW-48-2-1	Active	50			Y		NA	NA	
GW-50-1-1	Active	50	Y		Y		footvalve	footvalve	Reactivated to sampling plan in Q1 of 2024 due to Nitrate issues stemming from NE Stockpile
GW-51-1-1	Active	50		Y	Y		footvalve	footvalve	
GW-51-2-1	Active	50		Y	Y		footvalve	footvalve	
GW-51-3-1	Active	50		Y	Y		footvalve	footvalve	
GW-52-1-1	Active	50	Y		Y	Y	footvalve	footvalve	Pressure transducer installed in 2018
GW-52-2-0	Active	150			Y		NA	NA	
GW-52-3-0 (P52)	Active	150				Y	NA	NA	Pressure transducer records water levels continuously.
GW-52-4-0 (P7)	Active	250	Y			Y	NA	spigot	Pressure transducer installed. Purge well in conjunction with 80-1-0-P8. Sampling spigot installed in 2016.
GW-53-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-54-1-1	Active	50			Y	Y	sample pump	sample pump	Dedicated submersible pump installed January 2012. Water levels only. Pressure transducer installed in March 2019.
GW-54-2-1	Active	50			Y		footvalve	footvalve	Water levels only.
GW-54-3-1	Active	50			Y		footvalve	footvalve	Water levels only.
GW-55-1-1	Active	50		Y	Y		footvalve	footvalve	
GW-56-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-57-1-1	Active	50		Y	Y		footvalve	footvalve	
GW-58-1-0	Active	150	Y		Y		sample pump	sample pump	Dedicated submersible pump reinstalled after Phase 2 Cell one closure in October 2012. This well is an 8" diameter borehole.
GW-60-1-1	Active	50	Y		Y		footvalve	footvalve	

Notes:
Footvalves are 16 mm (5/8") unless otherwise noted.
NA - Not Available or Not Applicable.

Appendix A-2. Groundwater Monitoring Plan 2024-2025

Station Name	Status	Pipe Diameter (mm)	Groundwater Quality Samples		Groudwater Level Measurements		Development Method	Sampling Method	Comments
			Quarterly (4/yr)	Bi-annual (2/yr)	Manual measurement (4/yr)	Pressure transducer (continuous)			
GW-60-2-1	Active	50	Y		Y		footvalve	footvalve	
GW-60-3-1	Active	50	Y		Y		footvalve	footvalve	
GW-61-1-1	Active	150			Y		NA	NA	Borehole
GW-62-1-1	Active	50		Y	Y	Y	sample pump	sample pump	Portable pressure transducer installed January 2012 - records water levels every three hours. Submersible pump installed January 2012.
GW-62-2-1	Active	50		Y	Y		footvalve	footvalve	
GW-63-1-1	Active	50		Y	Y		sample pump	sample pump	Dedicated submersible pump installed January 2011.
GW-63-2-1	Active	50		Y	Y		footvalve	footvalve	
GW-71-1-1	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2012 has malfunctioned.
GW-71-2-1	Active	50	Y		Y		sample pump	footvalve	Dedicated submersible pump installed January 2012.
GW-71-3-1	Active	50	Y		Y		footvalve	footvalve	
GW-72-1-1	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2012.
GW-72-2-1	Active	50			Y		footvalve	footvalve	Well has been recharging very slowly since 2014, so it is no longer sampled. Water levels only.
GW-72-3-1	Active	50	Y		Y		footvalve	footvalve	
GW-73-1-1	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2012.
GW-73-2-1	Active	50	Y		Y		sample pump	sample pump	Dedicated submersible pump installed January 2012.
GW-73-3-1	Active	50	Y		Y		footvalve	footvalve	
GW-74-2-1	Active	50			Y		NA	NA	
GW-75-1-1	Active	50			Y		NA	NA	
GW-76-1-1	Active	50			Y	Y	sample pump	sample pump	Dedicated submersible pump installed January 2010. Water levels only. Pressure transducer installed in March 2019.
GW-76-2-1	Active	50			Y		sample pump	sample pump	Sampling discontinued in 2016. Water levels only. Dedicated submersible pump installed January 2012.
GW-76-3-1	Active	50			Y		footvalve	footvalve	Sampling discontinued in 2016. Water levels only.
GW-77-1-1	Active	50		Y	Y	Y	footvalve	footvalve	Portable pressure transducer installed January 2012. Dedicated submersible pump installed. Pump failed in 2020.
GW-77-2-1	Active	50		Y	Y		footvalve	footvalve	
GW-80-1-0 (P8)	Active	NA	Y		Y	Y	sample pump	spigot	Pressure transducer installed. Purge well in conjunction with 52-4-0-P7. Sampling spigot installed in 2016.
GW-81-1-0 (P9)	Active	NA	Y		Y	Y	NA	bailer	Borehole. Pressure transducer installed in 2018.
GW-82-1-1	Active	50			Y		NA	NA	
GW-83-1-1	Active	50			Y		NA	NA	
GW-85-1-1	Active	50	Y		Y		footvalve	footvalve	
GW-87-1-1	Active	50		Y	Y	Y	footvalve	sample pump	Well drilled in December 2014. Dedicated submersible pump installed in February 2015. Pressure transducer installed March 2016.
GW-87-2-1	Active	50		Y	Y	Y	footvalve	waterra	Well drilled in December 2014. Pressure transducer installed in March 2016.
GW-88-1-1	Active	50		Y	Y	Y	footvalve	waterra	Well drilled in December 2014. Pressure transducer installed March 2016.
GW-88-2-1	Active	50		Y	Y	Y	footvalve	waterra	Well drilled in December 2014. Pressure transducer installed in March 2016.
GW-89-1-1	Active	50			Y	Y	NA	NA	Well drilled in Dec 2018. Pressure transducer installed in March 2019
GW-89-2-1	Active	50			Y	Y	NA	NA	Well drilled in Dec 2018. Pressure transducer installed in March 2019
GW-91-1-1	Active	50	Y		Y	Y	Waterra	Waterra	Well drilled in Dec 2019. Pressure transducer installed in March 2020
GW-92-1-1	Active	50	Y		Y	Y	Waterra	Waterra	Well drilled in Dec 2019. Pressure transducer installed in March 2020
GW-94-1-1	Active	50	Y		Y	Y	Waterra	Waterra	Well drilled in Dec 2019. Pressure transducer installed in March 2020
GW-95-1-1	Active	50		Y	Y		Waterra	Waterra	Well drilled April 14 2022
GW-96-1-1	Active	50		Y	Y		Waterra	Waterra	Well drilled April 14 2022
GW-97-1-1	Active	50	Y		Y		Waterra	Waterra	Well drilled April 18 2022
GW-98-1-1	Active	50	Y		Y		Waterra	Waterra	Well drilled April 18 2022
GW-104-1-1	Active	50	Y		Y		Waterra	Waterra	Well drilled July 11 2022
GW-108-1-1	Active	50		Y	Y		Waterra	Waterra	Well drilled August 2 2022
GW-109-1-1	Active	50			Y		Waterra	Waterra	Well drilled August 9 2022. Deep well.
GW-111-1-1	Active	50	Y		Y		Waterra	Waterra	Well drilled September 9 2024
GW-111-2-1	Active	50	Y		Y		Waterra	Waterra	Well drilled September 10 2024
GW-112-1-1	Active	50	Y		Y		Waterra	Waterra	Well drilled September 11 2024
GW-112-2-1	Active	50	Y		Y		Waterra	Waterra	Well drilled September 12 2024
GW-113-1-1	Active	50	Y		Y		Waterra	Waterra	Well drilled September 13 2024
GW-113-2-1	Active	50	Y		Y		Waterra	Waterra	Well drilled September 16 2024
P1	Active	NA	Y			Y	NA	spigot	Pressure transducer installed. QED bladder pumps and pressure transducer installed. Electric submersible pump installed 14-May-2015.
P2	Active	NA	Y			Y	NA	spigot	Pressure transducer installed. QED bladder pumps installed and pressure transducer records water levels continuously.
P3	Active	NA	Y			Y	NA	spigot	Pressure transducer installed. QED bladder pumps installed and pressure transducer records water levels continuously.
P4	Active	NA	Y			Y	NA	spigot	Pressure transducer installed. QED bladder pumps installed and pressure transducer records water levels continuously.
P10	Active	NA	Y			Y	NA	spigot	Pressure transducer installed. QED bladder pumps installed and pressure transducer records water levels continuously.
P11	Active	101.6	Y		Y		Waterra	Waterra	Submersible pump installed and functional in Q2 of 2024
P12	Active	101.6	Y		Y		Waterra	Waterra	Well drilled August 5 2022. 4" diameter borehole
VLGW002D	Active	NA			Y		NA	NA	
VLGW003D	Active	NA			Y		NA	NA	
VLGW004D	Active	NA			Y		NA	NA	
VLGW008D	Active	NA			Y		NA	NA	
VLGW011S	Active	NA			Y		NA	NA	
VLGW015D	Active	NA			Y		NA	NA	
VLGW016D	Active	NA			Y		NA	NA	
VLGW017D	Active	NA			Y		NA	NA	
VLGW018D	Active	NA			Y		NA	NA	
VLGW019D	Active	NA			Y		NA	NA	
VLGW021D	Active	NA			Y		NA	NA	
VLGW026D	Active	NA			Y		NA	NA	

Notes:
Footvalves are 16 mm (5/8") unless otherwise noted.
NA - Not Available or Not Applicable.

Appendix A-2. Groundwater Monitoring Plan 2024-2025

Station Name	Status	Pipe Diameter (mm)	Groundwater Quality Samples		Groudwater Level Measurements		Development Method	Sampling Method	Comments
			Quarterly (4/yr)	Bi-annual (2/yr)	Manual measurement (4/yr)	Pressure transducer (continuous)			
VLGW020D	Inactive	NA			Y		NA	NA	Became obstructed in 2021
GW-01-1-1	Inactive	20							Site destroyed.
GW-01-1-2	Inactive	20							
GW-01-1-3	Inactive	20							
GW-01-2-1	Inactive	20							
GW-01-3-1	Inactive	20							
GW-02-1-1	Inactive	20							Site destroyed
GW-02-1-2	Inactive	20							
GW-02-1-3	Inactive	20							
GW-02-2-1	Inactive	20							
GW-03-1-1	Inactive	20							Deactivated at end of 1998, replaced by well 60-1-1.
GW-03-1-2	Inactive	20							Deactivated at end of 1998, replaced by well 60-2-1.
GW-03-1-3	Inactive	20							Deactivated at end of 1998, replaced by well 60-3-1.
GW-03-2-1	Inactive	50							Destroyed and replaced with 85-1-1 in March 2009.
GW-04-1-1	Inactive	20							Deactivated at end of 1998, replaced by new 04-2-1.
GW-04-1-2	Inactive	20							Deactivated at end of 1998, replaced by well 04-3-1.
GW-04-1-3	Inactive	20							Deactivated at end of 1998, replaced by well 04-4-1.
GW-04-1-4	Inactive	40							Deactivated during 1998, failed to recharge after purging.
GW-04-2-1	Inactive	50			Y		sample pump	sample pump	Dedicated submersible pump installed January 2012. Sampling discontinued due to very slow recharge rate.
GW-05-1-1	Inactive	20							Site destroyed during construction of Phase 2 lagoon
GW-05-1-2	Inactive	20							
GW-05-1-3	Inactive	20							
GW-05-2-1	Inactive	20							
GW-06-1-1	Inactive	20							Site destroyed during dike contruction in interim filling area.
GW-06-1-2	Inactive	20							
GW-06-1-3	Inactive	20							
GW-06-2-1	Inactive	20							
GW-07-1-0	Inactive	220			Y		well pump	well pump	Several maintenance issues (electrical panel, spigot connection, power) resulted in station not sampled in the last year
GW-08-1-1	Inactive	20							Site destroyed
GW-08-1-2	Inactive	20							
GW-08-1-3	Inactive	20							
GW-10-1-1	Inactive	20							Site destroyed
GW-11-1-1	Inactive	20							Site destroyed
GW-12-1-0	Inactive	220							Deactivated in 2010.
GW-13-1-1	Inactive	50							Site destroyed
GW-13-1-2	Inactive	50							
GW-14-1-1	Inactive	50							Site destroyed
GW-15-1-1	Inactive	50							Site destroyed
GW-22-1-1	Inactive	50							Destroyed during expansion of interim composting area.
GW-23-1-1	Inactive	50							Site destroyed in November 1994
GW-23-1-2	Inactive	50							
GW-24-1-1	Inactive	50							Site destroyed during construction of Phase 2 lagoon
GW-24-1-2	Inactive	50							
GW-26-1-1	Inactive	50							Site destroyed in August 1994
GW-26-1-2	Inactive	50							
GW-27-1-1	Inactive	50					footvalve	footvalve	Sampled in Q2, Q3, and Q4 of 2023. Decomissioned in Q1 of 2024 due to construction of cell 4
GW-27-1-2	Inactive	50					footvalve	footvalve	Destroyed in summer 2022. No longer exists.

Notes:
Footvalves are 16 mm (5/8") unless otherwise noted.
NA - Not Available or Not Applicable.

Appendix A-2. Groundwater Monitoring Plan 2024-2025

Station Name	Status	Pipe Diameter (mm)	Groundwater Quality Samples		Groudwater Level Measurements		Development Method	Sampling Method	Comments
			Quarterly (4/yr)	Bi-annual (2/yr)	Manual measurement (4/yr)	Pressure transducer (continuous)			
GW-32-1-1	Inactive	50							Site destroyed in October 1997
GW-32-1-2	Inactive	50							Site destroyed in October 1997
GW-33-1-1	Inactive	50							Deactivated in August 1992.
GW-33-1-2	Inactive	50							
GW-34-1-1	Inactive	50							Site destroyed in August 1994
GW-34-2-1	Inactive	50							
GW-35-1-1	Inactive	50							Site destroyed in August 1994
GW-35-1-2	Inactive	50							
GW-45-1-1	Inactive	50							Site destroyed.
GW-46-1-1	Inactive	50							Deactivated in June 1999.
GW-47-1-1	Inactive	50							Deactivated in December 2012.
GW-48-1-1	Inactive	50					NA	NA	Obstructed. Unable to measure groundwater level.
GW-49-1-0	Inactive	50							Deactived in June 2005.
GW-59-1-1	Inactive	50							Destroyed Feb 2005 by Phase 2 construction.
GW-64-1-1	Inactive	50							Destroyed by interim fill area construction in 2003.
GW-65-1-1	Inactive	50							Destroyed by interim fill area construction in 2003.
GW-66-1-1	Inactive	50							Destroyed by interim fill area construction in 2003.
GW-67-1-1	Inactive	50							Destroyed. Replaced by GW-82-1-1
GW-67-2-1	Inactive	50							Destroyed. Replaced by GW-82-1-1
GW-68-1-1	Inactive	50							Destroyed. Replaced by GW-83-1-1
GW-68-2-1	Inactive	50							Destroyed. Replaced by GW-83-1-1
GW-69-1-1	Inactive	50							Destroyed July 2006 during construction on active face
GW-69-2-1	Inactive	50							Destroyed July 2006 during construction on active face
GW-70-1-1	Inactive	50							Destroyed by interim fill area construction in 2003.
GW-74-1-1	Inactive	50			Y		NA	NA	Decommissioned
GW-78-1-1	Inactive	50					NA	NA	Sampled in Q2, Q3, and Q4 of 2023. Decomissioned in Q1 of 2024 due to construction of new commercial road
GW-78-2-1	Inactive	50					NA	NA	Sampled in Q2, Q3, and Q4 of 2023. Decomissioned in Q1 of 2024 due to construction of new commercial road
GW-79-1-1	Inactive	50					sample pump	sample pump	Well decommissioned in May 2018 due to blasting in vicinity.
GW-79-2-1	Inactive	50					footvalve	footvalve	Well decommissioned in May 2018 due to blasting in vicinity.
GW-84-1-1	Inactive	50							Destroyed spring 2009. Recorded continuous water levels until April 2012. No longer functioning. Cannot be repaired
GW-84-2-1	Inactive	50							Destroyed spring 2009. Recorded continuous water levels until April 2012. No longer functioning. Cannot be repaired
GW-90-1-1	Inactive	50					NA	NA	Well drilled in Oct 2019. No water levels taken in well due to high landfill gas concentrations in area.
GW-90-2-1	Inactive	50					NA	NA	Well drilled in Dec 2018. No water levels taken in well since Oct 2019 due to high landfill gas concentrations in area.
GW-93-1-1	Inactive	50					Waterra	Waterra	Destroyed September 2022 due to aggregate stockpiling
GW-99-1-1	Inactive	50		Y	Y		Waterra	Waterra	Decommissioned in 2024 Q1
GW-100-1-1	Inactive	50	Y		Y		Waterra	Waterra	Decommissioned in 2024 Q1
GW-101-1-1	Inactive	50		Y	Y		Waterra	Waterra	Decommissioned in 2024 Q1
GW-103-1-1	Inactive	50		Y	Y		Waterra	Waterra	Well drilled April 18 2022. Decomissioned in Summer 2024.
GW-105-1-1	Inactive	50	Y		Y		Waterra	Waterra	Decommissioned in 2024 Q1
GW-106-1-1	Inactive	50	Y		Y		Waterra	Waterra	Decommissioned in 2024 Q1
GW-107-1-1	Inactive	50		Y	Y		Waterra	Waterra	Decommissioned in 2024 Q1
GW-110-1-1	Inactive	50			Y		Waterra	Waterra	Decommissioned in 2024 Q1
T-86-1-1	Inactive	NA							
T-86-1-2	Inactive	NA			Y	Y	NA	NA	Pressure transducer installed October 2010. Well replaces GW-84-1-1 & GW-84-2-1. PT no longer functioning.
T-86-2-1	Inactive	NA			Y	Y	NA	NA	Pressure transducer installed October 2010. Well replaces GW-84-1-1 & GW-84-2-1. PT no longer functioning.
T-86-2-2	Inactive	NA			Y	Y	NA	NA	Pressure transducer installed October 2010. Well replaces GW-84-1-1 & GW-84-2-1. PT no longer functioning.
VLGW001D	Inactive	NA					NA	NA	Well is obstructed. No water level measurements were taken in 2018-2019

Notes:
Footvalves are 16 mm (5/8") unless otherwise noted.
NA - Not Available or Not Applicable.

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Appendix A-3

Groundwater Elevations

Appendix A-3. Groundwater Elevations 2024-2025

Station	Q2 06 May 2024 to 07 May 2024	Q3 04 Sep 2024 to 06 Sep 2024	Q4 05 Nov 2024 to 06 Oct 2024	Q1 30 Jan 2025 to 03 Feb 2025
	Groundwater Elevations (m ASL)			
04-2-1	126.08	124.87	122.59	126.30
04-3-1	123.24	122.81	123.49	123.31
04-4-1	124.20	123.49	124.62	124.45
07-1-0	139.73	Dry	139.79	139.67
09-1-0	144.76	143.53	145.55	145.20
16-1-1	127.89	125.72	133.33	129.48
16-1-2	128.56	126.26	133.71	130.36
16-2-1	129.88	128.32	134.73	131.22
16-2-2	129.72	128.18	134.56	131.14
17-1-1	143.58	141.91	145.31	144.52
17-1-2	143.57	141.92	145.51	144.48
17-1-3	143.83	142.10	146.11	144.84
18-1-1	150.15	148.58	150.47	150.63
18-2-1	159.52	158.54	163.02	160.38
18-2-2	159.55	155.60	163.08	160.41
19-1-1	131.54	130.30	132.89	132.89
19-1-2	132.89	132.32	132.89	132.89
19-2-1	132.54	131.99	132.54	132.54
19-2-2	131.88	127.60	130.70	130.90
20-1-1	109.30	108.66	109.68	109.21
20-1-2	108.95	108.46	109.30	109.10
21-1-1	109.30	108.79	109.92	109.41
21-1-2	108.98	108.44	109.30	109.11
21-2-1	109.03	108.47	109.36	109.17
25-1-1	124.34	124.20	125.48	124.97
25-1-2	125.47	125.00	125.78	126.07
28-1-0	118.81	118.57	119.79	119.73
29-1-1	111.03	110.26	111.40	111.50
29-1-2	111.13	110.32	111.46	111.54
30-1-1	107.80	103.96	105.69	105.28
30-1-2	108.00	105.03	106.94	106.32
31-1-1	103.39	102.65	103.86	104.13
31-1-2	103.27	102.68	103.85	104.00
36-1-1	120.99	121.97	118.90	121.04
36-2-1	121.42	120.71	123.02	122.15
36-3-1	121.64	120.60	123.91	122.76
37-1-1	123.20	120.99	120.99	123.87
37-2-1	121.23	120.41	123.48	124.05
37-3-1	123.24	122.87	125.35	123.99
38-1-1	119.15	118.36	120.03	119.47
39-1-1	119.24	118.93	121.34	120.21
39-2-1	118.78	118.69	119.74	119.25
40-1-1	116.65	116.44	117.39	116.56
41-1-1	146.65	146.73	146.89	147.29
42-1-1	137.03	136.83	136.28	137.64
43-1-1	157.42	157.30	158.36	158.98
44-1-1	159.35	158.69	159.57	159.98
46-2-1	154.19	153.83	154.14	153.98
46-3-1	153.97	153.05	153.62	149.91
46-4-1	158.48	148.56	152.54	152.99
47-2-1	153.18	151.79	153.32	153.36
48-2-1	148.69	148.82	154.81	149.55
50-1-1	114.59	112.49	115.32	117.43
51-1-1	108.46	108.04	109.30	109.23
51-2-1	108.53	108.09	109.58	109.28
51-3-1	108.51	108.05	109.32	109.28
52-1-1	118.20	114.99	117.17	117.41
52-2-0	117.51	115.18	117.62	117.78
52-3-0 (P52)	117.13	117.13	117.13	117.13
52-4-0 (P7)	113.00	113.00	113.00	113.00
53-1-1	119.56	119.34	120.67	120.17
54-1-1	148.46	146.01	149.02	149.05
54-2-1	147.97	145.68	148.51	148.60
54-3-1	148.06	146.14	148.72	148.98
55-1-1	141.26	139.66	140.98	141.88
56-1-1	142.43	142.10	144.67	145.39
57-1-1	128.14	124.45	128.71	129.16
58-1-0	127.16	127.27	---	---
60-1-1	140.84	140.58	141.03	140.99
60-2-1	140.80	140.55	141.03	140.99
60-3-1	140.41	140.23	140.72	140.52

Appendix A-3. Groundwater Elevations 2024-2025

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Station	Q2 06 May 2024 to 07 May 2024	Q3 04 Sep 2024 to 06 Sep 2024	Q4 05 Nov 2024 to 06 Oct 2024	Q1 30 Jan 2025 to 03 Feb 2025
61-1-1	184.62	182.20	184.89	183.27
62-1-1	169.89	163.54	170.83	171.91
62-2-1	169.86	165.74	170.79	171.87
63-1-1	189.57	188.21	191.14	190.75
63-2-1	190.61	189.95	193.17	192.59
71-1-1	140.59	139.95	140.95	140.91
71-2-1	140.77	140.17	141.06	141.07
71-3-1	140.71	140.11	140.99	141.00
72-1-1	140.62	140.32	140.89	140.79
72-2-1	140.93	140.47	140.89	141.09
72-3-1	140.76	140.48	141.10	141.03
73-1-1	132.13	131.17	133.10	132.66
73-2-1	132.32	131.36	133.09	132.84
73-3-1	131.77	130.62	132.17	131.99
74-2-1	151.09	150.94	151.58	151.84
75-1-1	128.44	128.28	127.24	127.64
76-1-1	156.71	154.96	155.96	157.88
76-2-1	159.48	157.95	160.19	160.62
76-3-1	161.58	160.11	162.56	162.68
77-1-1	148.65	148.38	150.82	149.86
77-2-1	147.70	147.20	149.93	148.79
80-1-0 (P8)	113.37	115.32	113.44	115.48
81-1-0 (P9)	115.50	115.47	116.00	115.64
82-1-1	Dry	Dry	Dry	Dry
83-1-1	126.09	126.16	126.64	126.43
85-1-1	144.25	144.14	144.69	144.40
87-1-1	167.58	155.54	159.55	173.55
87-2-1	167.61	161.67	161.92	173.76
88-1-1	168.31	162.38	168.73	170.10
88-2-1	168.31	164.90	168.76	170.37
89-1-1	146.24	149.69	151.31	151.28
89-2-1	148.48	148.52	148.59	148.53
90-1-1	120.68	119.54	121.94	121.87
90-2-1	133.66	139.78	135.44	135.33
91-1-1	159.65	159.12	160.85	160.82
92-1-1	159.86	157.94	161.33	161.26
94-1-1	195.12	178.69	188.41	200.74
LG-02-D	148.02	146.71	147.01	150.02
LG-03-D	149.95	150.59	150.64	153.07
LG-04-D	156.42	156.85	155.98	154.14
LG-08-D	145.95	148.22	146.67	152.96
LG-11-S	155.68	155.17	155.12	155.22
LG-15-D	149.26	148.27	149.46	149.05
LG-16-D	154.57	150.23	152.94	151.11
LG-17-D	160.94	153.90	158.80	152.76
LG-18-D	150.31	151.97	151.54	150.21
LG-19-D	149.42	149.97	149.82	150.21
LG-21-D	146.04	145.78	146.00	145.93
LG-26-D	143.99	144.75	144.46	144.22
95-1-1	126.93	126.54	127.82	127.31
96-1-1	126.95	126.48	128.15	127.24
97-1-1	126.25	125.95	127.18	126.72
98-1-1	126.81	126.55	127.76	127.25
104-1-1	130.29	129.90	131.10	132.70
108-1-1	122.72	122.45	125.77	124.45
109-1-1	128.03	127.94	128.96	134.91
P-11	---	---	---	---
P-12	120.76	121.18	125.65	127.98
111-1-1	---	---	96.14	96.21
111-1-2	---	---	95.74	95.77
112-1-1	---	---	115.56	115.59
112-1-2	---	---	115.36	115.30
113-1-1	---	---	156.16	156.46
113-1-2	---	---	158.76	159.57

Notes:

Bracketed data on bottom of well.

--- Not measured

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Appendix A-4

Surface Water Station Details

Appendix A-4. Surface Water Station Details 2024-2025

Station Name	Location		Status	Routine		Comments
	Northing	Easting				
	UTM (NAD83)	UTM (NAD83)		(4/yr)	(2/yr)	
SW-N-05	5 376 534.511	465 729.384	Active	Y		Heal Creek - 40m from perimeter fence line
SW-N-14	5 376 795.252	466 228.944	Active		Y	Heal Creek 2/3 of the way from the Northeast Diversion Ditch to Durrance Creek.
SW-N-15	5 377 109.531	465 982.354	Active			Durrance Creek well above confluence with Heal Creek.
SW-N-16	5 376 506.808	465 968.695	Active	Y		North Wetland at dischage of Weir SF5 into North Wetland Creek, just above confluence with Heal Creek.
SW-N-17	5 376 566.303	465 903.628	Active	Y		Heal Creek below confluence with 42 Creek and above confluence with North Wetland Creek.
SW-N-19	5 376 423.322	466 040.279	Active	Y		Northeast Diversion Ditch below Northeast Sedimentation Pond, just above discharge into North Wetland.
SW-N-41s1	5 376 892.202	465 171.078	Active	Y		41 Creek at north side of Willis Point Road, near source.
SW-N-41s3	5 377 102.438	465 021.226	Active	Y		41 Creek just above discharge to Durrance Lake.
SW-N-41s4	5 377 188.719	465 097.520	Active	Y		Discharge from Durrance Lake.
SW-N-42s1	5 376 753.436	465 553.804	Active	Y		42 Creek at discharge from 42 Wetland below southeast end of Yardwaste Pad. Across Willis Point Road from Well 42.
SW-N-45	5 376 605.647	465 797.403	Active	Y		Heal Creek just above confluence with 42 Creek.
SW-N-50	5 376 353.361	465 438.872	Active	Y		Toutle Valley break out.
SW-N-51	5 376 323.976	465 444.733	Active	Y		NW diversion ditch just above confluence with Toutle Valley break out.
SW-N-54	5 376 438.000	465 713.000	Active	Y		Runoff from northeast face of Phase 2 and Phase 2 Cell 1 closure into Northwest Sedimentation Pond. Replaced Sw-N-47.
SW-N-55	5 376 432.480	466 536.890	Active	Y		Stream located on the South side of Willis Point Road, captures surface water run off from the NE aggregate stockpiles area.
SW-N-56	5 376 326.240	466 776.380	Active	Y		Stream located on the North East perimeter of the landfill, North of Kiowa Road. Captures surfacewater flow from the southern extent of the NE aggregate stockpile area and flows towards Willis Point Road
SW-N-57	5 376 439.917	465 744.608	Active	Y		Added December 5 2022. Green pipe outlet at West end of upper lagoon. Collects directed surface water runoff from Shane's pond and the Toutle Valley.
SW-N-58	5 376 430.529	465 691.127	Active	Y		Added December 5 2022. Manhole near P11, collecting from black pipe in ditch along High Level Road and groundwater pumped out of P11.
SW-N-59	5 376 468.163	465 532.662	Active	Y		Added December 5 2022. Manhole near GW 77, collecting surfacewater from the kitcen scraps pad (not yet bult as of May 25 2023).
SW-N-60	5 376 504.232	465 439.352	Active	Y		Added December 5 2022. Manhole, smaller channel within the manhole collecting directed surfacewater runoff from Shane's pond.
SW-N-61	5 376 504.346	465 135.424	Active	Y		Added December 5 2022. Manhole on the West side of the road collected surfacewater drainage from Shane's pond. It is the beginning of the collection point which reports to SW-N-57.
SW-N-63	5 377 369.181	466 786.923	Active	Y		Added February 8 2023. Sampling point on Durrance creek after the confluence of Durrance Creek and Heal creek. Located adjacent to a culvert that runs under the road on private property.
SW-N-64	5 377 367.064	466 825.288	Active	Y		Added February 8 2023. Sampling point on Todd Creek upstream of the Durrance Creek input.
SW-N-65	5 377 383.733	466 830.580	Active	Y		Added February 8 2023. Sampling point on Todd Creek downstream of the Durrance Creek input.
SW-N-66	5 376 533.190	464 961.610	Active	Y		Flows down Mt. Work west of the NW aggregate area, into SW-N-CSs2 and subsequently Durrance Lake. Background station.
SW-N-CSs2	5 376 933.072	464 896.583	Active		Y	Control station on south side of Willis Point Rd at ephemeral stream and culvert 300 m west of Yardwaste gate.
SW-S-03	5 375 637.813	466 077.533	Active	Y		Kilarney Creek at culvert discharging from underneath Recycle Road.
SW-S-04	5 375 447.329	466 171.246	Active	Y		Kilarney Creek below confluence with Southwest Diversion Ditch.
SW-S-12	5 375 661.074	465 954.884	Active	Y		At the discharge of Weir SF2, upstream of Killarney Creek.
SW-S-20	5 375 607.030	465 945.921	Active		Y	At the discharge of Weir SF3, in the Southwest Diversion Ditch where it converges with the South High Level Road.
SW-S-21	5 375 419.559	466 150.441	Active	Y		Southwest Diversion Ditch just above confluence with Kilarney Creek.
SW-S-24	5 375 553.049	466 179.487	Active	Y		Kilarney Creek just above confluence with Bike Trail Kiosk Creek and below confluence with Southeast Storm Drain.
SW-S-27	5 375 591.468	466 163.597	Active	Y		Southeast Storm Drain just above confluence with Kilarney Creek.
SW-S-52	5 376 059.905	465 472.066	Active	Y		Creek from Mt. Work before entering culvert draining to South Diversion Ditch.

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Appendix B-1

Groundwater Quality Data

Appendix B-1. Groundwater Quality Data 2024-2025

AECOM

BC CSR				AW Maximum (1)		1,500		13.1-18.4 (3)		400		2-20 (4)		400		1,280-4,290 (5)								90		50		10,000		2 (9)				12,000		0.5-4 (5)				90 (7)		40	
				DW Maximum (2)		250				10		1		10		500						9500		6		10		1,000		8				5,000		5				6,000		14 (9)	
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter		Specific Conductivity - 25°C (Field)		Chloride		Nitrogen - ammonia		Nitrogen - nitrate		Nitrogen - nitrite		Nitrogen - nitrate plus nitrite		Sulphate		pH (Field)	Specific Conductivity - 25°C (Field)	Temperature (Field)		Alkalinity		Hardness as CaCO3		Aluminum		Antimony		Arsenic		Barium		Beryllium		Bismuth		Boron		Cadmium		Calcium		Chromium		Cobalt	
				Fraction		TOT		DIS		DIS		DIS		DIS		DIS		DIS		TOT	TOT	TOT		TOT		DIS		DIS		DIS		DIS		DIS		DIS		DIS		DIS		DIS	
				Unit		µS/cm		mg/L		mg/l		mg/l		mg/l		mg/l		mg/L		pH	µS/cm	°C		mg/L		mg/L		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		mg/L		µg/l		µg/l	
				Method Detection Limit		1		0.015		0.02		0.005		0.02		1		0.1		1	0.1	0.1		0.5		0.5		0.02		0.02		0.02		0.01		0.005		10		0.005		0.05		0.1		0.005
Gw-04-3-1	SS	Y	2024-05-23	Clear and colourless		340		27.0	<	0.015	<	0.020	<	0.005	<	0.020		34.0		7.69	340	10.3		160		216		2.54		0.066		0.190		29.4	<	0.010	<	0.005		78.0		0.037		72.1		0.120		0.030
Gw-04-3-1	SS	Y	2024-09-12	Clear and colourless		346		27.0	<	0.015		0.030	<	0.005		0.030		39.0		7.61	346	9.90		170		218		3.44		0.072		0.253		40.1	<	0.010	<	0.005		78.0		0.028		72.4	<	0.100		0.033
Gw-04-3-1	SS	Y	2024-11-28	Clear and colourless		344		31.0	<	0.015		0.027	<	0.005		0.027		40.0		7.54	344	9.80		170		225		2.51		0.089		0.196		40.1	<	0.010	<	0.005		78.0		0.021		74.1	<	0.100		0.036
Gw-04-3-1	SS	Y	2025-03-03	Clear and colourless		494		29.0	<	0.015	<	0.020	<	0.005	<	0.020		36.0		7.63	494	9.70		160		206		4.52		0.065		0.194		34.9	<	0.010	<	0.005		68.0		0.040		69.3	<	0.100		0.031
Gw-04-4-1	SS	Y	2024-05-23	Clear and colourless		227		34.0	<	0.015		0.496	<	0.005		0.496		22.0		7.11	227	9.20		71.0		106		8.87		0.053		0.066		9.12	<	0.010	<	0.005		76.0		0.040		33.7	<	0.100		0.063
Gw-04-4-1	SS	Y	2024-09-11	Clear and colourless		356		63.0	<	0.015		0.685	<	0.005		0.685		26.0		6.61	356	11.7		99.0		155		5.26		0.049		0.086		13.8	<	0.010	<	0.005		84.0		0.017		49.8	<	0.100		0.059
Gw-04-4-1	SS	Y	2024-11-28	Clear and colourless		229		24.0	<	0.015		1.42	<	0.005		1.42		34.0		7.14	229	10.6		72.0		103		8.38		0.079		0.080		7.87	<	0.010	<	0.005		74.0		0.014		32.8		0.210		0.077
Gw-04-4-1	SS	Y	2025-02-28	Clear and colourless		334		42.0	<	0.015		1.40	<	0.005		1.40		24.0		6.60	334	8.60		65.0		109		11.2		0.057		0.079		8.08	<	0.010	<	0.005		66.0		0.012		35.3		0.150		0.050
Gw-16-1-1	SS	N	2024-09-19	Clear and colourless		271		8.30		0.025		1.36	<	0.005		1.36		23.0		6.96	271	11.8		150		166		2.75		0.054		0.095		13.0	<	0.010	<	0.005		22.0		0.120		55.2	<	0.100		0.025
Gw-16-1-1	SS	N	2024-12-05	Clear and colourless		449		15.0	<	0.015		2.86		0.031		2.89		140		6.42	449	11.0		130		287		1.52		0.031		0.082		5.73	<	0.010	<	0.005		19.0		0.030		91.3		0.100		0.155
Gw-16-1-2	SS	N	2024-09-19	Clear and colourless		257		11.0		0.023		1.50	<	0.005		1.50		41.0		6.74	257	12.5		150		187		2.60		0.066		0.077		5.98	<	0.010	<	0.005		17.0		0.120		62.8	<	0.100		0.029
Gw-16-1-2	SS	N	2024-12-05	Clear and colourless		378		7.30	<	0.015		1.44		0.008		1.44		24.0		6.46	378	11.2		170		239		0.940		0.051		0.145		20.4	<	0.010	<	0.005		41.0		0.091		77.8		0.110		0.076
Gw-16-2-1	SS	N	2024-09-19	Clear and colourless		267		6.00	<	0.015		1.71	<	0.005		1.71		18.0		6.95	267	11.7		180		188		4.20		0.082		0.153		7.86	<	0.010	<	0.005		20.0		0.058		64.6	<	0.100		0.051
Gw-16-2-1	SS	N	2024-12-05	Clear and colourless		293		11.0	<	0.015		2.57		0.017		2.59		110		6.89	293	10.8		130		190		10.9		0.094		0.162		9.60	<	0.010	<	0.005		31.0		0.049		63.4	<	0.100		0.048
Gw-16-2-2	NS	N	2024-09-19	Dry (only 500mL in tube)		---		---		---		---		---		---		---		---	---	---		---		---		---		---		---		---		---		---		---		---		---		---	
Gw-16-2-2	SS	N	2024-12-05	Clear and colourless		405		17.0	<	0.015		1.85		0.120		1.97		100.0		6.37	405	11.3		140		245		3.77		0.054		0.138		14.2	<	0.010	<	0.005		18.0		0.075		78.5	<	0.100		0.555
Gw-17-1-1	SS	Y	2024-09-17	Purge water milky and very light grey		318		5.40	<	0.015		0.305	<	0.005		0.305		32.0		7.10	318	11.6		190		191		4.49		0.191		0.774		19.6	<	0.010	<	0.005		15.0		0.018		56.6	<	0.100		0.015
Gw-17-1-1	SS	Y	2024-12-05	Clear and colourless		325		4.70	<	0.015		0.603	<	0.005		0.603		33.0		7.12	325	9.40		200		221		1.97		0.308		0.369		16.6	<	0.010	<	0.005		18.0		0.023		68.3		0.110		0.015
Gw-17-1-2	SS	Y	2024-09-18	Clear and colourless		319		5.00	<	0.015		0.431	<	0.005		0.431		33.0		7.91	319	12.5		180		191		1.82		0.302		0.264		38.0	<	0.010	<	0.005		22.0		0.023		60.2	<	0.100		0.018
Gw-17-1-2	SS	Y	2024-12-05	Clear and colourless		260		4.20	<	0.015		1.31	<	0.005		1.31		34.0		6.64	260	10.6		155		172		12.2		0.126		0.219		18.2	<	0.010	<	0.005		15.0		0.025		47.9		0.140		0.031
Gw-17-1-3	SS	Y	2024-09-18	Clear and colourless		396		5.40	<	0.015		0.037	<	0.005		0.037		32.0		7.09	396	11.7		250		275		1.17		0.022		0.205		12.8	<	0.010	<	0.005		16.0		0.014		82.8	<	0.100		0.022
Gw-17-1-3	SS	Y	2024-12-05	Clear and colourless		393		4.90	<	0.015		0.288	<	0.005		0.288		35.0		7.05	393	10.8		220		219		16.4		0.033		0.175		11.1	<	0.010	<	0.005		15.0		0.015		65.7		0.130		0.086
Gw-18-1-1	FRM	Y	2024-05-09	Mean of duplicates		258		2.85	<	0.015	<	0.020	<	0.005	<	0.020		25.0		7.90	258	11.3		150		162		5.07		0.727		2.43		16.5	<	0.010	<	0.005		34.0		0.151		53.1	<	0.100		0.036
Gw-18-1-1	FRM	Y	2024-09-17	Mean of duplicates		255		2.95	<	0.015	<	0.020	<	0.005	<	0.020		26.0		7.55	255	11.8		140		164		6.52		0.597		2.53		14.3	<	0.010	<	0.005		28.0		0.047		54.2	<	0.100		0.007
Gw-18-1-1	FRM	Y	2024-12-04	Mean of duplicates		237		3.20	<	0.015	<	0.020	<	0.005	<	0.020		25.5		7.66	237	44.6		140		166		6.05		0.916		2.35		14.2	<	0.010	<	0.005		29.5		0.050		54.1		0.110		0.080
Gw-18-1-1	FRM	Y	2025-03-11	Mean of duplicates		239		2.95	<	0.015	<	0.020	<	0.005	<	0.020		26.0		7.83	239	9.00		140		160		6.97		0.826		2.18		12.8	<	0.010	<	0.005		27.0		0.625		52.6	<	0.100		0.051
Gw-18-2-1	SS	Y	2024-05-09	Clear and colourless		177		9.40	<	0.015		0.179	<	0.005		0.179		15.0		7.13	177	10.1		94.0		114		3.86		0.026		0.072		2.54	<	0.010	<	0.005	<	10.00		0.043		39.0	<	0.100		0.009
Gw-18-2-1	SS	Y	2024-09-17	Clear and colourless		236		5.60	<	0.015		0.162	<	0.005		0.162		31.0		7.06	236	11.0		150		177		2.67		0.023		0.067		1.55	<	0.010	<	0.005	<	10.00		0.038		60.8	<	0.100		0.019
Gw-18-2-1	SS	Y	2024-12-04	Clear and colourless		247		9.20	<	0.015		0.221	<	0.005		0.221		28.0		7.05	247	10.6		120		159		1.33		0.021		0.038		6.61	<	0.010	<	0.005	<	10.00		0.017		54.8	<	0.100		0.060
Gw-18-2-1	SS	Y	2025-03-11	Clear and colourless		218		11.0	<	0.015		0.113	<	0.005		0.113		23.0		7.16	218	12.2		120		144		2.45		0.034		0.040		1.54	<	0.010	<	0.005	<	10.00		0.048		49.5	<	0.100		0.012
Gw-18-2-2	SS	Y	2024-05-23	Clear and colourless		219		8.20	<	0.015		0.077	<	0.005		0.077		28.0		7.07	219	10.6		150		187		1.47		0.042		0.140		7.33	<	0.010	<	0.005		10.00		0.039		65.1	<	0.100		7.32
Gw-18-2-2	SS	Y	2024-09-17	Clear and colourless		232		6.30	<	0.015		0.215	<	0.005		0.215		34.0		7.09	232	116		140		168		6.04		0.038		0.078		11.4	<	0.010	<	0.005	<	10.00		0.035		58.2		0.110		0.843
Gw-18-2-2	SS	Y	2024-12-04	Clear and colourless		224		7.50	<	0.015		0.616	<	0.005		0.616		35.0		6.84	224	10.9		100.0		149		68.2		0.038		0.056		2.10		0.028		0.005	<	10.00		0.057		50.6		0.120		0.135
Gw-18-2-2	SS	Y	2025-03-11	Clear and colourless		256		9.40	<	0.015		0.118	<	0.005		0.118		21.0		7.62	256	10.6		120		141		2.39		0.033		0.049		5.11	<	0.010	<	0.005	<	10.00		0.049		49.3	<	0.100		0.050
Gw-19-1-1	SS	N	2024-05-08	Clear and very slightly yellow		319		17.0		0.034	<	0.020	<	0.005	<	0.020		23.0		7.14	319	10.5		170		214	<	0.500		0.031		0.893		11.0	<	0.010	<	0.005		43.0	<	0.005		67.7	<	0.100		0.152
Gw-19-1-1	SS	N	2024-09-12	Clear and colourless		320		19.0		0.046	<	0.020	<	0.005	<	0.020		23.0		7.20	320	10.7		170		197		2.68		0.068		0.772		10.3	<	0.010	<	0.005		37.0	<	0.005		61.6		0.100		0.155
Gw-19-1-1	SS	N	2024-11-28	Clear and colourless		324		25.0		0.036	<	0.020	<	0.005	<	0.020		26.0		7.04	324	9.80		213		213		1.31		0.029		0.609		6.86	<	0.010	<	0.005		33.0	<	0.005		67.9		0.100		0.165
Gw-19-1-1	SS	N	2025-02-28	Clear and colourless		414		17.0		0.065	<	0.020	<	0.005	<	0.020		31.0		7.29	414	10.00		150		195		2.23		0.029		2.42		8.82	<	0.010	<	0.005		47.0	<	0.005		61.2	<	0.100		0.135
Gw-19-1-2	SS	N	2024-05-22	Clear and colourless		383		21.0		0.100	<	0.020	<	0.005	<	0.020		11.0		6.94	383	11.3		210		239		2.41	<	0.020		2.98		5.25	<	0.010	<	0.005		21.0	<	0.005		79.1		0.340		0.124
Gw-19-1-2	SS	N	2024-09-11	Clear and colourless		380		23.0		0.080	<	0.020	<	0.005	<	0.020		14.0		6.80	380	11.3		210		232		1.29	<	0.020		1.89		4.47	<	0.010	<	0.005		20.0	<	0.005		75.5	<	0.100		0.158
Gw-19-1-2	SS	N	2024-11-28	Clear and colourless		311		19.0		0.060	<	0.020	<	0.005	<	0.020		23.0		6.99	311	9.90		160		194		7.61		0.024		1.94		4.47	<	0.010	<	0.005		24.0		0.007		62.4		0.120		0.076
Gw-19-1-2	SS	N	2025-02-28	Clear and colourless		361		11.0		0.027	<	0.020	<	0.005	<	0.020		30.0		7.61	361	9.90		140		185		2.48	<	0.020		0.770		3.58	<	0.010	<	0.005		47.0	<	0.005		57.8	<	0.100		0.021
Gw-19-2-1	SS	N	2024-05-22	Clear and colourless		319		18.0	<	0.015	<	0.020	<	0.005	<	0.020		38.0		7.44	319	10.9		160		205		2.30		0.026		0.269		41.4	<	0.010	<	0.005		73.0	<	0.005		64.3	<	0.100		0.371
Gw-19-2-1	SS	N	2024-09-12	Clear and colourless		313		16.0	<	0.015	<	0.020	<	0.005	<	0.020		35.0		7.50	313	10.7		160		204		1.75	<	0.020		0.221		43.2	<	0.010	<	0.005		67.0	<	0.005		63.1	<	0.100		0.078
Gw-19-2-1	SS	N	2024-11-28	Clear and colourless		314		20.0	<	0.015	<	0.020	<	0.005	<	0.020		38.0		7.25	314	10.00		160		211		1.41	<	0.020		0.241		43.5	<	0.010	<	0.005		63.0		0.018		64.7	<	0.100		0.122
Gw-19-2-1	SS	N	2025-02-28	Clear and colourless		437		20.0		0.022	<	0.020	<	0.005	<	0.020		41.0		7.63	437	10.6		150		229		4.40	<	0.040		0.246		43.3	<	0.020	<	0.010		77.0	<	0.010		72.3	<	0.200		0.182
Gw-19-2-2	SS	N	2024-05-23	Clear and colourless		283		18.0	<	0.015	<	0.020	<	0.005	<	0.020		38.0		7.43	283	10.2		130		188		1.15	<	0.020		0.065		12.1	<	0.010	<	0.005		71.0		0.051		56.0	<	0.100		0.010
Gw-19-2-2	SS	N	2024-09-12	Clear and colourless		371		26.0	<	0.015	<	0.020	<	0.005	<	0.020		24.0		7.10	371	11.2		200		235		6.53	<	0.020		0.113		19.1	<	0.010	<	0.005		36.0		0.095		76.1	<	0.100		0.050
Gw-19-2-2	SS	N	2024-11-28	Clear and colourless		337		27.0	<	0.015	<	0.020	<	0.005	<	0.020		32.0		7.12	337	11.0		160		211		2.64	<	0.020		0.043		13.1	<	0.010	<	0.005		43.0		0.053		66.0	<	0.100		0.021
Gw-19-2-2	SS	N	2025-03-03	Clear, very slightly yellow		423		21.0	<	0.015	<	0.020	<	0.005	<	0.020		34.0		7.30	423	9.50		150		190		2.16	<	0.020		0.054		16.0	<	0.010	<	0.005		44.0		0.008		59.6	<	0.100		0.018
Gw-20-1-1	SS	Y	2024-05-09	Clear and colourless		139		3.70	<	0.015	<	0.020	<	0.005	<	0.020		11.0		8.15	139	11.7		73.0		67.8		5.00	<	0.100	<	0.100		2.27	<	0.050	<	0.025		4190	<	0.025		21.7	<	0.500	<	0.025	
Gw-20-1-1	SS	Y	2024-09-20	Clear and colourless		147		6.00		0.041	<	0.020	<	0.005	<	0.020		13.0		7.04	147	11.8		80.0		75.1		6.70	<	0.100	<	0.100		2.52	<	0.050	<	0.025		5390	b	< 0.025		23.5	<	0.500		0.036	
Gw-20-1-1	SS	Y	2024-11-13	Clear and colourless		123		3.30	<	0.015	<	0.020	<	0.005	<	0.020		11.0		8.31	123	11.1		63.0		51.7		10.1	<	0.100	<	0.100		2.09	<	0.050	<	0.025		4090	<	0.025		17.1	<	0.500	<	0.025	
Gw-20-1-1	SS	Y	2025-02-20	Clear and colourless		158		2.50	<	0.015	<	0.020	<	0.005	<	0.020		11.0		8.48	158	10.3		61.0		59.0		4.00	<	0.100	<	0.100		1.82	<	0.050	<	0.025		4460	<	0.025		19.7	<	0.500	<	0.025	
Gw-20-1-2	SS	Y	2024-05-09	Clear and colourless		170		7.00	<	0.015	<	0.020	<	0.005	<	0.020		13.0		8.01	170	13.0		86.0		83.9		2.90	<	0.100	<	0.100		3.63	<	0.050	<	0.025		3930	<	0.025		26.2	<	0.500		0.060	
Gw-20-1-2	SS	Y	2024-09-20	Clear and colourless		157		5.00		0.020	<	0.020	<	0.005	<	0.020		13.0		8.06	157	12.8		76.0		85.3		9.90	<	0.100	<	0.100		3.33	<	0.050	<	0.025		4960	<	0.025		26.3	<	0.500		0.048	
Gw-20-1-2	SS	Y	2024-11-13	Clear and colourless		145		7.40	<	0.015	<	0.020	<	0.005	<	0.020		15.0		8.16	145	11.3		84.0		75.7		3.50	<	0.100	<	0.110		3.33	<	0.050	<	0.025		3920	<	0.025		23.4	<	0.500		0.045	
Gw-20-1-2	SS	Y	2025-02-21	Clear and colourless		205		5.30		0.032	<	0.020	<	0.005	<	0.020		12.0		8.33	205	11.8		77.0		74.9		3.70	<	0.100	<	0.100		3.15	<	0.050	<	0.025		4190	<	0.025		23.4	<	0.500		0.189	
Gw-21-1-1	FRM	Y	2024-05-09	Mean of duplicates		129		2.90	<	0.015	<	0.020	<	0.005	<	0.020		10.00		8.26	129	12.0		70.0		63.3		16.1	<	0.040		1.84		2.39	<	0.050	<	0.025		3950	<	0.025		19.7	<	0.500	<	0.025	
Gw-21-1-1	FRM	Y	2024-09-23	Mean of duplicates		133		2.65	<	0.015	<	0.020	<	0.005	<	0.020		11.0		8.17	133	12.1		70.0		65.2		4.15	<	0.040		0.448		1.57		0.033	<	0.010		3935		0.016		20.1	<	0.200		0.019	
Gw-21-1-1	FRM	Y	2024-11-13	Mean of duplicates		134		2.80	<	0.015	<	0.020	<	0.005	<	0.020		11.0		8.29	134	11.1		68.5		64.1		12.4	<	0.100		0.875		2.87	<	0.050	<	0.025		3845	<	0.025		19.9	<	0.500	<	0.025	
Gw-21-1-1	FRM	Y	2025-03-05	Mean of duplicates		186		3.00		0.016	<	0.020	<	0.005	<	0.020		11.0		8.47	186	10.5		68.0		61.9		1.45	<	0.040		0.608		1.36	<	0.020	<	0.010		3510	<	0.010		19.4	<	0.200	<	0.010	
Gw-21-1-2	FRM	Y	2024-05-09	Mean of duplicates		355		50.0		5.05	<	0.020	<	0.005	<	0.020		35.0		6.90	355	12.4		155		171		1.91	<	0.020		1.23		17.2	<	0.010	<	0.005		715		0.005		51.1		0.180		0.965	
Gw-21-1-2	FRM	Y	2024-09-20	Mean of duplicates		499		69.5		5.50	<	0.020	<	0.005	<	0.020		35.0		6.82	499	12.4		180		218		2.50	<	0.020		1.23		22.2	<	0.010	<	0.005		786		0.006		64.5		0.250		1.15	
Gw-21-1-2	FRM	Y	2024-11-13	Mean of duplicates		487		66.5		5.55	<	0.020	<	0.005	<	0.020		32.0		6.86	487	11.8		180		219		2.56		0.021		1.26		21.1	<	0.010	<	0.005		766		0.008		65.8		0.225		1.28	
Gw-21-1-2	FRM	Y	2025-02-21	Mean of duplicates		566		47.5		5.10		0.053	<	0.005		0.053		44.0		6.87	566	12.2		160		186		1.72		0.024		1.21		18.0	<	0.010	<	0.005		750		0.005		56.3		0.155		1.03	
Gw-21-2-1	FRM	Y	2024-05-09	Mean of duplicates		434		57.0		5.45		0.025		0.005		0.027		35.5		6.85	434	12.6		160		179		4.04	<	0.020		1.53		17.2	<	0.010	<	0.005		635		0.009		53.0		0.200		1.14	
Gw-21-2-1	FRM	Y	2024-09-20	Mean of duplicates		539		77.0		5.95		0.195		0.021		0.216		31.5		6.68	539	12.5		190		223		1.63	<	0.020		1.53		20.5	<	0.010	<	0.005		780		0.019		66.0		0.170		1.35	
Gw-21-2-1	FRM	Y	2024-11-13	Mean of duplicates		476		64.0		4.95		0.917		0.013		0.931		37.0		6.74	476	11.6		170		195		6.62	<	0.020		1.49		17.2	<	0.010	<	0.005		701		0.007		58.2		0.195		1.37	
Gw-21-2-1	FRM	Y	2025-02-21	Mean of duplicates		579		50.0		5.30		0.135	<	0.005		0.135		47.5		6.85	579	10.9		160		179		4.00		0.030		0.943		16.2	<	0.010	<	0.005		637		0.034		53.3		0.155		1.13	
Gw-25-1-1	SS	N	2024-05-14	Very slightly turbid, colourless		406		4.50		0.096		0.523	<	0.005		0.523		93.0		7.56	406	10.9		180		193		5.00		0.086		0.481		46.2	<	0.010		0.009		257		0.058		66.6	<	0.100		0.073	
Gw-25-1-1	SS	N	2024-09-23	Clear and colourless		603		5.50	<	0.015		1.28	<	0.005		1.28		160		7.23	603	14.1		120		275		3.23		0.212		0.126		9.83	<	0.010	<	0.005		138		0.014		97.2	<	0.100		0.015	
Gw-25-1-1	SS	N	2024-11-19	Moderately turbid, slightly grey		463		7.40		0.092		0.619	<	0.005		0.619		160		7.42	463	10.5		160		274		12.0		0.036		0.262		32.5	<	0.010	<	0.005		171		0.008		96.6	<	0.100		0.204	
Gw-25-1-1	SS	N	2025-02-19	Clear and colourless		486		5.60		0.160		1.52	<	0.005		1.52		170		7.99	486	10.5		170		316		25.8		0.061		0.136		37.6		0.010	<	0.005		234		0.009		110	<	0.100		0.217	
Gw-25-1-2	SS	N	2024-05-13	Very slightly turbid, colourless		391		4.90	<	0.015		0.497	<	0.005		0.497		120		7.11	391	11.3		130		243		2.55		0.204		0.134		7.26	<	0.010	<	0.005		145	<	0.005		86.3	<	0.100		0.172	
Gw-25-1-2	SS	N	2024-09-24	Clear and colourless		487		5.40	<	0.015		1.35		0.015		1.37		160		7.11	487	17.0		120		268		6.00		0.221		0.128		9.57	<	0.010	<	0.005		140		0.018		94.5	<	0.100		0.176	
Gw-25-1-2	SS	N	2024-11-18	Moderately turbid, slightly grey		311		2.90	<	0.015		1.73	<	0.005		1.73		59.0		6.90	311	11.8		130		189		2.97		0.153		0.119		7.07	<	0.010	<	0.005		106		0.011		66.3	<	0.100		0.051	
Gw-25-1-2	SS	N	2025-02-19	Clear and colourless		286		2.70	<	0.015		0.931	<	0.005		0.931		50.0		7.69	286	10.6		140

Appendix B-1. Groundwater Quality Data 2024-2025

AECOM

BC CSR				AW Maximum (1)	20-90 (5)		40-160 (5)					10,000	250-1,500 (5)					20			0.5-15 (5)					3			1,000		85		75-2,400 (5)	
				DW Maximum (2)	1,500	(6)	10	33 (9)		(6)		250	80					10			20	1,700 (8)	2,500				2500			20	20	3,000		
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Sulphur	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Zirconium
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/l	µg/l	µg/l	µg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	mg/L	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
				Method Detection Limit	0.05	1	0.005	0.5	0.05	0.05	0.05	0.02	2	0.05	0.04	50	0.005	0.05	0.05	3	0.002	0.2	0.5	0.002	0.2	0.1	0.1
Gw-04-3-1	SS	Y	2024-05-23	Clear and colourless	0.415	1.30	0.026	0.500	8.86	0.050	2.46	0.357	7.60	0.555	0.244	8520	0.005	12.1	197	12.2	0.003	0.200	0.500	0.555	0.200	0.870	0.100
Gw-04-3-1	SS	Y	2024-09-12	Clear and colourless	0.449	2.90	0.026	0.550	8.97	0.171	3.06	0.356	9.90	0.608	0.383	8490	0.005	11.2	203	13.0	0.003	0.200	0.622	0.200	0.940	0.100
Gw-04-3-1	SS	Y	2024-11-28	Clear and colourless	0.391	2.20	0.015	0.660	9.60	0.050	3.08	0.361	7.00	0.636	0.341	8810	0.005	13.0	188	15.5	0.002	0.200	0.500	0.651	0.200	0.650	0.100
Gw-04-3-1	SS	Y	2025-03-03	Clear and colourless	0.689	5.20	0.029	0.530	7.98	0.213	2.21	0.344	8.40	0.567	0.307	7910	0.005	9.80	186	10.6	0.002	0.200	0.500	0.454	0.200	1.06	0.100
Gw-04-4-1	SS	Y	2024-05-23	Clear and colourless	1.45	5.50	0.025	0.500	5.43	0.590	0.128	0.324	3.30	1.35	0.040	5970	0.005	17.3	105	7.00	0.002	0.200	0.500	0.012	0.580	0.640	0.100
Gw-04-4-1	SS	Y	2024-09-11	Clear and colourless	1.33	3.20	0.005	0.500	7.43	0.981	0.161	0.436	3.40	1.80	0.061	5850	0.005	23.3	150	8.80	0.002	0.200	0.500	0.027	0.500	0.510	0.100
Gw-04-4-1	SS	Y	2024-11-28	Clear and colourless	2.21	6.50	0.007	0.500	5.20	0.698	0.195	0.487	2.00	1.39	0.054	5460	0.005	17.0	96.6	12.2	0.002	0.200	0.500	0.020	0.640	0.840	0.100
Gw-04-4-1	SS	Y	2025-02-28	Clear and colourless	1.54	6.40	0.007	0.500	5.18	0.393	0.117	0.269	2.30	1.40	0.042	5570	0.005	20.9	107	7.90	0.002	0.200	0.500	0.010	0.420	1.44	0.100
Gw-16-1-1	SS	N	2024-09-19	Clear and colourless	0.476	1.60	0.005	0.500	6.85	5.43	0.494	0.474	2.30	0.210	0.040	6580	0.005	3.91	188	6.90	0.003	0.200	0.500	0.190	0.470	1.85	0.100
Gw-16-1-1	SS	N	2024-12-05	Clear and colourless	1.85	1.90	0.014	0.500	14.2	50.6	0.234	0.805	3.70	0.250	0.082	6580	0.005	5.69	293	49.9	0.003	0.200	0.500	0.118	0.690	1.53	0.100
Gw-16-1-2	SS	N	2024-09-19	Clear and colourless	0.699	4.90	0.007	0.500	7.45	9.41	0.398	0.360	2.40	0.192	0.044	5920	0.005	3.93	206	11.0	0.003	0.200	0.500	0.142	0.630	1.44	0.100
Gw-16-1-2	SS	N	2024-12-05	Clear and colourless	0.983	2.10	0.014	0.500	10.8	53.9	0.222	1.27	3.10	0.270	0.068	6350	0.005	5.28	281	38.0	0.004	0.200	0.500	0.206	0.480	3.67	0.100
Gw-16-2-1	SS	N	2024-09-19	Clear and colourless	0.578	2.70	0.005	0.500	6.48	7.68	0.813	0.525	2.50	0.285	0.053	6130	0.005	4.59	268	5.20	0.002	0.200	0.500	0.145	0.760	0.99	0.100
Gw-16-2-1	SS	N	2024-12-05	Clear and colourless	0.776	5.70	0.012	0.590	7.56	9.55	0.730	0.596	2.40	0.337	0.083	6380	0.005	5.34	283	8.80	0.002	0.200	0.500	0.188	0.930	1.30	0.100
Gw-16-2-2	NS	N	2024-09-19	Dry (only 500mL in tube)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-16-2-2	SS	N	2024-12-05	Clear and colourless	4.06	1.90	0.006	0.500	11.8	225	0.318	2.55	4.20	0.299	0.091	6290	0.005	6.08	275	35.4	0.005	0.200	0.500	0.164	0.540	2.28	0.100
Gw-17-1-1	SS	Y	2024-09-17	Purge water milky and very light grey	1.00	6.30	0.014	1.83	12.0	1.26	0.733	0.405	6.20	0.591	0.064	10900	0.005	12.1	392	9.10	0.004	0.200	0.500	0.578	1.55	5.76	0.100
Gw-17-1-1	SS	Y	2024-12-05	Clear and colourless	1.08	2.70	0.009	0.720	12.2	3.51	0.339	0.596	4.10	0.459	0.062	10600	0.005	6.65	364	10.6	0.002	0.200	0.500	0.199	1.20	2.70	0.100
Gw-17-1-2	SS	Y	2024-09-18	Clear and colourless	1.25	3.70	0.008	1.18	9.82	0.943	0.329	0.437	4.00	0.704	0.053	13000	0.005	7.91	340	9.70	0.007	0.200	0.500	0.331	0.690	4.73	0.100
Gw-17-1-2	SS	Y	2024-12-05	Clear and colourless	2.03	11.5	0.035	0.560	8.52	1.32	0.171	0.382	4.40	0.503	0.133	9290	0.005	5.60	221	10.5	0.005	0.200	0.500	0.108	0.470	15.1	0.100
Gw-17-1-3	SS	Y	2024-09-18	Clear and colourless	0.511	1.00	0.043	0.500	16.6	0.083	0.186	1.18	2.80	0.323	0.043	9130	0.005	4.14	414	10.1	0.002	0.200	0.500	0.077	1.97	0.600	0.100
Gw-17-1-3	SS	Y	2024-12-05	Clear and colourless	0.876	5.80	0.009	0.500	13.5	0.779	0.199	2.15	3.10	0.442	0.075	8920	0.005	4.38	350	10.3	0.002	0.200	0.500	0.111	1.77	0.790	0.100
Gw-18-1-1	FRM	Y	2024-05-09	Mean of duplicates	0.304	2.50	0.005	0.645	7.13	22.7	0.483	0.190	7.00	0.213	0.040	8640	0.005	4.88	87.5	8.00	0.002	0.200	0.500	0.129	0.890	1.53	0.100
Gw-18-1-1	FRM	Y	2024-09-17	Mean of duplicates	0.186	0.50	0.007	1.07	7.02	1.02	0.630	0.179	6.35	0.268	0.042	8720	0.005	4.98	92.4	7.50	0.002	0.200	0.500	0.141	0.790	1.14	0.100
Gw-18-1-1	FRM	Y	2024-12-04	Mean of duplicates	0.539	10.7	0.011	1.00	7.52	27.9	0.685	0.431	6.25	0.256	0.043	8125	0.005	5.50	86.8	7.90	0.002	0.200	0.500	0.147	0.865	1.27	0.100
Gw-18-1-1	FRM	Y	2025-03-11	Mean of duplicates	1.74	10.4	0.030	1.03	6.93	17.8	0.698	0.494	5.60	0.260	0.041	8045	0.005	5.18	87.8	8.25	0.002	0.200	0.500	0.120	0.805	3.96	0.100
Gw-18-2-1	SS	Y	2024-05-09	Clear and colourless	1.09	1.30	0.019	0.500	4.05	0.223	0.050	0.138	2.50	0.090	0.281	6970	0.005	3.30	41.1	4.90	0.002	0.200	0.500	0.030	0.560	1.02	0.100
Gw-18-2-1	SS	Y	2024-09-17	Clear and colourless	1.23	2.70	0.020	0.500	5.99	1.55	0.069	0.171	2.50	0.110	0.568	6450	0.005	3.47	62.4	8.80	0.002	0.200	0.500	0.060	0.660	0.980	0.100
Gw-18-2-1	SS	Y	2024-12-04	Clear and colourless	1.09	7.30	0.006	0.500	5.40	2.99	0.050	0.124	2.00	0.129	0.448	6730	0.005	3.63	59.4	8.50	0.002	0.200	0.500	0.030	0.540	0.730	0.100
Gw-18-2-1	SS	Y	2025-03-11	Clear and colourless	1.35	3.00	0.015	0.500	4.98	0.292	0.050	0.135	2.80	0.093	0.399	6840	0.005	3.50	53.9	5.50	0.002	0.200	0.500	0.025	0.640	0.99	0.100
Gw-18-2-2	SS	Y	2024-05-23	Clear and colourless	0.654	2.50	0.005	0.500	5.98	279	0.092	0.715	2.00	0.184	0.343	7080	0.005	3.49	71.2	8.90	0.002	0.200	0.500	0.082	0.360	0.750	0.100
Gw-18-2-2	SS	Y	2024-09-17	Clear and colourless	0.454	10.6	0.010	0.500	5.43	34.2	0.058	0.364	2.70	0.192	0.547	6040	0.005	3.27	69.3	9.30	0.003	0.200	0.500	0.080	0.850	1.10	0.100
Gw-18-2-2	SS	Y	2024-12-04	Clear and colourless	3.11	61.5	0.415	0.500	5.53	3.64	0.060	0.211	40.8	0.154	0.554	6910	0.005	3.99	51.9	10.4	0.003	0.200	1.61	0.123	0.720	1.61	0.150
Gw-18-2-2	SS	Y	2025-03-11	Clear and colourless	1.16	4.80	0.007	0.500	4.44	2.39	0.050	0.257	3.20	0.142	0.250	6850	0.005	3.38	53.1	5.90	0.002	0.200	0.500	0.023	0.520	0.910	0.100
Gw-19-1-1	SS	N	2024-05-08	Clear and very slightly yellow	0.050	2010	0.005	0.500	11.0	2140	1.47	0.300	2.00	0.202	0.040	13700	0.005	7.45	196	7.70	0.002	0.200	0.500	0.102	0.200	0.100	0.100
Gw-19-1-1	SS	N	2024-09-12	Clear and colourless	0.137	1130	0.016	0.500	10.5	1710	1.38	0.364	3.90	0.184	0.040	13000	0.005	6.82	179	7.70	0.002	0.200	0.500	0.109	0.230	0.680	0.100
Gw-19-1-1	SS	N	2024-11-28	Clear and colourless	0.079	1040	0.005	0.570	10.4	2150	1.13	0.341	2.00	0.227	0.040	13000	0.005	8.43	169	8.80	0.002	0.200	0.500	0.131	0.200	0.130	0.100
Gw-19-1-1	SS	N	2025-02-28	Clear and colourless	0.172	3880	0.005	0.500	10.3	1500	1.70	0.273	7.00	0.264	0.040	13300	0.005	7.28	176	9.20	0.002	0.200	0.500	0.125	0.310	0.340	0.100
Gw-19-1-2	SS	N	2024-05-22	Clear and colourless	0.195	9310	0.010	0.500	9.98	3130	0.464	0.352	5.70	0.212	0.116	14400	0.005	6.85	182	4.10	0.002	0.200	0.500	0.007	0.770	0.520	0.100
Gw-19-1-2	SS	N	2024-09-11	Clear and colourless	0.225	6910	0.005	0.500	10.6	2700	1.18	0.306	6.60	0.221	0.040	12400	0.005	6.58	195	5.20	0.002	0.200	0.500	0.012	0.420	0.460	0.100
Gw-19-1-2	SS	N	2024-11-28	Clear and colourless	0.153	4710	0.015	0.500	9.34	1760	0.424	0.226	4.00	0.184	0.040	11600	0.005	5.71	158	7.70	0.002	0.200	0.500	0.017	0.390	1.90	0.100
Gw-19-1-2	SS	N	2025-02-28	Clear and colourless	0.223	1640	0.005	0.500	9.98	575	0.460	0.336	3.10	0.145	0.040	11900	0.005	4.93	165	10.2	0.002	0.200	0.500	0.018	0.200	0.280	0.100
Gw-19-2-1	SS	N	2024-05-22	Clear and colourless	0.071	59.8	0.008	0.500	10.7	196	0.485	0.460	2.00	0.125	0.040	14000	0.005	4.76	165	11.6	0.002	0.200	0.500	0.097	0.200	0.500	0.100
Gw-19-2-1	SS	N	2024-09-12	Clear and colourless	0.203	34.1	0.012	0.500	11.4	90.4	0.491	0.223	4.30	0.145	0.040	12600	0.005	4.80	193	11.9	0.002	0.200	0.500	0.092	0.200	0.640	0.100
Gw-19-2-1	SS	N	2024-11-28	Clear and colourless	0.200	70.9	0.006	0.500	12.0	107	0.449	0.269	2.00	0.159	0.040	12800	0.005	5.30	174	12.0	0.002	0.200	0.500	0.091	0.260	0.430	0.100
Gw-19-2-1	SS	N	2025-02-28	Clear and colourless	0.780	121	0.010	1.00	11.8	153	0.530	0.312	4.00	0.170	0.080	13200	0.010	5.28	182	13.5	0.004	0.400	1.00	0.081	0.400	1.00	0.200
Gw-19-2-2	SS	N	2024-05-23	Clear and colourless	0.192	4.70	0.005	0.500	11.6	159	2.04	0.595	2.70	0.226	0.040	7560	0.005	5.00	168	11.9	0.002	0.200	0.500	0.206	0.200	0.460	0.100
Gw-19-2-2	SS	N	2024-09-12	Clear and colourless	0.680	16.7	0.013	0.500	10.8	1330	1.49	1.43	4.10	0.217	0.040	11300	0.005	6.00	218	8.20	0.002	0.200	0.500	0.053	0.200	3.07	0.100
Gw-19-2-2	SS	N	2024-11-28	Clear and colourless	0.402	5.90	0.005	0.520	11.3	375	0.881	0.774	2.00	0.271	0.040	9200	0.005	6.28	179	10.5	0.002	0.200	0.500	0.190	0.200	1.19	0.100
Gw-19-2-2	SS	N	2025-03-03	Clear, very slightly yellow	2.38	35.5	0.013	0.530	10.1	28.0	0.243	0.258	2.10	0.251	0.040	8030	0.005	5.46	174	10.00	0.002	0.200	0.500	0.152	0.200	16.4	0.100
Gw-20-1-1	SS	Y	2024-05-09	Clear and colourless	0.250	5.00	0.025	2.50	3.32	12.0	0.330	0.340	14.0	0.250	0.200	20400	0.025	9.79	390	15.0	0.010	1.00	2.50	0.014	1.00	0.500	0.500
Gw-20-1-1	SS	Y	2024-09-20	Clear and colourless	0.250	6.40	0.139	2.50	4.01	26.0	0.440	3.37	35.0	0.350	0.200	20900	0.025	12.4	456	15.0	0.010	1.00	2.50	0.018	1.00	1.39	0.500
Gw-20-1-1	SS	Y	2024-11-13	Clear and colourless	0.250	5.00	0.025	2.50	2.16	1.77	0.350	0.250	10.00	0.250	0.200	15700	0.025	9.65	332	15.0	0.010	1.00	2.50	0.017	1.00	0.960	0.500
Gw-20-1-1	SS	Y	2025-02-20	Clear and colourless	0.300	5.00	0.025	2.50	2.36	10.6	0.310	0.300	10.00	0.250	0.200	18700	0.025	8.47	321	15.0	0.010	1.00	2.50	0.011	1.00	0.560	0.500
Gw-20-1-2	SS	Y	2024-05-09	Clear and colourless	0.250	9.30	0.025	2.50	4.48	14.4	0.420	0.590	13.0	0.280	0.200	20500	0.025	11.0	519	15.0	0.010	1.00	2.50	0.012	1.00	0.500	0.500
Gw-20-1-2	SS	Y	2024-09-20	Clear and colourless	0.250	9.80	0.637	2.50	4.77	14.0	0.540	0.350	27.0	0.310	0.200	21800	0.025	11.1	522	15.0	0.010	1.00	2.50	0.011	1.00	2.27	0.500
Gw-20-1-2	SS	Y	2024-11-13	Clear and colourless	0.250	9.20	0.025	2.50	4.18	21.2	0.580	0.280	10.00	0.290	0.200	17300	0.025	11.1	462	15.0	0.010	1.00	2.50	0.012	1.00	1.48	0.500
Gw-20-1-2	SS	Y	2025-02-21	Clear and colourless	0.250	8.30	0.025	2.50	4.00	13.2	0.760	1.39	10.00	0.310	0.200	20200	0.025	10.4	474	15.0	0.010	1.00	2.50	0.010	1.00	0.830	0.500
Gw-21-1-1	FRM	Y	2024-05-09	Mean of duplicates	0.250	13.2	0.130	2.50	3.46	5.02	0.405	0.110	15.0	0.250	0.200	19250	0.025	8.49	447	15.0	0.010	1.00	2.50	0.028	1.00	1.10	0.500
Gw-21-1-1	FRM	Y	2024-09-23	Mean of duplicates	0.125	7.25	0.025	1.00	3.65	3.74	0.525	0.044	7.50	0.250	0.080	18850	0.010	8.60	456	6.00	0.004	0.400	1.00	0.037	0.400	0.350	0.200
Gw-21-1-1	FRM	Y	2024-11-13	Mean of duplicates	0.250	5.30	0.025	2.50	3.52	6.65	0.400	0.115	10.5	0.250	0.200	17550	0.025	8.57	419	15.0	0.010	1.00	2.50	0.015	1.00	0.935	0.500
Gw-21-1-1	FRM	Y	2025-03-05	Mean of duplicates	0.100	4.25	0.010	1.05	3.28	5.92	0.395	0.040	4.00	0.180	0.080	17600	0.010	7.94	455	6.00	0.004	0.400	1.00	0.010	0.400	0.200	0.200
Gw-21-1-2	FRM	Y	2024-05-09	Mean of duplicates	0.284	1065	0.005	0.500	10.7	2090	0.679	1.33	6.55	5.69	0.040	13150	0.005	23.8	481	11.2	0.002	0.200	0.500	0.051	0.250	0.290	0.100
Gw-21-1-2	FRM	Y	2024-09-20	Mean of duplicates	0.230	1365	0.007	0.500	13.7	2525	0.635	1.96	7.05	6.11	0.040	13150	0.005	25.1	609	11.3	0.002	0.200	0.500	0.081	0.285	0.870	0.100
Gw-21-1-2	FRM	Y	2024-11-13	Mean of duplicates	0.319	1380	0.009	0.500	13.2	2585	0.612	2.31	6.00	6.16	0.040	12950	0.005	26.6	587	11.4	0.003	0.200	0.500	0.096	0.295	0.805	0.100
Gw-21-1-2	FRM	Y	2025-02-21	Mean of duplicates	0.506	1120	0.006	0.500	11.0	2055	0.693	1.47	6.35	5.67	0.040	13550	0.005	24.6	511	14.5	0.003	0.200	0.500	0.060	0.225	0.520	0.100
Gw-21-2-1	FRM	Y	2024-05-09	Mean of duplicates	0.508	1050	0.008	0.500	11.3	2395	0.592	1.46	5.05	6.03	0.040	12600	0.005	24.0	489	11.4	0.003	0.200	0.500	0.056	0.265	0.500	0.100
Gw-21-2-1	FRM	Y	2024-09-20	Mean of duplicates	0.385	1135	0.008	0.500	14.1	2760	0.620	2.49	5.70	6.74	0.040	12800	0.005	29.7	612	10.6	0.003	0.200	0.500	0.090	0.320	1.04	0.100
Gw-21-2-1	FRM	Y	2024-11-13	Mean of duplicates	0.330	1145	0.007	0.500	12.1	2505	0.615	2.07	6.60	6.08	0.040	11950	0.005	31.3	515	12.1	0.004	0.200	0.500	0.093	0.300	0.325	0.100
Gw-21-2-1	FRM	Y	2025-02-21	Mean of duplicates	0.766	420	0.012	0.500	11.2	2300	0.651	1.74	4.75	5.87	0.040	12300	0.005	24.6	501	15.2	0.003	0.200	0.500	0.072	0.200	4.11	0.100
Gw-25-1-1	SS	N	2024-05-14	Very slightly turbid, colourless	0.476	3.30	0.056	0.850	6.60	56.5	1.92	0.254	17.8	1.05	0.136	11100	0.005	34.8	328	30.4	0.016	0.200	0.500	0.811	0.650	2.35	0.100
Gw-25-1-1	SS	N	2024-09-23	Clear and colourless	1.02	2.10	0.005	0.500	7.92	6.69	0.778	0.792	3.60	0.339	0.325	7430	0.005	4.13	216	52.3	0.002	0.200	0.500	0.354	0.380	0.710	0.100
Gw-25-1-1	SS	N	2024-11-19	Moderately turbid, slightly grey	0.158	22.2	0.024	0.500	8.02	301	1.42	0.228	4.40	0.536	0.148	10500	0.005	17.0	403	49.7	0.004	0.200	0.500	0.320	0.200	0.860	0.100
Gw-25-1-1	SS	N	2025-02-19	Clear and colourless	0.212	271	0.136	0.500	9.89	332	1.07	0.238	5.70	0.438	0.295	10500	0.005	10.8	463	56.9	0.004	0.200	0.710	0.323	0.250	0.740	0.100
Gw-25-1-2	SS	N	2024-05-13	Very slightly turbid, colourless	0.481	3.10	0.005	0.500	6.72	43.6	0.912	0.559	3.60	0.261	0.255	7220	0.005	3.71	188	39.5	0.002	0.200	0.500	0.265	0.270	0.340	0.100
Gw-25-1-2	SS	N	2024-09-24	Clear and colourless	0.909	6.90	0.009	0.500	7.75	53.1	0.778	0.665	5.20	0.319	0.344	7360	0.005	4.14	208	50.4	0.002	0.200	0.500	0.230	0.380	0.800	0.100
Gw-25-1-2	SS	N	2024-11-18	Moderately turbid, slightly grey	0.724	1.70	0.005	0.500	5.75	7.84	0.586	0.938	4.90	0.306	0.241	8940	0.005	3.73	138	20.0	0.002	0.200	0.500	0.305	0.510	0.460	0.100
Gw-25-1-2	SS	N	2025-02-19	Clear and colourless	0.721	4.50	0.006	0.500	5.69	30.2	0.413	0.717	3.40	0.258	0.235	8330	0.005	3.76	146	16.9	0.002	0.200	0.500	0.150	0.360	0.710	0.100
Gw-28-1-0	SS	N	2024-05-13	Clear and colourless	0.168	25.7	0.005	0.500	7.08	4.62	1.02	0.274	2.30	0.197	0.160	9380	0.005	3.67	331	9.20	0.002	0.200	0.500	0.220	0.730	0.160	0.100
Gw-28-1-0	SS	N	2024-09-24	Clear and colourless	0.703	43.7	0.015	0.500	7.86	6.93	1.44	0.763	3.30	0.218	0.150	9410	0.005	3.90	406	14.7	0.002	0.200	0.500	0.282	0.780	2.37	0.100
Gw-28-1-0	SS	N	2024-11-13	Clear and colourless	0.232	24.9	0.005	0.500	9.08	5.57	1.23	0.435	2.00	0.217	0.181	8740	0.005	4.30	389	15.4	0.002	0.200	0.500	0.297	0.800	0.320	0.100
Gw-28-1-0	SS	N	2025-02-14	Clear and colourless	0.254	18.9	0.005	0.500	8.50	5.30	1.00	0.317	2.00	0.204	0.120	9720	0.005	4.26	379	8.40	0.002	0.200	0.500	0.233	0.830	0.210	0.100
Gw-29-1-1	SS	Y	2024-05-21	Clear and colourless	0.334	9.00	0.007	0.500	5.97	0.326	0.385	0.812	11.0	0.308	0.139	6020	0.005	23.1	238	15.3	0.002	0.200	0.500	0.088	0.510	1.10	0.100
Gw-29-1-1	SS	Y	2024-09-13	Clear and colourless	0.413	7.50	0.005	0.500	6.95	0.250	0.377	0.615	4.40	0.311	0.110	6030	0.005	24.2	268	24.0	0.002	0.200	0.500	0.101	0.480	0.500	0.100
Gw-29-1-1	SS	Y	2024-11-08	Clear and colourless	0.206	6.70	0.005	0.500	6.48	0.220	0.382	0.643	4.20	0.315	0.162	5880	0.005	24.4	248	18.1	0.002	0.200	0.500	0.118	0.390	0.500	0.100
Gw-29-1-1	SS	Y	2025-02-13	Clear and colourless	0.340	2.10	0.428	0.500	5.61	0.073	0.431	0.513	2.70	0.263	0.156	5650	0.005	21.7	222	13.4	0.002	0.200	0.500	0.099	0.360	0.340	0.100
Gw-29-1-2	SS	Y	2024-05-21	Very slightly turbid, colourless	1.43	50.6	0.005	0.500	6.61	3.18	0.387	0.494	2.10	0.365	0.095	5510	0.005	23.1	224	27.9	0.003	0.200	0.500	0.055	0.210	0.380	0.100
Gw-29-1-2	SS	Y	2024-09-13	Clear and colourless	1.97	19.0	0.014	0.500	7.20	12.6	0.579	0.628	3.40	0.439	0.077	5580	0.005	20.7	248	29.4	0.004	0.200	0.500	0.127	0.360	0.940	0.100
Gw-29-1-2	SS	Y	2024-11-08	Clear and colourless	0.945	34.5	0.005	0.500	5.68	6.91	0.626	0.395	2.60	0.445	0.268	6320	0.005	30.7	213	21.5	0.002	0.200	0.500	0.068	0.200	0.

Appendix B-1. Groundwater Quality Data 2024-2025

AECOM

BC CSR				AW Maximum (1)		1,500		13.1-18.4 (3)		400		2-20 (4)		400		1,280-4,290 (5)							90		50		10,000		2 (9)				12,000		0.5-4 (5)				90 (7)		40	
				DW Maximum (2)		250				10		1		10		500						9500	6		10		1,000		8				5,000		5				6,000		14 (9)	
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter		Specific Conductivity - 25°C (Field)		Chloride		Nitrogen - ammonia		Nitrogen - nitrate		Nitrogen - nitrite		Nitrogen - nitrate plus nitrite		Sulphate	pH (Field)	Specific Conductivity - 25°C (Field)	Temperature (Field)	Alkalinity	Hardness as CaCO3	Aluminum	Antimony		Arsenic		Barium		Beryllium		Bismuth		Boron		Cadmium		Calcium		Chromium		Cobalt	
				Fraction		TOT		DIS		DIS		DIS		DIS		DIS		TOT	TOT	TOT	TOT	TOT	DIS	DIS	DIS		DIS		DIS		DIS		DIS		DIS		DIS		DIS	
				Unit		µS/cm		mg/L		mg/l		mg/l		mg/l		mg/L		pH	µS/cm	°C	mg/L	mg/L	µg/l	µg/l		µg/l		µg/l		µg/l		µg/l		mg/L		µg/l		µg/l		µg/l	
				Method Detection Limit		1		0.015		0.02		0.005		0.02		1		0.1	1	0.1	0.5	0.02	0.02		0.02		0.01		0.005		10		0.005		0.05		0.1		0.005	
Gw-30-1-1	SS	Y	2024-05-24	Clear and colourless		399		44.0	<	0.015		0.029	<	0.005		0.029		33.0	7.83	399	10.6	170	228	1.82	0.038		0.443		46.2	<	0.010	<	0.005		417		0.009		78.5	<	0.100		0.029	
Gw-30-1-1	SS	Y	2024-09-13	Clear and colourless		410		47.0		0.110		0.101	<	0.005		0.101		33.0	7.39	410	11.8	170	224	1.35	0.035		0.458		43.8	<	0.010	<	0.005		403		0.009		76.6	<	0.100		0.037	
Gw-30-1-1	FRM	Y	2024-11-08	Mean of duplicates		408		45.5		0.033		0.085	<	0.005		0.085		35.0	7.51	408	11.1	170	222	6.74	0.029		0.389		48.1	<	0.010	<	0.005		426		0.013		76.0	<	0.100		0.038	
Gw-30-1-1	SS	Y	2025-02-14	Clear and colourless		394		48.0		0.029	<	0.020	<	0.005	<	0.020		35.0	7.17	394	10.4	170	225	10.3	0.024		0.343		47.5	<	0.010	<	0.005		388		0.011		76.7	<	0.100		0.041	
Gw-30-1-2	FRM	Y	2024-05-24	Mean of duplicates		471		74.0		0.028		0.084	<	0.005		0.084		47.5	7.36	471	10.4	155	236	7.07	0.053		0.279		10.7	<	0.010	<	0.005		308		0.058		81.5		0.110		0.038	
Gw-30-1-2	FRM	Y	2024-09-13	Mean of duplicates		523		77.5	<	0.015		0.075	<	0.005		0.075		51.0	7.16	523	12.8	160	233	1.99	0.080		0.382		8.78	<	0.010	<	0.005		306		0.048		80.3		0.125		0.078	
Gw-30-1-2	SS	Y	2024-11-08	Clear and colourless		412		66.0	<	0.015		0.482	<	0.005		0.482		50.0	7.18	412	12.0	130	166	5.20	0.049		0.263		8.66	<	0.010	<	0.005		222		0.122		56.6		0.170		0.048	
Gw-30-1-2	FRM	Y	2025-02-14	Mean of duplicates		164		14.0	<	0.015		0.955	<	0.005		0.955		23.0	7.89	164	9.90	61.0	51.2	7.28	0.031		0.166		3.81	<	0.010	<	0.005		45.5		0.103		17.0		0.160		0.039	
Gw-31-1-1	FRM	Y	2024-05-21	Mean of duplicates		608		14.0	<	0.015		16.1	*b*	< 0.005		16.1	*b*	210	7.30	608	10.3	150	414	3.95	0.088		0.209		5.70	<	0.010	<	0.005		58.5		0.047		146	<	0.100		0.136	
Gw-31-1-1	FRM	Y	2024-09-13	Mean of duplicates		609		13.0	<	0.015		12.3	*b*	0.007		12.3	*b*	195	6.99	609	11.7	160	399	7.34	0.092		0.233		6.04	<	0.010	<	0.005		53.0		0.046		141		0.140		0.201	
Gw-31-1-1	FRM	Y	2024-11-08	Mean of duplicates		592		12.0		0.022		9.04		0.009		9.05		205	7.04	592	10.6	160	383	2.71	0.082		0.181		5.97	<	0.010	<	0.005		60.0		0.045		135	<	0.100		0.158	
Gw-31-1-1	SS	Y	2025-02-13	Clear and colourless		375		8.40	<	0.015		6.37		0.007		6.38		240	7.25	375	9.70	150	399	1.51	0.093		0.159		4.92	<	0.010	<	0.005		50.0		0.047		140	<	0.100		0.174	
Gw-31-1-2	SS	Y	2024-05-21	Clear and colourless		548		14.0	<	0.015		14.2	*b*	< 0.005		14.2	*b*	180	7.12	548	10.1	140	367	2.33	0.046		0.125		4.61	<	0.010	<	0.005		54.0		0.021		127	<	0.100		0.065	
Gw-31-1-2	SS	Y	2024-09-12	Clear and colourless		541		13.0	<	0.019		11.7	*b*	< 0.005		11.7	*b*	150	6.77	541	12.4	140	335	1.71	0.040		0.162		3.79	<	0.010	<	0.005		55.0		0.026		116	<	0.100		0.052	
Gw-31-1-2	SS	Y	2024-11-08	Clear and colourless		604		8.30	<	0.015		6.49	<	0.005		6.49		230	6.94	604	11.7	120	361	3.34	0.049		0.130		4.33	<	0.010	<	0.005		54.0		0.022		125	<	0.100		0.069	
Gw-31-1-2	SS	Y	2025-02-13	Clear and colourless		398		9.00	<	0.015		6.26	<	0.005		6.26		210	7.25	398	9.80	130	345	2.18	0.031		0.058		3.38	<	0.010	<	0.005		48.0		0.021		120	<	0.100		0.047	
Gw-36-3-1	SS	N	2024-05-09	Clear and colourless		781		27.0	<	0.015		0.523		0.006		0.529		200	7.04	781	13.2	320	510	7.99	0.076		0.265		39.2	<	0.010	<	0.005		118		0.010		153		0.100		0.094	
Gw-36-3-1	SS	N	2024-09-23	Clear and colourless		820		29.0	<	0.015		0.434	<	0.005		0.434		210	6.97	820	13.6	330	502	2.56	0.071		0.266		37.7	<	0.010	<	0.005		70.0		0.007		150		0.130		0.097	
Gw-36-3-1	SS	N	2024-11-19	Clear and colourless		789		25.0	<	0.015		0.504	<	0.020		0.524		220	6.97	789	12.6	310	512	2.30	0.076		0.267		37.1	<	0.010	<	0.005		51.0		0.008		156	<	0.100		0.096	
Gw-36-3-1	SS	N	2025-03-05	Clear and colourless		1030		25.0		0.025		0.388	<	0.005		0.388		220	7.05	1030	12.9	320	517	1.39	0.095		0.220		58.9	<	0.010	<	0.005		77.0		0.009		153	<	0.100		0.071	
Gw-37-3-1	SS	N	2024-05-09	Clear and colourless		523		52.0		0.660	<	0.020	<	0.005	<	0.020		92.0	6.96	523	11.5	170	305	2.23	0.022		0.335		20.6	<	0.010	<	0.005		308		0.017		104		0.150		0.431	
Gw-37-3-1	SS	N	2024-09-27	Clear and colourless		466		57.0		0.750	<	0.020	<	0.005	<	0.020		92.0	7.01	466	12.2	190	338	0.970	0.025		0.383		22.8	<	0.010	<	0.005		441		0.021		117		0.190		0.460	
Gw-37-3-1	SS	N	2024-11-19	Clear and colourless		561		35.0		0.600		0.169		0.016		0.184		170	7.05	561	11.3	160	332	2.42	0.044		0.316		22.1	<	0.010	<	0.005		370		0.021		114		0.160		0.565	
Gw-37-3-1	SS	N	2025-03-03	Clear and colourless		673		28.0		0.380		0.387		0.031		0.418		120	7.05	673	11.1	150	304	2.53	0.051		0.219		21.2	<	0.010	<	0.005		422		0.019		104	<	0.100		0.557	
Gw-38-1-1	SS	N	2024-05-14	Clear and colourless		528		15.0	<	0.015		0.435	<	0.005		0.435		43.0	7.29	528	12.0	320	333	1.07	0.244		0.421		8.88	<	0.010	<	0.005		194		0.029		102	<	0.100		0.029	
Gw-38-1-1	SS	N	2024-09-24	Clear and colourless		550		17.0	<	0.015		0.252		0.014		0.266		48.0	7.25	550	12.9	310	338	2.33	0.268		0.400		8.62	<	0.010	<	0.005		190		0.031		105	<	0.100		0.060	
Gw-38-1-1	SS	N	2024-11-22	Very slightly turbid, colourless		540		18.0	<	0.015		0.383	<	0.005		0.383		48.0	7.24	540	11.7	250	341	3.03	0.273		0.404		8.03	<	0.010	<	0.005		178		0.031		104		0.140		0.099	
Gw-38-1-1	SS	N	2025-03-05	Clear and colourless		731		17.0	<	0.015		0.296	<	0.005		0.296		52.0	7.35	731	10.2	310	338	2.98	0.260		0.405		7.96	<	0.010	<	0.005		174		0.029		103	<	0.100		0.136	
Gw-39-1-1	FRM	N	2024-05-09	Mean of duplicates		310		10.00	<	0.015		8.58		0.025		8.60		49.0	7.70	310	12.0	94.0	171	5.08	0.736		0.294		10.4	<	0.010	<	0.005		18.0		0.014		60.1		0.100		0.020	
Gw-39-1-1	FRM	N	2024-09-24	Mean of duplicates		327		13.0	<	0.015		6.13		0.033		6.16		64.0	7.69	327	12.3	92.0	178	4.95	0.759		0.318		9.48	<	0.010	<	0.005		13.0		0.017		63.0	<	0.100		0.027	
Gw-39-1-1	FRM	N	2024-11-19	Mean of duplicates		301		12.0	<	0.015		3.47	<	0.005		3.47		70.5	7.70	301	11.0	91.5	169	6.90	0.815		0.471		9.87	<	0.010	<	0.005		15.5		0.021		59.4		0.115		0.024	
Gw-39-1-1	FRM	N	2025-03-05	Mean of duplicates		417		11.0	<	0.015		6.86	<	0.005		6.86		66.5	7.80	417	10.9	92.5	179	3.25	0.725		0.380		8.23	<	0.010	<	0.005		21.0		0.012		62.6	<	0.100		0.023	
Gw-39-2-1	SS	N	2024-05-09	Clear and colourless		376		25.0	<	0.015		1.05	<	0.005		1.05		36.0	7.46	376	13.8	170	215	5.86	0.487		0.495		2.47	<	0.010	<	0.005		872		0.008		73.9	<	0.100		0.033	
Gw-39-2-1	SS	N	2024-09-24	Clear and colourless		299		12.0	<	0.015		0.776	<	0.005		0.776		31.0	7.57	299	12.5	150	175	1.63	0.483		0.524		1.94	<	0.010	<	0.005		1090	<	0.005		60.6	<	0.100		0.016	
Gw-39-2-1	SS	N	2024-11-18	Clear and colourless		323		15.0		0.023		0.244	<	0.005		0.244		34.0	7.83	323	12.2	160	201	1.49	0.509		0.491		2.04	<	0.010	<	0.005		1020	<	0.005		69.3		0.280		0.024	
Gw-39-2-1	SS	N	2025-03-03	Clear and colourless		514		26.0		0.023		1.45		0.005		1.46		58.0	7.50	514	12.2	150	246	0.99	0.618		0.416		2.43	<	0.010	<	0.005		710		0.005		85.4	<	0.100		0.037	
Gw-40-1-1	SS	N	2024-05-09	Clear and colourless		383		15.0		0.077		4.84		0.018		4.86		49.0	7.19	383	12.7	170	225	11.5	0.242		0.098		7.46	<	0.010	<	0.005		138		0.006		76.6		0.230		0.250	
Gw-40-1-1	SS	N	2024-09-20	Clear and colourless		486		21.0		0.320		3.73		0.031		3.76		56.0	7.07	486	13.6	220	269	2.26	0.225		0.105		9.26	<	0.010	<	0.005		165		0.008		91.7		0.120		0.331	
Gw-40-1-1	SS	N	2024-11-19	Clear and colourless		473		19.0		0.600		2.92	<	0.005		2.92		63.0	7.08	473	12.8	230	284	1.14	0.194		0.107		8.50	<	0.010	<	0.005		137		0.007		98.6		0.150		0.287	
Gw-40-1-1	SS	N	2025-03-05	Clear and colourless		455		17.0		0.230		3.11	<	0.005		3.11		61.0	7.08	455	12.8	190	244	2.87	0.204		0.094		7.64	<	0.010	<	0.005		125	<	0.005		83.7		0.150		0.320	
Gw-41-1-1	FRM	Y	2024-05-15	Mean of duplicates		313		7.95		0.017		0.101	<	0.005		0.101		48.0	7.52	313	11.4	150	192	3.13	0.069		3.79		2.51	<	0.010	<	0.005		33.5	<	0.005		65.3	<	0.100		0.024	
Gw-41-1-1	FRM	Y	2024-09-13	Mean of duplicates		343		7.80		0.036		0.101	<	0.005		0.101		56.0	7.30	343	12.2	160	201	1.57	0.038		3.28		1.83	<	0.010	<	0.005		33.0		0.012		68.6	<	0.100		0.053	
Gw-41-1-1	FRM	Y	2024-11-08	Mean of duplicates		323		7.10		0.048		0.128	<	0.005		0.128		51.5	7.36	323	10.8	160	198	2.31	0.050		4.37		1.30	<	0.010	<	0.005		31.0		0.008		66.8	<	0.100		0.054	
Gw-41-1-1	FRM	Y	2025-02-12	Mean of duplicates		346		6.50		0.040		0.053	<	0.005		0.053		48.0	7.40	346	10.7	150	192	1.19	0.046		3.35		1.16	<	0.010	<	0.005		26.0		0.005		65.1	<	0.100		0.041	
Gw-42-1-1	FRM	Y	2024-05-16	Mean of duplicates		399		21.0		0.072	<	0.020	<	0.005	<	0.020		55.0	7.12	399	9.50	205	257	13.5	0.022		0.162		15.0		0.011	<	0.005		69.0	<	0.005		93.1		0.210		0.079	
Gw-42-1-1	FRM	Y	2024-09-13	Mean of duplicates		442		23.0		0.077	<	0.020	<	0.005	<	0.020		73.5	6.93	442	10.7	210	285	3.72	< 0.020		0.246		15.6		0.016	<	0.005		70.5	<	0.005		104		0.220		0.052	
Gw-42-1-1	FRM	Y	2024-11-08	Mean of duplicates		419		26.0		0.090	<	0.020	<	0.005	<	0.020		70.0	7.02	419	10.5	200	287	6.09	< 0.020		0.171		15.4		0.017	<	0.005		84.5		0.006		104		0.255		0.062	
Gw-42-1-1	FRM	Y	2025-02-14	Mean of duplicates		385		24.0		0.073	<	0.020	<	0.005	<	0.020		65.5	7.75	385	9.00	190	261	6.16	< 0.020		0.115		14.6		0.012	<	0.005		67.5	<	0.005		94.1		0.195		0.072	
Gw-43-1-1	SS	N	2024-05-15	Clear and colourless		496		15.0	<	0.015	<	0.020	<	0.005	<	0.020		74.0	7.43	496	12.0	250	311	6.78	0.371		0.268		9.41	<	0.010	<	0.005		637		0.021		108	<	0.100		0.045	
Gw-43-1-1	NS	N	2024-09-26	Dry		---		---		---		---		---		---		---	---	---	---	---	---	---	---		---		0.000		---		0.000		---		---		---		---		---	
Gw-43-1-1	SS	N	2024-11-25	Clear and colourless		487		14.0	<	0.015	<	0.020	<	0.005	<	0.020		71.0	7.36	487	11.4	250	328	3.63	0.226		0.250		7.21	<	0.010	<	0.005		635		0.015		115	<	0.100		0.049	
Gw-43-1-1	SS	N	2025-03-06	Clear and colourless		656		15.0	<	0.015	<	0.020	<	0.005	<	0.020		80.0	7.65	656	10.9	250	312	3.85	0.988		0.211		9.29	<	0.010	<	0.005		662		0.021		109		0.100		0.037	
Gw-44-1-1	SS	N	2024-05-15	Clear and colourless		347		5.60	<	0.015		0.023	<	0.005		0.023		38.0	7.65	347	11.5	190	214	9.10	0.263		0.059		9.82	<	0.010	<	0.005		135		0.016		77.8	<	0.100		0.016	
Gw-44-1-1	SS	N	2024-09-26	Clear and colourless		350		6.60	<	0.015		0.026	<	0.005		0.026		40.0	7.42	350	11.3	190	220	12.5	0.228		0.065		9.06	<	0.010	<	0.005		91.0		0.015		80.2		0.130		0.037	
Gw-44-1-1	SS	N	2024-11-25	Clear and colourless		346		5.50	<	0.015	<	0.020	<	0.005	<	0.020		39.0	7.41	346	11.2	190	220	3.83	0.201		0.052		9.37	<	0.010	<	0.005		105		0.014		79.7	<	0.100		0.008	
Gw-44-1-1	SS	N	2025-03-06	Clear and colourless		481		5.80	<	0.015	<	0.020	<	0.005	<	0.020		56.0	7.55	481	9.60	180	213	4.36	0.270		0.056		8.47	<	0.010	<	0.005		104		0.014		77.1	<	0.100		0.015	
Gw-51-1-1	SS	N	2024-09-19	Clear and colourless		421		16.0	<	0.015		17.2	*b*	0.310		17.5	*b*	75.0	6.66	421	13.0	100.0	219	3.97	0.038		0.363		6.29	<	0.010	<	0.005		68.0		0.017		75.1	<	0.100		0.053	
Gw-51-1-1	SS	N	2024-11-12	Clear and colourless		283		11.0	<	0.015		1.92	<	0.005		1.92		60.0	7.03	283	11.6	98.0	165	1.66	0.043		0.361		3.67	<	0.010	<	0.005		69.0		0.007		56.5	<	0.100		0.035	
Gw-51-2-1	SS	N	2024-09-19	Clear and colourless		285		30.0		0.044		0.027	<	0.005		0.027		38.0	7.51	285	11.3	140	182	4.19	0.179		0.735		33.8	<	0.010	<	0.005		172		0.019		50.4	<	0.100		0.061	
Gw-51-2-1	SS	N	2024-11-13	Clear and colourless		317		27.0	<	0.015	<	0.020	<	0.005	<	0.020		37.0	7.72	317	10.7	140	185	2.71	0.187		0.811		30.3	<	0.010	<	0.005		175		0.010		51.8	<	0.100		0.070	
Gw-51-3-1	SS	N	2024-09-20	Very slightly turbid, colourless		328		56.0		0.170		0.095	<	0.005		0.095		16.0	7.59	328	11.3	120	187	1.46	0.133		0.478		27.9	<	0.010	<	0.005		262		0.007		51.8		0.180		0.024	
Gw-51-3-1	SS	N	2024-11-13	Clear and colourless		315		50.0	<	0.015		0.161	<	0.005		0.161		17.0	7.71	315	10.5	120	188	11.1	0.141		0.441		29.2	<	0.010	<	0.005		224		0.007		52.1	<	0.100		0.038	
Gw-52-1-1	SS	N	2024-05-14	Clear and colourless		1471		170		28.0	*a*	< 0.020	<	0.005	<	0.020	<	1.00	7.07	1471	14.0	850	481	1.10	0.053		0.241		111	<	0.020	<	0.010		3060	<	0.010		127		1.06		2.44	
Gw-52-1-1	SS	N	2024-09-19	Clear and colourless		1402		160		29.0	*a*	< 0.020		0.011	<	0.021	<	1.00	6.92	1402	14.6	910	485	3.70	0.054		0.221		114	<	0.020	<	0.010		2900	<	0.010		127		1.04		2.38	
Gw-52-1-1	SS	N	2024-11-18	Clear and colourless		1659		170		28.0	*a*	< 0.020	<	0.005	<	0.020	<	1.00	7.05	1659	12.9	910	499	4.10	< 0.100		0.190		109	<	0.050	<	0.025		3560	<	0.025		129		1.09		2.13	
Gw-52-1-1	SS	N	2025-03-05	Clear and colourless		1636		170		19.0	*a*	< 0.020	<	0.005	<	0.020	<	1.00	7.05	1636	13.6	840	480	1.50	0.054		0.210		108	<	0.020	<	0.010		3060	<	0.010		126		1.01		2.10	
Gw-52-4-0 (P7)	SS	N	2024-05-14	Clear, very slightly yellow		---		290	*b*	150	*a*	< 0.020	<	0.005	<	0.020		12.0	---	---	---	---	1500	535	10.8		0.100		4.92		466	<	0.010	<	0.005		2490	<	0.005		119		2.03		5.41	
Gw-52-4-0 (P7)	SS	N	2024-09-20	Clear and colourless		3407		330	*b*	160	*a*	< 0.020		0.006	<	0.020	<	1.00	6.72	3407	18.7	1500	573	12.4	0.116		5.62		515	<	0.020	<	0.010		3010	<	0.010		123		2.38		6.53	
Gw-52-4-0 (P7)	SS	N	2024-11-18	Clear, very slightly yellow		2805		270	*b*	160	*a*	< 0.100	<	0.025	<	0.100		40.0	6.72	2805	16.6	1200	474	10.3	0.141		3.69		309	<	0.020	<	0.010		2360	<	0.010		104		2.88		4.97	
Gw-52-4-0 (P7)	SS	N	2025-03-05	Clear, very slightly yellow		3494		270	*b*	170	*a*	< 0.020	<	0.005	<	0.020		11.0		3494	15.6	1400	514	11.8	0.105		3.82		451	<	0.024	<	0.010		2840	<	0.010		114		2.62		5.55	
Gw-53-1-1	SS	Y	2024-05-14	Clear and colourless		371		6.60		0.032	<	0.020	<	0.005	<	0.020		53.0	7.57	371	11.9	190	234	4.32	0.029		0.150		32.0	<	0.010	<	0.005		474		0.018		81.5	<	0.100		0.545	
Gw-53-1-1	SS	Y	2024-09-24	Clear and colourless		373		7.60	<	0.015	<	0.020	<	0.005	<	0.020		54.0	7.27	373	12.2	190	237	2.09	< 0.020		0.131		25.5	<	0.010	<	0.005		470		0.007		82.8	<	0.100		0.435	
Gw-53-1-1	SS	Y	2024-11-14	Clear and colourless		352		7.10	<	0.015	<	0.020	<	0.005	<	0.020		53.0	7.48	352	9.90	200	246	2.06	< 0.020		0.090		17.5	<	0.010	<	0.005		520		0.012		86.1	<	0.100		0.355	
Gw-53-1-1	SS	Y	2025-02-14	Clear and colourless		358		7.50	<	0.015	<	0.020	<	0.005	<	0.020		67.0	8.75	358	9.20	190	264	1.19	< 0.020		0.097		16.7	<	0.010	<	0.005		477	<	0.005		92.3	<	0.100		0.293	
Gw-55-1-1	SS	Y	2024-09-13	Clear and colourless		296		18.0	<	0.015		0.483	<	0.005		0.483		39.0	7.26	296	10.8	160	192	1.43	0.090		0.182		5.04	<	0.010	<	0.005		14.0	<	0.005		67.4		0.100		0.025	
Gw-55-1-1	SS	Y	2024-11-08	Clear and colourless		338		17.0		0.020		0.451	<	0.005		0.451		42.0	7.24	338	10.1	170	200	2.14	0.116		0.144		5.24	<	0.010	<	0.005		20.0		0.006		70.1		0.310		0.016	
Gw-56-1-1	SS	Y	2024-05-22	Clear and colourless		277		14.0	<	0.015	<	0.020	<	0.005	<	0.020		36.0	7.79	277	9.40	150	209	7.88	0.045		0.158		25.9	<	0.010	<	0.005		24.0		0.019		73.9		0.730		0.014	
Gw-56-1-1	SS	Y	2024-09-13	Clear and colourless		293		12.0	<	0.015	<	0.020	<	0.005	<	0.020		39.0	6.92	293	10.5	150	192	2.89	0.041		0.202		29.8	<	0.010	<	0.005		16.0		0.014		67.4	<	0.100		0.010	
Gw-56-1-1	SS	Y	2024-11-08	Clear and colourless		295		12.0	<	0.015	<	0.020	<	0.005	<	0.020		38.0	7.54	295	10.5	140	178	6.26	0.049		0.158		34.8	<	0.010	<	0.005		19.0		0.017		62.5	<	0.100		0.007	
Gw-56-1-1	SS	Y	2025-02-13	Clear and colourless		383		23.0		0.084	<	0.020	<	0.005	<	0.020		63.0	8.26	383	9.10	190	248	5.58	< 0.020		0.085		14.1		0.016	<	0.005		67.0	<	0.005		89.6		0.240		0.076	
Gw-57-1-1	SS	Y	2024-09-13	Clear and colourless		326		12.0	<	0.015	<	0.020	<	0.005	<	0.020		41.0	7.44	326	10.7	170	204	1.31	0.021		0

Appendix B-1. Groundwater Quality Data 2024-2025

AECOM

BC CSR				AW Maximum (1)	20-90 (5)		40-160 (5)					10,000	250-1,500 (5)				20			0.5-15 (5)				3		1,000		85		75-2,400 (5)	
				DW Maximum (2)	1,500	(6)	10	33 (9)		(6)		250	80				10			20	1,700 (8)	2,500			2500			20	20	3,000	
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Sulphur	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Zirconium
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/l	µg/l	µg/l	µg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	mg/L	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
				Method Detection Limit	0.05	1	0.005	0.5	0.05	0.05	0.05	0.02	2	0.05	0.04	50	0.005	0.05	0.05	3	0.002	0.2	0.5	0.002	0.2	0.1	0.1
Gw-30-1-1	SS	Y	2024-05-24	Clear and colourless	0.107	3.40	0.011	1.77	7.81	11.0	1.28	0.200	9.50	0.561	< 0.040	7830	< 0.005	19.4	540	10.2	0.004	< 0.200	< 0.500	0.303	0.340	0.410	< 0.100
Gw-30-1-1	SS	Y	2024-09-13	Clear and colourless	0.587	2.50	0.011	1.74	7.96	14.3	1.26	0.279	9.30	0.598	< 0.040	7690	< 0.005	19.3	525	10.8	0.004	< 0.200	< 0.500	0.319	0.410	0.640	< 0.100
Gw-30-1-1	FRM	Y	2024-11-08	Mean of duplicates	0.079	4.40	0.015	1.93	7.82	28.7	0.854	0.242	9.15	0.573	< 0.040	7800	< 0.005	19.6	488	11.1	0.006	< 0.200	< 0.500	0.306	< 0.200	0.320	< 0.100
Gw-30-1-1	SS	Y	2025-02-14	Clear and colourless	0.104	10.9	0.025	2.07	8.11	44.2	0.904	0.295	8.20	0.594	< 0.040	7360	< 0.005	22.3	504	11.2	0.005	< 0.200	< 0.500	0.338	0.230	0.450	< 0.100
Gw-30-1-2	FRM	Y	2024-05-24	Mean of duplicates	0.487	25.9	0.010	< 0.500	7.96	0.477	2.66	0.668	13.6	2.07	0.046	5635	< 0.005	32.3	390	15.3	0.003	< 0.200	< 0.500	0.263	0.315	9.04	< 0.100
Gw-30-1-2	FRM	Y	2024-09-13	Mean of duplicates	1.31	3.95	0.020	< 0.500	7.73	3.02	5.79	0.745	15.2	2.28	0.103	5395	< 0.005	34.0	362	16.4	< 0.002	< 0.200	< 0.500	0.347	0.470	6.96	< 0.100
Gw-30-1-2	SS	Y	2024-11-08	Clear and colourless	0.721	7.70	0.007	< 0.500	5.96	0.271	2.73	0.755	11.8	2.09	0.097	5290	< 0.005	35.0	250	16.9	0.002	< 0.200	< 0.500	0.183	0.250	30.2	< 0.100
Gw-30-1-2	FRM	Y	2025-02-14	Mean of duplicates	0.762	2.15	< 0.005	< 0.500	2.14	0.282	0.430	0.568	7.05	1.18	0.066	3845	< 0.005	24.3	69.3	6.30	< 0.002	< 0.200	< 0.500	0.007	0.215	41.9	< 0.100
Gw-31-1-1	FRM	Y	2024-05-21	Mean of duplicates	0.489	5.15	0.041	< 0.500	12.0	21.4	0.813	0.289	6.75	0.777	0.101	5425	< 0.005	8.10	492	70.6	0.002	< 0.200	< 0.500	0.445	0.330	1.62	< 0.100
Gw-31-1-1	FRM	Y	2024-09-13	Mean of duplicates	0.755	24.4	0.015	< 0.500	11.5	40.1	0.969	0.707	7.65	0.706	0.068	5535	< 0.005	7.48	469	66.6	0.002	< 0.375	< 0.500	0.417	0.345	3.42	< 0.100
Gw-31-1-1	FRM	Y	2024-11-08	Mean of duplicates	0.414	3.45	0.005	< 0.500	11.1	27.1	0.877	0.292	4.45	0.723	0.186	5145	< 0.005	7.10	421	67.2	< 0.002	< 0.200	< 0.500	0.476	0.205	0.795	< 0.100
Gw-31-1-1	SS	Y	2025-02-13	Clear and colourless	0.493	2.70	< 0.005	< 0.500	12.1	33.1	0.836	0.425	2.60	0.677	0.191	4880	< 0.005	7.37	456	75.8	< 0.002	< 0.200	< 0.500	0.443	0.300	0.610	< 0.100
Gw-31-1-2	SS	Y	2024-05-21	Clear and colourless	0.878	18.3	0.006	< 0.500	12.1	0.643	0.513	0.157	< 2.00	0.702	0.195	5190	< 0.005	7.20	382	60.2	0.003	< 0.200	< 0.500	0.511	0.500	1.46	< 0.100
Gw-31-1-2	SS	Y	2024-09-12	Clear and colourless	1.01	2.50	0.008	< 0.500	11.0	2.55	0.589	0.189	4.20	0.810	0.127	5400	< 0.005	7.42	365	54.6	0.002	< 0.200	< 0.500	0.442	0.540	1.70	< 0.100
Gw-31-1-2	SS	Y	2024-11-08	Clear and colourless	1.19	2.70	0.007	< 0.500	11.7	0.482	0.779	0.251	3.00	0.832	0.228	4620	< 0.005	7.13	354	78.0	0.002	< 0.200	< 0.500	0.516	0.400	1.68	< 0.100
Gw-31-1-2	SS	Y	2025-02-13	Clear and colourless	0.910	3.20	0.006	< 0.500	11.1	0.389	0.534	0.303	< 2.00	0.629	0.164	4680	< 0.005	6.89	366	65.3	< 0.002	< 0.200	< 0.500	0.545	0.380	1.52	< 0.100
Gw-36-3-1	SS	N	2024-05-09	Clear and colourless	1.00	11.3	0.007	0.560	31.2	1.67	0.250	0.294	10.1	0.737	0.099	11100	< 0.005	10.2	389	64.0	0.004	< 0.200	< 0.500	0.236	0.250	0.920	< 0.100
Gw-36-3-1	SS	N	2024-09-23	Clear and colourless	0.974	2.50	0.005	0.590	30.7	0.361	0.259	1.37	7.70	0.719	0.115	10200	< 0.005	8.91	400	66.9	0.004	< 0.200	< 0.500	0.252	0.310	0.550	< 0.100
Gw-36-3-1	SS	N	2024-11-19	Clear and colourless	1.01	1.40	< 0.005	< 0.500	30.1	1.17	0.272	0.244	8.20	0.723	0.133	11400	< 0.005	9.20	406	69.1	0.005	< 0.200	< 0.500	0.263	0.250	0.620	< 0.100
Gw-36-3-1	SS	N	2025-03-05	Clear and colourless	1.17	2.60	< 0.005	0.850	32.7	0.160	0.318	0.372	9.40	0.782	0.108	11000	< 0.005	9.63	474	68.1	0.008	< 0.200	< 0.500	0.297	0.230	0.830	< 0.100
Gw-37-3-1	SS	N	2024-05-09	Clear and colourless	0.104	1230	0.006	< 0.500	11.2	467	0.359	1.19	6.40	0.508	< 0.040	11400	< 0.005	8.54	246	30.4	0.011	< 0.200	< 0.500	0.140	0.470	0.700	< 0.100
Gw-37-3-1	SS	N	2024-09-27	Clear and colourless	0.098	1640	0.011	< 0.500	10.9	485	0.417	1.50	9.50	0.542	< 0.040	12200	< 0.005	8.13	258	30.1	0.014	< 0.200	< 0.500	0.189	0.430	0.660	< 0.100
Gw-37-3-1	SS	N	2024-11-19	Clear and colourless	0.742	1220	0.015	< 0.500	11.7	471	0.408	1.77	9.00	0.549	0.049	11500	< 0.005	8.87	280	52.3	0.011	< 0.200	< 0.500	0.218	0.370	1.35	< 0.100
Gw-37-3-1	SS	N	2025-03-03	Clear and colourless	0.682	701	0.015	< 0.500	10.7	398	0.388	1.75	7.40	0.506	0.047	10200	< 0.005	8.60	263	42.0	0.011	< 0.200	< 0.500	0.196	0.360	0.700	< 0.100
Gw-38-1-1	SS	N	2024-05-14	Clear and colourless	0.897	13.2	0.018	0.560	19.0	0.113	1.99	4.01	4.30	0.349	0.327	13900	< 0.005	10.5	574	13.0	0.002	< 0.200	< 0.500	0.526	1.64	1.77	< 0.100
Gw-38-1-1	SS	N	2024-09-24	Clear and colourless	0.818	4.20	0.020	0.630	18.6	1.74	2.43	4.67	3.40	0.392	0.261	13800	< 0.005	12.3	595	15.0	< 0.002	< 0.200	< 0.500	0.625	1.86	1.80	< 0.100
Gw-38-1-1	SS	N	2024-11-22	Very slightly turbid, colourless	0.542	3.60	0.007	0.790	19.6	0.129	2.68	4.63	5.60	0.385	0.278	14500	< 0.005	13.4	573	15.0	0.002	< 0.200	< 0.500	0.526	1.82	1.55	< 0.100
Gw-38-1-1	SS	N	2025-03-05	Clear and colourless	1.19	8.00	0.007	0.760	19.7	0.226	2.40	4.52	3.30	0.368	0.365	13600	< 0.005	12.6	599	15.5	0.002	< 0.200	< 0.500	0.550	1.92	1.51	< 0.100
Gw-39-1-1	FRM	N	2024-05-09	Mean of duplicates	0.312	3.45	0.007	< 0.500	5.03	0.096	3.27	0.158	2.90	0.315	0.388	5015	< 0.005	5.86	357	16.8	< 0.002	< 0.200	< 0.500	0.282	1.53	0.695	< 0.100
Gw-39-1-1	FRM	N	2024-09-24	Mean of duplicates	0.382	3.80	0.016	< 0.500	4.94	0.159	3.43	0.189	2.70	0.334	0.519	4990	< 0.005	5.21	363	21.1	< 0.002	< 0.200	< 0.500	0.309	1.51	0.825	< 0.100
Gw-39-1-1	FRM	N	2024-11-19	Mean of duplicates	0.407	10.6	0.008	< 0.500	4.91	0.204	2.90	0.255	< 2.00	0.326	0.795	5070	< 0.005	4.65	363	21.5	< 0.002	< 0.200	< 0.500	0.298	1.60	1.72	< 0.100
Gw-39-1-1	FRM	N	2025-03-05	Mean of duplicates	0.417	8.15	< 0.005	< 0.500	5.38	0.084	4.05	0.264	< 2.00	0.309	0.769	4725	< 0.005	4.71	397	19.4	< 0.002	< 0.200	< 0.500	0.263	1.66	0.695	< 0.100
Gw-39-2-1	SS	N	2024-05-09	Clear and colourless	0.358	8.50	< 0.005	< 0.500	7.45	12.4	1.75	0.308	2.50	0.222	1.54	7850	< 0.005	3.97	379	10.6	< 0.002	< 0.200	< 0.500	0.273	1.05	0.570	< 0.100
Gw-39-2-1	SS	N	2024-09-24	Clear and colourless	0.314	1.10	< 0.005	< 0.500	5.71	5.09	1.87	0.170	< 2.00	0.206	1.54	7880	< 0.005	3.59	318	9.30	< 0.002	< 0.200	< 0.500	0.237	1.24	1.28	< 0.100
Gw-39-2-1	SS	N	2024-11-18	Clear and colourless	0.315	4.50	< 0.005	< 0.500	6.83	8.40	1.57	0.241	< 2.00	0.210	0.807	8710	< 0.005	3.86	334	10.5	< 0.002	< 0.200	< 0.500	0.312	1.10	< 0.100	< 0.100
Gw-39-2-1	SS	N	2025-03-03	Clear and colourless	0.400	1.80	< 0.005	< 0.500	7.99	16.8	1.67	0.288	2.40	0.238	0.926	7180	< 0.005	4.04	446	18.2	< 0.002	< 0.200	< 0.500	0.362	1.05	0.170	< 0.100
Gw-40-1-1	SS	N	2024-05-09	Clear and colourless	1.64	14.5	0.031	1.00	8.25	1.36	0.702	1.11	6.60	0.377	0.048	7300	< 0.005	10.9	409	15.6	< 0.002	< 0.200	< 0.500	0.588	0.260	4.07	< 0.100
Gw-40-1-1	SS	N	2024-09-20	Clear and colourless	1.58	5.60	0.016	0.850	9.74	13.1	0.815	1.13	4.60	3.50	0.068	7410	< 0.005	11.7	493	18.5	< 0.002	< 0.200	< 0.500	0.768	0.260	7.42	< 0.100
Gw-40-1-1	SS	N	2024-11-19	Clear and colourless	1.75	2.80	0.011	< 0.500	9.29	50.0	0.950	0.935	2.20	3.49	0.060	7530	< 0.005	10.1	513	19.4	0.002	< 0.200	< 0.500	0.854	0.300	4.51	< 0.100
Gw-40-1-1	SS	N	2025-03-05	Clear and colourless	2.03	4.40	0.017	1.02	8.63	9.16	0.595	1.07	< 2.00	3.28	0.053	7080	< 0.005	10.7	458	17.4	< 0.002	< 0.200	< 0.500	0.641	0.320	4.54	< 0.100
Gw-41-1-1	FRM	Y	2024-05-15	Mean of duplicates	0.183	10.2	0.006	< 0.500	6.88	8.22	1.67	0.113	3.45	0.874	0.053	7210	< 0.005	5.66	191	15.2	< 0.002	< 0.200	< 0.500	0.185	< 0.200	0.355	< 0.100
Gw-41-1-1	FRM	Y	2024-09-13	Mean of duplicates	0.496	19.3	0.007	< 0.500	7.21	228	2.64	0.213	2.95	0.899	0.103	7290	< 0.005	5.17	212	16.3	0.002	< 0.200	< 0.500	0.232	0.205	0.355	< 0.100
Gw-41-1-1	FRM	Y	2024-11-08	Mean of duplicates	0.307	5.50	0.007	< 0.500	6.99	249	2.40	0.182	2.55	0.814	< 0.040	7515	< 0.005	5.22	198	15.6	0.003	< 0.200	< 0.500	0.214	< 0.200	0.600	< 0.100
Gw-41-1-1	FRM	Y	2025-02-12	Mean of duplicates	0.246	3.55	0.006	< 0.500	7.11	90.8	1.90	0.160	< 2.00	0.763	< 0.040	7305	< 0.005	4.95	205	14.0	< 0.002	< 0.200	< 0.500	0.192	< 0.200	0.330	< 0.100
Gw-42-1-1	FRM	Y	2024-05-16	Mean of duplicates	0.094	717	0.017	< 0.500	5.82	161	0.243	0.165	7.05	1.02	< 0.040	6045	< 0.005	9.15	359	18.2	< 0.002	< 0.200	0.99	0.054	0.790	0.380	< 0.100
Gw-42-1-1	FRM	Y	2024-09-13	Mean of duplicates	0.121	675	0.007	< 0.500	6.16	158	0.371	0.159	6.80	0.968	< 0.040	6760	< 0.005	9.78	420	24.7	< 0.002	< 0.200	< 0.505	0.078	0.820	0.330	< 0.100
Gw-42-1-1	FRM	Y	2024-11-08	Mean of duplicates	0.066	730	0.005	< 0.500	6.12	158	0.308	0.172	6.60	1.03	< 0.040	7075	< 0.005	9.65	389	23.9	< 0.002	< 0.200	< 0.500	0.061	0.825	0.145	0.105
Gw-42-1-1	FRM	Y	2025-02-14	Mean of duplicates	0.094	690	0.006	< 0.500	6.21	157	0.268	0.137	4.00	1.06	< 0.040	5940	< 0.005	10.1	363	22.1	< 0.002	< 0.200	< 0.500	0.047	0.745	0.260	< 0.100
Gw-43-1-1	SS	N	2024-05-15	Clear and colourless	3.48	4.00	0.029	0.820	10.00	0.963	0.866	0.466	3.90	0.466	0.049	11100	< 0.005	9.99	454	25.3	< 0.002	< 0.200	< 0.500	0.156	1.19	1.40	< 0.100
Gw-43-1-1	NS	N	2024-09-26	Dry	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-43-1-1	SS	N	2024-11-25	Clear and colourless	3.00	3.40	< 0.005	0.840	10.2	2.15	0.763	0.479	2.10	0.437	0.048	11200	< 0.005	9.11	469	24.6	< 0.002	< 0.200	< 0.500	0.112	1.01	0.770	< 0.100
Gw-43-1-1	SS	N	2025-03-06	Clear and colourless	3.24	10.8	< 0.005	0.980	9.72	0.414	0.767	0.634	2.60	0.454	0.067	10500	< 0.005	9.15	480	25.7	< 0.002	< 0.200	< 0.500	0.199	1.44	1.25	< 0.100
Gw-44-1-1	SS	N	2024-05-15	Clear and colourless	0.547	23.7	0.017	0.580	4.88	0.636	1.08	0.301	10.9	0.360	< 0.040	7280	< 0.005	6.68	188	11.9	< 0.002	< 0.200	< 0.500	0.182	0.300	1.40	< 0.100
Gw-44-1-1	SS	N	2024-09-26	Clear and colourless	0.644	71.5	0.039	0.570	4.89	1.64	0.972	0.292	9.80	0.365	< 0.040	7370	< 0.005	6.03	197	12.4	< 0.002	< 0.200	< 0.500	0.143	0.300	1.69	< 0.100
Gw-44-1-1	SS	N	2024-11-25	Clear and colourless	0.443	2.30	0.006	0.560	5.07	0.575	0.970	0.330	7.60	0.329	< 0.040	7650	< 0.005	6.61	189	12.8	< 0.002	< 0.200	< 0.500	0.150	0.270	1.51	< 0.100
Gw-44-1-1	SS	N	2025-03-06	Clear and colourless	2.09	5.90	0.134	0.530	4.99	0.678	0.894	0.279	8.20	0.355	< 0.040	6900	< 0.005	6.31	206	17.2	< 0.002	< 0.240	< 0.500	0.152	0.320	2.69	< 0.100
Gw-51-1-1	SS	N	2024-09-19	Clear and colourless	1.91	6.10	< 0.005	< 0.500	7.65	2.03	0.146	0.652	3.20	0.566	0.045	5080	< 0.005	5.50	293	25.2	0.004	< 0.200	< 0.500	0.043	0.270	0.550	< 0.100
Gw-51-1-1	SS	N	2024-11-12	Clear and colourless	1.45	1.20	0.008	< 0.500	5.80	0.920	0.175	0.370	4.60	0.388	0.058	5270	< 0.005	4.89	207	18.9	0.004	< 0.200	< 0.500	0.053	0.290	0.220	< 0.100
Gw-51-2-1	SS	N	2024-09-19	Clear and colourless	0.407	2.80	0.012	1.13	13.6	10.2	1.16	0.909	7.40	0.422	0.327	12400	< 0.005	9.66	636	12.1	0.006	< 0.200	< 0.500	0.539	0.530	1.01	< 0.100
Gw-51-2-1	SS	N	2024-11-13	Clear and colourless	0.436	1.30	0.017	1.15	13.5	13.5	1.21	0.809	6.10	0.402	0.146	12400	< 0.005	10.9	605	14.0	0.005	< 0.200	< 0.500	0.434	0.530	0.610	< 0.100
Gw-51-3-1	SS	N	2024-09-20	Very slightly turbid, colourless	0.472	2.40	0.041	1.22	14.0	0.619	0.470	0.889	6.50	0.337	0.071	15400	< 0.005	7.81	729	4.70	0.003	< 0.200	< 0.500	0.060	0.280	0.800	< 0.100
Gw-51-3-1	SS	N	2024-11-13	Clear and colourless	0.699	21.3	0.043	1.20	14.2	0.964	0.429	0.914	8.40	0.357	0.058	14700	< 0.005	7.94	704	5.80	0.002	< 0.200	< 0.500	0.067	0.310	0.890	< 0.100
Gw-52-1-1	SS	N	2024-05-14	Clear and colourless	< 0.100	558	0.041	4.80	39.9	361	0.470	11.6	19.2	14.8	< 0.080	37600	< 0.010	224	3220	< 6.00	< 0.004	< 0.400	< 1.00	< 0.004	0.740	0.400	< 0.200
Gw-52-1-1	SS	N	2024-09-19	Clear and colourless	< 0.100	552	0.061	4.70	40.7	369	0.510	11.0	18.6	14.5	< 0.080	33400	< 0.010	215	3210	< 6.00	< 0.004	< 0.400	< 1.00	< 0.004	0.650	2.47	< 0.200
Gw-52-1-1	SS	N	2024-11-18	Clear and colourless	< 0.250	538	< 0.025	5.20	43.1	382	0.540	11.4	< 10.00	14.7	0.220	38400	< 0.025	229	3020	< 15.0	< 0.010	< 1.00	< 2.50	< 0.010	< 1.00	0.930	< 0.500
Gw-52-1-1	SS	N	2025-03-05	Clear and colourless	0.250	530	< 0.010	4.90	40.0	363	0.480	11.0	11.2	14.5	< 0.080	35100	< 0.010	216	3260	< 6.00	< 0.004	< 0.400	< 1.00	< 0.004	0.830	0.490	< 0.200
Gw-52-4-0 (P7)	SS	N	2024-05-14	Clear, very slightly yellow	0.973	19100	0.039	1.79	57.6	1070	0.632	13.8	326	106	0.194	19300	< 0.005	293	1220	< 3.00	< 0.002	0.600	1.81	0.027	2.56	3.88	0.630
Gw-52-4-0 (P7)	SS	N	2024-09-20	Clear and colourless	0.350	20300	0.040	2.30	64.4	1140	0.700	17.8	232	118	0.164	19900	< 0.010	346	1360	< 6.00	< 0.004	0.900	1.80	0.020	2.95	12.1	0.710
Gw-52-4-0 (P7)	SS	N	2024-11-18	Clear, very slightly yellow	0.700	11900	0.026	1.60	52.2	1040	0.920	14.3	141	91.1	0.152	17300	0.011	268	1020	15.4	< 0.004	0.550	2.60	0.047	3.09	5.87	0.650
Gw-52-4-0 (P7)	SS	N	2025-03-05	Clear, very slightly yellow	0.560	18100	< 0.010	1.80	55.6	1140	0.840	17.0	340	116	0.165	17400	< 0.010	323	1440	< 6.00	< 0.004	0.660	2.80	0.014	3.12	13.2	0.690
Gw-53-1-1	SS	Y	2024-05-14	Clear and colourless	0.120	248	0.008	< 0.500	7.29	261	0.579	0.739	3.40	0.291	< 0.040	12000	< 0.005	3.50	334	15.9	0.015	< 0.200	< 0.500	0.076	< 0.200	0.390	< 0.100
Gw-53-1-1	SS	Y	2024-09-24	Clear and colourless	0.098	292	0.006	< 0.500	7.34	214	0.593	0.547	3.20	0.265	< 0.040	11400	< 0.005	3.37	346	17.4	0.008	< 0.200	< 0.500	0.072	< 0.200	0.480	< 0.100
Gw-53-1-1	SS	Y	2024-11-14	Clear and colourless	0.131	314	0.009	< 0.500	7.53	162	0.704	0.461	< 2.00	0.238	< 0.040	12500	< 0.005	3.71	315	18.7	0.011	< 0.200	< 0.500	0.100	< 0.200	0.290	< 0.100
Gw-53-1-1	SS	Y	2025-02-14	Clear and colourless	0.112	372	< 0.005	< 0.500	8.22	158	0.676	0.352	< 2.00	0.237	< 0.040	10800	< 0.005	4.04	345	19.4	0.011	< 0.200	< 0.500	0.071	< 0.200	0.300	< 0.100
Gw-55-1-1	SS	Y	2024-09-13	Clear and colourless	0.349	2.70	< 0.005	< 0.500	5.82	6.68	0.435	0.162	2.60	1.42	0.215	5470	< 0.005	13.0	206	12.1	< 0.002	< 0.200	< 0.500	0.219	0.440	0.370	< 0.100
Gw-55-1-1	SS	Y	2024-11-08	Clear and colourless	0.258	5.90	< 0.005	< 0.500	6.12	3.58	0.416	0.143	< 2.00	1.50	0.231	5560	< 0.005	13.1	200	13.4	0.002	< 0.200	< 0.500	0.261	< 0.200	0.270	< 0.100
Gw-56-1-1	SS	Y	2024-05-22	Clear and colourless	0.204	10.2	0.012	< 0.500	5.99	0.214	1.18	0.380	5.90	0.337	0.181	7310	< 0.005	4.30	266	11.4	0.005	< 0.200	< 0.500	0.101	< 0.200	0.430	< 0.100
Gw-56-1-1	SS	Y	2024-09-13	Clear and colourless	0.358	2.20	< 0.005	< 0.500	5.80	0.766	1.17	0.101	7.00	0.365	0.065	6340	< 0.005	3.83	284	12.5	0.003	< 0.200	< 0.500	0.098	< 0.200	1.02	< 0.100
Gw-56-1-1	SS	Y	2024-11-08	Clear and colourless	0.100	1.50	< 0.005	< 0.500	5.31	0.184	1.16	0.112	7.60	0.377	0.048	6030	< 0.005	3.71	243	10.7	0.003	< 0.200	< 0.500	0.103	< 0.200	0.230	< 0.100
Gw-56-1-1	SS	Y	2025-02-13	Clear and colourless	0.078	656	0.006	< 0.500	5.95	153	0.258	0.205	4.00	1.09	< 0.040	5590	< 0.005	9.38	372	18.9	< 0.002	< 0.200	< 0.500	0.044	0.600	0.420	< 0.100
Gw-57-1-1	SS	Y	2024-09-13	Clear and colourless	0.493	2.20	< 0.005	< 0.500	5.07	3.24	0.323	0.173	2.60	0.466	< 0.040	5910	< 0.005	8.93	208	13.1	0.003	< 0.200	< 0.500	0.031	< 0.200	0.320	< 0.100
Gw-57-1-1	SS	Y	2024-11-12	Clear and colourless	0.396	10.00	0.021	< 0.500	5.49	14.5	0.300	0.346	3.00	0.554	< 0.040	5660	< 0.005	9.68	206	18.4	0.005	< 0.200	< 0.500	0.037	< 0.200	2.35	< 0.100
Gw-58-1-0	NS	N	2024-05-22	Inaccessible this round due to glas plant cons	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-58-1-0	NS	N	2024-09-13	No access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-58-1-0	NS	N	2024-11-07	No access due to construction	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-58-1-0	NS	N	2025-03-15	Not sampled due to construction/access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-60-1-1	SS	N	2024-05-23	Clear and colourless	0.312	75.4	0.007	< 0.500	19.3	105	0.394	0.969	3.50	0.320	< 0.040	11600	< 0.005	18.1	489	11.5	0.007	< 0.200	< 0.500	0.166	< 0.200	0.520	< 0.100
Gw-60-1-1	SS	N	2024-09-10	Clear and colourless	0.414	181	0.007	0.530	20.3	211	0.418	1.18	7.20	0.313	< 0.040	12000	< 0.005	18.7	502	12.4	0.007	< 0.200	< 0.500	0.118	< 0.200	1.13	< 0.100
Gw-60-1-1	SS	N

Appendix B-1. Groundwater Quality Data 2024-2025

AECOM

BC CSR				AW Maximum (1)		1,500		13.1-18.4 (3)		400		2-20 (4)		400		1,280-4,290 (5)								90 (7)		40
				DW Maximum (2)		250				10		1		10		500						9500		6		10		1,000		8				5,000		5				6,000		14 (9)
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter	Specific Conductivity - 25°C (Field)	Chloride		Nitrogen - ammonia		Nitrogen - nitrate		Nitrogen - nitrite		Nitrogen - nitrate plus nitrite		Sulphate		PH (Field)	Specific Conductivity - 25°C (Field)	Temperature (Field)	Alkalinity	Hardness as CaCO3	Aluminum	Antimony		Arsenic		Barium		Beryllium		Bismuth		Boron		Cadmium		Calcium		Chromium		Cobalt
				Fraction	TOT	DIS		DIS		DIS		DIS		DIS		DIS		TOT	TOT	TOT	TOT	DIS	DIS	DIS		DIS		DIS		DIS		DIS		DIS		DIS		DIS		DIS
				Unit	µS/cm	mg/L		mg/l		mg/l		mg/l		mg/l		mg/L		pH	µS/cm	°C	mg/L	mg/L	µg/l	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		mg/L		µg/l		µg/l
				Method Detection Limit	1	1		0.015		0.02		0.005		0.02		1		0.1	1	0.1	1	0.5	0.5	0.02		0.02		0.02		0.01		0.005		10		0.005		0.05		0.1		0.005
Gw-97-1-1	SS	N	2024-05-15	Very slightly turbid, colourless	262	2.10	<	0.015	<	0.020	<	0.005	<	0.020		22.0		8.06	262	13.5	130	142	3.88	0.583		0.194		24.0	<	0.010	<	0.005		50.0	<	0.005		52.2	<	0.100		0.023
Gw-97-1-1	SS	N	2024-09-24	Clear and colourless	308	2.80	<	0.015	<	0.020	<	0.005	<	0.020		46.0		7.45	308	14.3	140	176	4.38	0.672		0.195		32.3	<	0.010	<	0.005		59.0	<	0.005		64.5	<	0.100		0.016
Gw-97-1-1	SS	N	2024-11-19	Clear and colourless	243	< 1.00	<	0.015		0.155	<	0.005		0.155		20.0		7.47	243	12.3	110	122	6.01	0.319		0.119		12.5	<	0.010	<	0.005		32.0	<	0.012		45.7	<	0.100		0.113
Gw-97-1-1	SS	N	2025-02-20	Clear and colourless	252	1.60	<	0.015		0.025	<	0.005		0.025		28.0		7.22	252	9.70	140	158	4.52	0.316		0.093		12.5	<	0.010	<	0.005		35.0	<	0.005		58.9	<	0.100		0.064
Gw-98-1-1	SS	N	2024-05-15	Slightly turbid, very slightly grey	436	5.60	<	0.015		4.79	<	0.005		4.79		160		7.28	436	11.2	120	287	1.32	0.207		0.088		3.73	<	0.010	<	0.005		163		0.009		94.5	<	0.100		0.029
Gw-98-1-1	SS	N	2024-09-24	Clear and colourless	565	6.40	<	0.015		7.79	<	0.005		7.79		210		7.24	565	14.5	110	335	1.50	0.195		0.073		5.09	<	0.010	<	0.005		148		0.009		110	<	0.100		0.053
Gw-98-1-1	SS	N	2024-11-14	Very turbid, very grey	692	6.90		0.043		15.0	b <	0.005		15.0	b	330		6.55	692	12.1	61.0	432	5.21	0.126		0.154		10.9	<	0.010	<	0.005		99.0		0.043		137		0.180		0.188
Gw-98-1-1	SS	N	2025-03-13	Very slightly turbid, colourless	741	38.0	<	0.015		3.89	<	0.005		3.89		380		6.87	741	10.5	86.0	517	373	0.201		0.181		4.64		0.052	<	0.024		153		0.036		170		0.310		0.179
Gw-103-1-1	SS	N	2024-05-24	Very slightly turbid, very slightly grey	442	15.0	<	0.015		5.46		0.156		5.61		130		7.97	442	11.9	110	261	5.80	0.268		1.38		49.2	<	0.010	<	0.005		104	<	0.005		76.2	<	0.100		0.013
Gw-104-1-1	FRM	N	2024-05-23	Mean of duplicates	706	67.0		0.150		3.95	<	0.005		3.95		200		7.26	706	12.1	185	408	27.5	0.193		0.196		7.71	<	0.010	<	0.005		102		0.104		134		0.390		37.2
Gw-104-1-1	NS	N	2025-09-24	No access	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---
Gw-104-1-1	SS	N	2024-12-05	Clear, very slightly yellow	732	29.0		0.061		8.85		0.012		8.86		310		7.03	732	11.9	140	422	4.23	0.193		0.143		7.36	<	0.010	<	0.005		117		0.078		136	<	0.100		39.4
Gw-104-1-1	SS	N	2025-03-13	Clear and colorless	757	22.0		0.081		2.38		0.024		2.40		230		7.34	757	10.5	140	340	11.8	0.195		0.125		5.28	<	0.010	<	0.005		98.0		0.083		111		0.200		27.7
Gw-108-1-1	SS	N	2024-05-24	Clear and colourless	600	32.0	<	0.015	<	0.020	<	0.005	<	0.020		230		7.83	600	11.6	130	393	2.33	0.053		0.370		68.2	<	0.010	<	0.005		133		0.009		104		0.120		0.058
Gw-108-1-1	NS	N	2024-09-27	No access	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		0.000		---		0.000		---		---		---		---		---
Gw-108-1-1	SS	N	2024-12-06	Clear and colourless	601	31.0	<	0.015	<	0.020	<	0.005	<	0.020		240		7.43	601	11.4	130	388	2.36	0.050		0.337		60.2	<	0.010	<	0.005		135		0.012		101	<	0.100		0.070
Gw-108-1-1	SS	N	2025-03-13	Very slightly turbid, colourless	639	26.0	<	0.015	<	0.020	<	0.005	<	0.020		270		7.65	639	11.3	150	433	80.5	0.052		0.370		60.6	<	0.010	<	0.005		141		0.012		116		0.320		0.161
Gw-109-1-1	FRM	N	2024-05-24	Mean of duplicates	375	6.85		0.300	<	0.020	<	0.005	<	0.020		60.0		9.06	375	15.5	145	41.8	3.98	0.300		6.52		6.56	<	0.010	<	0.005		220	<	0.005		10.3	<	0.100		0.020
Gw-109-1-1	NS	N	2024-09-27	No access	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-109-1-1	FRM	N	2024-12-06	Mean of duplicates	412	12.0		0.265		0.057	<	0.005		0.057		73.0		9.10	412	14.8	160	21.0	40.4	0.311		7.47		3.62	<	0.010		0.007		232	<	0.005		4.81	<	0.100		0.032
Gw-109-1-1	FRM	N	2025-03-13	Mean of duplicates	439	13.0		0.290	<	0.020	<	0.005	<	0.020		80.0		9.29	439	15.2	170	11.6	11.9	0.320		7.10		1.99	<	0.010	<	0.005		226		0.024		2.88	<	0.100		0.028
Gw-111-1-1	SS	Y	2024-10-03	Clear and colourless	369	7.20	<	0.015		13.1	b	0.179		13.3	b	40.0		7.64	369	10.5	160	233	43.1	0.415		0.261		39.9	<	0.010	<	0.005		21.0		0.011		82.7	<	0.100		0.074
Gw-111-1-1	FRM	Y	2024-11-13	Mean of duplicates	367	7.65		0.017		13.9	b	0.161		14.0		51.5		7.45	367	10.2	150	242	2.78	0.582		0.213		26.3	<	0.010	<	0.005		13.5		0.010		86.4	<	0.100		0.085
Gw-111-1-1	SS	Y	2025-03-11	Clear and colourless	378	8.20		0.060		8.47		0.938		9.41		50.0		7.69	378	9.60	170	236	10.1	0.386		0.296		35.3	<	0.010	<	0.005		13.0		0.009		83.9	<	0.100		0.079
Gw-111-2-1	SS	Y	2024-10-03	Very slightly turbid, colourless	389	8.30	<	0.015		11.8	b	0.025		11.8	b	64.0		7.41	389	11.4	160	329	5.47	0.066		0.222		23.9	<	0.010	<	0.005		22.0		0.015		86.0	<	0.100		0.297
Gw-111-2-1	SS	Y	2024-11-13	Clear and colourless	350	7.10	<	0.015		7.85		0.013		7.87		46.0		7.26	350	11.1	150	205	7.42	0.108		0.211		11.0	<	0.010	<	0.005		15.0		0.014		71.9	<	0.100		0.176
Gw-111-2-1	SS	Y	2025-03-11	Clear and colourless	307	7.00	<	0.015		6.65	<	0.005		6.65		37.0		7.70	307	8.80	150	216	3.03	0.047		0.182		7.62	<	0.010	<	0.005		13.0		0.011		76.0	<	0.100		0.036
Gw-112-1-1	SS	Y	2024-10-03	Very slightly turbid, colourless	699	8.30	<	0.015		11.8	b	0.025		11.8	b	64.0		7.52	699	10.5	160	329	5.47	0.066		0.222		23.9	<	0.010	<	0.005		22.0		0.015		86.0	<	0.100		0.297
Gw-112-1-1	SS	Y	2024-11-22	Very turbid, moderately grey	800	11.0		0.020		13.8	b	1.96	b	15.7	b	180		6.84	800	12.1	240	323	9.20	35.8	b	1.63		53.3	<	0.010	<	0.005		52.0		0.022		112	<	0.100		0.221
Gw-112-1-1	SS	Y	2025-03-11	Inaccessble - not sampled	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-112-2-1	NS	Y	2024-10-03	Dry	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-112-2-1	SS	Y	2024-11-22	Very turbid, slightly grey	718	8.30		0.600		18.5	b	0.077		18.6	b	230		6.96	718	11.0	250	505	11.1	0.192		0.233		47.4	<	0.010	<	0.005		45.0		0.060		173	<	0.100		3.91
Gw-112-2-1	SS	Y	2025-03-11	Inaccessble - not sampled	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-113-1-1	SS	N	2024-10-02	Clear, very slightly grey	834	3.20	<	0.015		0.025		0.021		0.046		470		7.86	834	11.4	120	619	8.19	2.05		0.421		20.9	<	0.010	<	0.005		169		0.010		210	<	0.100		0.633
Gw-113-1-1	SS	N	2024-11-22	Clear and colourless	889	3.10	<	0.015		0.058		0.036		0.095		480		7.51	889	11.4	110	595	4.93	1.97		0.576		20.8	<	0.010	<	0.005		169		0.011		198	<	0.100		0.718
Gw-113-1-1	SS	N	2025-03-10	Clear and colourless	709	4.20	<	0.015		0.211		0.009		0.220		580	b	7.87	709	5.90	120	717	7.45	1.64		0.572		18.7	<	0.010	<	0.005		170		0.009		241	<	0.100		0.529
Gw-113-2-1	SS	N	2024-10-03	Clear and colourless	1007	9.00	<	0.015	<	0.020	<	0.005	<	0.020		540	b	7.65	1007	11.7	137	537	8.78	2.00		0.495		38.7	<	0.010	<	0.005		142	<	0.005		182	<	0.100		0.397
Gw-113-2-1	SS	N	2024-11-22	Clear and colourless	929	6.70	<	0.022	<	0.020	<	0.005	<	0.020		460		7.58	929	12.6	130	515	8.39	0.853		0.738		39.4	<	0.010	<	0.005		159		0.028		168		0.120		1.59
Gw-113-2-1	SS	N	2025-03-06	Very slightly turbid, colourless	1203	8.20		0.060		8.47		0.938		9.41		50.0		7.67	1203	10.9	170	236	10.1	0.386		0.296		35.3	<	0.010	<	0.005		13.0		0.009		83.9	<	0.100		0.079
Gw-P1	SS	N	2024-05-24	Slightly turbid, colourless	1064	71.0		36.0	a <	0.020	<	0.005	<	0.020	<	1.00		7.03	1064	15.1	500	253	4.70	0.082		7.58		1390	b <	0.020	<	0.010		1420	<	0.010		76.4		0.600		1.54
Gw-P1	NS	N	2024-09-20	Dry, not pumping	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-P1	SS	N	2024-11-29	Clear, very slightly yellow	1786	72.0		35.0	a <	0.020	<	0.005	<	0.020	<	1.00		7.22	1786	16.2	500	273	16.7	< 0.100		9.16		1670	b <	0.050	<	0.025		1290	<	0.025		79.6		0.710		1.17
Gw-P1	SS	N	2025-02-28	Clear and colourless	1201	62.0		32.0	a <	0.020	<	0.005	<	0.020	<	1.00		7.12	1201	15.0	470	277	9.74	0.063		6.85		1390	b <	0.010	<	0.005		1120	<	0.005		84.8		0.470		0.958
Gw-P2	SS	N	2024-05-24	Slightly turbid, very slightly yellow	1729	160		90.0	a	1.03		0.006		1.04	<	1.00		7.27	1729	15.3	800	244	7.50	0.062		1.05		535	<	0.020	<	0.010		2940	<	0.010		62.0		1.14		4.53
Gw-P2	SS	N	2024-09-20	Very turbid, very slightly orange	1866	180		81.0	a	1.75		0.029		1.78	<	1.00		7.24	1866	16.2	850	277	9.30	0.063		0.760		523	<	0.020	<	0.010		3730	<	0.010		68.0		1.03		3.91
Gw-P2	SS	N	2024-11-29	Clear, very slightly yellow	1892	160		77.0	a	0.187		0.010		0.197	<	1.00		7.30	1892	16.5	830	253	5.40	0.048		0.696		471	<	0.020		0.012		2840	<	0.010		63.1		1.10		3.54
Gw-P2	SS	N	2025-02-28	Moderately turbid, very slightly orange	1798	170		81.0	a	0.108		0.012		0.120	<	1.00		7.78	1798	15.3	820	255	7.10	0.066		0.945		537	<	0.020	<	0.010		3410	<	0.010		65.9		1.04		4.38
Gw-P3	SS	N	2024-05-24	Moderately turbid, very slightly orange	2043	190		120	a	1.50		0.481		1.99	<	1.00		7.21	2043	15.8	880	221	128	0.069		2.30		719	<	0.020	<	0.010		3430	<	0.011		52.6		1.23		5.19
Gw-P3	SS	N	2024-09-20	Clear, very slightly yellow	2183	210		110	a <	0.020		0.022		0.029	<	1.00		7.24	2183	15.2	1000	252	18.0	0.061		1.76		757	<	0.020	<	0.010		3940	<	0.010		56.2		1.17		5.01
Gw-P3	SS	N	2024-11-29	Clear, very slightly yellow	2091	190		93.0	a <	0.020	<	0.005	<	0.020	<	1.60		7.29	2091	15.1	950	230	16.0	0.060		2.00		593	<	0.020		0.012		3470	<	0.010		51.8		1.28		4.18
Gw-P3	SS	N	2025-02-28	Moderately turbid, very slightly yellow	1995	190		92.0	a	0.025		0.013		0.038	<	1.00		7.34	1995	15.4	890	257	18.8	0.082		2.41		784	<	0.020	<	0.010		3860	<	0.010		61.0		1.07		4.44
Gw-P4	SS	N	2024-05-24	Moderately turbid, very slightly orange	1913	190		110	a	0.022	<	0.005		0.022	<	1.00		6.96	1913	14.8	860	312	4.90	0.051		1.10		149	<	0.020	<	0.010		2630	<	0.010		78.4		0.940		3.39
Gw-P4	SS	N	2024-09-20	Clear, very slightly yellow	1925	200		84.0	a	0.209		0.011		0.220	<	1.00		6.95	1925	15.1	870	342	3.70	0.052		1.71		184	<	0.020	<	0.010		2490	<	0.010		86.9		0.890		3.11
Gw-P4	SS	N	2024-11-29	Clear, very slightly yellow	2080	200		86.0	a	0.039		0.008		0.046		5.40		7.50	2080	15.3	880	312	8.10	0.070		1.86		153	<	0.020	<	0.010		2170	<	0.010		78.0		1.00		2.94
Gw-P4	SS	N	2025-02-28	Clear and colourless	2253	160		83.0	a	0.052		0.013		0.066		11.0		6.91	2253	14.7	870	368	4.42	0.043		0.953		146	<	0.010	<	0.005		2210	<	0.005		93.6		0.740		3.03
Gw-P10	SS	N	2024-05-24	Slightly turbid, very slightly orange	951	60.0		33.0	a	0.213		0.008		0.221	<	1.00		6.96	951	14.7	470	271	2.98	0.033		0.717		641	<	0.010	<	0.005		1170	<	0.005		81.8		0.440		1.17
Gw-P10	SS	N	2024-09-20	Very slightly turbid, very orange	1193	99.0		40.0	a	0.204		0.010		0.213	<	1.00		7.11	1193	16.1	540	285	3.50	0.061		0.788		877	<	0.020	<	0.010		1510	<	0.010		81.0		0.560		1.62
Gw-P10	SS	N	2024-11-29	Clear, very slightly yellow	1292	77.0		34.0	a <	0.020	<	0.005	<	0.020	<	1.00		7.44	1292	17.9	520	274	9.17	0.032		0.676		711	<	0.010	<	0.005		1180		0.005		80.2		0.490		1.33
Gw-P10	SS	N	2025-02-21	Very turbid, very orange	1126	60.0		33.0	a	0.99		0.020		1.01	<	1.00		8.24	1126	14.1	430	281	5.25	0.054		0.598		597	<	0.010	<	0.005		1440	<	0.005		85.7		0.370		1.11
Gw-P11	SS	N	2024-05-23	Clear and colourless	606	56.0	<	0.015		8.16		0.020		8.18		170		7.05	606	12.5	96.0	341	282	0.198		0.066		3.81	<	0.010		0.005		127		0.020		110		0.690		0.528
Gw-P11	NS	N	2024-09-27	No access	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-P11	SS	N	2024-12-06	Clear and colourless	562	13.0	<	0.015		5.11	<	0.005		5.11		240		7.20	562	11.8	100.0	168	14.0	0.324		4.68		18.8	<	0.010	<	0.005		156		0.009		46.7		0.130		0.125
Gw-P11	NS	N	2025-03-13	Pump malfuction/dry	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-P12	NS	N	2024-05-23	Dry	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-P12	NS	N	2024-09-27	No access	---	---		---		---		---		---		---		---	---	---	---	---	---	---		---		---		---		---		---		---		---		---		---		---
Gw-P12	SS	N	2024-12-06	Very slightly turbid, moderatley yellow	633	15.0		0.120		3.14	<	0.005		3.14		170		7.90	633	13.5	120	25.6	10.4	0.366		9.36		4.80	<	0.010	<	0.005		224	<	0.005		6.18		0.120		0.043
Gw-P12	SS	N	2025-03-12	Clear, very slightly orange	537	19.0	<	0.015		7.48	<	0.005		7.48		170		6.84	537	11.8	140	330	9.10	0.148		0.153		7.51	<	0.010	<	0.005		92.0		0.017		107		0.200		0.340
FB	FB	N	2024-05-23	Clear and colourless	37.0	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		7.75	37.0	8.40	1.00	< 0.500	1.57	< 0.020	<	0.020		1.06	<	0.010	<	0.005	<	10.00	<	0.005		0.143	<	0.100	<	0.005
FB	FB	N	2024-09-27	Clear and colourless	13.4	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		9.10	13.4	7.70	1.20	< 0.500	5.32	< 0.020	<	0.020		0.021	<	0.010	<	0.005	<	10.00	<	0.005	<	0.050	<	0.100	<	0.005
FB	FB	N	2024-12-03	Decanted in the field by GW 63-1-1	---	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		---	---	---	1.00	< 0.500	1.73	< 0.020	<	0.020		0.122	<	0.010	<	0.005	<	10.00	<	0.005	<	0.050	<	0.100	<	0.005
FB	FB	N	2025-03-05	Clear and colourless	13.6	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		8.37	13.6	13.8	1.00	< 0.500	< 0.500	< 0.020	<	0.020		0.028	<	0.010	<	0.005	<	10.00	<	0.005		0.169		0.320		0.007
TB	TB	N	2024/05/23	Sealed lab provided blank water	---	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		---	---	---	1.00	< 0.500	< 0.500	< 0.020	<	0.020	<	0.020	<	0.010	<	0.005	<	16.0	<	0.005	<	0.050	<	0.100	<	0.005
TB	TB	N	2024-09-26	Sealed lab provided blank water	---	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		---	---	---	1.30	< 0.500	< 0.500	< 0.020	<	0.020	<	0.020	<	0.010	<	0.005	<	10.00	<	0.005	<	0.050	<	0.100	<	0.005
TB	TB	N	2024-12-03	Sealed lab provided blank water	---	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		---	---	---	1.00	< 0.500	< 0.500	< 0.020	<	0.020	<	0.020	<	0.010	<	0.005	<	10.00	<	0.005	<	0.050	<	0.100	<	0.005
TB	TB	N	2025-03-05	Clear and colourless	---	< 1.00	<	0.015	<	0.020	<	0.005	<	0.020	<	1.00		---	---	---	1.00	< 0.500	< 0.500	< 0.020	<	0.020	<	0.020	<	0.010	<	0.005	<	10.00	<	0.005	<	0.050	<	0.100	<	0.005

Notes:

a	*Above CSR Schedule 3.2 AW Standard.*
b	*Above CSR Schedule 3.2 DW Standard.*
SS	*Single sample.*
FRM	*Field replicate mean (average of field replicates).*
NS	*No sample.*
BC CSR	*CSR-Sch3.2: BC Contaminated Site Regulation - Schedule 3.2 - Generic Numerical Water Standards, last amended March 1, 2023.*
(1)	*Aquatic Life (AW) Freshwater Standard, Column 3 in CSR-Sch3.2*
(2)	*Drinking Water (DW) Standard, Column 6 in CSR-Sch3.2*
(3)	*Standard varies with pH. Every ammonia result was compared to a standard based on the associated pH result for that sample.*
(4)	*Standard varies with chloride. Every nitrite result was compared to a standard based on the associated chloride result for that sample.*
(5)	*Standard varies with hardness. Every result was compared to a standard that was based on the associated hardness result for that sample.*
(6)	*BC CSR Schedule 3.2 criterion for iron and manganese were not applied as directed by the Stage 8 CSR Amendments.*
(7)	*Standard is based on the trivalent (Cr(III)) species. The Cr(III) is the most common form of chromium.*
(8)	*Interim standard used.*
(9)	*CSR Stage 13 amendments, protocol 9, background concentration is higher than the applicable CSR DW and/or most stringent CSR a standard. A concentration above the CSR DW or most strigent CSR AW stanadard but below the regional background concentration (South Vancouver Island Region) is not considered contaminated and is not highlighted as a CSR DW or AW exceedance.*

Appendix B-1. Groundwater Quality Data 2024-2025

AECOM

BC CSR				AW Maximum (1)	20-90 (5)		40-160 (5)					10,000	250-1,500 (5)				20			0.5-15 (5)				3			1,000	85		75-2,400 (5)	
				DW Maximum (2)	1,500	(6)	10	33 (9)		(6)		250	80				10			20	1,700 (8)	2,500			2500			20	20	3,000	
Station	Sample Type	Compliance Well (Y/N?)	Date Sampled	Parameter	Copper	Iron	Lead	Lithium	Magnesium	Manganese	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Silicon	Silver	Sodium	Strontium	Sulphur	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	Zirconium
				Fraction	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS
				Unit	µg/l	µg/l	µg/l	µg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	mg/L	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
				Method Detection Limit	0.05	1	0.005	0.5	0.05	0.05	0.05	0.02	2	0.05	0.04	50	0.005	0.05	0.05	3	0.002	0.2	0.5	0.002	0.2	0.1	0.1
Gw-97-1-1	SS	N	2024-05-15	Very slightly turbid, colourless	0.269	6.70	< 0.005	0.730	2.77	5.75	0.840	0.436	7.10	0.696	0.105	6370	< 0.005	2.55	97.1	6.80	0.006	< 0.200	< 0.500	0.667	0.310	0.310	< 0.100
Gw-97-1-1	SS	N	2024-09-24	Clear and colourless	0.609	10.2	< 0.005	0.940	3.57	3.93	1.28	0.767	6.40	0.896	0.065	7050	< 0.005	3.27	126	15.4	0.009	< 0.200	< 0.500	0.580	0.670	0.600	< 0.100
Gw-97-1-1	SS	N	2024-11-19	Clear and colourless	0.579	3.80	< 0.005	0.520	1.98	22.9	0.527	1.40	2.90	0.369	0.106	6570	< 0.005	5.73	82.8	6.40	0.005	< 0.200	< 0.500	0.270	0.250	1.89	< 0.100
Gw-97-1-1	SS	N	2025-02-20	Clear and colourless	0.405	3.20	< 0.005	< 0.500	2.66	24.1	0.377	0.639	2.60	0.322	0.093	7280	< 0.005	3.01	103	9.80	0.004	< 0.200	< 0.500	0.325	0.240	0.490	< 0.100
Gw-98-1-1	SS	N	2024-05-15	Slightly turbid, very slightly grey	0.256	2.50	< 0.005	< 0.500	12.4	1.21	0.951	0.238	2.90	0.237	0.789	8470	< 0.005	4.72	175	52.9	0.005	< 0.200	< 0.500	0.363	0.650	0.620	< 0.100
Gw-98-1-1	SS	N	2024-09-24	Clear and colourless	0.342	1.50	< 0.005	< 0.500	14.4	0.848	0.951	0.276	2.80	0.288	1.38	8620	< 0.005	4.82	195	69.3	0.005	< 0.200	< 0.500	0.298	0.560	0.880	< 0.100
Gw-98-1-1	SS	N	2024-11-14	Very turbid, very grey	0.613	2.80	0.087	< 0.500	21.7	12.9	0.418	0.881	2.10	0.344	0.980	8330	< 0.005	7.08	242	108	0.007	< 0.200	< 0.500	0.083	0.630	4.63	< 0.100
Gw-98-1-1	SS	N	2025-03-13	Very slightly turbid, colourless	0.955	392	0.836	< 0.500	22.3	16.4	0.666	0.494	27.7	0.292	0.800	8550	< 0.005	5.98	302	117	0.006	< 0.200	12.0	0.472	1.05	2.90	< 0.380
Gw-103-1-1	SS	N	2024-05-24	Very slightly turbid, very slightly grey	0.212	3.90	< 0.005	1.45	17.3	10.7	16.5	0.224	14.8	1.69	0.133	5980	< 0.005	8.95	647	42.8	0.007	< 0.200	< 0.500	0.606	0.630	0.160	< 0.100
Gw-104-1-1	FRM	N	2024-05-23	Mean of duplicates	58.4	119	0.017	< 0.500	17.7	3025	7.16	6.79	11.9	0.645	0.253	7185	0.023	35.0	381	60.5	0.033	< 0.200	4.83	1.11	5.54	2.17	0.210
Gw-104-1-1	NS	N	2025-09-24	No access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-104-1-1	SS	N	2024-12-05	Clear, very slightly yellow	26.2	26.5	# 0.005	< 0.500	20.0	2590	5.49	5.59	7.00	0.702	0.306	6620	< 0.005	25.5	378	99.4	0.035	< 0.200	0.740	0.794	1.68	1.68	< 0.100
Gw-104-1-1	SS	N	2025-03-13	Clear and colorless	18.7	52.9	# 0.022	< 0.500	15.1	2220	5.23	4.10	6.30	0.556	0.276	5940	< 0.005	18.8	308	68.2	0.025	< 0.200	1.07	0.639	1.87	2.19	< 0.100
Gw-108-1-1	SS	N	2024-05-24	Clear and colourless	0.334	2.30	0.005	1.86	32.2	12.3	8.85	0.794	12.1	1.17	0.076	13800	< 0.005	7.87	1320	78.4	0.014	< 0.200	< 0.500	0.177	0.500	0.320	< 0.100
Gw-108-1-1	NS	N	2024-09-27	No access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-108-1-1	SS	N	2024-12-06	Clear and colourless	0.252	3.20	0.005	1.54	32.9	16.3	6.63	0.696	11.3	1.02	0.058	14500	< 0.005	6.87	1240	84.2	0.013	< 0.200	< 0.500	0.129	0.540	0.310	< 0.100
Gw-108-1-1	SS	N	2025-03-13	Very slightly turbid, colourless	0.573	149	0.026	1.93	34.9	17.9	4.66	0.867	15.7	1.00	0.055	13700	< 0.005	6.62	1400	85.9	0.012	< 0.200	4.33	0.146	0.780	0.720	< 0.100
Gw-109-1-1	FRM	N	2024-05-24	Mean of duplicates	0.079	2.05	0.028	5.41	3.89	8.11	33.8	0.187	22.7	0.929	0.083	15450	< 0.005	78.5	151	20.1	0.002	< 0.200	< 0.500	1.00	0.205	0.170	< 0.100
Gw-109-1-1	NS	N	2024-09-27	No access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-109-1-1	FRM	N	2024-12-06	Mean of duplicates	0.088	20.9	0.050	6.12	2.18	5.59	19.9	0.449	25.8	0.99	0.095	13600	< 0.005	104	80.7	24.6	0.004	< 0.200	0.525	1.27	0.755	0.215	< 0.100
Gw-109-1-1	FRM	N	2025-03-13	Mean of duplicates	0.379	9.45	0.044	7.31	1.07	3.18	16.1	0.546	26.5	0.907	0.094	11950	< 0.005	105	42.3	24.4	0.003	< 0.200	< 0.500	1.19	0.450	1.55	< 0.100
Gw-111-1-1	SS	Y	2024-10-03	Clear and colourless	0.344	64.9	0.033	0.640	6.53	19.4	0.454	0.372	4.60	0.771	0.242	6160	< 0.005	4.72	179	12.9	0.008	< 0.200	0.440	0.710	0.523	0.200	1.69	< 0.100
Gw-111-1-1	FRM	Y	2024-11-13	Mean of duplicates	0.131	2.50	0.007	< 0.500	6.37	18.9	0.364	0.222	3.40	0.652	0.209	5555	< 0.005	4.76	167	15.0	0.007	< 0.200	< 0.500	0.587	< 0.200	0.830	< 0.100
Gw-111-1-1	SS	Y	2025-03-11	Clear and colourless	0.300	19.9	0.012	0.710	6.44	26.6	0.575	0.310	8.40	0.786	0.146	5720	< 0.005	4.56	166	13.6	0.012	< 0.200	< 0.500	0.844	< 0.200	1.14	< 0.100
Gw-111-2-1	SS	Y	2024-10-03	Very slightly turbid, colourless	0.386	4.40	0.007	0.590	7.94	64.5	0.455	1.03	5.70	0.967	0.151	6120	< 0.005	5.36	169	16.7	0.010	< 0.210	< 0.500	0.876	0.290	0.900	< 0.100
Gw-111-2-1	SS	Y	2024-11-13	Clear and colourless	1.12	6.60	0.030	< 0.500	6.25	41.2	0.590	0.653	5.30	0.747	0.087	5620	< 0.005	5.36	129	13.9	0.008	< 0.200	< 0.500	0.338	0.450	2.67	< 0.100
Gw-111-2-1	SS	Y	2025-03-11	Clear and colourless	0.583	2.10	0.007	< 0.500	6.35	8.66	0.286	0.459	3.90	0.590	0.070	6240	< 0.005	4.89	140	12.1	0.006	< 0.200	< 0.500	0.243	0.410	1.24	< 0.100
Gw-112-1-1	SS	Y	2024-10-03	Very slightly turbid, colourless	0.386	4.40	0.007	0.590	7.94	64.5	0.455	1.03	5.70	0.967	0.151	6120	< 0.005	5.36	169	16.7	0.010	< 0.210	< 0.500	0.876	0.290	0.900	< 0.100
Gw-112-1-1	SS	Y	2024-11-22	Very turbid, moderately grey	0.368	17.9	0.006	7.93	10.3	61.7	5.66	1.16	6.90	1.89	0.791	6200	< 0.005	72.4	427	64.6	0.019	< 0.200	< 0.500	8.49	< 0.200	1.59	< 0.100
Gw-112-1-1	SS	Y	2025-03-11	Inaccessible - not sampled	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-112-2-1	NS	Y	2024-10-03	Dry	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-112-2-1	SS	Y	2024-11-22	Very turbid, slightly grey	0.486	17.5	< 0.005	0.930	17.9	836	7.38	3.99	3.20	2.05	0.236	6500	< 0.005	7.98	420	77.4	0.019	0.420	< 0.500	3.78	0.250	1.86	< 0.100
Gw-112-2-1	SS	Y	2025-03-11	Inaccessible - not sampled	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-113-1-1	SS	N	2024-10-02	Clear, very slightly grey	0.099	11.3	0.006	1.12	23.3	72.9	2.05	3.01	3.40	0.965	0.298	7220	< 0.005	8.20	612	172	0.010	< 0.200	< 0.500	3.08	< 0.200	1.16	< 0.100
Gw-113-1-1	SS	N	2024-11-22	Clear and colourless	0.175	< 1.00	< 0.005	2.05	24.1	101	2.60	2.88	< 2.00	1.12	0.213	6590	< 0.005	11.0	618	182	0.015	0.230	< 0.500	3.83	< 0.200	0.910	< 0.100
Gw-113-1-1	SS	N	2025-03-10	Clear and colourless	0.418	6.80	0.008	1.89	28.0	87.3	3.58	3.18	2.20	0.843	0.223	7180	< 0.005	15.0	766	218	0.005	0.230	< 0.500	3.46	< 0.200	2.66	< 0.100
Gw-113-2-1	SS	N	2024-10-03	Clear and colourless	0.291	5.90	0.020	8.86	19.9	92.1	4.19	1.89	3.70	2.83	2.98	6960	< 0.005	85.0	725	196	0.030	0.350	< 0.500	8.06	< 0.200	0.790	< 0.100
Gw-113-2-1	SS	N	2024-11-22	Clear and colourless	0.372	6.30	0.008	8.91	23.1	344	4.52	2.76	4.50	3.42	0.502	6720	< 0.005	48.2	576	176	0.027	< 0.200	< 0.500	8.63	0.220	1.65	< 0.100
Gw-113-2-1	SS	N	2025-03-06	Very slightly turbid, colourless	0.300	19.9	0.012	0.710	6.44	26.6	0.575	0.310	8.40	0.786	0.146	5720	< 0.005	4.56	166	13.6	0.012	< 0.200	< 0.500	0.844	< 0.200	1.14	< 0.100
Gw-P1	SS	N	2024-05-24	Slightly turbid, colourless	0.370	21900	0.116	11.6	15.2	193	12.0	4.66	81.6	30.3	< 0.080	17500	< 0.010	91.7	820	< 6.00	< 0.004	< 0.400	< 1.00	0.010	< 0.400	5.65	< 0.200
Gw-P1	NS	N	2024-09-20	Dry, not pumping	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-P1	SS	N	2024-11-29	Clear, very slightly yellow	< 0.250	35900	0.555	11.4	18.1	119	9.07	4.13	224	28.7	< 0.200	17200	< 0.025	84.1	861	< 15.0	< 0.010	< 1.00	< 2.50	< 0.010	< 1.00	4.88	< 0.500
Gw-P1	SS	N	2025-02-28	Clear and colourless	1.59	24400	0.071	9.93	15.8	195	10.00	3.50	101	26.0	0.047	17000	< 0.005	75.3	917	< 3.00	< 0.002	< 0.320	< 0.500	0.006	0.340	4.64	< 0.100
Gw-P2	SS	N	2024-05-24	Slightly turbid, very slightly yellow	1.92	651	0.126	4.70	21.6	272	20.5	8.90	25.1	65.6	0.108	12400	< 0.010	237	887	< 6.00	< 0.004	< 0.420	< 1.00	0.010	1.88	1.90	0.240
Gw-P2	SS	N	2024-09-20	Very turbid, very slightly orange	1.05	795	0.020	2.40	26.1	274	17.9	8.33	26.3	65.9	0.130	13100	< 0.010	242	987	< 6.00	< 0.004	< 0.400	< 1.00	0.009	2.10	1.69	0.280
Gw-P2	SS	N	2024-11-29	Clear, very slightly yellow	1.07	416	0.479	2.60	23.1	260	15.8	7.94	14.5	61.8	0.099	11500	< 0.010	212	856	< 6.00	< 0.004	< 0.400	< 1.00	0.008	2.07	2.91	0.260
Gw-P2	SS	N	2025-02-28	Moderately turbid, very slightly orange	6.89	677	0.030	4.30	21.9	260	22.7	8.90	15.3	67.1	0.136	12500	< 0.010	245	974	< 6.00	< 0.004	< 0.400	< 1.00	0.007	2.08	1.74	0.270
Gw-P3	SS	N	2024-05-24	Moderately turbid, very slightly orange	2.33	890	0.072	5.30	21.8	232	27.0	10.00	28.2	73.9	0.123	15300	< 0.010	272	853	< 6.00	< 0.004	< 0.430	< 1.00	0.007	3.08	4.95	0.260
Gw-P3	SS	N	2024-09-20	Clear, very slightly yellow	3.43	1170	0.046	4.40	27.2	230	23.7	9.98	34.2	82.6	0.141	14600	< 0.010	301	991	< 6.00	< 0.004	< 0.400	< 1.00	0.006	2.48	1.84	0.290
Gw-P3	SS	N	2024-11-29	Clear, very slightly yellow	1.75	477	0.154	4.60	24.4	229	20.5	9.33	34.7	78.3	0.118	14900	< 0.010	266	805	< 6.00	0.005	< 0.400	< 1.00	0.007	2.86	2.76	0.260
Gw-P3	SS	N	2025-02-28	Moderately turbid, very slightly yellow	4.89	689	0.041	4.90	25.5	301	25.8	9.37	23.7	79.2	0.145	15900	< 0.010	283	1030	< 6.00	< 0.004	0.520	< 1.00	0.008	2.63	4.61	0.260
Gw-P4	SS	N	2024-05-24	Moderately turbid, very slightly orange	1.52	2170	0.035	< 1.00	28.1	636	14.3	7.96	25.1	64.5	0.120	12000	< 0.010	228	847	< 6.00	< 0.004	< 0.400	< 1.00	0.014	1.78	1.81	< 0.200
Gw-P4	SS	N	2024-11-29	Clear, very slightly yellow	0.680	8700	0.036	< 1.00	28.5	715	11.5	7.12	70.6	57.3	0.140	11600	< 0.010	204	797	< 6.00	< 0.004	< 0.400	< 1.00	0.016	4.68	1.63	0.250
Gw-P4	SS	N	2025-02-28	Clear and colourless	0.667	1780	0.014	< 0.500	32.6	858	11.3	6.39	20.0	61.4	0.119	11600	< 0.005	210	978	5.30	< 0.002	< 0.200	< 0.500	0.009	1.94	0.470	0.170
Gw-P10	SS	N	2024-05-24	Slightly turbid, very slightly orange	0.866	508	0.023	2.52	16.1	457	4.53	3.02	10.4	26.8	0.060	12400	< 0.005	75.7	828	< 3.00	< 0.002	< 0.200	< 0.500	0.006	0.670	1.07	< 0.100
Gw-P10	SS	N	2024-09-20	Very slightly turbid, very orange	1.61	707	0.058	3.80	20.0	351	7.90	4.30	14.9	33.2	< 0.080	14100	< 0.010	109	935	< 6.00	< 0.004	< 0.400	< 1.00	0.007	0.520	1.50	< 0.200
Gw-P10	SS	N	2024-11-29	Clear, very slightly yellow	0.787	519	0.056	3.29	17.9	360	4.77	3.59	12.7	29.7	0.053	13200	< 0.005	90.2	913	< 3.00	< 0.002	< 0.200	< 0.500	0.006	0.640	1.05	< 0.100
Gw-P10	SS	N	2025-02-21	Very turbid, very orange	3.35	170	0.016	3.12	16.4	275	5.94	2.79	11.1	27.5	0.055	12700	< 0.005	79.3	900	< 3.00	< 0.002	0.230	0.540	0.006	0.460	2.31	< 0.100
Gw-P11	SS	N	2024-05-23	Clear and colourless	4.50	634	0.059	< 0.500	15.9	12.7	1.18	1.26	14.1	1.40	0.583	6160	< 0.005	16.2	348	57.9	0.006	< 0.200	4.44	0.299	2.40	5.77	< 0.100
Gw-P11	NS	N	2024-09-27	No access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-P11	SS	N	2024-12-06	Clear and colourless	1.30	26.5	0.032	3.42	12.4	27.3	12.0	0.700	18.3	1.28	0.358	10100	< 0.005	64.5	413	52.6	< 0.002	< 0.200	< 0.500	1.19	1.08	2.05	< 0.100
Gw-P11	NS	N	2025-03-13	Pump malfuction/dry	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-P12	NS	N	2024-05-23	Dry	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-P12	NS	N	2024-09-27	No access	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gw-P12	SS	N	2024-12-06	Very slightly turbid, moderatley yellow	0.254	14.1	0.029	5.94	2.47	6.85	20.2	0.532	26.3	1.00	0.140	13400	< 0.005	105	101	25.7	< 0.002	< 0.200	< 0.500	1.53	1.06	0.690	< 0.100
Gw-P12	SS	N	2025-03-12	Clear, very slightly orange	6.78	484	0.012	< 0.500	15.1	7.67	1.36	0.907	5.00	1.32	0.329	5280	< 0.005	12.1	273	53.3	< 0.002	< 0.200	< 0.500	0.249	0.820	1.43	< 0.100
FB	FB	N	2024-05-23	Clear and colourless	0.165	2.80	< 0.005	< 0.500	< 0.050	< 0.050	< 0.050	< 0.050	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	< 0.050	< 3.00	< 0.002	< 0.200	< 0.500	< 0.002	< 0.200	0.390	< 0.100
FB	FB	N	2024-09-27	Clear and colourless	0.179	1.30	< 0.005	< 0.500	< 0.050	< 0.050	< 0.050	< 0.020	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	< 0.050	< 3.00	< 0.002	< 0.200	< 0.500	< 0.002	< 0.200	0.120	< 0.100
FB	FB	N	2024-12-03	Decanted in the field by GW 63-1-1	0.846	6.70	< 0.005	< 0.500	0.052	0.197	< 0.050	0.101	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	0.064	0.094	< 3.00	< 0.002	< 0.200	< 0.500	0.003	< 0.200	0.710	< 0.100
FB	FB	N	2025-03-05	Clear and colourless	0.528	6.80	0.005	< 0.500	< 0.050	< 0.050	0.351	< 0.020	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	0.073	< 3.00	< 0.002	< 0.200	< 0.500	< 0.002	< 0.200	0.210	< 0.100
TB	TB	N	2024/05/23	Sealed lab provided blank water	< 0.050	< 1.00	< 0.005	< 0.500	< 0.050	< 0.050	< 0.050	< 0.020	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	< 0.050	< 3.00	< 0.002	< 0.200	< 0.500	< 0.002	< 0.200	< 0.100	< 0.100
TB	TB	N	2024-09-26	Sealed lab provided blank water	< 0.050	< 1.00	< 0.005	< 0.500	< 0.050	< 0.050	< 0.050	< 0.020	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	< 0.050	< 3.00	< 0.002	< 0.200	< 0.500	< 0.002	< 0.200	< 0.100	< 0.100
TB	TB	N	2024-12-03	Sealed lab provided blank water	< 0.050	< 1.00	< 0.005	< 0.500	< 0.050	< 0.050	< 0.050	< 0.020	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	0.067	< 3.00	< 0.002	< 0.200	< 0.500	0.002	< 0.200	< 0.100	< 0.100
TB	TB	N	2025-03-05	Clear and colourless	< 0.050	< 1.00	< 0.005	< 0.500	< 0.050	< 0.050	< 0.050	< 0.020	< 2.00	< 0.050	< 0.040	< 50.0	< 0.005	< 0.050	< 0.050	< 3.00	< 0.002	< 0.200	< 0.500	< 0.002	< 0.200	< 0.100	< 0.100

Notes:

a *Above CSR Schedule 3.2 AW Standard.*

b *Above CSR Schedule 3.2 DW Standard.*

SS *Single sample.*

FRM *Field replicate mean (average of field replicates).*

NS *No sample.*

BC CSR *CSR-Sch3.2: BC Contaminated Site Regulation - Schedule 3.2 - Generic Numerical Water*

(1) *Aquatic Life (AW) Freshwater Standard, Column 3 in CSR-Sch3.2*

(2) *Drinking Water (DW) Standard, Column 6 in CSR-Sch3.2*

(3) *Standard varies with pH. Every ammonia result was compared to a standard based on the associated pH result for that sample.*

(4) *Standard varies with chloride. Every nitrite result was compared to a standard based on the associated chloride result for that sample.*

(5) *Standard varies with hardness. Every result was compared to a standard that was based on the associated hardness result for that sample.*

(6) *BC CSR Schedule 3.2 criterion for iron and manganese were not applied as directed by the Stage 8 CSR Amendments.*

(7) *Standard is based on the trivalent (Cr(III)) species. The Cr(III) is the most common form of chro*

(8) *Interim standard used.*

(9) *CSR Stage 13 amendments, protocol 9, background concentration is higher than the applicable CSR DW and/or most stringent CSR a standard. A concentration above the CSR DW or most strigent CSR AW stanadard but below the regional background concentration (South Vancouver Island Region) is not considered contaminated and is not highlighted as a CSR DW or AW exceedance.*

AECOM

Appendix B-2

Domestic Well Quality

Appendix B-2. Domestic Well Quality - 2024 to 2025

State	Parameters	Minimum Detection Limit	Units	Criteria		013	014	012	008	010	009	016
						5100 Wildview Crescent	237 Meadowbrook	160 Lohr Road	176 Lohr Road	184 Lohr Road	200 Lohr Rd.	5648 Wallace Drive Treated
				DWQ Guidelines[1]	SDWQ Guidelines[2]	2024-07-11	2024-07-11	2024-07-11	2024-07-11	2024-07-11	2024-07-11	2024-07-11
---	pH (field)	0.01	pH	7.0 to 10.5[4]		7.44	7.09	**6.64**	**6.61**	**6.8**	7	7.41
TOT	Temperature °C (field)	0.01	°C	15[3]	15[3]	11.8	12.2	**15.7**	12.5	12.4	12.7	**17.2**
DIS	Total dissolved solids	10	mg/L	500[3]		100	110	140	78	170	180	190
TOT	Conductivity (field)	2	µS/cm			180	190	280	160	320	350	350
TOT	Alkalinity - Bicarbonate	1	mg/L			85	80	130	51	150	160	150
TOT	Alkalinity - Carbonate	1	mg/L			< 1	< 1	< 1	< 1	< 1	< 1	< 1
TOT	Alkalinity - Hydroxide	1	mg/L			< 1	< 1	< 1	< 1	< 1	< 1	< 1
TOT	Alkalinity - Phenolphthalein - pH 8.3	1	mg/L			< 1	< 1	< 1	< 1	< 1	< 1	< 1
TOT	Alkalinity - Total - pH 4.5	1	mg/L			69	66	100	42	120	130	120
TOT	Calcium (ug/L)	50	µg/L			16700	15400	34300	14900	37700	42200	30100
DIS	Chloride, dissolved	1	mg/L	250[3]	250[3]	8.8	10	12	12	13	15	15
TOT	Hardness (as CaCO3)	0.5	mg/L			52.4	57.5	96.9	48.5	115	127	103
TOT	Magnesium (ug/L)	50	µg/L			2610	4630	2710	2740	5170	5260	6860
TOT	Sodium	0.001	mg/L	200[3]								
TOT	Nitrogen - Ammonia	0.015	mg/L			< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
DIS	Nitrogen - Nitrite	0.005	mg/L	1	1	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
DIS	Nitrogen - Nitrate	0.02	mg/L	10	10	0.061	0.393	0.043	0.839	0.879	0.571	< 0.02
DIS	Nitrogen - Nitrite + Nitrate	0.02	mg/L	10	10	0.061	0.393	0.043	0.839	0.879	0.571	< 0.02
DIS	Sulphate, dissolved	1	mg/L	500[3]	500[3]	5	7.6	7.7	7.6	10	9.2	28

State	Parameters	Minimum Detection Limit	Units	Criteria		015	351	007	006	352	005	345
						255 Farmington Road	5455 Spotts Close	5436 Spotts Close	5435 Kiowa Road	27 Hartland Avenue	1 Hartland Ave Municipal Water	400 Durrance Close
				DWQ Guidelines[1]	SDWQ Guidelines[2]	2024-07-11	2024-07-11	2024-07-11	2024-07-11	2024-07-11	2024-07-11	2024-07-11
---	pH (field)	0.01	pH	7.0 to 10.5[4]		8.53	8.83	**6.68**	7.08	**5.97**	**6.85**	**6.79**
TOT	Temperature °C (field)	0.01	°C	15[3]	15[3]	**15.6**	12.8	**17.3**	**17.3**	13.8	**18.5**	14.2
DIS	Total dissolved solids	10	mg/L	500[3]		130	130	270	240	120	30	220
TOT	Conductivity (field)	2	µS/cm			250	240	480	500	230	60	410
TOT	Alkalinity - Bicarbonate	1	mg/L			110	82	160	230	45	18	230
TOT	Alkalinity - Carbonate	1	mg/L			1.3	4.6	< 1	< 1	< 1	< 1	< 1
TOT	Alkalinity - Hydroxide	1	mg/L			< 1	< 1	< 1	< 1	< 1	< 1	< 1
TOT	Alkalinity - Phenolphthalein - pH 8.3	1	mg/L			1.1	3.8	< 1	< 1	< 1	< 1	< 1
TOT	Alkalinity - Total - pH 4.5	1	mg/L			91	75	130	190	37	15	190
TOT	Calcium (ug/L)	50	µg/L			9080	4970	54500	58800	15400	4630	57300
DIS	Chloride, dissolved	1	mg/L	250[3]	250[3]	9.3	15	42	27	26	4.7	4.2
TOT	Hardness (as CaCO3)	0.5	mg/L			33.4	14.7	163	166	52.8	16	161
TOT	Magnesium (ug/L)	50	µg/L			2600	545	6470	4590	3490	968	4300
TOT	Sodium	0.001	mg/L	200[3]								0.655
TOT	Nitrogen - Ammonia	0.015	mg/L			0.062	< 0.015	< 0.015	< 0.015	< 0.015	0.14	< 0.015
DIS	Nitrogen - Nitrite	0.005	mg/L	1	1	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
DIS	Nitrogen - Nitrate	0.02	mg/L	10	10	< 0.02	< 0.02	1.81	0.097	1.29	0.164	< 0.02
DIS	Nitrogen - Nitrite + Nitrate	0.02	mg/L	10	10	< 0.02	< 0.02	1.81	0.097	1.29	0.164	< 0.02
DIS	Sulphate, dissolved	1	mg/L	500[3]	500[3]	15	14	25	12	22	1.3	5.8

State	Parameters	Minimum Detection Limit	Units	Criteria		016	348	349	346	---	---
						5648 Wallace Drive Untreated	6665 Mark Lane	7048 Mark Lane	6515 Willis Point Road.	Field Blank	Trip Blank
				DWQ Guidelines[1]	SDWQ Guidelines[2]	2024-07-11	2024-07-11	2024-07-16	2024-07-22	2024-07-16	2024-07-11
---	pH (field)	0.01	pH	7.0 to 10.5[4]		7.64	7.43	7.29	8.16	8.09	
TOT	Temperature °C (field)	0.01	°C	15[3]	15[3]	**15.9**	14	11.3	11.2	4.3	
DIS	Total dissolved solids	10	mg/L	500[3]		220	190	380	120	< 10	< 10
TOT	Conductivity (field)	2	µS/cm			350	390	630	210	5.1	< 2
TOT	Alkalinity - Bicarbonate	1	mg/L			140	180				< 1
TOT	Alkalinity - Carbonate	1	mg/L			< 1	< 1				< 1
TOT	Alkalinity - Hydroxide	1	mg/L			< 1	< 1				< 1
TOT	Alkalinity - Phenolphthalein - pH 8.3	1	mg/L			< 1	< 1				< 1
TOT	Alkalinity - Total - pH 4.5	1	mg/L			120	150				< 1
TOT	Calcium (ug/L)	50	µg/L			30200	43400	77800	23800	< 50	< 50
DIS	Chloride, dissolved	1	mg/L	250[3]	250[3]	14	19	55	2.2	< 1	< 1
TOT	Hardness (as CaCO3)	0.5	mg/L			103	134	228	70	< 0.5	< 0.5
TOT	Magnesium (ug/L)	50	µg/L			6780	6200	8220	2580	< 50	< 50
TOT	Sodium	0.001	mg/L	200[3]			1	18	12.2	< 0.05	< 50
TOT	Nitrogen - Ammonia	0.015	mg/L			< 0.015	< 0.015	0.021	< 0.015	< 0.015	< 0.015
DIS	Nitrogen - Nitrite	0.005	mg/L	1	1	< 0.005	< 0.005				< 0.005
DIS	Nitrogen - Nitrate	0.02	mg/L	10	10	< 0.02	0.17				< 0.02
DIS	Nitrogen - Nitrite + Nitrate	0.02	mg/L	10	10	< 0.02	0.17				< 0.02
DIS	Sulphate, dissolved	1	mg/L	500[3]	500[3]	29	8.3				< 1

Notes:

[1] Health Canada (updated in September 2020 version). Guidelines for Canadian Drinking Water Quality—Summary Table.

[2] British Columbia Approved Source Drinking Water Quality Guideline (SDWQGs) (2020 edition).

[3] Limit for this parameter is an aesthetic objective (AO), not a human health objective.

[4] Limit for this parameter is an operational guideline (OG) only.

***Bold** - Sample concentrations expressed in bold exceed AO drinking water quality guidelines.*

AECOM

Appendix B-3

Surface Water Quality

Appendix B-3. Surface Water Quality - 2024-2025

B.C. Water Quality Guidelines				BC WQG-STA (1)			600		1.9-24.9 (2)		0.06-0.6 (3)		32.8								-				1000	
				BC WQG-LTC (1)			150		0.135-1.77 (2)		0.02-0.2 (3)		3		128-429 (5)		Variable (7)		5		1,200				0.06-0.98 (4)			
BC CSR Protocol 11				AW Upper Cap Concentration (11)			15,000		13.1-184		2-20		4,000		12,800-42,900				500		120,000		5-40		400		200-900			
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter			Conductivity		Chloride		Nitrogen - Ammonia		Nitrogen - Nitrite		Nitrogen - Nitrate		Sulphate		Aluminum		Arsenic		Boron		Cadmium		Cobalt		Copper		Hardness (As $CaCO_3$)		Iron	
				State			TOT		DIS		TOT		DIS		DIS		DIS		TOT		TOT		TOT		TOT		TOT		TOT		TOT	
				Unit			µS/cm		mg/L		mg/L		mg/L		mg/L		mg/L		µg/L		µg/L		µg/L		µg/L		µg/L		mg/L		µg/L	
				Detection Limit			1		1		0.015		0.005		0.02		1		0.5		0.02		10		0.005		0.01		0.1		0.5		1	
SW-N-05	FRM	Y	2024-06-04	Very low flow, clear and colourless			665.0		7.8		< 0.02		< 0.01		5.92	b	210		38.2		0.17		165.5		0.02		0.10		4.81		305.0		38.1	
SW-N-05	FRM	Y	2024-10-23	Moderately high flow. Clear and colourless sample.			723.0		11.0		< 0.02		< 0.01		13.00	b	360		67.0		0.16		109		0.02		0.19		3.41		422.0		78.3	
SW-N-05	FRM	Y	2024-12-17	Very low flow, clear and colourless			612.0		9.8		< 0.02		< 0.01		8.62	b	320		49.4		0.16		112.5		0.03		0.17		3.31		416.0		43.3	
SW-N-05	FRM	Y	2025-02-21	Very low flow, clear and colourless			602.0		26.5		< 0.02		< 0.01		6.40	b	335		67.9		0.24		99.5		0.02		0.27		3.37		382.5		73.3	
SW-N-14	SS	N	2024-06-17	Low flow, clear and colourless			289.0		17.0		< 0.02		< 0.01		0.68		55.0		49.7		0.15		82.0		0.01		0.12		1.02		165.0		153.0	
SW-N-14	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.			376.0		19.0		< 0.02		< 0.01		3.91	b	140		7.0		0.11		102		< 0.01		0.11		1.71		226.0		12.2	
SW-N-14	SS	N	2024-12-16	Clear and colourless, very high flow			278.0		15.0		< 0.02		< 0.01		3.74	b	110		389	b	0.19		82.0		0.01		0.48		3.53		182.0		756.0	
SW-N-14	SS	N	2025-02-20	High flow, clear and colourless			306.0		30.0		< 0.02		< 0.01		3.87	b	99.0		69.3		0.12		64.0		0.01		0.17		3.09		164.0		161.0	
SW-N-15	SS	N	2024-06-17	Moderate flow, clear and colourless			161.8		7.2		< 0.02		< 0.01		0.15		9.4		8.3		0.10		43.0		< 0.01		0.02		0.27		99.2		9.0	
SW-N-15	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.			186.0		9.2		< 0.02		< 0.01		0.94		15.0		3.3		0.09		46.0		< 0.01		0.01		0.51		102.0		5.6	
SW-N-15	SS	N	2024-12-16	Clear and colourless, very high flow			122.0		7.8		< 0.02		< 0.01		0.17		10.0		18.5		0.08		31.0		< 0.01		0.02		0.52		74.9		21.3	
SW-N-15	SS	N	2025-02-20	High flow, clear and colourless			121.0		9.2		< 0.02		< 0.01		0.24		11.0		7.8		0.07		24.0		< 0.01		0.02		0.29		70.1		7.6	
SW-N-16	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless			386.0		19.0		0.02		0.01		7.00	b	39.0		369.5	b	0.20		92.5		0.02		0.66	b	5.43		178.5		737.0	
SW-N-16	FRM	Y	2024-10-23	Low flow, nil turbidity, clear colourless			394.0		15.0		0.20		0.11		9.10	b	120		64.2		0.25		79.5		0.02		0.46		8.80		221.5		190.0	
SW-N-16	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless			386.5		14.5		0.04		0.01		8.46	b	85.0		454		0.24		74.0		0.02		0.88	b	13.10		179.5		863.5	
SW-N-16	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless			325.0		40.0		0.05		< 0.01		8.59	b	60.5		74.6		0.19		57.0		0.01		0.50		15.15		149.0		232.0	
SW-N-17	SS	N	2024-06-17	Low flow, clear and colourless			530.0		27.0		0.03		< 0.01		0.14		100		12.9		0.11		136		0.01		0.46		0.40		223.0		242.0	
SW-N-17	SS	N	2024-11-01	Moderate flow, clear and colourless sample.			484.0		25.0		< 0.02		< 0.01		3.74	b	220		7.4		0.09		150		0.01		0.09		0.79		303.0		7.3	
SW-N-17	SS	N	2024-12-16	Clear and colourless, moderately high flow			399.0		19.0		< 0.02		< 0.01		2.43		190		17.3		0.08		128		< 0.01		0.07		0.69		242.0		26.3	
SW-N-17	SS	N	2025-02-20	High flow, clear and colourless			371.0		26.0		< 0.02		< 0.01		1.63		160		10.0		0.08		107		0.01		0.06		0.67		213.0		17.1	
SW-N-19	SS	N	2024-10-23				352.0		13.0		0.10		0.32	b	7.93	b	100		53.9		0.30		67.0		0.01		0.83	b	11.6		187.0		171.0	
SW-N-19	SS	N	2024-12-17				276.0		15.0		0.04		0.02		9.07	b	61.0		507	b	0.28		76.0		0.02		0.96	b	21.5		162.0		845.0	
SW-N-19	SS	N	2025-02-21				344.0		42.0		0.03		< 0.01		9.45	b	64.0		101		0.22		54.0		0.01		0.54		21.0		145.0		168.0	
SW-N-41S1	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless			270.7		5.50		< 0.02		< 0.01		0.39		54.0		62.7		0.23		21.0		0.01		0.10		0.37		148.5		149.5	
SW-N-41S1	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless			323.0		7.15		< 0.03		< 0.01		0.85		77.0		78.9		0.26		22.0		0.01		0.15		0.48		200.0		225.0	
SW-N-41S1	FRM	Y	2024-12-16	Low flow, nil turbidity, clear colourless			250.0		20.0		< 0.02		< 0.01		0.26		80.5		26.1		0.07		65.0		< 0.01		0.07		0.58		186.5		67.0	
SW-N-41S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless			241.0		9.00		< 0.02		< 0.01		0.75		53.0		130.0		0.22		17.5		< 0.01		0.15		0.52		158.5		262.0	
SW-N-41S3	SS	N	2024-05-03	Low flow, nil turbidity, clear colourless			197.1		9.70		< 0.02		< 0.01		0.27		21.0		15.9		0.12		37.0		0.01		0.02		0.31		124.0		16.2	
SW-N-41S3	SS	N	2024-10-21	Low flow. Clear and colourless sample.			227.0		11.0		< 0.02		< 0.01		0.19		24.0		64.0		0.20		49.0		0.01		0.06		0.80		138.0		105.0	
SW-N-41S3	SS	N	2024-12-16	Clear and colourless, very high flow			158.0		8.40		< 0.02		< 0.01		0.25		17.0		16.5		0.11		29.0		< 0.01		0.03		1.40		101.0		26.6	
SW-N-41S3	SS	N	2025-02-20	Moderately High flow, clear and colourless			161.0		9.40		< 0.02		< 0.01		0.29		20.0		25.8		0.07		24.0		< 0.01		0.03		0.45		104.0		22.5	
SW-N-41S4	SS	N	2024-05-03	Low flow, nil turbidity, clear colourless			190.0		7.70		< 0.02		< 0.01	<	0.02		6.9		6.0		0.10		37.0		< 0.01		0.03		0.26		76.1		62.9	
SW-N-41S4	SS	N	2024-10-21	Low flow. Clear and colourless sample.			144.0		7.90		0.02		< 0.01	<	0.02		6.2		7.7		0.13		45.0		< 0.01		0.03		0.29		78.2		72.0	
SW-N-41S4	SS	N	2024-12-16	Clear and colourless, high flow			131.0		8.30		0.05		< 0.01	<	0.02		7.1		6.0		0.11		42.0		< 0.01		0.03		0.25		83.3		44.1	
SW-N-41S4	SS	N	2025-02-20	High flow, clear and colourless			109.0		7.70		0.11		< 0.01		0.04		6.9		5.9		0.07		34.0		< 0.01		0.03		0.24		69.6		46.2	
SW-N-42S1	FRM	Y	2024-05-03	Low flow, nil turbidity, clear colourless			423.0		32.0		< 0.02		< 0.01		0.25		66.5		12.7		0.06		47.0		< 0.01		0.06		0.35		204.0		35.9	
SW-N-42S1	FRM	Y	2024-10-22	Low flow, nil turbidity, clear colourless			392.0		29.0		< 0.02		< 0.01		0.13		96.0		49.0		0.10		40.5		< 0.01		0.13		0.90		208.0		126.0	
SW-N-42S1	FRM	Y	2024-12-16	Low flow, nil turbidity, clear colourless			338.5		5.05		0.05		< 0.01		0.95		67.5		139		0.28		18.5		0.01		0.16		0.59		164.0		274.5	
SW-N-42S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless			309.0		26.0		< 0.02		< 0.01		0.27		75.0		23.7		0.06		48.5		< 0.01		0.06		0.53		158.0		47.5	
SW-N-45	SS	N	2024-11-01	Moderate flow, clear and colourless sample.			604.0		17.0		< 0.02		< 0.01		9.46	b	300		7.5		0.09		200		0.01		0.17		1.50		386.0		6.9	
SW-N-45	SS	N	2024-12-16	Clear and colourless, high flow			524.0		14.0		< 0.02		< 0.01		6.56	b	280		15.7		0.10		196		0.01		0.12		1.37		349.0		17.6	
SW-N-45	SS	N	2025-02-20	High flow, clear and colourless			467.0		23.0		< 0.02		< 0.01		4.28	b	220		10.1		0.10		141		0.01		0.13		1.42		265.0		15.2	
SW-N-54	SS	N	2024-10-23	Moderate flow, clear and moderately yellow sample.			610.0		8.90		0.03		0.16	b	26.9	b	160		354		0.36		55		0.03		1.50	b	26.1		311.0		684.0	
SW-N-54	SS	N	2024-12-17	Clear and slightly yellow, moderately high flow			430.0		3.70		0.05		0.02		9.25	b	67.0		890	b	0.31		53		0.01		1.35	b	23.2		184.0		1630.0	a
SW-N-54	SS	N	2025-02-21	Moderate flow, clear and colourless			315.0		14.0		< 0.02		< 0.01		13.1	b	63.0		119		0.25		42		< 0.01		0.28		21.8		155.0		209.0	
SW-N-55	SS	Y	2024-12-18	Clear and colourless, moderately high flow			480.0		7.50		0.09		< 0.01		4.28	b	170		147		0.09		11		0.07		0.20		1.60		200.0		78.7	
SW-N-55	SS	Y	2025-02-20	Moderately low, clear and colourless			580.0		7.70		< 0.02		< 0.01		9.17	b	350		24.9		0.09		10		0.12		0.13		0.82		364.0		18.2	
SW-N-56	SS	N	2024-12-16	Clear and colourless, moderate high flow			181.0		9.80		< 0.02		< 0.01		1.33		48.0		53.7		0.09		20		< 0.01		0.05		0.63		111.0		47.6	
SW-N-56	SS	N	2025-02-20	High flow, clear and colourless			178.0		9.70		< 0.02		< 0.01		0.88		45.0		11.9		0.06		15		< 0.01		0.04		0.47		94.5	<	5.0	
SW-N-57	SS	N	2024-05-02	Moderate flow, very white, moderately turbid			560.0		5.60		0.04		0.01		2.53		130		1850	b	0.27		28		0.02		2.46	b	5.36		236.0		3700	a
SW-N-57	SS	N	2024-10-23	Moderate flow. Very high turbidity, very grey sample.			648.0		5.90		0.10		0.07	b	4.74	b	330		21900		1.45		58		0.10		31.50	b	59.9		480.0		39100	a
SW-N-57	SS	N	2024-12-17	Clear and colourless, moderately high flow			530.0		5.90		0.05		< 0.01		2.77		150		713	b	0.63		21		0.02		0.96	b	5.69		252.0		1260	a
SW-N-57	SS	N	2025-02-21	Moderate flow, clear and colourless			417.0		7.10		< 0.02		< 0.01		1.72		150		6.2		0.10		19		0.01		0.14		0.90		253.0		12.0	
SW-N-63	SS	N	2024-05-02	MOderate flow, nil turbidity, light tan			165.3		8.40		0.03		< 0.01		0.25		18.0		26.6		0.19		41		< 0.01		0.34		1.49		91.7		478.0	
SW-N-63	SS	N	2024-10-22	Moderate flow, clear and colourless sample.			269.0		30.0		0.05		0.01		2.09		83.0		99.0		0.27		55		0.01		0.38		4.51		131.0		406.0	
SW-N-63	SS	N	2024-12-16	Clear and colourless, very high flow			230.0		7.90		0.02		< 0.01		0.74		31.0		128		0.17		36		0.01		0.15		2.23		87.6		261.0	
SW-N-63	SS	N	2025-02-20	High flow, clear and colourless			152.0		11.00		0.02		< 0.01		1.00		30.0		153		0.13		34		< 0.01		0.18		2.15		94.1		360.0	
SW-N-64	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan			192.2		17.0		0.11		0.01		0.19		50.0		197		1.15		54		0.02		2.92	b	5.35		79.3		3050	a
SW-N-64	SS	N	2024-10-22	Very low flow, clear and slightly yellow sample			299.0		23.0		0.09		0.09		0.89		52.0		275		0.61		50		0.01		0.61	b	4.21		85.9		1050	a
SW-N-64	SS	N	2024-12-16	Slightly turbid, slightly yellow, moderately high flow			110.0		12.0		0.02		< 0.01		0.37		9.5		493	b	0.47		29		0.02		0.39		3.24		61.3		810.0	
SW-N-64	SS	N	2025-02-20	High flow, clear and colourless			116.0		17.0		0.03		< 0.01		0.39		10.0		110		0.33		26		0.01		0.18		1.83		58.2		509.0	

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

Appendix B-3. Surface Water Quality - 2024-2025

B.C. Water Quality Guidelines				BC WQG-STA (1)			546-5,830 (4)		46,000								25			6.5-9.0								
				BC WQG-LTC (1)			607-2,717 (4)		7,600				2		0.12		5											
BC CSR Protocol 11				AW Upper Cap Concentration (11)		400-1,600			100,000		2,500-15,000		200		5-150				750-24,000									
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter		Lead			Manganese		Molybdenum		Nickel		Selenium		Silver		TSS		Zinc		pH		Conductivity		Temperature		Aluminum		Arsenic		Boron
				State		TOT			TOT		TOT		TOT		TOT		TOT		TOT		TOT		---		TOT		TOT		DIS		DIS		DIS
				Unit		µg/L			µg/L		µg/L		µg/L		µg/L		µg/L		mg/L		µg/L		pH		µS/cm		°C		µg/L		µg/L		µg/L
				Detection Limit		0.005			0.1		0.05		0.02		0.04		0.005		1		1		0.1		1		0.1		0.5		0.02		10
SW-N-05	FRM	Y	2024-06-04	Very low flow, clear and colourless		0.01			1.83		4.70		1.37		0.36	<	0.01		1.20		4.13		8.37		665.0		10.90		22.8		0.20		159.0
SW-N-05	FRM	Y	2024-10-23	Moderately high flow. Clear and colourless sample.		0.03			5.54		2.59		1.19		0.71	<	0.01		1.80		3.90		7.20		723.0		12.30		16.2		0.18		126.0
SW-N-05	FRM	Y	2024-12-17	Very low flow, clear and colourless	<	0.02			2.71		3.23		1.24		0.52	<	0.01	<	1.30		3.25		7.23		612.0		9.50		25.1		0.14		116.0
SW-N-05	FRM	Y	2025-02-21	Very low flow, clear and colourless		0.05			15.6		2.57		1.21		0.35	<	0.01		1.60		4.25		7.87		602.0		7.90		17.65		0.24		147.5
SW-N-14	SS	N	2024-06-17	Low flow, clear and colourless		0.05			18.5		0.42		0.32		0.06	<	0.01		1.60		1.75		7.43		289.0		11.00		3.53		0.13		88.0
SW-N-14	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.		0.01			5.05		0.42		0.62		0.15	<	0.01	<	1.00		1.72		7.55		376.0		9.20		40.10		0.10		93.0
SW-N-14	SS	N	2024-12-16	Clear and colourless, very high flow		0.22			38.9		0.43		1.30		0.12	<	0.01		9.20	b	5.20		7.29		278.0		6.30		10.20		0.11		90.0
SW-N-14	SS	N	2025-02-20	High flow, clear and colourless		0.08			17.5		0.43		0.99		0.10	<	0.01		2.00		2.70		8.09		306.0		6.40		8.90		0.11		81.0
SW-N-15	SS	N	2024-06-17	Moderate flow, clear and colourless		0.01			1.38		0.26		0.09		0.06	<	0.01	<	1.00		0.20		7.76		161.8		7.20		2.24		0.09		42.0
SW-N-15	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.		0.01			0.88		0.24		0.12		0.16	<	0.01	<	1.00		0.30		7.77		186.0		9.20		8.60		0.09		40.0
SW-N-15	SS	N	2024-12-16	Clear and colourless, very high flow		0.02			2.36		0.21	<	0.10	<	0.04	<	0.01	<	1.00	<	1.00		7.49		122.0		7.20		4.66		0.07		37.0
SW-N-15	SS	N	2025-02-20	High flow, clear and colourless	<	0.02			0.93		0.21		0.11	<	0.04	<	0.01	<	1.00	<	1.00		7.24		121.0		7.20		2.65		0.13		29.0
SW-N-16	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless		0.07			56.4		0.58		2.39		0.08	<	0.01		6.40	b	7.30		6.95		386.0		13.10		8.17		0.22		108.0
SW-N-16	FRM	Y	2024-10-23	Low flow, nil turbidity, clear colourless		0.05			61.4		0.84		2.57		0.20	<	0.01	<	1.70		12.85		7.50		394.0		9.50		18.8		0.26		93.0
SW-N-16	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless		0.13			50.3		0.69		3.74		0.17	<	0.01		10.8	b	7.60		7.73		386.5		7.00		15.2		0.19		84.5
SW-N-16	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless		0.04			46.8		0.67		3.87		0.15	<	0.01		1.40		5.50		7.78		325.0		6.10		17.8		0.20		85.5
SW-N-17	SS	N	2024-06-17	Low flow, clear and colourless		0.01			88.2		0.34		0.35		0.04	<	0.01		1.60		2.46		7.22		530.0		11.60		6.73		0.09		141.0
SW-N-17	SS	N	2024-11-01	Moderate flow, clear and colourless sample.	<	0.01			4.21		0.51		0.25		0.21	<	0.01		4.00		1.44		7.48		484.0		9.30		16.80		0.09		133.0
SW-N-17	SS	N	2024-12-16	Clear and colourless, moderately high flow	<	0.02			4.17		0.47		0.18		0.12	<	0.01	<	1.00		1.60		7.30		399.0		6.60		7.3		0.08		151.0
SW-N-17	SS	N	2025-02-20	High flow, clear and colourless	<	0.02			2.04		0.48		0.19		0.11	<	0.01	<	1.00		1.10		7.82		371.0		6.60		6.32		0.08		136.0
SW-N-19	SS	N	2024-10-23			0.05			36.1		0.78		3.55		0.19		0.01		2.40		3.10		7.56		352.0		10.50		12.6		0.30		77.0
SW-N-19	SS	N	2024-12-17			0.19			16.8		0.80		4.99		0.17	<	0.01		5.60	b	5.10		7.52		276.0		7.30		19.8		0.22		85.0
SW-N-19	SS	N	2025-02-21			0.04			4.77		0.74		4.90		0.16		0.01		1.20		3.50		7.18		344.0		6.60		24.0		0.22		85.0
SW-N-41S1	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless		0.06			66.7		0.25		0.20		0.05	<	0.01		4.40	<	1.00		7.59		270.7		9.10		5.15		0.17		21.0
SW-N-41S1	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless		0.09			114.0		0.29		0.25		0.15	<	0.01		3.60		1.65		7.64		323.0		10.80		5.45		0.21		22.0
SW-N-41S1	FRM	Y	2024-12-16	Low flow, nil turbidity, clear colourless		0.03			18.7		0.51		0.16		0.07	<	0.01		2.60	<	1.15		7.63		250.0		7.00		7.55		0.06		67.5
SW-N-41S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless		0.09			93.0		0.25		0.26		0.11	<	0.01		8.20	b	< 1.00		9.22		241.0		7.80		6.82		0.14		18.5
SW-N-41S3	SS	N	2024-05-03	Low flow, nil turbidity, clear colourless		0.02			3.13		0.32		0.14		0.12	<	0.01		2.00		0.92		7.35		197.1		8.30		3.88		0.12		36.0
SW-N-41S3	SS	N	2024-10-21	Low flow. Clear and colourless sample.		0.09			13.10		0.33		0.23		0.14	<	0.01		3.20	<	1.00		7.36		227.0		9.90		6.86		0.19		53.0
SW-N-41S3	SS	N	2024-12-16	Clear and colourless, very high flow		0.05			3.66		0.36		0.28		0.10	<	0.01		3.20		1.20		7.46		158.0		7.30		42.4		0.11		39.0
SW-N-41S3	SS	N	2025-02-20	Moderately High flow, clear and colourless		0.03			3.34		0.27		0.16		0.13	<	0.01		1.20	<	1.00		8.43		161.0		7.00		3.62		0.07		25.0
SW-N-41S4	SS	N	2024-05-03	Low flow, nil turbidity, clear colourless		0.02			16.50		0.21		0.10		0.05	<	0.01		1.60		0.34		7.30		190.0		6.80		2.50		0.11		39.0
SW-N-41S4	SS	N	2024-10-21	Low flow. Clear and colourless sample.		0.03			14.60		0.17		0.11		0.04	<	0.01	<	1.00	<	1.00		7.56		144.0		12.20		3.25		0.15		44.0
SW-N-41S4	SS	N	2024-12-16	Clear and colourless, high flow	<	0.02			38.20		0.15	<	0.10	<	0.04	<	0.01	<	1.00		1.70		7.51		131.0		5.60		2.23		0.10		63.0
SW-N-41S4	SS	N	2025-02-20	High flow, clear and colourless	<	0.02			41.00		0.15	<	0.10	<	0.04	<	0.01	<	1.00	<	1.00		9.19		109.0		3.70		3.11		0.12		37.0
SW-N-42S1	FRM	Y	2024-05-03	Low flow, nil turbidity, clear colourless		0.02			18.9		0.58		0.18		0.06	<	0.01		2.00		0.44		7.42		423.0		11.70		4.92		0.08		49.5
SW-N-42S1	FRM	Y	2024-10-22	Low flow, nil turbidity, clear colourless		0.06			55.3		0.49		0.53		0.08	<	0.01		5.00	<	1.00		7.25		392.0		9.60		5.71		0.11		47.0
SW-N-42S1	FRM	Y	2024-12-16	Low flow, nil turbidity, clear colourless		0.10			111.0		0.28		0.28		0.09	<	0.01		7.60	b	< 3.40		7.51		338.5		6.30		7.51		0.15		24.5
SW-N-42S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless		0.03			10.02		0.51		0.13		0.07	<	0.01		2.20		1.15		7.67		309.0		7.80		4.11		0.06		63.5
SW-N-45	SS	N	2024-11-01	Moderate flow, clear and colourless sample.		0.01			9.34		0.99		0.38		0.50	<	0.01	<	1.00		1.62		7.30		604.0		9.90		12.9		0.09		181.0
SW-N-45	SS	N	2024-12-16	Clear and colourless, high flow	<	0.02			6.65		0.96		0.31		0.34	<	0.01	<	1.00		1.10		7.22		524.0		7.70		6.87		0.08		203.0
SW-N-45	SS	N	2025-02-20	High flow, clear and colourless	<	0.02			6.76		0.96		0.31		0.25	<	0.01		1.20		1.00		8.46		467.0		7.90		5.34		0.12		176.0
SW-N-54	SS	N	2024-10-23	Moderate flow, clear and moderately yellow sample.		0.10			358.0		0.87		3.38		0.37	<	0.01		4.80		2.00		7.32		610.0		14.30		10.0		0.37		61.0
SW-N-54	SS	N	2024-12-17	Clear and slightly yellow, moderately high flow		0.24			47.9		0.77		3.18		0.24	<	0.01		8.80	b	4.40		7.70		430.0		8.70		13.5		0.27		62.0
SW-N-54	SS	N	2025-02-21	Moderate flow, clear and colourless		0.09			5.70		0.68		1.79		0.25	<	0.01		2.00	<	1.00		7.93		315.0		8.40		8.95		0.27		64.0
SW-N-55	SS	Y	2024-12-18	Clear and colourless, moderately high flow		0.14			9.83		0.11		0.30		0.25	<	0.01		4.00		8.60		7.64		480.0		8.50		47.5	<	0.10	<	50.0
SW-N-55	SS	Y	2025-02-20	Moderately low, clear and colourless		0.03			7.11		0.13		0.22		0.49		0.01	<	1.00		28.00		7.98		580.0		7.50		11.4		0.09		14.0
SW-N-56	SS	N	2024-12-16	Clear and colourless, moderate high flow		0.03			1.03		0.09		0.30		0.06	<	0.01	<	1.00	<	1.00		7.75		181.0		6.40		18.9		0.07		31.0
SW-N-56	SS	N	2025-02-20	High flow, clear and colourless	<	0.02	<		0.10		0.13		0.16		0.04	<	0.01	<	1.00	<	1.00		7.62		178.0		6.20		12.0		0.06		20.0
SW-N-57	SS	N	2024-05-02	Moderate flow, very white, moderately turbid		0.35			57.9		1.28		3.27		0.48	<	0.01		90.0	a b	6.40		6.99		560.0		14.30		97.0		0.20		33.0
SW-N-57	SS	N	2024-10-23	Moderate flow. Very high turbidity, very grey sample.		3.61			692.0		2.95		30.30		0.86		0.05		800	a b	57.20		7.77		648.0		10.90		24.0		0.19		58.0
SW-N-57	SS	N	2024-12-17	Clear and colourless, moderately high flow		0.47			22.10		3.01		2.68		0.52	<	0.01		33.0	a b	17.20		7.87		530.0		9.20		9.67		0.53		22.0
SW-N-57	SS	N	2025-02-21	Moderate flow, clear and colourless	<	0.02			4.36		1.49		1.07		0.59	<	0.01		1.60		1.20		6.93		417.0		8.90		4.88		0.10		31.0
SW-N-63	SS	N	2024-05-02	MOderate flow, nil turbidity, light tan		0.07			69.2		0.32		0.80		0.12	<	0.01	<	1.00		0.79		6.71		165.3		10.20		14.80		0.25		48.0
SW-N-63	SS	N	2024-10-22	Moderate flow, clear and colourless sample.		0.15			63.9		0.59		1.30		0.22	<	0.01		1.20		1.50		7.15		269.0		9.70		30.0		0.29		64.0
SW-N-63	SS	N	2024-12-16	Clear and colourless, very high flow		0.20			19.4		0.29		0.68		0.08	<	0.01		2.00		1.60		7.26		230.0		5.50		27.30		0.14		39.0
SW-N-63	SS	N	2025-02-20	High flow, clear and colourless		0.28			20.30		0.28		0.65		0.08	<	0.01		4.40		1.40		8.18		152.0		5.00		15.0		0.12		36.0
SW-N-64	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan		0.27			524.0		0.59		3.72		0.16		0.01		2.40		4.40		6.55		192.2		11.10		179.0		1.17		67.0
SW-N-64	SS	N	2024-10-22	Very low flow, clear and slightly yellow sample		0.25			77.5		0.57		2.17		0.14		0.02		6.40	b	5.40		7.44		299.0		10.10		50.60	b	0.61		59.0
SW-N-64	SS	N	2024-12-16	Slightly turbid, slightly yellow, moderately high flow		0.45			41.6		0.28		1.46		0.08	<	0.01		10.0	b	4.10		7.48		110.0		5.20		45.50		0.37		33.0
SW-N-64	SS	N	2025-02-20	High flow, clear and colourless		0.21			17.9		0.24		0.88		0.06	<	0.01		2.00		2.60		8.35		116.0		5.30		34.40		0.30		29.0

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

Appendix B-3. Surface Water Quality - 2024-2025

B.C. Water Quality Guidelines				BC WQG-STA (1)	0.038-2.8 (5)			BC BLM (8)			350			BC BLM (8)				variable (10)		
				BC WQG-LTC (1)	0.018-0.645 (5)			BC BLM (8)						BC BLM (8)				variable (10)		
BC CSR Protocol 11				AW Upper Cap Concentration (11)																
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter	Cadmium		Cobalt		Copper		Hardness (As $CaCO_3$)	Iron		Lead		Manganese	Molybdenum		Nickel		Selenium		Silver		Sodium		Zinc		Dissolved Organic Carbon
				State	DIS		DIS		DIS		DIS	DIS		DIS		DIS	DIS		DIS		DIS		DIS		TOT		DIS		Dissolved
				Unit	µg/L		µg/L		µg/L		mg/L	µg/L		µg/L		µg/L	µg/L		µg/L		µg/L		µg/L		mg/L		µg/L		mg/L
				Detection Limit	0.005		0.005		0.05		0.5	1		0.005		0.05	0.05		0.02		0.04		0.005		0.05		0.1		0.5
SW-N-05	FRM	Y	2024-06-04	Very low flow, clear and colourless	0.02		0.09		4.63	b	305.0	13.5	<	0.01		0.90	4.78		1.36		0.39	<	0.01				4.22		4.90
SW-N-05	FRM	Y	2024-10-23	Moderately high flow. Clear and colourless sample.	0.02		0.15		3.26	b	460.0	13.8	<	0.01		0.53	2.88		1.19		0.75	<	0.01		11.35		3.37		5.75
SW-N-05	FRM	Y	2024-12-17	Very low flow, clear and colourless	0.02		0.15		3.61	b	427.5	17.5		0.01		1.48	3.26		1.35		0.50	<	0.01		8.30		3.73		5.70
SW-N-05	FRM	Y	2025-02-21	Very low flow, clear and colourless	0.02		0.14		3.24	b	472.5	9.7	<	0.01		0.23	2.95		1.16		0.41	<	0.01		9.46		2.83		5.45
SW-N-14	SS	N	2024-06-17	Low flow, clear and colourless	0.01		0.08		0.83		166.0	8.4		0.01		9.78	0.42		0.28	<	0.04	<	0.01				1.02		3.60
SW-N-14	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.	0.01		0.10		1.61		217.0	75.8		0.04		0.60	0.47		0.58		0.13	<	0.01		11.90		2.10		5.40
SW-N-14	SS	N	2024-12-16	Clear and colourless, very high flow	0.01		0.11		2.21	b	195.0	15.7		0.01		1.38	0.45		0.79		0.10	<	0.01		10.80		1.27		6.10
SW-N-14	SS	N	2025-02-20	High flow, clear and colourless	< 0.01		0.13		2.86		198.0	11.5		0.01		0.86	0.48		1.00		0.11	<	0.01		13.60		1.35		5.60
SW-N-15	SS	N	2024-06-17	Moderate flow, clear and colourless	0.01		0.02		0.25		91.5	2.5		0.01		0.20	0.28		0.07	<	0.04	<	0.01				0.29		1.20
SW-N-15	SS	N	2024-11-01	Moderate-high flow, clear and colourless sample.	< 0.01		0.01		0.44		93.4	10.3	<	0.02		0.39	0.26	<	0.10		0.12	<	0.01		5.39	<	1.00		1.90
SW-N-15	SS	N	2024-12-16	Clear and colourless, very high flow	< 0.01		0.01		0.86	b	82.0	6.8		0.01		0.66	0.25		0.19		0.05	<	0.01		5.31		0.57		2.20
SW-N-15	SS	N	2025-02-20	High flow, clear and colourless	< 0.01		0.02		0.56	b	82.2	73.3		0.01		0.99	0.24		0.16	<	0.04	<	0.01		4.69		1.83		1.70
SW-N-16	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.01		0.28			b	204.5	51.2	<	0.01		49.50	0.70		1.91		0.09	<	0.01				5.15		8.50
SW-N-16	FRM	Y	2024-10-23	Low flow, nil turbidity, clear colourless	0.02		0.43		8.69	b	235.5	85.2		0.03		64.85	0.93		2.67		0.22		0.01		12.85		13.15		14.50
SW-N-16	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless	0.02		0.41		11.65	b	192.5	62.8		0.02		33.35	0.73		3.27		0.17	<	0.01		11.75		4.89		10.00
SW-N-16	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless	0.01		0.49		14.90	b	199.5	135.5		0.01		53.90	0.77		4.35		0.16	<	0.01		22.60		5.67		12.50
SW-N-17	SS	N	2024-06-17	Low flow, clear and colourless	< 0.01		0.43		0.31		218.0	174.0	<	0.01		82.40	0.34		0.27	<	0.04	<	0.01				1.95		2.90
SW-N-17	SS	N	2024-11-01	Moderate flow, clear and colourless sample.	0.01		0.09		0.84		272.0	16.0	<	0.02		3.93	0.58		0.26		0.18	<	0.01		12.40		2.00		4.30
SW-N-17	SS	N	2024-12-16	Clear and colourless, moderately high flow	0.01		0.08		0.71	b	285.0	12.4	<	0.01		4.31	0.53		0.22		0.16	<	0.01		12.60		1.32		4.40
SW-N-17	SS	N	2025-02-20	High flow, clear and colourless	< 0.01		0.06		1.47		236.0	8.0		0.01		1.80	0.57		0.26		0.11	<	0.01		12.50		1.58		3.30
SW-N-19	SS	N	2024-10-23		0.01		0.76		10.40	b	197.0	81.0		0.02		29.50	0.84		3.62		0.18	<	0.01		12.20		2.71		20.0
SW-N-19	SS	N	2024-12-17		0.01		0.50		17.30	b	165.0	30.7		0.03		6.31	0.82		4.30		0.14	<	0.01		11.80		3.23		12.0
SW-N-19	SS	N	2025-02-21		0.01		0.51		23.70	a b	197.0	44.7		0.02		3.19	0.88		5.61		0.19	<	0.01		24.60		6.07		14.0
SW-N-41S1	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless	< 0.01		0.07		0.22		172.5	27.4	<	0.01		35.05	0.30		0.10		0.06	<	0.01				0.24		1.60
SW-N-41S1	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless	0.01		0.06		0.33		210.5	26.2	<	0.01		54.80	0.36		0.15		0.14	<	0.01		5.49		1.68		2.80
SW-N-41S1	FRM	Y	2024-12-16	Low flow, nil turbidity, clear colourless	< 0.01		0.06		1.04		193.5	32.9		0.02		13.20	0.50		0.32		0.07	<	0.01		10.10		1.83		4.70
SW-N-41S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless	< 0.01		0.04		1.85	b	167.5	26.2	<	0.01		20.80	0.31		0.10		0.10	<	0.01		4.70		1.56		1.70
SW-N-41S3	SS	N	2024-05-03	Low flow, nil turbidity, clear colourless	< 0.01		0.03		0.20		121.0	3.7	<	0.01		1.28	0.32		0.08		0.11	<	0.01			<	0.10		1.10
SW-N-41S3	SS	N	2024-10-21	Low flow. Clear and colourless sample.	< 0.01		0.02		0.45		143.0	14.6	<	0.01		3.40	0.41		0.15		0.13	<	0.01		5.79		0.35		3.30
SW-N-41S3	SS	N	2024-12-16	Clear and colourless, very high flow	0.01		0.04		0.68		108.0	46.3		0.06		7.20	0.29		0.15		0.12	<	0.01		5.11		0.33		4.10
SW-N-41S3	SS	N	2025-02-20	Moderately High flow, clear and colourless	< 0.01		0.01		0.27		107.0	3.6	<	0.01		1.17	0.32		0.05		0.13	<	0.01		5.03		0.21		1.50
SW-N-41S4	SS	N	2024-05-03	Low flow, nil turbidity, clear colourless	< 0.01		0.07		0.27		75.5	51.4		0.01		12.3	0.53		0.13	<	0.04	<	0.01				0.41		3.40
SW-N-41S4	SS	N	2024-10-21	Low flow. Clear and colourless sample.	< 0.01		0.02		0.23		79.6	51.1		0.01		14.1	0.18		0.06	<	0.04	<	0.01		5.34		0.58		3.70
SW-N-41S4	SS	N	2024-12-16	Clear and colourless, high flow	< 0.01		0.02		0.53		82.5	30.1		0.01		38.2	0.18		0.12	<	0.04	<	0.01		5.21		0.48		3.20
SW-N-41S4	SS	N	2025-02-20	High flow, clear and colourless	< 0.01		0.03		1.50		75.6	43.5		0.01		44.2	0.15		0.10	<	0.04	<	0.01		5.09		1.69		3.00
SW-N-42S1	FRM	Y	2024-05-03	Low flow, nil turbidity, clear colourless	< 0.01		0.08		1.72	b	208.0	28.3		0.01		12.15	0.67		0.31		0.05	<	0.01				2.20		3.05
SW-N-42S1	FRM	Y	2024-10-22	Low flow, nil turbidity, clear colourless	< 0.01		0.08		0.67		240.5	35.7		0.01		29.95	0.64		0.30		0.09	<	0.01		10.60		0.97		3.80
SW-N-42S1	FRM	Y	2024-12-16	Low flow, nil turbidity, clear colourless	< 0.01		0.04		0.64		176.0	29.9		0.01		25.75	0.33		0.15		0.09	<	0.01		4.85		0.70		2.20
SW-N-42S1	FRM	Y	2025-02-20	Low flow, nil turbidity, clear colourless	< 0.01		0.04		1.02		190.5	13.5		0.01		6.04	0.59		0.23		0.08	<	0.01		9.51		1.28		2.60
SW-N-45	SS	N	2024-11-01	Moderate flow, clear and colourless sample.	0.01		0.15		1.50	b	370.0	10.0	<	0.02		6.85	1.01		0.39		0.48	<	0.01		12.50		1.50		3.70
SW-N-45	SS	N	2024-12-16	Clear and colourless, high flow	0.01		0.13		1.22		376.0	6.4		0.01		6.67	1.02		0.31		0.36	<	0.01		12.40		1.10		4.40
SW-N-45	SS	N	2025-02-20	High flow, clear and colourless	0.01		0.14		1.30		310.0	14.3	<	0.01		7.90	1.08		0.34		0.26	<	0.01		11.80		0.95		3.8
SW-N-54	SS	N	2024-10-23	Moderate flow, clear and moderately yellow sample.	0.02		1.23		25.80	b	336.0	58.0		0.01		379.0	0.97		3.03		0.42	<	0.01		12.50		0.41		25.0
SW-N-54	SS	N	2024-12-17	Clear and slightly yellow, moderately high flow	0.01		0.29		19.50	b	192.0	27.8		0.02		22.2	0.83		2.14		0.24	<	0.01		6.83		2.03		14.0
SW-N-54	SS	N	2025-02-21	Moderate flow, clear and colourless	< 0.01		0.18		23.10	b	201.0	13.9	<	0.01		2.33	0.80		1.81		0.27	<	0.01		10.80		0.40		14.0
SW-N-55	SS	Y	2024-12-18	Clear and colourless, moderately high flow	< 0.03		0.05		1.42		203.0	< 5.0	<	0.03		3.72	< 0.25		0.30	<	0.20	<	0.03		4.99		8.53		6.40
SW-N-55	SS	Y	2025-02-20	Moderately low, clear and colourless	0.13		0.13		1.30		425.0	7.2		0.01		7.36	0.12		0.25		0.55	<	0.01		6.79		32.40		3.0
SW-N-56	SS	N	2024-12-16	Clear and colourless, moderate high flow	< 0.01		0.04		0.56		118.0	20.4		0.01		0.36	0.11		0.26		0.05	<	0.01		6.37		0.53		6.30
SW-N-56	SS	N	2025-02-20	High flow, clear and colourless	< 0.01		0.04		0.53		110.0	5.4	<	0.01		0.07	0.14		0.79		0.04	<	0.01		6.43		0.16		3.70
SW-N-57	SS	N	2024-05-02	Moderate flow, very white, moderately turbid	0.01		0.31		2.55	a b	259.0	189.0		0.07		11.2	1.57		0.88		0.50	<	0.01				1.72		1.40
SW-N-57	SS	N	2024-10-23	Moderate flow. Very high turbidity, very grey sample.	< 0.01		0.39		1.02	b	444.0	22.2		0.01		14.2	4.66		1.46		0.89	<	0.01		7.09		0.22		1.10
SW-N-57	SS	N	2024-12-17	Clear and colourless, moderately high flow	0.01		0.14		2.10	b	214.0	7.1		0.01		2.14	3.16		0.70		0.49	<	0.01		5.48		4.77		1.80
SW-N-57	SS	N	2025-02-21	Moderate flow, clear and colourless	0.01		0.14		4.68	a b	311.0	17.9		0.01		4.85	1.66		1.24		0.61	<	0.01		4.78		4.64		2.20
SW-N-63	SS	N	2024-05-02	MOderate flow, nil turbidity, light tan	< 0.01		0.34		3.21	a b	93.5	319.0		0.04		72.50	0.33		0.82		0.10	<	0.01				1.02		4.60
SW-N-63	SS	N	2024-10-22	Moderate flow, clear and colourless sample.	0.01		0.42		4.26	b	163.0	295.0		0.06		75.70	0.70		2.23		0.23	<	0.01		9.10		3.38		11.0
SW-N-63	SS	N	2024-12-16	Clear and colourless, very high flow	< 0.01		0.11		1.56	b	98.3	132.0		0.05		16.70	0.26		0.56		0.10	<	0.01		5.94		0.83		5.10
SW-N-63	SS	N	2025-02-20	High flow, clear and colourless	0.01		0.12		1.84		101.0	93.7		0.04		17.70	0.27		0.44		0.07	<	0.01		6.88		0.97		3.80
SW-N-64	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan	0.02		3.35		5.22	b	94.2	2850.0	a	0.24		622.0	0.67		4.27		0.23		0.01				4.55		30.0
SW-N-64	SS	N	2024-10-22	Very low flow, clear and slightly yellow sample	0.01		0.57		3.82		105.0	620.0	a	0.10		79.10	0.79		2.37		0.13		0.01		13.3		6.24		13.0
SW-N-64	SS	N	2024-12-16	Slightly turbid, slightly yellow, moderately high flow	0.01		0.26		2.96	b	65.8	312.0		0.15		35.20	0.26		1.21		0.07	<	0.01		8.35		3.60		9.20
SW-N-64	SS	N	2025-02-20	High flow, clear and colourless	0.01		0.16		2.63		64.5	350.0		0.12		16.60	0.29		0.82		0.07	<	0.01		9.32		2.67		7.00

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

Appendix B-3. Surface Water Quality - 2024-2025

B.C. Water Quality Guidelines				BC WQG-STA (1)			600		1.9-24.9 (2)		0.06-0.6 (3)		32.8								-			1000
				BC WQG-LTC (1)			150		0.135-1.77 (2)		0.02-0.2 (3)		3		128-429 (5)		Variable (7)		5		1,200				0.06-0.98 (4)			
BC CSR Protocol 11				AW Upper Cap Concentration (11)			15,000		13.1-184		2-20		4,000		12,800-42,900				500		120,000		5-40		400		200-900			
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter	Conductivity		Chloride		Nitrogen - Ammonia		Nitrogen - Nitrite		Nitrogen - Nitrate		Sulphate		Aluminum		Arsenic		Boron		Cadmium		Cobalt		Copper		Hardness (As $CaCO_3$)		Iron
				State	TOT		DIS		TOT		DIS		DIS		DIS		TOT		TOT		TOT		TOT		TOT		TOT		TOT
				Unit	µS/cm		mg/L		mg/L		mg/L		mg/L		mg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		mg/L		µg/L
				Detection Limit	1		1		0.015		0.005		0.02		1		0.5		0.02		10		0.005		0.01		0.1		0.5		1
SW-N-65	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan	187.7		14.0		0.10		0.02		14.0		2.42		4.65		78.6		2530		0.24		432.0		0.56		0.10		0.01
SW-N-65	SS	N	2024-10-22	Very low flow. Clear, slightly yellow sample.	222.0		21.0		0.07		0.01		21.0		0.64		4.38		94.3		993.0		0.28		100.0		0.61		0.07		0.07
SW-N-65	SS	N	2024-12-16	Clear and colourless, moderately high flow	190.0		11.0		0.02		0.01		11.0		0.32		3.33		67.3		730.0		0.43		38.80		0.28		0.02		0.01
SW-N-65	SS	N	2025-02-20	High flow, clear and colourless	122.0		16.0		0.03		0.01		16.0		0.20		1.93		64.60		479.0		0.22		19.20		0.26		0.03		0.01
SW-N-66	SS	N	2025-02-24	Moderate high flow, clear and colourless	58.0		3.50	<	0.02		0.01		3.50		0.03		0.57		33.0		12.1		0.02		0.42		0.05		0.02		0.01
SW-N-CS2	SS	N	2024-12-16	Clear and colourless, moderately low flow	190.0		4.90	<	0.02		0.01		4.90		0.02		0.25		79.3		5.0		0.02		0.15		0.08		0.02		0.01
SW-S-03	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	231.3		33.0		0.04		0.01		33.0		0.18		3.00		100.0		282.0		0.04		37.90		0.17		0.04		0.02
SW-S-03	SS	N	2024-10-21	Moderate flow. Clear and colourless sample.	393.0		19.0		0.04		0.03		19.0		0.24		6.78		177.0		134.0		0.06		33.50		0.20		0.04		0.01
SW-S-03	SS	N	2024-12-17	Slightly turbid, grey, very high flow	220.0		11.0		0.66		0.19		11.0		3.74		38.3		85.3		6820		27.70		177.0		0.90		0.66		0.03
SW-S-03	SS	N	2025-02-24	Moderately high flow, clear and colourless	331.0		74.0		0.98		0.03		74.0		0.48		9.54		128.0		187.0		0.09		155.0		0.15		0.98		0.02
SW-S-04	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless	240.8		43.0	<	0.02		0.01		43.0		0.07		1.03		112.5		26.0		0.03		3.22		0.13		0.02		0.01
SW-S-04	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless	303.0		32.5	<	0.02		0.01		32.5		0.08		1.72		132.5		27.9		0.05		2.65		0.12		0.02		0.01
SW-S-04	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless	167.5		11.0		0.14		0.14		11.0		7.92		30.2		90.30		13950		9.25		557.5		0.54		0.14		0.02
SW-S-04	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless	235.0		58.5		0.13		0.08		58.5		3.53		17.45		88.25		5755		5.30		186.5		0.42		0.13		0.02
SW-S-12	FRM	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	252.1		22.0		3.00	b	0.01		22.0		0.85		5.20		109.0		1850.0		0.21		302		0.13		3.00		0.09
SW-S-12	FRM	N	2024-10-21	Moderate flow, nil turbidity, clear colourless	418.0		9.75		0.11		0.06		9.75		0.50		11.9		199.5		242.5		0.13		63.25		0.11		0.11		0.01
SW-S-12	FRM	N	2024-12-17	Moderate flow, nil turbidity, clear colourless	315.0		14.0		0.94		0.18		14.0		2.94		47.4		117.0		4925		32.00		214.5		1.14		0.94		0.03
SW-S-12	FRM	N	2024-07-03	Clear and colourless sample.	170.0		13.0		2.00	b	0.01		13.0		0.51		4.96		69.8		764.5		0.04		224.5		0.06		2.00		0.01
SW-S-20	SS	N	2023-11-02	Moderately low flow, clear and colourless.	90.0		6.9		0.68		0.01		6.9		0.29		3.64		41.5		357.0		0.21		23.40		0.06		0.68		0.01
SW-S-20	SS	N	2024-12-17	Clear, slightly yellow, moderately high flow	74.0		5.9		0.05		0.01		5.9		0.90		3.56		49.6		1480		0.32		28.0		0.10		0.05		0.01
SW-S-21	SS	N	2024-12-17	Clear and colourless, moderately high flow	100.0		5.8	<	0.02		0.01		5.8		0.07		1.48		40.9		80.8		0.05		2.89		0.05		0.02		0.01
SW-S-21	SS	N	2025-02-24	Moderately high flow, clear and colourless	78.1		5.3	<	0.02		0.01		5.3		0.04		1.06		39.0		38.7		0.02		0.77		0.07		0.02		0.01
SW-S-24	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	275.7		44.0	<	0.02		0.01		44.0		0.12		1.41		132.0		38.8		0.03		34.30		0.17		0.02		0.01
SW-S-24	SS	N	2024-10-21	Clear and colourless sample.	339.0		34.0		0.08		0.02		34.0		0.20		3.42		154.0		168.0		0.21		28.10		0.16		0.08		0.01
SW-S-24	SS	N	2024-12-17	Clear, slightly grey, very high flow	117.7		10.0		0.21		0.12		10.0		6.75		27.0		86.9		12400		9.43		438		0.56		0.21		0.02
SW-S-24	SS	N	2025-02-24	High flow, clear and colourless	314.0		70.0		0.23		0.02		70.0		0.14		4.64		129.0		24.2		0.03		40.60		0.16		0.23		0.04
SW-S-27	SS	N	2024-05-02	Low flow, nil turbidity, clear colourless	330.0		40.0	<	0.02		0.01		40.0		0.22		2.90		102.0		154.0		0.14		22.00		0.27		0.02		0.01
SW-S-27	SS	N	2024-12-17	Clear, slightly grey, very high flow	180.0		10.0		0.33		0.13		10.0		5.15		29.5		74.30		8910		16.50		300		0.63		0.33		0.03
SW-S-27	SS	N	2025-02-24	High flow, clear and colourless	344.0		80.0		0.47		0.03		80.0		0.37		7.99		125.0		238.0		0.21		112		0.15		0.47		0.07
SW-N-Agg Drain	SS	N	2025-03-11		569.0		9.5	<	0.02		0.02		9.5		0.15		1.04		368.0		11.3		0.01		4.57		0.84		0.02		0.01
SW-FB	FB	N	2024-05-02		< 2.0	<	1.00	<	0.02		0.01		1.00		0.01		0.05		0.50		1.0		0.01		0.05		0.05		0.02		0.01
SW-FB	FB	N	2024-10-23	Decanted on tailgate.		<	1.00	<	0.02		0.01		1.00		0.01		0.10		0.50		5.0		0.02		0.10		0.05		0.02		0.01
SW-FB	FB	N	2024-12-17	Taken at 20	< 2.0	<	1.00	<	0.02		0.01		1.00		0.01		0.20		0.50		1.1		0.01		0.05		0.05		0.02		0.01
SW-FB	FB	N	2025-02-24	Clear and colourless	8.2	<	1.00	<	0.02		0.01		1.00		0.01		0.10		0.50		5.0		0.02		0.10		0.05		0.02		0.01
SW-TB	TB	N	2024-05-02		< 2.0	<	1.00	<	0.02		0.01		1.00		0.01		0.05		0.50		1.0		0.01		0.05		0.05		0.02		0.01
SW-TB	TB	N	2024-10-23	Sealed bottles from the lab.		<	1.00	<	0.02		0.01		1.00		0.01		0.10		0.50		5.0		0.02		0.10		0.05		0.02		0.01
SW-TB	TB	N	2024-12-17	Taken on the second day	< 2.0	<	1.00	<	0.02		0.01		1.00		0.01		0.05		0.50		1.0		0.01		0.05		0.05		0.02		0.01
SW-TB	TB	N	2025-02-24	Sealed bottles, clear and colourless	<	<	1.00	<	0.02		0.01		1.00		0.01		0.10		0.50		5.0		0.02		0.10		0.05		0.02		0.01

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

Appendix B-3. Surface Water Quality - 2024-2025

B.C. Water Quality Guidelines				BC WQG-STA (1)			546-5,830 (4)		46,000							25				6.5-9.0									
				BC WQG-LTC (1)			607-2,717 (4)		7,600				2		0.12	5													
BC CSR Protocol 11				AW Upper Cap Concentration (11)	400-1,600				100,000		2,500-15,000		200		5-150				750-24,000										
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter	Lead		Manganese		Molybdenum		Nickel		Selenium		Silver	TSS			Zinc		pH		Conductivity		Temperature		Aluminum		Arsenic		Boron
				State	TOT		TOT		TOT		TOT		TOT		TOT	TOT			TOT		---		TOT		TOT		DIS		DIS		DIS
				Unit	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	mg/L			µg/L		pH		µS/cm		°C		µg/L		µg/L		µg/L
				Detection Limit	0.005		0.1		0.05		0.02		0.04		0.005	1			1		0.1		1		0.1		0.5		0.02		10
SW-N-65	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan	0.20		3.22		0.16		0.01				41.0	2.00			4.10		6.98		187.7		11.00		152.0		1.04		66.0
SW-N-65	SS	N	2024-10-22	Very low flow. Clear, slightly yellow sample.	1.13		2.44		0.16		0.01		10.00		58.0	3.60			5.30		7.63		222.0		9.60		45.1		0.55		59.0
SW-N-65	SS	N	2024-12-16	Clear and colourless, moderately high flow	0.40		1.27		0.08		0.01		7.13		14.0	10.0		b	3.90		7.77		190.0		5.10		32.5		0.32		31.0
SW-N-65	SS	N	2025-02-20	High flow, clear and colourless	0.50		0.86		0.08		0.01		8.21		14.0	2.80			2.30		8.49		122.0		5.30		29.4		0.26		29.0
SW-N-66	SS	N	2025-02-24	Moderate high flow, clear and colourless	0.02		0.10		0.04		0.01		2.11		6.0	2.00		<	1.00		7.19		58.0		6.20		18.2		0.05	<	10.0
SW-N-CS2	SS	N	2024-12-16	Clear and colourless, moderately low flow	0.52		0.10		0.08		0.01		3.03		13.0	< 1.00		<	1.00		7.48		190.0		7.80		2.94		0.04		18.0
SW-S-03	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	1.92		0.59		0.07		0.01				19.0	4.80			2.75		7.19		231.3		11.00		6.78		0.12		55.0
SW-S-03	SS	N	2024-10-21	Moderate flow. Clear and colourless sample.	5.10		2.32		0.16		0.01		16.60		120	< 1.00			5.60		7.25		393.0		14.40		10.1		0.20		58.0
SW-S-03	SS	N	2024-12-17	Slightly turbid, grey, very high flow	1.72		7.08		0.14		0.07		8.52		33.0	120	a	b	98.10	a	b	6.54		220.0		8.20		84.5		1.05		155.0
SW-S-03	SS	N	2025-02-24	Moderately high flow, clear and colourless	2.79		2.47		0.09		0.01		27.70		30.0	2.40			11.30		7.83		331.0		8.90		22.5		0.18		54.0
SW-S-04	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless	0.51		0.27		0.05		0.01				20.5	< 1.00			1.21		7.74		240.8		8.80		15.13		0.07		61.5
SW-S-04	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless	4.61		0.44		0.10		0.01		18.45		59.5	< 1.00			2.50		7.15		303.0		11.50		10.55		0.11		70.0
SW-S-04	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless	1.20		11.30		0.11		0.05		8.17		20.0	180	a	b	92.55		7.77		167.5		7.80		38.6		0.30		81.0
SW-S-04	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless	1.21		5.78		0.08		0.03		22.65		20.0	72.5	a	b	49.50		7.08		235.0		7.10		49.15		0.22		53.0
SW-S-12	FRM	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	2.78		1.75		0.07		0.01				18.0	7.60		b	3.77		7.12		252.1		12.50		11.85		0.28		85.0
SW-S-12	FRM	N	2024-10-21	Moderate flow, nil turbidity, clear colourless	6.31		5.36		0.15		0.01		11.45		155	2.60			6.30		6.89		418.0		14.40		22.5		0.28		53.5
SW-S-12	FRM	N	2024-12-17	Moderate flow, nil turbidity, clear colourless	2.90		6.99		0.17		0.08		11.40		52.0	82.0	a	b	92.30		6.58		315.0		8.60		66.2		1.37		251.5
SW-S-12	FRM	N	2024-07-03	Clear and colourless sample.	2.46		1.28		0.06		0.01				14.0	< 1.70			4.30		6.80		170.0		9.10		20.75		0.17		64.5
SW-S-20	SS	N	2023-11-02	Moderately low flow, clear and colourless.	1.32		0.58		0.07		0.01				9.6	12.0		b	13.0		b	7.39		90.0		10.70		88.0	b	0.17		24.0
SW-S-20	SS	N	2024-12-17	Clear, slightly yellow, moderately high flow	0.11		1.27		0.05		0.01		2.98		1.0	13.0		b	9.1		b	6.79		74.0		6.60		63.8		0.13		36.0
SW-S-21	SS	N	2024-12-17	Clear and colourless, moderately high flow	0.24		0.26		0.05		0.01		3.16		4.1	2.80			8.30		b	6.74		100.0		6.80		45.3		0.09		25.0
SW-S-21	SS	N	2025-02-24	Moderately high flow, clear and colourless	0.11		0.21		0.04		0.01		2.95		1.1	1.20			8.50		8.20		78.1		6.10		38.7		0.09		11.0
SW-S-24	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless	0.41		0.38		0.04		0.01				23.0	1.60			2.18		7.14		275.7		9.40		14.1		0.13		101.0
SW-S-24	SS	N	2024-10-21	Clear and colourless sample.	2.22		0.83		0.08		0.01		19.10		83.0	9.20		b	7.7		7.28		339.0		11.60		7.85		0.17		80.0
SW-S-24	SS	N	2024-12-17	Clear, slightly grey, very high flow	1.20		10.00		0.11		0.05		7.28		19.0	150	a	b	78.4	a	b	6.85		117.7		7.30		35.5		0.40		77.0
SW-S-24	SS	N	2025-02-24	High flow, clear and colourless	2.13		1.28		0.06		0.01		26.50		32.0	2.80			7.40		7.20		314.0		8.20		96.0	b	0.19		70.0
SW-S-27	SS	N	2024-05-02	Low flow, nil turbidity, clear colourless	1.16		0.59		0.06		0.01				17.0	3.60			2.49		7.53		330.0		12.40		9.06		0.15		59.0
SW-S-27	SS	N	2024-12-17	Clear, slightly grey, very high flow	1.31		7.96		0.11		0.05		7.77		21.0	130	a	b	82.0	a	b	6.65		180.0		7.30		47.2		0.60		100.0
SW-S-27	SS	N	2025-02-24	High flow, clear and colourless	2.96		2.10		0.08		0.01		28.80		30.0	2.00			11.7		7.22		344.0		8.10		17.3		0.19		56.0
SW-N-Agg Drain	SS	N	2025-03-11		6.27		0.89		0.33		0.01		6.55		260	< 1.50			1.37		7.46		569.0		10.20		7.45		0.17		33.0
SW-FB	FB	N	2024-05-02		0.02		0.02		0.04		0.01				1.0	< 1.00			0.15			<	2.0				1.50		< 0.02		< 10.0
SW-FB	FB	N	2024-10-23	Decanted on tailgate.	0.02		0.10		0.04		0.01		0.25		1.0	< 1.00		<	1.0								1.21		< 0.02		< 10.0
SW-FB	FB	N	2024-12-17	Taken at 20	0.02		0.05		0.04		0.01		0.05		1.0	< 1.00			0.75			<	2.0				1.33		< 0.02		< 10.0
SW-FB	FB	N	2025-02-24	Clear and colourless	0.02		0.10		0.04		0.01		0.25		1.0	< 1.00		<	1.0		9.54		8.2		5.90		0.74		< 0.02		< 10.0
SW-TB	TB	N	2024-05-02		0.02		0.02		0.04		0.01				1.0	< 1.00		<	0.1			<	2.0			<	0.50		< 0.02		< 10.0
SW-TB	TB	N	2024-10-23	Sealed bottles from the lab.	0.02		0.10		0.04		0.01		0.25		1.0	< 1.00			6.7							<	0.50		< 0.02		< 10.0
SW-TB	TB	N	2024-12-17	Taken on the second day	0.02		0.02		0.04		0.01		0.05		1.0	< 1.00		<	0.1			<	2.0			<	0.50		< 0.02		< 10.0
SW-TB	TB	N	2025-02-24	Sealed bottles, clear and colourless	0.02		0.10		0.04		0.01		0.25		1.0	< 1.00		<	1.0			<				<	0.50		< 0.02		< 10.0

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

Appendix B-3. Surface Water Quality - 2024-2025

B.C. Water Quality Guidelines				BC WQG-STA (1)	0.038-2.8 (5)			BC BLM (8)				350							BC BLM (8)						variable (10)		
				BC WQG-LTC (1)	0.018-0.645 (5)			BC BLM (8)											BC BLM (8)						variable (10)		
BC CSR Protocol 11				AW Upper Cap Concentration (11)																								
Station	Sample Type	Compliance Point (Y/N?)	Date Sampled	Parameter	Cadmium			Cobalt			Copper			Hardness (As $CaCO_3$)			Iron			Lead			Manganese			Molybdenum			Nickel			Selenium			Silver			Sodium			Zinc			Dissolved Organic Carbon		
				State	DIS			DIS			DIS			DIS			DIS			DIS			DIS			DIS			DIS			DIS			TOT			DIS			Dissolved		
				Unit	µg/L			µg/L			µg/L			mg/L			µg/L			µg/L			µg/L			µg/L			µg/L			µg/L			µg/L			µg/L			mg/L		
				Detection Limit	0.005			0.005			0.05			0.5			1			0.005			0.05			0.05			0.02			0.04			0.005			0.05			0.1			0.5		
SW-N-65	SS	N	2024-05-02	Low flow, nil turbidity, moderately tan		0.02			2.78			5.44		b		96.5			2390.0	a		0.21			516.0			0.69			3.70			0.17			0.01						5.08			25.0		
SW-N-65	SS	N	2024-10-22	Very low flow. Clear, slightly yellow sample.		0.01			0.57			4.26				117.0			535.0	a		0.09			82.00			0.78			2.51			0.16			0.01			12.5			6.07			12.0		
SW-N-65	SS	N	2024-12-16	Clear and colourless, moderately high flow		0.01			0.18			3.14		b		71.3			235.0			0.13			34.70			0.25			1.00			0.07		<	0.01			7.43			3.43			7.60		
SW-N-65	SS	N	2025-02-20	High flow, clear and colourless		0.01			0.15			1.56				69.5			311.0			0.10			16.60			0.26			0.74			0.04		<	0.01			8.92			1.62			6.50		
SW-N-66	SS	N	2025-02-24	Moderate high flow, clear and colourless		0.16			0.02			3.60	a	b		35.8			17.8			0.01			0.13			0.07			0.11			0.04		<	0.01			2.40			3.14			3.20		
SW-N-CS2	SS	N	2024-12-16	Clear and colourless, moderately low flow	<	0.01			0.02			0.29				87.5			1.8		<	0.01			0.06			0.09			0.04			0.07		<	0.01			3.13			0.37			2.10		
SW-S-03	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless		0.01			0.15			2.64		b		104.0			121.0			0.01			36.9			0.20			0.61			0.06		<	0.01						2.64			3.60		
SW-S-03	SS	N	2024-10-21	Moderate flow. Clear and colourless sample.		0.03			0.21			6.66		b		183.0			28.0			0.01			29.0			0.24			2.44			0.15		<	0.01			17.60			5.59			4.30		
SW-S-03	SS	N	2024-12-17	Slightly turbid, grey, very high flow		0.08			0.53			9.81	a	b		76.5			196.0			1.20			84.4			0.78			2.19			0.08		<	0.01			9.06			32.7			14.0		
SW-S-03	SS	N	2025-02-24	Moderately high flow, clear and colourless		0.03			0.41			8.39		b		142.0			109.0			0.03			156.0			0.18			2.44			0.07		<	0.01			31.10			13.0			5.40		
SW-S-04	FRM	Y	2024-05-02	Low flow, nil turbidity, clear colourless		0.02			0.07			0.97		b		110.0			3.2		<	0.01			3.38			0.14			0.27			0.04		<	0.01						2.00			2.20		
SW-S-04	FRM	Y	2024-10-21	Low flow, nil turbidity, clear colourless		0.01			0.07			1.65		b		138.0			3.9		<	0.01			0.80			0.14			0.38			0.09		<	0.01			19.45			2.52			3.50		
SW-S-04	FRM	Y	2024-12-17	Low flow, nil turbidity, clear colourless		0.01			0.12			3.45		b		69.2			63.7			0.17			12.35			0.41			0.73			0.05		<	0.01			8.81			5.14			5.65		
SW-S-04	FRM	Y	2025-02-21	Low flow, nil turbidity, clear colourless		0.01			0.12			3.39		b		91.3			77.0			0.18			9.87			0.40			0.79			0.05		<	0.01			27.00			5.61			4.80		
SW-S-12	FRM	N	2024-05-02	Moderate flow, nil turbidity, clear colourless		0.01			0.65			3.35		b		107.5			616.5	a		0.05			300.5			0.14			1.58			0.06		<	0.01						2.69			4.95		
SW-S-12	FRM	N	2024-10-21	Moderate flow, nil turbidity, clear colourless		0.07			0.43			11.10	a	b		210.0			31.4			0.01			67.9			0.11			5.65			0.16		<	0.01			12.20			6.05			5.55		
SW-S-12	FRM	N	2024-12-17	Moderate flow, nil turbidity, clear colourless		0.06			0.74			14.60	a	b		112.0			219.5			1.23			153.0			0.92			3.32			0.10		<	0.01			12.05			31.3			20.5		
SW-S-12	FRM	N	2024-07-03	Clear and colourless sample.	<	0.01			0.52			5.46	a	b		80.3			654.5	a		0.01			256.0		<	0.05			1.30			0.09		<	0.01						3.70			4.45		
SW-S-20	SS	N	2023-11-02	Moderately low flow, clear and colourless.	<	0.01			0.12			3.26		b		44.7			85.3			0.03			14.60		<	0.05			0.45			0.08			0.01						10.40			7.90		
SW-S-20	SS	N	2024-12-17	Clear, slightly yellow, moderately high flow	<	0.01			0.08			1.57		b		50.5			77.2			0.04			9.00			0.10			0.30			0.04		<	0.01			3.14			5.10			7.70		
SW-S-21	SS	N	2024-12-17	Clear and colourless, moderately high flow	<	0.01			0.04			2.49		b		42.2			25.1			0.01			0.29			0.09			0.37			0.05		<	0.01			3.38			8.41			6.00		
SW-S-21	SS	N	2025-02-24	Moderately high flow, clear and colourless	<	0.01			0.03			1.06				42.5			22.6			0.01			0.32			0.09			0.17		<	0.04		<	0.01			3.34			7.57			5.40		
SW-S-24	SS	N	2024-05-02	Moderate flow, nil turbidity, clear colourless		0.01			0.11			1.66		b		137.0			21.1			0.03			26.2			0.20			0.42			0.04		<	0.01						2.68			3.00		
SW-S-24	SS	N	2024-10-21	Clear and colourless sample.		0.01			0.10			2.80		b		160.0			6.4			0.01			4.86			0.18			0.74			0.10		<	0.01			20.70			4.01			4.30		
SW-S-24	SS	N	2024-12-17	Clear, slightly grey, very high flow		0.03			0.20			3.60		b		63.2			69.7			0.25			37.90			0.40			0.78			0.05		<	0.01			7.76			6.76			6.00		
SW-S-24	SS	N	2025-02-24	High flow, clear and colourless		0.02			0.23			4.79		b		138.0			188.0			0.14			52.10			0.15			1.31			0.07		<	0.01			30.30			7.31			4.70		
SW-S-27	SS	N	2024-05-02	Low flow, nil turbidity, clear colourless	<	0.01			0.11			2.29		b		100.0			9.4		<	0.01			0.55			0.26			0.45			0.05		<	0.01						1.32			3.50		
SW-S-27	SS	N	2024-12-17	Clear, slightly grey, very high flow		0.02			0.28			5.20	a	b		57.3			102.0			0.50			62.7			0.52			1.12			0.06		<	0.01			8.18			11.6			8.00		
SW-S-27	SS	N	2025-02-24	High flow, clear and colourless		0.02			0.25			6.75		b		144.0			37.8			0.01			99.7			0.15			1.96			0.07		<	0.01			33.30			10.2			5.50		
SW-N-Agg Drain	SS	N	2025-03-11			0.03			0.15			0.91				404.0			3.3			0.01			4.35			0.82			0.80			0.31		<	0.01			7.30			1.20			2.20		
SW-FB	FB	N	2024-05-02		<	0.01		<	0.01			0.78			<	0.50			2.6			0.01		<	0.05		<	0.05		<	0.02		<	0.04		<	0.01						0.47			0.64		
SW-FB	FB	N	2024-10-23	Decanted on tailgate.	<	0.01		<	0.01		<	0.05				1.38			1.4		<	0.01			0.09		<	0.05			0.02		<	0.04		<	0.01		<	0.05			0.32		<	0.50		
SW-FB	FB	N	2024-12-17	Taken at 20	<	0.01		<	0.01			0.40			<	0.50			7.3			0.01			0.08		<	0.05			0.09		<	0.04		<	0.01		<	0.05			0.60			0.70		
SW-FB	FB	N	2025-02-24	Clear and colourless	<	0.01		<	0.01			0.72			<	0.50			1.6		<	0.01			0.05		<	0.05		<	0.02		<	0.04		<	0.01		<	0.05			0.63			1.30		
SW-TB	TB	N	2024-05-02		<	0.01		<	0.01		<	0.05			<	0.50		<	1.00		<	0.01		<	0.05		<	0.05		<	0.02		<	0.04		<	0.01					<	0.10		<	0.50		
SW-TB	TB	N	2024-10-23	Sealed bottles from the lab.	<	0.01		<	0.01		<	0.05			<	0.50		<	1.00		<	0.01		<	0.05		<	0.05		<	0.02		<	0.04		<	0.01		<	0.05		<	0.10		<	0.50		
SW-TB	TB	N	2024-12-17	Taken on the second day	<	0.01		<	0.01		<	0.05			<	0.50		<	1.00		<	0.01		<	0.05		<	0.05		<	0.02		<	0.04		<	0.01		<	0.05		<	0.10		<	0.50		
SW-TB	TB	N	2025-02-24	Sealed bottles, clear and colourless	<	0.01		<	0.01		<	0.05			<	0.50		<	1.00		<	0.01		<	0.05		<	0.05		<	0.02		<	0.04		<	0.01		<	0.05		<	0.10		<	0.50		

Notes:

a *Above short-term acute (STA) British Columbia Water Quality Guideline.*

b *Above long-term chronic (LTC) British Columbia Water Quality Guideline.*

(1) British Columbia Approved Water Quality Guidelines (Criteria), Updated May 16, 2025

(2) The ammonia guideline is pH and temperature (15°C assumed) dependant. All ammonia results were compared to standards based on the associated pH and temperature results for that sample.

(3) The nitrite guidelines are chloride dependant. All nitrite results were compared to standards based on the associated chloride result for that sample.

(4) This value is hardness dependent. All metals results were compared to standards based on the associated hardness result for a particular sample.

(5) The TSS guidelines are "change from background" and flow condition dependent. The background TSS in the landfill are derived from station Sw-S-52

(6) Dissolved copper and nickel guidelines vary with water hardness, temperature and DOC, and calcuated using BLM

(7) Total Aluminum guidance is pH, hardness, and DOC dependent and calculated based on BC Water Quality Guideline calculator for Aluminum in Freshwater.

(8) Dissolved Lead guidance is hardness and DOC dependent.

(9) Dissolved Zinc guidance is pH, hardness, and DOC dependent.

AECOM

Appendix B-4

Leachate Quality

Hartland Valve Chamber

Appendix B-4. Monthly Leachate Quality Data - Hartland Valve Chamber 2024-2025

AECOM

State	Parameter	Minimum Detection Limit	Unit	Sewer Use Criteria		Hartland Valve Chamber FR1	Hartland Valve Chamber FR2	Hartland Valve Chamber FRM	Hartland Valve Chamber SS	Hartland Valve Chamber SS	Hartland Valve Chamber SS	Hartland Valve Chamber FR1	Hartland Valve Chamber FR2	Hartland Valve Chamber FRM	Hartland Valve Chamber SS
				min	max	29-Apr-2024	29-Apr-2024	29-Apr-2024	29-May-2024	11-Jun-2024	25-Jun-2024	29-Aug-2024	29-Aug-2024	29-Aug-2024	1-Oct-2024
CONVENTIONALS															
TOT	Total Sulphide	0.0018	mg/L	---	1	0.015	0.0094	0	0	0	0	0	0	0	
DISS	Dissolved Sulphide	0.009	mg/L	---	1	0.013	0.019	0	0.018	0.022		0.02	< 0.0084	0.01	
TOT	TSS	1	mg/L	---	350	9.2	8.4	9	24	16	18	56	47	52	38
TOT	BOD	2	mg/L	---	500	10	10	10	12	20	12	70	64	67	41
TOT	COD	10	mg/L	---	1,000	254	261	258	566	421	528	597	609	603	534
DISS	Chloride	1	mg/L	---	1,500	180	180	180	440	220	260	360	370	365	310
DISS	Sulphate	1	mg/L	---	1,500	61	64	62.5	4.4	88	< 100	< 1.	110	55.5	240
TOT	Oil & Grease, Total	1	mg/L	---	100	1.00	< 1.00	1.00	1.20	1.10	2.40	1.00	< 1.00	1.00	< 1.00
TOT	Oil & Grease, Mineral	2	mg/L	---	15	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
TOT	Cyanide - SAD (total)	0.0005	mg/L	---	1	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01
TOT	Cyanide - WAD	0.0005	mg/L	---	1	0.0062	0.0026	0	0.00650	0.00521	0.00827	0.00863	< 0.00050	0.00457	0.0042
TOT	Phenols	0.015	mg/L	---	1	< 0.0075	< 0.0086	< 0.008	0.011	0.012	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TOT	Ammonia	1.5	mg/L	---	---	84	57	71	300	210	250	320	310	315	280
TOT	Nitrite	0.005	mg/L	---	---	0.94	0.99	0.96	1.05	0.81	0.33	0.34	0.18	0.26	1.23
TOT	Nitrate	0.02	mg/L	---	---	5.36	5.24	5.30	4.17	2.69	< 0.20	0.74	0.68	0.71	5.13
TOT	pH	0.01	pH	5.5	11	7.50	7.50	7.50	7.98	7.91	7.88	7.68	7.68	7.68	7.88
TOT	Conductivity	0.1	µS/cm	---	---	3120	3120	3120	2863	4945	4870	5012	5012	5012	4916
TOT	Temperature	0.1	°C	---	---	14.2	14.2	14.2	13.5	18.1	17.3	17.6	17.6	17.6	18.3
TOT	Dissolved Oxygen	0.01	mg/L	---	---	3.5	3.5	3	1.05	0.74	0.78	0.83	0.83	0.83	0.9
TOT	ORP	1	mV	---	---	135	135	135.00	128.4	105.8	101.3	102.1	102.1	102.1	98.2
METALS															
TOT	Arsenic	0.04	µg/L	---	400	4.89	4.71	4.80	8.33	6.53	10.50	11.00	10.60	10.80	9.20
TOT	Cadmium	0.01	µg/L	---	300	0.16	0.11	0.13	0.08	0.07	0.03	0.03	0.03	0.03	< 0.01
TOT	Chromium	0.2	µg/L	---	4,000	27.00	27.40	27.20	63.50	50.80	70.30	69.60	67.70	68.65	55.40
TOT	Cobalt	0.02	µg/L	---	5,000	6.47	6.66	6.57	14.10	11.40	14.20	15.90	15.30	15.60	10.90
TOT	Copper	0.2	µg/L	---	1,000	7.6	7.77	8	16	13	11	8	7	8	5
TOT	Iron	10	µg/L	---	50,000	960	1010	985	3480	2350	1870	2700	2590	2645	1760
TOT	Lead	0.04	µg/L	---	1,000	0.78	0.72	0.75	1.03	0.71	0.70	0.77	0.74	0.76	0.63
TOT	Manganese	0.2	µg/L	---	5,000	404	413	408.5	387	309	242	392	376	384	244
TOT	Mercury	0.019	µg/L	---	20	< 0.03	< 0.03	< 0.03	< 0.01	0.01	< 0.01	0.01	< 0.01	0.01	< 0.02
TOT	Molybdenum	0.1	µg/L	---	5,000	5.94	5.48	5.71	2.78	3.34	3.71	1.25	1.29	1.27	3.42
TOT	Nickel	0.2	µg/L	---	3,000	17	17.6	17	38	32	40	45	43	44	32
TOT	Selenium	0.08	µg/L	---	300	0.31	0.41	0.36	0.49	0.43	0.55	0.55	0.50	0.52	0.54
TOT	Sodium	0.5	mg/L	---	---	220	222	221	< 0.05	< 0.02	< 0.02	294	290	292	< 0.02
TOT	Silver	0.02	µg/L	---	500	0.038	0.043	0.0405	< 0.05	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TOT	Zinc	2	µg/L	---	3,000	13.3	16.7	15	21	16	12	18	61	40	12
POLYCYCLIC AROMATIC HYDROCARBONS															
TOT	Total PAH	0.01	µg/L	---	50	1.9	1.9	1.9	1.9	1.6	3.4	2.4	2.8	2.6	11.0
TOT	Acenaphthene	0.01	µg/L	---	---	0.13	0.099	0.1145	0.34	0.16	0.56	0.22	0.22	0.22	2.10
TOT	Acenaphthylene	0.01	µg/L	---	---	0.014	0.01	0.012	< 0.01	< 0.01	0.021	0.02	0.024	0.022	0.04
TOT	Anthracene	0.01	µg/L	---	---	0.092	0.094	0.093	0.056	0.032	0.21	0.2	0.22	0.21	0.34
TOT	Benzo(a)anthracene	0.01	µg/L	---	---	0.11	0.12	0.115	0.049	0.064	0.13	0.098	0.12	0.109	0.11
TOT	Benzo(a)pyrene	0.005	µg/L	---	---	0.031	0.031	0.031	0.0092	0.0079	0.031	0.032	0.037	0.0345	0.02
TOT	Benzo(b,j)fluoranthene	0.01	µg/L	---	---	0.066	0.062	0.064	< 0.01	0.022	0.061	0.061	0.064	0.0625	0.03
TOT	Benzo(g,h,i)perylene	0.02	µg/L	---	---	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TOT	Benzo(k)fluoranthene	0.01	µg/L	---	---	0.024	0.02	0.022	< 0.01	< 0.01	0.017	0.024	0.018	0.021	0.01
TOT	Chrysene	0.01	µg/L	---	---	0.13	0.12	0.125	0.044	0.093	0.14	0.13	0.14	0.135	0.11
TOT	Dibenzo(a,h)anthracene	0.02	µg/L	---	---	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TOT	Fluoranthene	0.01	µg/L	---	---	0.69	0.69	0.69	0.49	0.4	0.64	0.48	0.64	0.56	0.81
TOT	Fluorene	0.01	µg/L	---	---	0.11	0.11	0.11	0.37	0.16	0.32	0.19	0.19	0.19	1.30
TOT	Indeno(1,2,3-c,d)pyrene	0.02	µg/L	---	---	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TOT	Naphthalene	0.01	µg/L	---	---	0.018	0.019	0.0185	0.039	0.057	0.37	0.2	0.17	0.185	2.50
TOT	Phenanthrene	0.01	µg/L	---	---	0.013	0.024	0.0185	0.16	0.097	0.23	0.086	0.1	0.093	1.60
TOT	Pyrene	0.01	µg/L	---	---	0.49	0.47	0.48	0.37	0.46	0.62	0.65	0.68	0.665	0.54
BTEX															
DISS	Benzene	0.4	µg/L	---	100	< 0.4	< 0.4	< 0.40	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.40
DISS	Toluene	0.4	µg/L	---	200	< 0.4	< 0.4	< 0.40	< 0.4	0.65	1.2	< 0.4	< 0.4	< 0.4	0.68
DISS	Ethylbenzene	0.4	µg/L	---	200	< 0.4	< 0.4	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0
DISS	Xylenes	0.4	µg/L	---	200	< 0.4	< 0.4	< 0	< 0	< 0	1	< 0	< 0	< 0	< 0

Notes:

a *- Exceeded maximum allowable value specified in CRD Sewer Use Bylaw 2922.*

FR1 - Field replicate 1.

FR2 - Field replicate 2.

FRM - Mean of field replicates.

SS - Single Sample

Appendix B-4. Monthly Leachate Quality Data - Hartland Valve Chamber 2024-2025

AECOM

State	Parameter	Minimum Detection Limit	Unit	Sewer Use Criteria		Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber	Hartland Valve Chamber
						SS	FR1	FR2	FRM	SS	SS	FR1	FR2	FRM	SS
				min	max	30-Oct-2024	4-Nov-2024	4-Nov-2024	4-Nov-2024	12-Dec-2024	15-Jan-2025	14-Mar-2025	14-Mar-2025	14-Mar-2025	31-Mar-2025
CONVENTIONALS															
TOT	Total Sulphide	0.0018	mg/L	---	1	0.14	0	0	0	0	0	0	0	0	0
DISS	Dissolved Sulphide	0.009	mg/L	---	1	0.0086	0.024	0.033	0.0285	0.05	0.029	0.029	0.058	0.0535	0.027
TOT	TSS	1	mg/L	---	350	34	43	44	44	39	36	42	55	49	39
TOT	BOD	2	mg/L	---	500	12	38	38	38.	0	12	24	27	25.5	0
TOT	COD	10	mg/L	---	1,000	276	402	410	406.	448	429	445	1040 a	742.5	448
DISS	Chloride	1	mg/L	---	1,500	180	220	220	220	240	270	260	260	260	240
DISS	Sulphate	1	mg/L	---	1,500	290	190	190	190.	99	150	57	60	58.5	99
TOT	Oil & Grease, Total	1	mg/L	---	100	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1.00	2.20	1.60	1.90	< 1.00
TOT	Oil & Grease, Mineral	2	mg/L	---	15	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	2.00	< 2.00
TOT	Cyanide - SAD (total)	0.0005	mg/L	---	1	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02
TOT	Cyanide - WAD	0.0005	mg/L	---	1	0.005 98	0.00620	0.007 1	0.00665	0.00790	0.004	< 0.00250	0.004	0.00325	0.0079
TOT	Phenols	0.015	mg/L	---	1	0.5	0.011	0.01	0.0100	0.017	< 0.5	0.014	0.013	0.0135	0.017
TOT	Ammonia	1.5	mg/L	---	---	160	220	220	220	260	260	270	250	260	260
TOT	Nitrite	0.005	mg/L	---	---	11.50	4.06	4.27	4.17	0.54	0.92	0.80	0.80	0.80	0.54
TOT	Nitrate	0.02	mg/L	---	---	35.90	23.30	25.10	24.20	2.12	7.60	6.62	6.71	6.67	2.12
TOT	pH	0.01	pH	5.5	11	8.75	8.88	8.88	8.88	8.14	8.23	8.12	8.12	8.12	8.14
TOT	Conductivity	0.1	µS/cm	---	---	4121	3890	3890	3890	1670	1598	1693	1693	1693	1670
TOT	Temperature	0.1	°C	---	---	18.1	17.9	17.9	17.9	16.5	16.8	17.1	17.1	17.1	16.5
TOT	Dissolved Oxygen	0.01	mg/L	---	---	2.44	2.24	2.24	2.24	2.21	2.77	2.16	2.16	2.16	2.21
TOT	ORP	1	mV	---	---	58.1	41.2	41.2	41.2	105.16	102.1	111.2	111.2	111.2	105.16
METALS															
TOT	Arsenic	0.04	µg/L	---	400	4.88	7.05	7.23	7.14	9.84	9.17	7.81	7.54	7.68	9.84
TOT	Cadmium	0.01	µg/L	---	300	< 0.04	0.07	0.06	0.06	0.06	0.05	0.06	0.05	0.06	0.06
TOT	Chromium	0.2	µg/L	---	4,000	28.80	51.70	52.10	51.90	60.40	46.80	58.30	55.30	56.80	60.40
TOT	Cobalt	0.02	µg/L	---	5,000	8.59	13.10	12.90	13.00	10.70	9.75	11.70	11.50	11.60	10.70
TOT	Copper	0.2	µg/L	---	1,000	13	19	19	19	13	8	9	9	9	13
TOT	Iron	10	µg/L	---	50,000	1640	3600	3750	3675	1350	1400	1480	1450	1465	1350
TOT	Lead	0.04	µg/L	---	1,000	0.71	1.10	1.09	1.10	1.09	0.79	0.83	0.82	0.82	1.09
TOT	Manganese	0.2	µg/L	---	5,000	368	459	448	453.5	366	349	445	441	443	366
TOT	Mercury	0.019	µg/L	---	20	0.01	0.02	0.02	0.02	< 0.01	0.01	< 0.02	0.02	0.02	0.01
TOT	Molybdenum	0.1	µg/L	---	5,000	6.28	4.1	4.07	4.085	2.45	2.22	2.47	2.16	2.315	2.45
TOT	Nickel	0.2	µg/L	---	3,000	22	31	30	31	34	29	33	33	33	34
TOT	Selenium	0.08	µg/L	---	300	0.47	0.51	0.49	0.50	0.59	0.51	0.50	0.49	0.49	0.59
TOT	Sodium	0.5	mg/L	---	---	< 178	214	214	214	< 0.02	0.1	128	122	125	0.02
TOT	Silver	0.02	µg/L	---	500	< 0.013	0.02	0.017	0.0185	< 0.02	0.1	< 0.02	< 0.02	0.02	0.02
TOT	Zinc	2	µg/L	---	3,000	18	21	21	21	42	< 15	16	20	18	< 42
POLYCYCLIC AROMATIC HYDROCARBONS															
TOT	Total PAH	0.01	µg/L	---	50	7.1	6.6	8.1	7.35	9.9	2.6	14	14	14	3.1
TOT	Acenaphthene	0.01	µg/L	---	---	1.5	1.5	1.7	1.6	3.1	0.77	3.2	3.3	3.25	0.032
TOT	Acenaphthylene	0.01	µg/L	---	---	< 0.018	0.024	0.029	0.0265	0.032	0.01	0.026	0.025	0.0255	0.37
TOT	Anthracene	0.01	µg/L	---	---	0.11	0.16	0.2	0.18	0.37	0.057	0.37	0.37	0.37	0.13
TOT	Benzo(a)anthracene	0.01	µg/L	---	---	< 0.078	0.086	0.15	0.118	0.13	0.054	0.15	0.16	0.155	0.027
TOT	Benzo(a)pyrene	0.005	µg/L	---	---	< 0.017	0.019	0.032	0.0255	0.027	0.005	0.039	0.043	0.041	0.03
TOT	Benzo(b,j)fluoranthene	0.01	µg/L	---	---	< 0.023	0.04	0.061	0.0505	0.03	0.08	0.058	0.068	0.063	0.02
TOT	Benzo(g,h,i)perylene	0.02	µg/L	---	---	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	0.02	< 0.013
TOT	Benzo(k)fluoranthene	0.01	µg/L	---	---	< 0.01	0.012	0.019	0.0155	0.013	0.01	0.029	0.026	0.0275	0.099
TOT	Chrysene	0.01	µg/L	---	---	< 0.081	0.12	0.19	0.155	0.099	0.13	0.13	0.16	0.145	0.02
TOT	Dibenzo(a,h)anthracene	0.02	µg/L	---	---	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	0.02	< 0.93
TOT	Fluoranthene	0.01	µg/L	---	---	0.65	0.74	1.1	0.92	0.93	0.13	1.1	1.1	1.1	1.9
TOT	Fluorene	0.01	µg/L	---	---	0.96	1	1.2	1.1	1.9	0.56	1.9	2	1.95	0.02
TOT	Indeno(1,2,3-c,d)pyrene	0.02	µg/L	---	---	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	0.02	< 0.04
TOT	Naphthalene	0.01	µg/L	---	---	1.7	0.9	0.96	0.93	0.04	0.43	3.5	3.4	3.45	1.4
TOT	Phenanthrene	0.01	µg/L	---	---	0.72	0.98	1.2	1.09	1.4	0.22	0.91	0.93	0.92	0.56
TOT	Pyrene	0.01	µg/L	---	---	< 0.42	0.49	0.71	0.6	0.56	0.14	0.71	0.76	0.735	0.45
BTEX															
DISS	Benzene	0.4	µg/L	---	100	< 0.4	0.52	0.46	0.49	< 0.4	0.57	0.4	< 0.4	0.4	0.4
DISS	Toluene	0.4	µg/L	---	200	< 0.4	0.65	0.63	0.64	0.96	< 1.3	< 0.95	0.71	0.83	< 0.96
DISS	Ethylbenzene	0.4	µg/L	---	200	< 0	< 0	< 0	< 0	< 0	1	< 0	< 0	0	0
DISS	Xylenes	0.4	µg/L	---	200	< 0	< 0	< 0	< 0	0	< 1	0	< 0	0	< 0

Notes:

a - Exceeded maximum allowable value specified in CRD Sewer Use Bylaw 2922.

FR1 - Field replicate 1.

FR2 - Field replicate 2.

FRM - Mean of field replicates.

SS - Single Sample

AECOM

Appendix B-5

Leachate Quality

Hartland Valve Chamber

Trace Organics

Appendix B-5. Quarterly Leachate Quality - Trace Organics - 2024-2025

AECOM

Sate	Parameters	Detection Limit	Unit	Sewer Use Criteria			Hartland Valve Chamber		Hartland Valve Chamber		Hartland Valve Chamber		Hartland Valve Chamber		Hartland Valve Chamber		Hartland Valve Chamber	
							FR1		FR2		FRM		SS		SS		SS	
				min	max		29-Apr-2024		29-Apr-2024		29-Apr-2024		25-Jul-2024		30-Oct-2024		15-Jan-2025	
CHLORINATED PHENOLS																		
TOT	Chlorinated phenols (total)	0.41	µg/L		50	<	0.1	<	0.1	<	0.1		0.42	<	1.0	<	0.41	
TOT	Total Dichlorophenols	0.22	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.22	
TOT	Total Monochlorophenols	0.09	µg/L			<	0.08	<	0.08	<	0.08		0.42	<	0.8		0.22	
TOT	Total Nonchlorinated phenols	1.6	µg/L			<	10	<	10	<	10	<	10	<	10		9.3	
TOT	Total Phenolic Compounds	0.17	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.17	
TOT	Total Tetrachlorophenols	0.17	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.24	
TOT	Total Trichlorophenols	0.24	µg/L			<	0.08	<	0.08	<	0.08	<	0.08	<	0.8		0.22	
TOT	2-Chlorophenol	0.05	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0		0.13	
TOT	2,4 + 2,5 Dichlorophenol	0.1	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.1	
TOT	2,4,6-Trichlorophenol	0.1	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.1	
TOT	Pentachlorophenol	0.1	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.1	
TOT	2,3,4,5-Tetrachlorophenol	0.1	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.1	
TOT	2,3,4,6-Tetrachlorophenol	0.1	µg/L			<	0.1	<	0.1	<	0.1	<	0.1	<	1.0	<	0.1	

Notes:

FR1 - Field replicate 1.

FR2 - Field replicate 2.

FRM - Mean of field replicates.

SS- Single sample

AECOM

Appendix B-7

Leachate Quality

North Purge Wells

Appendix B-7. Monthly Leachate Quality - North Purge Well 2024-2025

AECOM

State	Parameters	Minimum Detection Limit	Unit	Sewer Use Criteria		North Purge Well System	North Purge Well System	North Purge Well System	North Purge Well System	North Purge Well System	North Purge Well System	North Purge Well System	North Purge Well System	North Purge Well System
						SS	SS	SS	SS	SS	SS	SS	SS	SS
				min	max	29-Apr-2024	29-May-2024	11-Jun-2024	25-Jul-2024	29-Aug-2024	1-Oct-2024	30-Oct-2024	12-Dec-2024	15-Jan-2025
CONVENTIONALS														
TOT	Total Sulphide	0.0018	mg/L		1	0.068	0.06	0.1	0.083	0.0018	0.064	0.079	0.015	0.039
TOT	TSS	1	mg/L		350	53	56	60	84	57	45	39	8	51
TOT	BOD	2	mg/L		500	7.3	13	12	16	14	12	13	85	10
TOT	COD	10	mg/L		1,000	261	234	239	290	237	237	244	378	228
DISS	Chloride	1	mg/L		1,500	300	300	280	310	320	320	280	380	300
DISS	Sulphate	1	mg/L		1,500	< 1	< 1	7.1	< 1	3.1	1.9	40	< 1	< 1
TOT	Oil & Grease, Total	1	mg/L		100	< 1	< 1	< 2.3	< 1	< 1	< 1.1	< 1	< 1	< 1
TOT	Oil & Grease, Mineral	2	mg/L		15	< 2	< 2	< 4.6	< 2	< 2	< 2	< 2	< 2	< 2
TOT	Cyanide - SAD (total)	0.0005	mg/L		1	0.0037	0.0071	0.00368	0.00485	0.00431	0.00154	0.00361	0.0102	0.0033
TOT	Cyanide - WAD	0.0005	mg/L		1	< 0.0025	0.0032	0.00072	0.00264	0.00056	< 0.0005	< 0.0005	0.0025	< 0.0025
TOT	Phenols	0.015	mg/L		1	0.0081	0.0045	< 0.0075	0.0072	0.0063	0.0056	0.0051	0.0076	0.003
TOT	Ammonia	1.5	mg/L			86	150	150	160	160	140	160	130	150
TOT	Nitrite	0.005	mg/L			< 0.005	< 0.005	< 0.005	< 0.005	0.014	< 0.005	< 0.005	6.81	< 0.05
TOT	Nitrate	0.02	mg/L			< 0.02	< 0.02	< 0.02	< 0.02	0.048	< 0.02	0.027	13.4	< 0.2
TOT	pH	0.01	pH	5.5	11	6.7	7.83	8.15	8.05	8.01	8.1	8.51	8.73	8.44
TOT	Conductivity	0.1	µS/cm			3210	3160	9880	7816	7513	6672	3980	3700	2997
TOT	Temperature	0.1	°C			16.2	15.9	20.1	18.1	17.9	17.2	15.2	15.2	17.2
TOT	Dissolved Oxygen	0.01	mg/L			3.98	1.29	2.3	2.16	1.85	1.6	6.1	7.8	1.65
TOT	ORP	1	mV			260.1	82.1	125.7	120.1	1181	106.1	66.2	77.3	112.2
METALS														
TOT	Arsenic	0.04	µg/L		400	4.65	4.68	5.12	7.1	6.39	6.01	7.43	3.91	5.92
TOT	Cadmium	0.01	µg/L		300	0.044	< 0.01	0.018	< 0.01	< 0.01	< 0.01	< 0.01	0.044	< 0.01
TOT	Chromium	0.2	µg/L		4,000	7.99	5.95	6.67	11.3	8.18	5.61	8.17	24.9	4.8
TOT	Cobalt	0.02	µg/L		5,000	6.28	5.94	6.26	8.11	7.57	5.89	6.36	15.7	5.58
TOT	Copper	0.2	µg/L		1,000	1.47	2.52	1.4	2.29	2.01	0.61	1.41	9.91	1.47
TOT	Iron	10	µg/L		50,000	16000	16300	17200	24100	17600	16000	15000	1690	17800
TOT	Lead	0.04	µg/L		1,000	0.184	0.105	0.261	0.196	0.214	0.066	0.121	0.195	0.092
TOT	Manganese	0.2	µg/L		5,000	970	1020	1060	1250	1070	952	1020	1250	1020
TOT	Mercury	0.019	µg/L		20	< 0.03	< 0.0019	0.0019	< 0.0095	0.0029	< 0.0095	< 0.0095	< 0.0095	< 0.0095
TOT	Molybdenum	0.1	µg/L		5,000	2.23	0.75	0.76	0.91	0.89	0.82	1.35	1.34	0.75
TOT	Nickel	0.2	µg/L		3,000	15.2	14.3	15.1	20.1	18	15.1	15.7	36.7	14.8
TOT	Selenium	0.08	µg/L		300	0.225	0.167	0.132	0.188	0.202	0.183	0.203	0.417	0.153
TOT	Silver	0.02	µg/L		500	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.016	< 0.02
TOT	Zinc	2	µg/L		3,000	2.2	< 2	5.3	4.8	2	< 2	8.3	59.4	2.9
BTEX														
DISS	Benzene	0.4	µg/L		100	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
DISS	Toluene	0.4	µg/L		200	< 0.4	< 0.4	< 0.4	1	< 0.4	< 0.4	< 0.4	0.68	< 0.4
DISS	Ethylbenzene	0.4	µg/L		200	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
DISS	Xylenes	0.4	µg/L		200	< 0.4	< 0.4	< 0.4	0.68	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4

Notes:

SS - Single Sample

Appendix B-8

Leachate Quality

Controlled Waste Ditch

Appendix B-8. Monthly Leachate Quality - Controlled Waste Ditch 2024-2025

State	Parameter	Minimum Detection Limit	Units	Sewer Use Criteria			Controlled Waste Ditch		Controlled Waste Ditch		Controlled Waste Ditch		Controlled Waste Ditch		Controlled Waste Ditch	
							SS		SS		SS		SS		SS	
				min	max		29-Apr-2024		29-May-2024		1-Oct-2024		30-Oct-2024		12-Dec-2024		15-Jan-2025
CONVENTIONALS																	
TOT	Total Sulphide	0.0018	mg/L		1		0.13		0.061		0.0028		0.014		0.0095		0.015
TOT	TSS	1	mg/L		350		80		54		22		10		39		6.8
TOT	BOD	2	mg/L		500		23		40		79		60		17		66
TOT	COD	10	mg/L		1,000		4650	a	294		563		359		235		401
DISS	Chloride	1	mg/L		1,500		430		280		560		270		330		370
DISS	Sulphate	1	mg/L		1,500	<	1	<	1	<	1		38		13	<	1
TOT	Oil & Grease, Total	1	mg/L		100		1.9	<	1	<	1		1.4	<	2.6	<	1
TOT	Oil & Grease, Mineral	2	mg/L		15	<	2	<	2	<	2	<	2	<	5.3	<	2
TOT	Cyanide - SAD (total)	0.0005	mg/L		1		0.0159		0.00895		0.0088		0.00732		0.00418		0.0098
TOT	Cyanide - WAD	0.0005	mg/L		1		0.0095		0.00335	<	0.0025		0.0026		0.00065	<	0.0025
TOT	Phenols	0.015	mg/L		1	<	0.0075		0.0056		0.009		0.0054		0.005		0.0069
TOT	Ammonia	1.5	mg/L				160		210		350		190		79		330
TOT	Nitrite	0.005	mg/L				8.49		9.58		13.6		6.91		0.0136		3.08
TOT	Nitrate	0.02	mg/L				8.45		21.8		3.61		7.7	<	0.02		10.1
TOT	pH	0.01	pH	5.5	11		8.22		8.36		7.66		8.23		8.94		8.36
TOT	Conductivity	0.1	µS/cm				4535		4510		3410		5560		4213		3344
TOT	Temperature	0.1	°C				13.8		15.8		17.3		15.3		15.8		16.7
TOT	Dissolved Oxygen	0.01	mg/L				68.1		3.88		1.24		0.1		0.76		3.98
TOT	ORP	1	mV				165.3		111.8		94.1		110.3		120.4		118.1
METALS																	
TOT	Arsenic	0.04	µg/L		400		49.6		2.33		5.06		3.33		5.03		4.37
TOT	Cadmium	0.01	µg/L		300		1.92		0.024	<	0.025		0.049	<	0.01		0.042
TOT	Chromium	0.2	µg/L		4,000		484		20.3		29.6		17		7.56		22.2
TOT	Cobalt	0.02	µg/L		5,000		50.6		10.6		19.9		11.8		6.73		14.3
TOT	Copper	0.2	µg/L		1,000		341		6.29		1.88		13.5		1.72		5.43
TOT	Iron	10	µg/L		50,000		414000	a	1330		2240		1470		14500		1590
TOT	Lead	0.04	µg/L		1,000		27.7		0.308		0.25		0.187		0.093		0.14
TOT	Manganese	0.2	µg/L		5,000		38600	a	972		242		1050		1080		1340
TOT	Mercury	0.019	µg/L		20		0.043		0.0055	<	0.0095	<	0.0095	<	0.0095	<	0.0095
TOT	Molybdenum	0.1	µg/L		5,000		9.2		0.98		1.29		1.33		0.83		1.06
TOT	Nickel	0.2	µg/L		3,000		107		24.6		42		29.9		16.6		32.7
TOT	Selenium	0.08	µg/L		300		1.86		0.282		0.57		0.392		0.157		0.48
TOT	Silver	0.02	µg/L		500		0.59	<	0.02	<	0.05		0.021	<	0.02	<	0.05
TOT	Zinc	2	µg/L		3,000		8640	a	46.6		36.3		51.9		2.8		51.3
BTEX																	
DISS	Benzene	0.4	µg/L		100	<	0.4	<	0.4	<	0.4	<	0.4	<	0.4	<	0.4
DISS	Toluene	0.4	µg/L		200	<	0.4	<	0.4	<	0.4		0.64	<	0.4		0.41
DISS	Ethylbenzene	0.4	µg/L		200	<	0.4	<	0.4	<	0.4	<	0.4	<	0.4	<	0.4
DISS	Xylenes	0.4	µg/L		200	<	0.4	<	0.4	<	0.4	<	0.4	<	0.4	<	0.4

Notes:

a *- Exceeded maximum allowable value specified in CRD Sewer Use Bylaw 2922.*

SS - Single Sample

Appendix B-9

Leachate Quality

South Purge Wells

Appendix B-9. Leachate Quality - South Purge Wells - 2024-2025

State	Parameter	Minimum Detection Limit	Units	Sewer Use Criteria		South Purge Wells	South Purge Wells	South Purge Wells	South Purge Wells	South Purge Wells	South Purge Wells	South Purge Wells	South Purge Wells
						SS	SS	SS	SS	SS	SS	SS	SS
				min	max	29-Apr-2024	29-May-2024	25-Jul-2024	29-Aug-2024	1-Oct-2024	30-Oct-2024	12-Dec-2024	15-Jan-2025
CONVENTIONALS													
TOT	Total Sulphide	0.0018	mg/L		1	0.0073	0.0094	0.0094	0.0018	0.0023	0.0036	0.0022	0.016
TOT	TSS	1	mg/L		350	100	43	86	63	22	120	47	46
TOT	BOD	2	mg/L		500	8.4	4	14	18	9	24	5.5	4.4
TOT	COD	10	mg/L		1,000	56	68	118	115	112	121	53	54
DISS	Chloride	1	mg/L		1,500	75	91	150	160	150	140	88	64
DISS	Sulphate	1	mg/L		1,500	< 1	< 1	< 1	< 1	5.7	< 1	< 1	< 1
TOT	Oil & Grease, Total	1	mg/L		100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
TOT	Oil & Grease, Mineral	2	mg/L		15	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
TOT	Cyanide - SAD (total)	0.0005	mg/L		1	< 0.0025	< 0.0005	0.00214	0.00112	0.00053	0.00189	0.00095	< 0.0025
TOT	Cyanide - WAD	0.0005	mg/L		1	0.0036	< 0.0005	0.00124	< 0.0005	< 0.0005	0.00052	< 0.0005	< 0.0025
TOT	Phenols	0.015	mg/L		1	< 0.0075	0.0024	0.0044	0.0028	0.0024	0.0017	0.0026	0.0017
TOT	Ammonia	1.5	mg/L			19	41	62	64	59	70	40	32
TOT	Nitrite	0.005	mg/L			< 0.005	< 0.005	0.0061	0.0194	0.0076	0.0303	< 0.005	< 0.005
TOT	Nitrate	0.02	mg/L			< 0.02	< 0.02	0.125	0.028	0.077	0.086	< 0.02	< 0.02
TOT	pH	0.01	pH	5.5	11	7.04	8.2	8.1	7.5	7.49	7.4	7.94	8.98
TOT	Conductivity	0.1	µS/cm			985	1075	985	816	788	1599	1401	1466
TOT	Temperature	0.1	°C			12.8	13.5	0.0033	0.0033	0.0033	0.0033	0	0
TOT	Dissolved Oxygen	0.01	mg/L			6.88	3.56	3.3	2.95	1.45	3.09	4.16	2.15
TOT	ORP	1	mV			102.1	72.1	63.5	55.3	55.1	69.3	59.3	108.1
METALS													
TOT	Arsenic	0.04	µg/L		400	5.56	5.28	1.76	5.7	1.69	13.1	5.21	5.7
TOT	Cadmium	0.01	µg/L		300	0.113	0.013	0.023	0.015	< 0.01	0.024	0.011	< 0.01
TOT	Chromium	0.2	µg/L		4,000	0.88	0.55	1.42	0.96	0.77	1.03	0.7	0.57
TOT	Cobalt	0.02	µg/L		5,000	1.71	1.76	3.62	3.19	2.7	2.97	1.32	1.06
TOT	Copper	0.2	µg/L		1,000	0.38	0.32	2.24	0.3	< 0.2	0.38	0.17	0.22
TOT	Iron	10	µg/L		50,000	19900	14900	4960	22900	4190	39700	17800	18600
TOT	Lead	0.04	µg/L		1,000	0.732	0.564	0.466	0.209	0.089	0.286	0.255	0.228
TOT	Manganese	0.2	µg/L		5,000	250	180	314	331	288	326	124	168
TOT	Mercury	0.019	µg/L		20	< 0.03	< 0.0019	< 0.0019	< 0.0019	< 0.0019	< 0.0019	< 0.0019	< 0.0019
TOT	Molybdenum	0.1	µg/L		5,000	13.7	11.5	16.3	12.4	12.6	13.4	9.32	9.1
TOT	Nickel	0.2	µg/L		3,000	4.65	4.31	7.35	6.62	5.91	6.21	3.59	3.34
TOT	Selenium	0.08	µg/L		300	0.254	< 0.08	0.116	0.121	0.115	0.122	0.06	< 0.08
TOT	Silver	0.02	µg/L		500	0.09	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02
TOT	Zinc	2	µg/L		3,000	8.2	4.5	7.9	7.8	7.4	9.5	9.1	6.1
BTEX													
DISS	Benzene	0.4	µg/L		100	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
DISS	Toluene	0.4	µg/L		200	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
DISS	Ethylbenzene	0.4	µg/L		200	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
DISS	Xylenes	0.4	µg/L		200	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4

Notes:

SS - Single Sample

AECOM

Appendix B-10

Leachate Quality

West Face Drainage

Appendix B-10. Monthly Leachate Quality - West Face Drainage 2024-2025

AECOM

State	Parameter	Minimum Detection Limit	Units	Sewer Use Criteria		West Face Drainage		West Face Drainage		West Face Drainage		West Face Drainage		West Face Drainage		West Face Drainage		West Face Drainage	
						SS		SS		SS		SS		SS		SS		SS	
				min	max	29-Apr-2024		29-May-2024		11-Jun-2024		1-Oct-2024		30-Oct-2024		12-Dec-2024		15-Jan-2025	
CONVENTIONALS																			
TOT	Total Sulphide	0.0018	mg/L		1		0.009		0.018		0.09		0.009		0.009		0.015		0.051
TOT	TSS	1	mg/L		350		17		23		22		32		100		41		75
TOT	BOD	2	mg/L		500		200		71		190		350		89		190		62
TOT	COD	10	mg/L		1,000		2700	a	914		2500	a	4310	a	1040	a	2330	a	819
DISS	Chloride	1	mg/L		1,500		1100		460		940		1400		520		900		400
DISS	Sulphate	1	mg/L		1,500		160		150		55		130		230		230		400
TOT	Oil & Grease, Total	1	mg/L		100		2.9	<	1		9.5		2.4	<	1		4.4	<	1
TOT	Oil & Grease, Mineral	2	mg/L		15	<	2	<	2	<	2	<	2	<	2	<	2	<	2
TOT	Cyanide - SAD (total)	0.0005	mg/L		1		0.0491		0.0145		0.0272		0.035		0.0234		0.0402		0.0176
TOT	Cyanide - WAD	0.0005	mg/L		1		0.0174		0.0045		0.0112		0.0068		0.0148		0.0103		0.0051
TOT	Phenols	0.015	mg/L		1		0.12		0.028		0.097		0.19		0.062		0.13		0.027
TOT	Ammonia	1.5	mg/L				530		470		1300		1600		580		330		420
TOT	Nitrite	0.005	mg/L				0.504		4.89		0.834	<	0.5		2.01		1.37		1.53
TOT	Nitrate	0.02	mg/L				0.68		15.1		1.53		2.9		20.8	<	2		7.09
TOT	pH	0.01	pH	5.5	11		6.95		8.16		7.15		8.87		8.1		8.84		8.27
TOT	Conductivity	0.1	µS/cm				11295		13720		11280		18716		6973		7513		4162
TOT	Temperature	0.1	°C				21.3		20.1		22.1		20.2		19.3		18.9		192
TOT	Dissolved Oxygen	0.01	mg/L				3.21		1.15		0.75		2.1		0.23		0.55		2.66
TOT	ORP	1	mV				210.2		120.5		105.8		76.3		103.1		110.5		108.9
METALS																			
TOT	Arsenic	0.04	µg/L		400		49		13.1		40.4		65.2		21.7		36.9		13.8
TOT	Cadmium	0.01	µg/L		300		0.267		0.108		0.23		0.45		0.2		0.293		0.084
TOT	Chromium	0.2	µg/L		4,000		272		97		193		320		96.5		196		79.5
TOT	Cobalt	0.02	µg/L		5,000		41.5		20.4		36.4		44.3		22.9		31.1		18
TOT	Copper	0.2	µg/L		1,000		7.6		13.8		4.04		11.1		54.9		11.6		11.9
TOT	Iron	10	µg/L		50,000		3490		1510		3040		4030		1900		3680		1230
TOT	Lead	0.04	µg/L		1,000		4.04		1.83		3.26		5.28		1.73		3.67		1.13
TOT	Manganese	0.2	µg/L		5,000		332		268		321		340		412		386		319
TOT	Mercury	0.019	µg/L		20		0.068		0.022		0.036	<	0.095		0.0199		0.0375		0.0197
TOT	Molybdenum	0.1	µg/L		5,000		3.12		3.56		2.09		2.48		4.62		1.33		2.76
TOT	Nickel	0.2	µg/L		3,000		125		59		113		137		66.4		94.3		54.7
TOT	Selenium	0.08	µg/L		300		1.05		0.67		0.65		1.42		0.85		0.8		1.14
TOT	Silver	0.02	µg/L		500	<	0.1	<	0.05	<	0.05	<	0.1	<	0.05	<	0.05	<	0.05
TOT	Zinc	2	µg/L		3,000		100		31.9		95.3		127		61.4		93.5		22.1
BTEX																			
DISS	Benzene	0.4	µg/L		100	<	0.4		0.59	<	0.4	<	0.4		1		0.96		0.9
DISS	Toluene	0.4	µg/L		200		0.75		0.7	<	0.4		1.4		3.2		4.1		2.6
DISS	Ethylbenzene	0.4	µg/L		200	<	0.4		0.75	<	0.4		0.43		1.9		0.96		1.4
DISS	Xylenes	0.4	µg/L		200		1.6		1.9		0.52		3.5		5.4		6.9		3.4

Notes:

a *- Exceeded maximum allowable value specified in CRD Sewer Use Bylaw 2922.*

SS - Single Sample

AECOM

Appendix B-11

Leachate Quality

Cell 3 Pipe Outlet

Appendix B-11. Monthly Leachate Quality - Cell 3 Pipe Outlet 2024-2025

AECOM

State	Parameter	Minimum Detection Limit	Units	Sewer Use Criteria		Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet	Cell 3 Pipe Outlet
						SS	SS	SS	SS	SS	SS	SS	SS	SS
				min	max	29-Apr-2024	29-May-2024	11-Jun-2024	25-Jul-2024	29-Aug-2024	1-Oct-2024	30-Oct-2024	12-Dec-2024	15-Jan-2025
CONVENTIONALS														
TOT	Total Sulphide	0.0018	mg/L		1	0.009	0.042	0.09	0.43	0.0048	0.009	0.014	0.024	0.09
TOT	TSS	1	mg/L		350	30	28	34	130	49	36	38	34	21
TOT	BOD	2	mg/L		500	250	380	320	460	390	330	290	210	140
TOT	COD	10	mg/L		1,000	3980 a	4790 a	3580 a	5530 a	5290 a	2750 a	2960 a	2050 a	1620 a
DISS	Chloride	1	mg/L		1,500	1500	31	1400	1600 a	1800 a	1300	1300	950	630
DISS	Sulphate	1	mg/L		1,500	110	64	< 10	< 100	250	240	220	70	25
TOT	Oil & Grease, Total	1	mg/L		100	4.2	7.1	19	3.5	2.5	0	2.8	12	1.3
TOT	Oil & Grease, Mineral	2	mg/L		15	< 2	< 2	< 8.4	< 2	< 2	0	< 2	< 2	< 2
TOT	Cyanide - SAD (total)	0.0005	mg/L		1	0.0597	0.0303	0.0312	0.067	0.074	0.0301	0.0431	0.0404	0.031
TOT	Cyanide - WAD	0.0005	mg/L		1	0.017	0.0066	0.0121	0.0152	0.014	0.0063	0.0201	0.0098	0.0093
TOT	Phenols	0.015	mg/L		1	0.18	0.29	0.17	0.18	0.23	0.22	0.14	0.13	0.075
TOT	Ammonia	1.5	mg/L			450	1800	1500	1900	1900	1400	1400	290	840
TOT	Nitrite	0.005	mg/L			< 0.05	< 0.05	< 0.05	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TOT	Nitrate	0.02	mg/L			0.23	0.23	< 0.2	< 2	< 2	3.3	< 2	< 2	14.2
TOT	pH	0.01	pH	5.5	11	7.88	8.91	8.95	8.9	8.9	8.91	8.89	8.25	8.47
TOT	Conductivity	0.1	µS/cm			8776	10560	18980	21730	2265	23102	10124	10240	37942
TOT	Temperature	0.1	°C			19.8	21.3	25.6	21.5	21.5	23.1	21.4	19.7	21.3
TOT	Dissolved Oxygen	0.01	mg/L			3.02	0.59	2.88	2.56	2.88	3.16	1.12	3.24	1.42
TOT	ORP	1	mV			142.7	65.7	88.7	80.1	88.1	91.2	130.6	145.6	117.7
METALS														
TOT	Arsenic	0.04	µg/L		400	76.2	82.9	70.2	92.4	90.8	64.7	86	50.2	41.9
TOT	Cadmium	0.01	µg/L		300	0.35	0.543	0.307	0.475	0.356	0.235	0.351	0.2	0.125
TOT	Chromium	0.2	µg/L		4,000	488	551	428	608	501	366	374	230	179
TOT	Cobalt	0.02	µg/L		5,000	59.1	64	52.5	65.8	69	45.9	48.9	32.2	25.1
TOT	Copper	0.2	µg/L		1,000	24.6	19.5	20.1	40	17	14.1	50.4	14	26.1
TOT	Iron	10	µg/L		50,000	4710	5410	4360	7110	5980	4320	4480	3550	2170
TOT	Lead	0.04	µg/L		1,000	6.7	7.45	6.4	10.4	7.58	4.73	7.03	3.57	2.88
TOT	Manganese	0.2	µg/L		5,000	435	437	396	477	456	366	379	275	243
TOT	Mercury	0.019	µg/L		20	0.087	0.082	0.082	0.0852	0.025	< 0.048	0.0246	0.0185	0.0145
TOT	Molybdenum	0.1	µg/L		5,000	3.52	3.51	2.1	2.86	3.69	1.87	1.55	1.24	1.84
TOT	Nickel	0.2	µg/L		3,000	172	187	156	201	206	138	136	95.7	76.3
TOT	Selenium	0.08	µg/L		300	1.76	1.73	0.71	1.8	1.74	1.32	1.45	1.03	0.95
TOT	Silver	0.02	µg/L		500	< 0.1	< 0.1	< 0.1	< 0.11	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05
TOT	Zinc	2	µg/L		3,000	133	148	138	183	183	111	151	77.3	53.9
BTEX														
DISS	Benzene	0.4	µg/L		100	0.68	1.2	0.83	0.97	0.73	0.54	0.78	0.58	0.83
DISS	Toluene	0.4	µg/L		200	6.9	11	7.8	6.2	5.3	2.8	8.3	5.8	7.4
DISS	Ethylbenzene	0.4	µg/L		200	2.1	4	2.2	1.2	1.3	0.72	2.8	1.8	2.7
DISS	Xylenes	0.4	µg/L		200	11	15	15	9.9	9.5	5.8	11	8.6	9

Notes:

a - Exceeded maximum allowable value specified in CRD Sewer Use Bylaw 2922.

SS - Single sample

AECOM

Appendix B-12

Leachate Quality

Emerging Contaminants

Appendix B-12. Monthly Leachate Quality - Emerging Contaminant 2024-2025

AECOM

State	Parameter	Minimum Detection Limit	Units		Hartland Valve Chamber		Hartland Valve Chamber		Hartland Valve Chamber
					FR1		FR2		FRM
					14-Mar-2025		14-Mar-2025		14-Mar-2025
EMERGING CONTAMINANTS									
TOT	Perfluoroheptanoic Acid (PFHpA)	20	ng/L		230.		230.		230.00
TOT	Perfluorooctanoic Acid (PFOA)	20	ng/L		830.		800.		815.00
TOT	Perfluorononanoic Acid (PFNA)	20	ng/L		39.		39.		39.00
TOT	Perfluorodecanoic Acid (PFDA)	20	ng/L		39.		41.		40.00
TOT	Perfluoroundecanoic Acid (PFUnA)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorododecanoic Acid (PFDoA)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorotridecanoic acid (PFTRDA)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorotetradecanoic acid(PFTEDA)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorohexadecanoic acid (PFHxDA)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorooctadecanoic acid (PFODA)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluoropropanesulfonic acid PFPRS	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorobutanesulfonic acid (PFBS)	20	ng/L		670.		680.		675.00
TOT	Perfluoropentanesulfonic acid PFPes	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorohexanesulfonic acid(PFHxS)	20	ng/L		400.		390.		395.00
TOT	Perfluoroheptanesulfonic acid PFHpS	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorooctanesulfonic acid (PFOS)	20	ng/L		160.		150.		155.00
TOT	1,4-Dioxane	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorononanesulfonic acid (PFNS)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorodecanesulfonic acid (PFDS)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluorododecanesulfonic acid	20	ng/L	<	20.	<	20.		20.00
TOT	2H-Perfluorooctenoic Acid	20	ng/L		22.		22.		22.00
TOT	2H-Perfluoro-decenoic Acid	20	ng/L	<	20.	<	20.		20.00
TOT	4:2 Fluorotelomer sulfonic acid	20	ng/L	<	20.	<	20.		20.00
TOT	6:2 Fluorotelomer sulfonic acid	20	ng/L		81.		86.		83.50
TOT	8:2 Fluorotelomer sulfonic acid	40	ng/L	<	40.	<	40.		40.00
TOT	10:2 Fluorotelomer sulfonic acid	40	ng/L	<	40.	<	40.		40.00
TOT	Perfluorooctane Sulfonamide (PFOSA)	40	ng/L	<	40.	<	40.		40.00
TOT	MeFOSA	40	ng/L	<	40.	<	40.		40.00
TOT	EtFOSA	40	ng/L	<	40.	<	40.		40.00
TOT	MeFOSAA	40	ng/L		140.		140.		140.00
TOT	EtFOSAA	40	ng/L		100.		100.		100.00
TOT	MeFOSE	40	ng/L	<	40.	<	40.		40.00
TOT	EtFOSE	40	ng/L	<	40.	<	40.		40.00
TOT	Hexafluoropropyleneoxide Dimer Acid	40	ng/L	<	40.	<	40.		40.00
TOT	4,8-Dioxa-3H-Perfluorononanoic Acid	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluoro-3-methoxypropanoic acid	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluoro-4-methoxybutanoic acid	20	ng/L	<	20.	<	20.		20.00
TOT	Nonafluoro-3,6-dioxaheptanoic acid	40	ng/L	<	40.	<	40.		40.00
TOT	9Cl-PF3ONS (F-53B Major)	20	ng/L	<	20.	<	20.		20.00
TOT	11Cl-PF3OUdS (F-53B Minor)	20	ng/L	<	20.	<	20.		20.00
TOT	Perfluoro2ethoxyethanesulfonic acid	20	ng/L	<	20.	<	20.		20.00
TOT	PFECHS	20	ng/L	<	20.	<	20.		20.00
TOT	3-Perfluoropropylpropanoic acid	100	ng/L	<	100.	<	100.		100.00
TOT	2H2H3H3H-Perfluorooctanoic acid	100	ng/L		8 400.		8 200.		8300.00
TOT	3-Perfluoroheptylpropanoic acid ng	100	ng/L		440.		420.		430.00

Notes:

FR1 - Field replicate 1.

FR2 - Field replicate 2.

FRM - Mean of field replicates.

Appendix C-1

Daily Rainfall Data

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	1	2.4	11.6	0	7.6	0	8	5.4	0	11	5	35	0	22.2	22	0	0	3	2	0	0	0	0	0	0	10.5	2.25	0	0	0
January	2	0	0	0	0	0	2.6	32.6	0	0	0.8	64.4	11.2	0	1.3	0.0	0.8	0.0	1.5	0.0	0.0	0.0	0.0	0	0	40.5	0	0	0	3.3
January	3	0	0.2	0	16.8	4.6	2.6	6.8	5.8	0	1.6	7.8	1.6	0.2	0.0	0.0	5.5	0.0	10.5	4.3	0.0	0.0	0.0	17.75	0	7.5	16	0.75	0.75	15.1
January	4	0	16.2	0	11.2	13	0.2	15	0	0	1.4	9.6	0.4	20.4	40.0	4.3	8.3	5.3	0.0	3.5	0.5	0.0	0.8	74	0	13.75	5.75	0	0	2.5
January	5	0	20.8	0	0	30.2	0	0	0	0	23.8	57.4	11	2.8	5.8	21.8	22.8	1.8	0.0	31.5	2.0	0.0	4.0	1.5	0	16.5	8.75	0.25	0.25	1.9
January	6	0	20.4	0.4	6.4	0	10.2	0	9.8	3	11.4	2.6	0	21	0.0	23.8	8.5	3.8	0.0	26.0	2.5	0.0	0.0	0.5	0	0.75	0	0.5	0.5	0
January	7	0	1	0	1.8	0	44.4	0	16.4	14.2	6	55.8	0	28.6	0	11	1	9	0	0	0	0	14	7.5	0	0.25	33.75	0	0	0
January	8	0	0	0	7.6	0.2	21.8	0	2.2	12.8	1.8	4.2	8.2	2.2	15.0	0.0	1.8	6.0	9.0	0.3	0.0	0.0	6.5	0	0	5	0.75	0	0	1.8
January	9	0	0	19.6	19.8	0	0	0	2	0	16.4	10.8	0.6	0.2	2.0	0.3	0.5	6.8	7.5	0.3	0.0	0.3	1.5	1.5	0	1.5	1.25	0	0	0
January	10	0	0	21	3	0	0.4	0	1.2	0	42.4	12	36.6	17.2	1.5	0.0	0.3	2.3	5.0	2.3	0.0	0.0	2.5	1.5	23	3.25	0	0	0	3.6
January	11	0	0	1	1.2	0	0.4	0	1.6	0.6	14.2	0.6	3.4	0.8	27.8	0.0	0.0	0.0	2.5	3.0	0.0	0.0	4.0	1.5	2	23.5	7	1.5	1.5	0
January	12	0	0	0.2	4.2	0	7.8	7	0	0	17	0	1.8	0	4	3	0	1	4	1	6	0	5	0	12.5	34	25	17	17	0
January	13	0	17.2	0	0.6	3.2	0	0.4	2.2	0	8.4	0	0	0	2.5	16.3	0.0	0.0	2.3	0.3	12.5	0.0	3.8	0	0	0.75	13.25	3.25	3.25	0
January	14	0	20.4	65.6	6	0	n/a	2.2	2.2	0	0	0	12	0	22	14	1	0	0	0	2	0	0	0	0	0	2.25	0	0	0
January	15	0	22.8	0.2	10.8	0	0	0	2	3.6	0	0	0	0	21	15	6	1	0	0	0	0	0	0	3.75	0	0.75	5.5	5.5	0
January	16	0	13.4	10.2	6.4	0	0.8	0	0	8.6	36	5.6	0	0	0	11	0	0	0	3	2	1	0	0	0	0.75	0.25	0	0	0
January	17	0	16.4	8.6	2.2	0.4	0.8	0	0	54.4	1.4	0	0	0	1.3	0.3	0.5	0.0	0.0	0.0	12.0	14.5	12.5	0	0	1.5	0	2.25	2.25	0
January	18	0	0.2	20.6	0	10.2	1.8	0	5.4	18.4	0	12.4	0.4	0	2	0	0	0	0	21	6	6	4	7.75	1.75	0.25	6.5	1.5	1.5	0
January	19	0	0.4	3.2	0	2.6	8.6	0	2.6	15.4	3.6	5.4	2.8	0	0.0	0.0	0.0	0.3	0.3	37.0	0.5	2.3	4.0	5.25	1.5	0	3.75	0	0	0
January	20	0	0	2.8	5.4	0.4	11.6	0.6	0	10	6	0	0	0	0	8	0	0	0	1	0	0	3	4.5	1.75	0	5	0	0	0
January	21	0	0.4	1	10	21.4	10.8	9.4	0	0.4	2.2	2	0	0	0.0	8.8	19.5	0.0	0.0	0.0	7.8	0.5	12.0	0.25	18	0.75	6.5	2.25	2.25	0
January	22	0	1	1.6	0	0	4	27.6	0	42.2	0	18.2	0	0	0	0	5	0	0	1	34	0	12	0	21.25	0	0	0.25	0.25	0
January	23	0	16	0.4	0.4	0	4.4	10	8.6	0.2	0.2	8.8	0	0	0.0	5.0	4.3	0.0	0.0	8.8	2.5	0.0	23.0	31.5	19.5	0.75	0	2	2	0
January	24	0	6.2	0	0	1.2	22.8	9.4	0.6	0	0	0	0	0	4	10	1	4	0	14	0	0	1	3.5	3.25	13.25	0.25	2	2	0
January	25	0	0.4	0.4	0.8	1	20.4	0.6	0	0	0	0.2	0	0	1	0	20	6	0	4	0	0	4	0.25	3.75	3.5	0	0.25	0.25	0
January	26	0	6.6	2	0	0	3	24.4	3.6	0	18.6	0	1	0	0.0	0.0	21.5	0.3	0.0	0.0	0.0	0.0	6.5	0	3	0.5	0	1.5	1.5	0
January	27	0	4	7.4	0	0	6.2	6.2	4.4	0	3	0	0.2	6	0	0	0	3	0	0	10	0	6	0	12	2	0	0.5	0.5	0
January	28	0	1.2	19.2	0	0	0	0	16.8	0.2	11.2	0	0.4	0	0.0	5.0	0.0	0.0	1.5	0.3	0.5	0.0	3.0	0	8.5	3.25	0.75	0	0	0
January	29	0	0	88.2	0	5.8	0	7.4	13.4	0	33.2	0	8.2	0	0.5	6.0	1.5	0.0	1.3	0.0	1.3	2.0	2.8	0	15.25	0	0	0	0	0
January	30	0	3.2	2.2	0	5.2	16	2.8	18.6	11.4	10.8	0	4.2	0	6.5	0.0	21.8	0.5	21.3	0.0	8.8	0.0	13.0	0	9.5	0	2.25	0	0	3.7
January	31	0	0	5	1	0	3.6	38	0.4	3.8	1	0	2.8	0	0	0	1	1	2	0	4	0	5	0	6.25	10.25	7.5	4	4	11.9
Total Monthly Rainfall		**2.4**	**200**	**280.8**	**123.2**	**99.4**	**213.2**	**205.8**	**119.8**	**210.2**	**277.4**	**312.8**	**106.8**	**121.6**	**180.5**	**161.75**	**150.75**	**53.75**	**70.25**	**160.75**	**114.5**	**26**	**153.5**	**158.75**	**166.5**	**194.5**	**149.5**	**45.25**	**45.25**	**43.8**
Maximum Daily Rainfall		**2.4**	**22.8**	**88.2**	**19.8**	**30.2**	**44.4**	**38**	**18.6**	**54.4**	**42.4**	**64.4**	**36.6**	**28.6**	**40**	**23.75**	**22.75**	**8.5**	**21.25**	**37**	**34**	**14.5**	**23**	**74**	**23**	**40.5**	**33.75**	**17**	**17**	**15.1**

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
February	1	0	0	28.8	26.4	0	0.8	0.2	6	0	10.2	0	0	1.4	3.0	0.0	4.8	0.5	0.0	1.0	7.5	0.0	14.50	1.0	24.25	22	0	1.5	1.5	13.5
February	2	0	0	45.4	0.4	9.4	0	0.2	8	0	11	0	0.2	4.6	2	0	5	0	0	3	1	0	5.50	11.3	0.25	7	0	0	0	5
February	3	0	0.4	3.2	0	3.2	0.4	0	1.2	1.6	5.6	1.6	0	0	1.0	2.0	0.0	0.0	0.0	3.5	0.3	0.0	1.50	0.0	0	0	2	4.25	4.25	5.5
February	4	0	0	6.2	0	9.2	0	0	2.2	10.6	32.6	6.6	0.2	0	0.5	9.8	0.0	1.8	0.0	1.0	1.8	14.0	1.3	0.3	13	0.75	3.75	2.5	2.5	0
February	5	0	0	0.6	0	4	2.6	0	0	0	0	0	12.8	0	1	0	0	0	0	4	0	3	0.0	0.0	18.5	0.25	2.25	2	2	0
February	6	0	0	17.6	0.4	0.4	11.8	0	6.4	25.4	0	0	14	4.4	0	9	0	10	0	28	0	0	0.8	1.3	17.75	0	0	11.5	11.5	0
February	7	0	0	5.4	0.4	0	8.2	0	0	0	0.2	4	13	0	2.8	0.3	0.0	6.8	0.0	17.3	0.0	0.3	0.3	0.3	18.25	0	0	27.25	27.25	0.25
February	8	0	1	11.4	5.4	13.4	0.2	0	0	0	0.4	1	1.8	0	0.5	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.3	0.0	0.25	0	0	0.5	0.5	8
February	9	0	1.6	1.6	1.8	0	0	0	0	0	0	1.4	3.4	0	0	0	6	0	0	5	0	15	0.0	0.0	0	0	1	5.75	5.75	0.5
February	10	0	0.8	2.2	0	0	0.6	0	0	0	0	0.4	5.8	12.2	0	0	15	0	0	11	0	4	0.0	0.0	0	0	0.5	1.25	1.25	0
February	11	0	0	0	0	0	4	0	0	0	0	1.2	3.4	1.4	3	1	2	0	17	2	4	1	0.0	0.0	0	0	0	0	0	0
February	12	0	13.8	0	0	0	0	0	0	0.6	0	0.8	0	0	4	23	1	0	7	0	15	0	0.0	0.0	0	0	0	2	2	0
February	13	0	11.8	2.4	0	0	0	0	0	0	5.8	1	0	0	2.0	1.8	4.0	1.0	5.8	5.8	10.5	0.0	1.3	0.0	2.5	0	0	8	8	0
February	14	0	0.2	0	0	0	0	0	1	0	0	14.6	0	0	4	12	1	0	2	4	12	5	1.0	0.0	0.25	1.5	0	0	0	0
February	15	0	0.6	0	0.6	0.6	0	1.2	3.8	0	0	10.8	3.4	0	1	0	0	9	10	0	8	5	1.0	0.0	4.5	11.75	0.5	0	0	0
February	16	0	0	4.8	0.2	10.8	7.8	2.4	2.8	0	0	0.8	0	0	5	7	0	1	18	0	74	0	6.0	10.5	0	11.25	0	2.25	2.25	9.75
February	17	0	0	12.8	0	0.4	0.6	5.4	3	0	0	2.8	0	0	0	0	7	0	3	0	0	0	20.8	0.5	0	0	0	1.75	1.75	11.5
February	18	0	0.6	10.6	0	3.4	0	1.6	8	0	0	1.6	0	0	0	0	9	0	13	0	15	0	0.5	0.0	0	5.25	0	0.5	0.5	3
February	19	0	3.2	9.6	0	0	4.8	2.4	0	0	0	22.2	0	0	0	0	28	6	18	0	6	0	0.0	0.0	0	3.25	0	0	0	3.25
February	20	0	0	0	0	0	0.4	10.2	0	0	0	16	2.2	0	0	0	0	0	11	2	1	0	0.0	0.8	0	4	0	1.25	1.25	9
February	21	0	3.2	3.8	1.4	0	65.8	2.4	0	0	0	1.2	0	0	0	1	3	1	3	0	3	0	0.0	0.3	0	19.25	0.5	2.25	2.25	0.25
February	22	0	3	24.4	1.4	4.4	38.2	0.8	0	0	0	0.6	0	2.4	0	0	2	1	0	0	1	0	2.8	0.0	2.5	1.25	5.25	0	0	12.25
February	23	0	2.6	10.6	4	0	14.4	0.2	0	0	1.2	0	0	1.6	2.3	0.0	0.0	21.3	4.0	0	11	0	3.3	4.5	15.25	5	0	0	0	14.5
February	24	0	0	54.2	0	0	0	0	0	0	0	5.4	0	1.8	10	0	1	0	0	0	0	0	3.5	5.3	0	0	0	0	0	13.75
February	25	0	1.8	1.6	0	0	0	0	4.2	0	0	0	0	13.4	1	0	28	2	4	0	0	0	5.0	3.5	0.25	10	1.25	0	0	0.75
February	26	0	0	0.2	5.8	0	0	0	3.8	0	12	0	0	0	5	0	6	6	16	1	0	0	0.0	0.0	0.25	1	0	9	9	14.5
February	27	0	1	21.6	16.8	0	0	0	1.8	0	0.2	0	1.2	0	3.0	2.5	0.0	1.3	0.0	15.0	0.3	0.0	0.8	0.0	0	0.75	7.25	1	1	0
February	28	0	13	7.4	1	0	0	2	0	1	0	0	0	0.6	0	4	2	0	0	20	1	4	0.3	0.0	10.25	0.5	31.75	14.5	14.5	0
February	29	n/a	n/a	n/a	13.6	n/a	n/a	n/a	0.8	n/a	n/a	n/a	1.6	n/a	n/a	n/a	0				3.25				1					
Total Monthly Rainfall		**0**	**58.6**	**286.4**	**79.6**	**59.2**	**160.6**	**29**	**53**	**39.2**	**79.2**	**94**	**63**	**43.8**	**50.25**	**72.5**	**122.5**	**67.3**	**130.0**	**133.0**	**172.8**	**50.0**	**70.0**	**39.3**	**129.0**	**104.8**	**56.0**	**99.0**	**99.0**	**125.3**
Maximum Daily Rainfall		**0**	**13.8**	**54.2**	**26.4**	**13.4**	**65.8**	**10.2**	**8**	**25.4**	**32.6**	**22.2**	**14**	**13.4**	**9.75**	**22.5**	**27.5**	**21.25**	**18.25**	**27.75**	**74**	**14.75**	**20.75**	**11.25**	**24.25**	**22**	**31.75**	**27.25**	**27.25**	**14.5**

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
March	1	0	11.8	9.8	0.4	6.6	0	0	0	6.6	0	0	2.8	0	0	4.25	5.00	18.00	0.00	0.00	3.00	1.75	0.25	0.00	0.75	0.25	23.25	0.25	0.25	0
March	2	0	1	3.6	2.6	11.2	0	1.2	0	0.2	0	5.4	1.6	0.2	2	6.5	0.0	3.3	0.0	4.0	22.5	7.0	14.0	0.0	5.75	0	5.75	10	10	0
March	3	0	2	32	6.2	2.2	0	1.4	2.2	0	0	2.4	4.6	0	0	1.75	5.75	6.25	13.00	0.25	5.50	11.75	0.75	0.00	0	0	5	3.5	3.5	0
March	4	2.2	0	9	5.8	0	0	0	0.2	0	0	0.2	0.2	0	0	7.25	0.00	0.00	4.00	0.00	7.50	0.00	0.00	0.00	0.75	2.5	0	3.5	3.5	0
March	5	0.8	0	0	0	0	0	0.4	11	0	0	1.2	0	0	0	5.5	4.8	0.0	14.0	0.0	0.0	4.0	0.0	0.0	1.25	0	0	0.25	0.25	3
March	6	0	0	0	0	0	0	0.4	0	0	2.2	0	0	0	0	0.25	12.25	3.75	2.5	0	0	1.75	0	0	0	0.75	0	0.25	0.25	0.25
March	7	0.2	0	0	0	0	0.2	4.8	43.8	0.6	0.4	2.8	2.2	0	1.5	0	0	6.5	14.75	0	7.75	10.25	0	0	0	2.75	0	0	0	0
March	8	0	2.6	0	0	5.2	2.8	0.8	0	1.6	15.8	8.8	0	1	0	0	0	1.5	0	0	11.75	7.75	5.25	0.25	0	0	0	0	0	0
March	9	8.8	8.2	0	1	2.8	1.2	20.4	0.2	3.4	5.4	1.6	4.4	0	0.25	7	0	0	2.5	0	1.75	11.75	0.25	0	0	0	1	0	0	17
March	10	0	5.8	0.6	0.2	0	3.4	3	0	0	0.8	12	0	0	2.25	15.75	15.5	0	0	0	6.25	0.25	0	0	0.75	0	0	1.25	1.25	3.75
March	11	0	0.4	0	4.6	0	44.8	13.6	0	0	3.8	65.8	0	0	11	2.75	5.5	0.25	2.75	0.25	38.5	7.5	0	0	0	0	1	0.75	0.75	1
March	12	0	1.2	2	0.6	0	18	17.4	0	0	0	3.4	0	0	13.25	1	0.75	6.25	0	3	1.5	2.25	0	9.5	0.5	0	1.75	15.25	15.25	3.75
March	13	0	2.8	3.6	1.8	3	16.6	17.6	0	0	0	1.2	0	0	1	1	7.25	2.5	0	0.75	0.25	9	2	1.25	0.25	0	0.25	3.25	3.25	6.75
March	14	0.6	0	7	14.4	0.2	0	6.8	0	0	0.4	3.2	10	0	5.75	2.75	0.75	13.25	3	1	8.5	11.25	0.25	0	0	0.25	0.25	0.5	0.5	0.75
March	15	0	0.6	0.4	0	4.6	1.6	0	0	0	0	6.4	24	0	2.5	19.25	3.5	9.5	6.25	16	2.5	1.75	0	1	0	0	20.5	0	0	1
March	16	0	0	8	3	0.6	15	0	0	4.6	1	6	15	0	1.5	8	19	2.5	22.25	36.25	0	2.5	0	0.25	0	0	4.5	0	0	16.25
March	17	0	0	0	5.8	0	0	1.2	0	1	0.8	9.8	3.8	2.2	0.25	4	1.75	0	0.75	0	0	13.75	2.75	0	0	0	0.5	0	0	3
March	18	1	0	0	4	5.4	8.6	0.8	6.6	0	0	0	2	0	0	0.25	1.25	0	0	0.75	0	9	0	0	0	0	19.5	0	0	1
March	19	0	0	0.6	5.2	7.2	2.2	3	15.8	11	0	6	4.6	0	0	1.25	0.25	8.5	0.75	0	0	0	0	0	0	1	0.75	0	0	0
March	20	0	0	0	1	0.8	13.4	0	0	4	0	1.4	2.2	0	0	0.5	0	3.25	1.25	17.25	0	0.25	0	0	0	0.5	0.75	4.75	4.75	1.75
March	21	0.2	2.2	4.6	0	0	1.6	8.6	0	0.4	0	0.4	0	0	0.75	0	15	5.75	0	7.25	2.25	2.75	0.5	0	0	8.75	4.75	0.25	0.25	8.75
March	22	0	7	0	7.6	0	0	27.4	0	0	1.4	4.4	0	0	0	4.75	0.25	0	0	13	1.25	0.75	2.5	0	0	0.75	9	0	0	13
March	23	0	8.8	1	0	0	0	6.2	0.2	0	0	9.6	0.8	0	0	0.25	0	0	1	0.5	0	1.5	0	0	0	0	5	0.5	0.5	0.75
March	24	0.8	3.4	0	0	0	0	1	7.8	0	2.6	8.4	0	0	0	0	0	0	0	1.5	4.5	2	0.25	0	1.25	8.25	0.25	19.5	19.5	30.5
March	25	0	1.4	0	0	8.4	0	0.4	2.4	0	0	0	0.2	0	5.25	0.5	0	0	0	0.5	1.5	1.25	0	0	0	0.75	0	1.5	1.5	17
March	26	1.6	0.4	15.2	0	5	2.2	6.4	1.6	34.8	1	0	0	0	0.5	1.5	0	0	8	6.75	0	2	3.25	2	0.75	0	0	0.5	0.5	0.25
March	27	7.6	0	0	0.2	5.6	0.6	3.6	0.2	4	0	0	0.6	0	0	0	1.75	0	2.75	0	3.25	1.75	0.25	0.5	5	0	4.5	0	0	13.25
March	28	0	4	0.4	0	7.6	3.6	0.4	0	4.4	0.6	0	4.6	0	2.75	0	0	0	0.5	1.25	7	20.75	0	0	9.25	14.75	0.75	0	0	3.75
March	29	0.2	0	5.4	0	1.8	0	0	0	3.8	0	0	0	0.2	40	0	2	0	7	0.25	0	11.75	0.75	0	1.25	0	7	0	0	1.75
March	30	0	3	6.8	0	0.8	0	0.6	2.2	0	0.4	0.4	0.6	0	1	2	16.5	0	5	11.75	0	0	0	0	12	0	0	0	0	0.75
March	31	0.6	6.2	0	0	2	0	2.2	2.8	5.6	0	1.4	15	0	0	10.25	10.75	0	0.5	0.25	0	0	0	0	0.25	0	0.5	4.25	4.25	0.25
Total Monthly Rainfall		**24.6**	**72.8**	**110**	**64.4**	**81**	**135.8**	**149.6**	**97**	**86**	**36.6**	**162.2**	**99.2**	**3.6**	**92**	**108**	**130**	**91**	**113**	**123**	**137**	**158**	**33**	**15**	**40**	**41**	**117**	**70**	**70**	**149**
Maximum Daily Rainfall		**8.8**	**11.8**	**32**	**14.4**	**11.2**	**44.8**	**27.4**	**43.8**	**34.8**	**15.8**	**65.8**	**24**	**2.2**	**40**	**19.25**	**19**	**18**	**22.25**	**36.25**	**38.5**	**20.75**	**14**	**9.5**	**12**	**14.75**	**23.25**	**19.5**	**19.5**	**30.5**

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
April	1	9	0	0	0	1.2	0	0	0	7.6	13.4	0.4	0	18.6	0	4.25	2.25	0.00	0.00	0.25	0.00	4.50	0.0	0	4.75	0.00	0.25	4.25		
April	2	0	0	1.4	0	0	0	0	0	0.6	0	0	0	18.2	16	16	3	0	0	1	0	0	0.0	0.5	0	0	0	0		
April	3	0	0	1.2	0	0	0	0.4	0	2.2	5.6	0	0	0	3.5	16.5	0.0	0.0	0.0	1.0	4.8	0.0	0.0	3.5	0.8	0.0	18.3	4.8		
April	4	0	0	0	0	0	0	4.6	0	0	0	0	5	0	0	0.25	1.00	0.00	0.50	0.00	0.25	4.00	0.0	0	0.00	0.00	30.00	10.00		
April	5	0	0	0	0	3	0	0	0	9.2	0	0.2	0	0	0	15	0	11	0	0	1	12	18.8	1	0	0	3	3		
April	6	0	0	0	3.4	2.4	0	1.8	0	1.6	0	0	0.4	0	0.5	10.75	0.75	2.50	3.50	0.00	0.00	3.00	17.8	2	0.00	0.00	0.00	0.25		
April	7	0	0	2.2	0	6.4	2	3.8	0	4.6	0	4.6	4.6	0	8	2.75	6.75	3.75	0.00	0.00	0.00	10.50	1.3	0	0.00	0.00	0.00	1.00		
April	8	0	0.6	0.6	0	0	0	2.6	0	0	3.6	6	1.4	0	5.75	0	0	12	0	0	0	3	11.8	11.5	0	5	2	1		
April	9	0	0	0.2	0	0	2.4	1.8	0	0	5.6	2	0	n/a	0.5	0	0	0	12	0	0	0	3.0	3.5	0	0	2	2		
April	10	0	1.6	0	0	4	1	0	0	0.4	4.2	1.2	0	0	0	0	0	1	0	0	0	1	0.0	2	0	9	26	5		
April	11	0	1	0	0	0	0	0	0	1	0	0	0	0	0	4.5	0.0	14.8	0.0	4.5	0.0	0.0	0.5	8	0.0	0.5	0.5	0.0		
April	12	0	0.8	0.4	0	1.2	0.2	1	0	0.4	0.2	0	0	17.4	0	0.75	4.50	0.25	0.00	8.50	4.25	20.50	1.0	0.25	0.00	0.00	2.50	5.00		
April	13	0	0	0	1.6	0.6	11.2	13.6	0	0.6	4.8	1.4	0.2	3.6	0	1.75	2.25	5.50	0.00	0.25	0.00	6.25	0.5	6.75	0.00	0.00	0.50	0.00		
April	14	0	0	0	0.8	0	32	0.2	0	0	8.6	0.4	10.8	31.4	0	1.25	0.00	6.50	0.00	1.00	2.50	0.00	24.5	0	0.00	0.00	0.00	1.00		
April	15	0	0	0	0.4	0	9	0.8	2.2	8	0.4	0	0	n/a	0.5	7.5	0.0	0.8	0.0	1.5	0.0	10.0	3.5	0	0.0	0.0	0.0	0.0		
April	16	0.8	0	0	0	0	3.2	0.8	0	5	0	3.4	0	0	0	1.25	0.00	3.00	4.25	0.00	0.00	0.00	1.3	0	0.00	0.00	0.00	0.50		
April	17	1.2	0	0	0	12.2	0.6	0.6	0	0.2	2.4	0.8	0	4.4	3.25	0	9	1	7	0	0	1	12.3	0	0	0	0	2		
April	18	3.2	0.6	0	0	2.2	0	0.2	0	1.6	0.2	1	6.6	0	0	0	1	0	11	0	0	1	0.5	11.25	0	0	1	0		
April	19	2.8	0	4.4	0	0	0	2.8	0	0	0	0	22.6	0	3	0	1	1	0	0	0	0	0.0	0.75	0	0	1	3		
April	20	21.8	0	2.4	0	0	0	0	0	0	0.4	0	0	0	11.25	1.25	12.25	6.50	2.00	0.00	0.00	0.50	0.0	0	0.00	0.00	1.75	3.25		
April	21	0	1	0	0	0	0.2	1.4	0	0	1.2	0	8	0	0.5	1.5	0.3	0.8	1.0	0.0	0.0	0.0	3.8	0	0.0	0.0	1.3	7.3		
April	22	0	0	4.4	4.4	3	0	0	0	0	0	0.8	0	1	0	0	0	0	3	0	0	3	1.5	3.25	17	0	3	1		
April	23	4	0	0	1	3.6	0	1	0	0	0	0	1.4	0	7.25	0	0	0	2	0	1	1	0.0	0	0	0	0	6		
April	24	1.6	0.2	0	0	0	0	7.6	0	0.6	0	3.8	0	0	3.75	0	0	0	7	2	0	0	0.0	0	0	0	3	2		
April	25	0.8	0	0	0	0	0	0	0	0	0	0.8	0	0	0	2	5	0	11	12	0	0	0.0	0	3	13	4	1		
April	26	0.6	0	1.2	0	0	9.4	0	0	0	0	2.6	0	0	0	8.25	3.25	0.00	0.25	0.75	0.00	0.25	0.0	0	4.50	10.00	1.00	0.00		
April	27	1	0	0	0.4	0	0.6	1.2	2.2	0	0	11.4	3	0	1	0	0	0	1	0	0	5	0.0	0	1	1	6	2		
April	28	4.2	0	0	0	2	0	0	0.4	0	0	0	6.4	0	2.25	10.75	0.00	0.00	2.25	2.25	0.00	0.00	0.0	0	1.25	0.00	0.00	0.00		
April	29	1.8	0	0	0.2	1.4	0	0	0	0	5	0	0	0	0	3.5	0.0	0.8	0.0	0.5	0.0	4.8	6.0	0	0.8	0.0	0.8	0.0		
April	30	2	0	0	0.2	4.4	0	0	0	0	0	0	0	0	0.75	0	2	1	0	0	0	0	0.3	0	0	0	12	0		
Total Monthly Rainfall		**54.8**	**5.8**	**18.4**	**12.4**	**47.6**	**71.8**	**46.2**	**4.8**	**43.6**	**55.6**	**40.8**	**70.4**	**94.6**	**67.75**	**109.75**	**53.5**	**70.5**	**66**	**35**	**14**	**90.75**	**108**	**54.25**	**32.75**	**37.25**	**118**	**64.25**		
Maximum Daily Rainfall		**21.8**	**1.6**	**4.4**	**4.4**	**12.2**	**32**	**13.6**	**2.2**	**9.2**	**13.4**	**11.4**	**22.6**	**31.4**	**16**	**16.5**	**12.25**	**14.75**	**11.75**	**11.50**	**4.75**	**20.50**	**24.50**	**11.50**	**16.75**	**12.75**	**30**	**10**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
May	1	0.8	0	0.4	2.2	3.6	0	0	0	0	0	0	0	0	0.75	0	4.25	0	0	0	0	2.5	1.5	0	0	3.25	0	0		
May	2	0	0	5.2	0	0	0	0	0.2	2	0	2.8	0.4	4	15.75	0	0.75	0	0	0	0	2	0	0	1.75	0	1.5	0		
May	3	0	0	0.2	2	0	0	1.4	1	0	0	2.2	2.8	0	8.25	9.75	0	0	0	0	0.75	2	0	0	2	0	0.25	0		
May	4	0.6	0	2	3	2.2	0	11.4	0.6	0.4	0	0.2	0	3.2	6.75	0	10.75	0	1.75	0	0.25	0	0	0	0	1.5	1	0		
May	5	15.8	0	0	2	4	1	4.4	0.6	0	0	0.2	0	8.6	0	0	0	0	15	0	0	0	0	0	0	0	9.25	0.25		
May	6	3.6	0	0	1.6	1	0	0	0	0	0.8	1	0	11.8	2.75	2	0	0	5	3.5	0	0.25	0	0	0	0	0	12.75		
May	7	0	0	0.4	0	0	0	0	1	0	3.6	0	0	0	0	4.75	0	0	0	0	0	0	0	0	0	0	0	0		
May	8	0	0	3.4	1.6	0	0	0	0.2	0.8	0	0	0	0	0	1.5	0	0	0	0	0	0	0	0	0	0.25	1.25	0		
May	9	0	0	1.4	0	0	0	0	0	0.8	0	0	0	0	0	0	0	0	9.5	0	0	0	0	0	0	0	0.25	0		
May	10	0	0	0.4	11	0	0	0	1	0	0	0	0.2	3.6	2.25	0	0	0	0	0	0	0	0.75	0	0	0.5	0	0		
May	11	0	0.2	1.4	0.4	0	0	0	0.6	0	0	0	0.2	2.8	0	0.5	0	0	0	0	0	10.25	8.25	0	1.75	0	0	0		
May	12	0	0.8	0	0	0	0	0	0	0	0	0	0	0.4	0	5.75	0	2.5	0	0	0	1.25	0	0	7.25	0	3	0		
May	13	0	0	0.4	0	0	1	0	0	0.2	0	0	5.2	10.2	0	0	0	5.5	0	0	0	6.75	0	0	5.75	0	0	0		
May	14	0	3.6	0.2	0	6	0.2	1.4	0	0.2	0	0	0.2	9	0	0	0	3.25	0	0	0	0	0	4.75	0	0	2.5	0		
May	15	0	1	0	0	1	0	0.2	0	0.8	0	0	0	0	0	9.75	0	0	0	0.5	0	8.25	0	1.75	0	0	14.25	0		
May	16	0	0	0.2	0	5.2	0	0	0	0.2	0	0	0	0	0	20.75	0	1.75	0	0	0	2.75	0	0	10	0	1	0		
May	17	0	0	9.4	0	0	6.2	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.75	0	0	0		
May	18	0	0	1.8	0	0	0	0	0	0.4	0	0	0	7.8	4.5	0	0	3	0	0	0	0	0	0	0	3.5	5	0		
May	19	0	0	0	7.2	0	0	2.4	0	1.6	0	1.6	1.8	0	1.5	0	0	1	0	0	0	0	0	0	0	0	0	0		
May	20	0	0	0	0	0	1.8	0.6	0	0	0	10.4	0.2	0	7.25	0	0	0	0	0	0.75	0	0	9.75	0	0	0	0		
May	21	3	0.6	0	4.4	0	0.4	0.4	0	0.4	2.6	0	4.6	n/a	0	0	0.5	4.75	0	0	0	0	0	1.25	8	0	0	0		
May	22	1	0	0	0	0	0	2	9.4	0.4	17.4	0	0	0	1	1.5	5.75	6.75	0	0	0	0	0	0	0	0	0	0		
May	23	3.6	0	0	0	0	0	1	1.2	0.4	0	0	0	0	0	0.25	0	8	0	0	0.25	0	0	0	0	0	0	2.25		
May	24	0	0.4	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	1.25	3.25	0	0	0	0	0	0	0	0	0		
May	25	0	6.8	0	0	0	2.6	0	1.2	0	3	0	0	0	1.5	0	1.25	0	0	0	0	0	0	13.5	7.75	4.75	0.5	0		
May	26	0	1.8	0	9.6	0	2.4	0	0.6	0	6.2	0	0.2	1.2	7	2.25	0	0.25	2	0	0	0	0	0.25	0	4	6.25	0		
May	27	0.4	22.8	0	7.2	0	0	0.2	9	0	0.4	0	0	0	0	0	0	3.5	0.75	0	0	0	0	0	0	0	3.5	0		
May	28	4.8	2.4	0	0.8	3.2	2.4	0	3.2	0	0	0	0	n/a	6.25	2.5	0	5.25	3	0	9.75	0	0	0	0	4.25	0.5	0		
May	29	6	0	0	0	0	1.4	0	7.6	0	0	0	0	0	0.75	0.5	0.25	1.5	0	0	0	0	0	0	0	0	0	0		
May	30	5.2	0	0	6.2	1.2	0	0	1	0	0	0	0	0	3.75	0	0	4.25	0	0	0	5	0	0	2.5	0	0.25	0		
May	31	14	0	0	0.8	0	0	0	0	0.4	0	0	0	0	6.5	0	8.5	1	0	0	0	0.25	0	0	0	0	0	0		
Total Monthly Rainfall		**58.8**	**40.4**	**26.8**	**60**	**27.4**	**19.4**	**25.4**	**38.4**	**9.2**	**34.2**	**18.4**	**15.8**	**62.6**	**76.5**	**61.75**	**32**	**53.5**	**40.25**	**4**	**11.75**	**41.25**	**10.5**	**31.25**	**47.5**	**22**	**50.25**	**15.25**		
Maximum Daily Rainfall		**15.8**	**22.8**	**9.4**	**11**	**6**	**6.2**	**11.4**	**9.4**	**2**	**17.4**	**10.4**	**5.2**	**11.8**	**15.75**	**20.75**	**10.75**	**8**	**15**	**3.5**	**9.75**	**10.25**	**8.25**	**13.5**	**10**	**4.75**	**14.25**	**12.75**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
June	1	0.2	0	0.6	0	8.4	0	0	0	0.4	5.4	0	0	0	0	0	1.75	0.5	0	0	7.5	0	0	0	0	0	0	0		
June	2	0.4	0	0	0	2.8	0	0	0	0	0.6	0	0.4	0	0	0	5.25	0.25	0	0.25	0.25	0.75	0.25	0	0.75	0	0	0		
June	3	8.2	0	0	0	0.8	0	0	0	0	0	1.4	4.4	0	0	1	0	0	0	0.25	0	0	0.25	0	0	0	4.5	0		
June	4	0.4	0	0	0	0	0	0	0	0	0	1.4	0.4	0	0	0	0	0	0	0	0	0	0	0	0.75	0	6	0		
June	5	0	0	4	1.6	0	2.4	0	4.8	0	0	0.8	2.8	0	0	0	0	0	0	0	0	0	0	0.25	0	1	0.25	0		
June	6	0	0	0.4	3.6	0.6	0	0	1	0	0	0.8	5.8	0	0	0	0	0	0	0	0	0	0	0.25	3.75	1	0	0		
June	7	0.6	0	1.6	0.4	0	0	0	0.2	0	6.2	0	0	0	0	0	0	0	0	0	0	0	0	1.75	0.25	0.5	0.25	0		
June	8	0	0	0.6	0	0	0	0	0	0.4	16.8	0	0	0	0	0	15	0.25	0	0	0	11.25	0	0	0	4	0	0		
June	9	0	0	0	0	10	0	0	5	0	0	9	10.2	0	0	0	0.25	0	0	0	0	0	8	0	22.5	0	24.75	0		
June	10	0	10.8	0	2.4	1.4	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	5.5	0.5	0	0.75	1	0.25	5.5		
June	11	3	0	0	2.6	1.4	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0	0	22		
June	12	0.2	0	0	15.8	1.2	0	0	0.4	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	8.75	2.25	1	0		
June	13	0	0	0.2	0	0	0	0.6	8.4	0.2	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0.25	1.25	0.25	0		
June	14	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	1.5	1	0	3	0	2	0	0	3.75	0	0		
June	15	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	4.25	14	0	0	3.75	0	0.5	0		
June	16	1.2	3.6	2.4	0	0	0	0	0	0.2	0.8	0	0	0	0	1	0	0	0	0	11.75	0	0	0	0.25	11.5	7.25	0		
June	17	13.4	0	0	0	0.4	2.6	0	0	0	0.6	0	0	1.4	0.35	0	1	0	6.25	0	0	0.25	0	0	0	0	0.25	0		
June	18	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	1	0	0	0.25	2.25	0	0	0	0	1.25	0		
June	19	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	2.25	1.75	0.25	0	2.75	0	0	0	0	0.5	0	0	0.5		
June	20	0.4	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	3.25	0	0.25	0	0	0	0	1	0	0	0		
June	21	11.8	0	1.6	0	0	0	0	0	0.4	0	5.8	0	1.4	0.35	0	0	2.5	0	0	0	0	0	0	0	0	0	0		
June	22	0	0	0.2	0	0	0	0	0	0	0	1.4	0	0	0	0	0	0	0	0	8.5	0	0	0	0	0	0	0		
June	23	2.2	0	6.2	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	4.75	0	0	0	0	0	0	0		
June	24	0	7.8	7.6	0	0	0	0	0	0	0	3.2	0	2.8	0.7	0	4.25	1.25	0.75	0	1.25	0	0	0	0	0	0	0		
June	25	0.8	0	0.4	0	0	0	0	0.4	0	0	0	0	0.2	0.05	3	0	2	0	0	0	0	7.75	0	0	0	0	0		
June	26	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0		
June	27	0.6	0	0	0	0.8	1	0	0	0	0	0	0	1.4	0.35	0	0	1.5	0	0	0	0	0	16.75	1.75	0	0	0		
June	28	0	0	7.4	0	0.2	6.6	0	0	0	0	4	0	0	0	0.25	0	3	2	0	0	0	0	0	0.25	0	0	0		
June	29	27.4	0	0	0	0	5	0	0	0	0	4.4	0	0	0	0	2.5	0	1.75	0	0	0	0	0	0	0	0	0		
June	30	0	0	3.6	0.8	0	0	1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0		
Total Monthly Rainfall		**73.8**	**23.2**	**37**	**27.6**	**28**	**18**	**2**	**20.2**	**1.6**	**30.4**	**34.4**	**24.2**	**7.2**	**1.8**	**7.5**	**44.75**	**30.25**	**12**	**3.5**	**41.5**	**34**	**19.25**	**19**	**45.25**	**26.25**	**46.5**	**28**		
Maximum Daily Rainfall		**27.4**	**10.8**	**7.6**	**15.8**	**10**	**6.6**	**1.4**	**8.4**	**0.4**	**16.8**	**9**	**10.2**	**2.8**	**0.7**	**3**	**15**	**12**	**6.25**	**2.75**	**11.75**	**14**	**8**	**16.75**	**22.5**	**11.5**	**24.75**	**22**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
July	1	0	0	0	0	0	0	1.2	0	0	0	0	0	0	0	0	3	0	0	0	0.5	0	3	0	0	0	0	0		
July	2	0	0	3.2	0.2	0	0	0	3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.25	0	0	0	0		
July	3	0	20.6	3.2	1.8	0	0	0	0	0	0	0	2.2	0	0	0.25	5.5	0	0	0	0	0	0	0	7	0	16.5	0		
July	4	0	1.8	0	0	0	0	0	0	0	0	0	0	0	0	0	4.25	0	0	0	0	0	0	0	0	0	1.75	0		
July	5	2.4	0	0	1	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0.25	0	0.25	0	0	0	0	0	0.25	0		
July	6	4.8	0	0	0	0	0	0	3.4	0.4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
July	7	0	0	0	0	0	0	0	0	0	0	0	0	1.6	0.4	0	0	0	1	0	3.5	0	0	1.75	0	0	2.25	0		
July	8	23	0	0	0	0	7.4	0	0	0.6	0	0	0	6	1.5	0	0	0	0	0	0.75	0	0	0	0.25	0	0	0		
July	9	2.4	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	11.5	0	0	4	3	0	0	0		
July	10	0	0	0	0	0	0	0	0.8	0	1.8	0	0	0	0	0	0	0	0	0	0	0	0.25	5.25	0	0	0	0		
July	11	0	0	0	0	0	0	0	2.6	0.2	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0.5	0	0	0	0		
July	12	0	0.2	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0	0		
July	13	0	0	0	0		0	3	0	0	0	0	0	0	0	2.25	0	0	0	0	0	0	0	0	0	0	0	0		
July	14	0	1.8	0.6	0		0	4.2	0	0	0	0	0	0	0	0.25	1.25	0	0	0	0	0	0	0	0	0	0	0		
July	15	0	9.2	0	0		0	0	0	0	0	0	0	0	0	9.75	0	0	0	0	0	0	0	0	0	0	0.25	0		
July	16	0	0	0.8	0		0	0	0	0	0	0	0	0	0	0.75	3	0	0	0	0	0	0	0	0	0	0	0		
July	17	0	0	0.6	0		0	0	0	0	0	5.6	0	0	0	12.75	0	0	0	0	0	0	0	2.5	0	0	0.25	0		
July	18	0	0	0	0	0	0	0	0	0	0	14.45	0	0	0	0.25	0	0	0	0	0	0	0	0	0	0	0.25	0		
July	19	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
July	20	0	0	0	0	0	0	0.4	0	0	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
July	21	2.4	0	0	0	0	0	0	0	0	0	9.2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0		
July	22	0	0	0	0	0	0	0	0	0	0	7.8	0	0	0	0	0	0	0	0	1.5	0	0	0	0	0	0	0		
July	23	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
July	24	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.25	0	0	0	0	0	0	0	0	0		
July	25	0	0	0	0	0	0	0	0	0	0	0	0	3	0.75	0	0	0	3	7.75	0	0	0	0	0	0	0	13.25		
July	26	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25		
July	27	0	0	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.5	0	0	0	0	0	0	0	0		
July	28	0	0	0	10.2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0	0		
July	29	0	0	0.4	0	0	0	0	0	0	0	0	3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
July	30	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
July	31	0	0.8	0	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total Monthly Rainfall		**35**	**34.4**	**9.6**	**16.6**	**10**	**7.4**	**11.8**	**31**	**1.2**	**2**	**41.65**	**7**	**10.6**	**2.65**	**26.25**	**21**	**0**	**6.5**	**17.5**	**18.5**	**0**	**3.25**	**22.25**	**10.25**	**0**	**21.5**	**13.5**		
Maximum Daily Rainfall		**23**	**20.6**	**3.2**	**10.2**	**10**	**7.4**	**4.2**	**21**	**0.6**	**1.8**	**14.45**	**3.8**	**6**	**1.5**	**12.75**	**5.5**	**0**	**3**	**9.5**	**11.5**	**0**	**3**	**8.25**	**7**	**0**	**16.5**	**13.25**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
August	1	0	0	0	0	0	0	0	0	0	0	0	1.6	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0		
August	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.25	0	0	0	0		
August	3	0	0	0.2	0	13.6	0	0	0.4	0	0	0	0	0	0	0	0	2.75	0	0	0	0	0	0	1.25	0	0	0		
August	4	0	0	0.2	0	5.4	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	5	0	0	7.8	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	6	5.4	0	0	0	2.4	0	0	25.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.5	0	0	0		
August	7	0	0	0	0	0	0	0	0.2	0	0	0	0	0	12.25	0	0	0	0	0	0	0	0	0	2.25	1.25	0.31	0.00		
August	8	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.25	0	2	0	0	0	0	0	0	0	0.25	4.75	1.19	0.00		
August	9	0	0	0	0	0	0	0	0	0	0	0	4.4	2	1.25	0	0.25	0	0	1	0	0	0	0	0	0	0	0		
August	10	0	0	0	0	0	0	0	0	0	0.8	0	0	12	0	0	0	0	0	0	0.5	0	0	0.75	0	0	0	0		
August	11	0	0	0	0	0	0	0	0	0	0.2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	12	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	1.75	0.5	0	0	0	0	0		
August	13	0	0	0.2	0	0	0	0	0	0	0	0	0	7.2	0	0	0	0	0	0	0	1.5	0	0	0	0	0	0		
August	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.75	0	0	0	0	0	0	0	0	0		
August	15	0	0	8.2	0	0	0	0	0	0	0	1.4	0	0	0	0	0	0	1.75	0	0	0	0	0	0	0	0	0		
August	16	0	5.4	3.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	1	0	0	0		
August	17	0	0	0	0	0	0.8	0	0	2.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	18	0	0.2	0	3.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	19	0	0	0	0	0	0	0	0	0	0	12.2	5.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	20	0.2	0	0	0	0	0	0	0	0	0	0.8	4.8	0	0	0	0	0	0	0	0	0	0	0	4.75	0	0	0		
August	21	5.4	0	0	0	2.2	0	0	11.2	0	0	7.6	0.4	0	0	0	0	0	0	0	0	0	0	4.75	2.5	0	0	0		
August	22	0	0	0	0	11.2	0	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	23	0.2	0	0	0	6.4	0	0	0	0	0	0	0	0	0	16.5	0	0	0	0	0	0	0	2.25	0	0	0	0		
August	24	0.2	0	0	0	1.8	0	0	30	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0.25	0.25	0	0	0		
August	25	3.4	0	0	0	0	0	0	31.6	0	0	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	26	5	0	0	0	0	0	0	0.8	0	0	0	4.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
August	27	7.2	0	0	0	0	0	0	2.6	0	0	0	5.2	0	0.5	0	0	0	0	0	0	0	0	0	0	1.75	0.44	0.00		
August	28	0	0	0	0	0	0	0	0	0	2.4	0	1.2	0	0	0	0	0	0	0.25	0.5	0	0	0	0	0	0	0		
August	29	0	0	3.8	4.8	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	6.25	0	0	0	0	0	0	0	2.5		
August	30	0	0	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.75	0	0	0	0	1	0	0	2.5		
August	31	0	0	0	0	0	0	0	0	0	0	1.2	0	0	12	0	0	0	0	1.25	1.75	0	0	0	0	0	0	1.25		
Total Monthly Rainfall		**27**	**5.6**	**24.4**	**9.6**	**43.2**	**0.8**	**0.6**	**106.2**	**2.8**	**3.4**	**23.2**	**43.6**	**22.2**	**26.25**	**16.5**	**2.25**	**3**	**12.75**	**15.5**	**2.75**	**3.25**	**0.5**	**12.75**	**18.75**	**7.75**	**1.94**	**6.25**		
Maximum Daily Rainfall		**27**	**5.4**	**8.2**	**4.8**	**13.6**	**0.8**	**0.6**	**31.6**	**2.4**	**2.4**	**12.2**	**15**	**12**	**12.25**	**16.5**	**2**	**2.75**	**10.75**	**6.75**	**1.75**	**1.75**	**0.5**	**4.75**	**5.5**	**4.75**	**1.19**	**2.50**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
September	1	0	0	0	0	5.2	0	0	2	0	0	0	0	0	0	0	0	0	0	8.5	3.5	0	0	0	0	0.25	0	2		
September	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	11.25	0	0	0	0	0	0	0		
September	3	0	0	0	0	1.6	0	0	0	0	0	5.6	0	1.6	0	0	0	0	19	12.25	0	0	0	0	0	0	0	0		
September	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.5	0	0	0	0	0	0	1	4.25		
September	5	0.4	0	2	0.2	0	0	0	0	0	0	0	0	1.4	0	0	0	0	0	0	2.5	0	0	0	0	5.25	0	0		
September	6	0	0	0.4	0	0	0	1.2	0	0	0	0	0	13.8	10.25	0	0	0	0	4.5	2	0	0	0	0	0.25	0	0		
September	7	0	0	0	0.4	0	0	7.6	0	0	0	0	0	5.4	7	0	0	0	0	15.25	2.5	0	0	0	0	0	0	0		
September	8	0	1.2	0	6	0	0	0	2.2	0	0	0	0	0	2.5	0	0	0	0	0	0	0.5	6	0	0	0	0	0		
September	9	0	0	0	0	0	0	0	0	0	11.6	0	0	12.2	0.25	0	0	0	0	0	0	7.75	1.5	1	0	0.75	0	0		
September	10	0	0	0	0	0	0	1.6	0	0	0	0	0	0	0.25	0	0.5	0	1	0	0	0	8	0	0	0	0	0		
September	11	0	0	0	0	0	0	0.8	21.4	0	0	0	0	0	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0		
September	12	0.2	0	0	0	0	0	0	0.2	0	0	0	0	0	14.25	0	0	3.75	0	0	0	0	2.5	2.5	0	6.75	0	0		
September	13	0	0	0	0	0	0	0	11.4	0	0.6	0	0	0	8	0	0	0	0	0	0	0	0.5	0	0	0.5	0	0		
September	14	6.4	0	0	0	0	0	0.8	0.8	0	0.6	0	0	0	0.25	0	0	0	0	0	0	0	0	8.25	4.75	0	0	0		
September	15	3	0	0	0	0	0	0	17.2	0	0.2	0	0	0	1.25	0	0	0	0	3	0	0	0	13.5	2	3.5	0	0		
September	16	9.6	0	0	0	0	0	10	2.2	0	0	5.2	0	5.4	2.75	0	0	3	0	0	0	0	4.5	0.75	0.25	0	0	0		
September	17	9.6	0	0	0	0	0	0	6.8	0	3.2	0	0	0	13.25	0	0	0	0	1.25	13.25	1	4	20.75	0	0	0	0		
September	18	5.4	0.2	0	0	0		8	5.8	0	4.4	2.4	0	0	18	0.25	0	0	0.25	1.25	0	1.25	0	1.25	0	43.5	0	0		
September	19	0	0	0	0	0		4.6	7.6	0	1.2	0	0	6.2	10.75	2.25	0	0	0.75	0.25	5	2.75	0	0.5	0	8.5	0	0		
September	20	0	0	0	3.2	0		0	0	0	10	1	0.2	0	0.5	0	0	0	0	0.75	0	0.25	0	0	0	5.75	0	0.5		
September	21	0	0	0	0	5.8		0	0	0	0	0.6	0	0	0	0	0	8.75	0	4.5	0	0	5.25	0	2.25	0	0	1		
September	22	0	0	0	0	0		0	1.4	0	0	0.6	0	0	0	1.75	0	0.25	0	0	0	0	6.25	6.25	0	0	0	0		
September	23	0	0	0.4	0	0		0	4.2	0	0	0	0	0	10.5	11.5	0	12.5	0	0	2	0	2	12.5	27.5	0	0	0		
September	24	0	0	0	0	0		0	0	0	0	1	11.6	0	1.5	0	0	3.5	12.5	0	0.5	0	0	0.25	20	0	0	1.25		
September	25	0	2.2	6.2	0	0		0	0	0	0	0.4	8.4	0	7.75	0	0	9.25	3	4.5	0.25	3.25	0	0	26	0	0	2.25		
September	26	23	0	0.8	0	14.6		0	0	0	0	0	1.2	0	17.5	3	0	4.75	1.25	2.75	0	0	0	0.5	11.5	0	0	1.25		
September	27	12.4	0	0	0	0		0	0	0	0	0	0	0	6	24	0	0	12	0.25	0	0	0	12	0	36	0	1.5		
September	28	8.6	0	0	0	0.6		0	0	0	0	0.6	0	0.8	0	1	0	6.5	0	0	0	0	0	0.25	0	4.25	0.25	3		
September	29	0	0	0	15.6	0.8		0	0	0.4	0	1	0	8	0	0	0	4.75	0	0	0	1	0	0	0	3	0	1.25		
September	30	11	0	0	1.4	0		0	0	0	0	8.8	0	0	0	0	0	3.25	1.5	0	0	1.5	0	0	0	5.5	0	0		
Total Monthly Rainfall		**89.6**	**3.6**	**9.8**	**26.8**	**28.6**	**0**	**34.6**	**83.2**	**0.4**	**31.8**	**27.2**	**21.4**	**54.8**	**133.75**	**43.75**	**0.5**	**60.25**	**51.25**	**76.5**	**42.75**	**19.25**	**40.5**	**80.25**	**94.25**	**123.75**	**1.25**	**18.25**		
Maximum Daily Rainfall		**23**	**2.2**	**6.2**	**15.6**	**14.6**	**0**	**10**	**21.4**	**0.4**	**11.6**	**8.8**	**11.6**	**13.8**	**18**	**24**	**0.5**	**12.5**	**19**	**15.25**	**13.25**	**7.75**	**8**	**20.75**	**27.5**	**43.5**	**1**	**4.25**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
October	1	3	0	0	0	0		0	0	0	0	0	0	3.4	0	0	0	9.25	0	0	0.5	0	11	0	0	16.25	0	0		
October	2	0.4	9.6	0	0	0		0	0	0	0	10.2	2	0	0	0	0	7	0	0	0.5	0	3	0.75	0	0	0	0		
October	3	12	2.6	0	0	0		0	0	0	0	1	13.4	0	0	0.5	0	5.75	0	2.25	4.25	0	0.5	0.25	0.25	0	0	17.75		
October	4	15	0.4	0	0	0		0	0	0	0	1	6.4	0	0	0.25	0	0	0	0	1	0	0	9.25	0.25	0	0	0.25		
October	5	1	0	21	0	0	0	0	4.8	0.4	0	0	1.8	0	0	0	0	0	0	0	0.25	0	0	2.5	0.5	0	0	0		
October	6	0	0	0	0	0	0	4.6	5.2	0	1.6	9	1.8	0	0	2	0	0	0	0	8	2	8.75	0	0	1.25	0	0		
October	7	8	0	9.2	0	0	0	8.2	3.6	0.4	0	10.4	2.4	0	0	0	0	0	0	0	12.25	0	0	9	0.25	5.5	0	0		
October	8	13.6	3.4	23.6	1.4	2	0	7.4	19.2	0	5.2	0	0	0	2.75	0.5	0	1.75	0	11.75	5	0	8.5	0.75	0.25	0	0	0		
October	9	0.2	1.8	1	5.2	0	0	7.6	3.4	0	0	0.4	0.6	0	23	0.5	0	0	0	0	0.25	0	5.25	0	16.5	0	0	0		
October	10	12.2	0	0	3	16.2	0	2.8	0	0.4	0	0	0	0	3.5	0.5	0	0	0	0	0	0	0.25	0	6.5	5.25	0	3		
October	11	0.8	0	0	0	0	0	1.6	0	0	0	0	0	0	2.25	8	0.25	0.25	1.25	12.75	0	0.25	0	0	34.25	4.25	0	2.75		
October	12	2.2	13.2	3.2	0	7	0	24	0	0	0	0	0	0	0.5	15.75	0	0	4.25	0	4.5	3.25	0	5	2	0.25	5	2.25		
October	13	2.4	3	7.8	0	0	0	0	0	0	0	n/a	8.2	0.8	0	2.5	3.5	4	1	6.75	3.25	1.75	0	0	28.5	2	0	0.25		
October	14	6.6	14.2	0	0	7.4	0	0	0	0	5	0	0	3.2	0	0	17.75	0	7	0	2.5	0	0	0	0	0.75	19.75	1		
October	15	2	0	0	0	0	0	8	0	0	10	0	7.6	3.2	0	0	3	0	0	0.25	9.25	0	0	3.25	0	2.5	0	1		
October	16	0	0	0	8	0.4	0	100	0	0	1.6	0.2	7	14.2	0	0	14.25	0	3	0	2.75	0.5	0	10.5	0	7.25	0	4		
October	17	0.8	7.6	0	24.8	0	0	104.4	27.2	0	0	1.2	0	48.6	0	0	0	0	0.75	0	2.25	13	0	11.25	0.75	8.25	0	4.5		
October	18	0	0	0	5.8	1.2	0	0.6	5.2	0	11.8	22.6	0	0	0	0	0	0	4.5	0	3.75	5.75	0	11.5	21.75	4.5	0	16.5		
October	19	0	0	0	0.2	3.2	1.6	12.8	10.2	0	8.2	27.4	0	0	0	0	19.75	0.5	0.25	0	6.5	9.75	0	2.5	0	0.25	0	11.5		
October	20	0	0	0	19.2	0	1.2	85.4	3.2	0	0	9.8	1.8	0	0	0.25	1	0.5	6.25	0.25	23	2	0	4.5	0	0	0	0.25		
October	21	0	0	0	0	14.4	0	13.6	0	0	0	1.6	0	4.4	0	0	0.75	0	4.5	0.25	11.5	2.5	0	22.25	0	3	3.5	0		
October	22	0.2	0	0	0	10.4	0	1.6	1.6	0	0	5.6	0	1.4	0.25	5.25	0	0.25	2	0.25	0.25	5	0	0	0	3.25	0	0		
October	23	0	0	0	0	9.6	0	1.8	0	0	0	0	0	34.8	2.25	16.25	5.75	0.5	25.75	0.25	1.5	0	0	0	17.5	1.5	2.75	0		
October	24	0	0	3.2	0	0.4	0	0	0	0	3	0	0	0	17.75	0	3	0	8.75	0	0	0	0.25	0	0	0.25	7.75	0		
October	25	0	0	0.4	0	21.4	0	0	7.2	3	0.4	0	0	10	22.75	0	3.75	0	1.5	0.5	0.25	0	1	0.5	0	1.25	5.5	56		
October	26	6.8	0	0	0	9.2	0	0	0	0	0.2	0	0	7.6	3.25	0	0	0.25	22.75	14.5	14.25	0	4	0	0.75	15.75	0.75	16		
October	27	0	0	1.2	0	1.6	1.8	0	0	0	0	0	0	0	0	1.75	9.75	0	9.75	2.25	4.75	0	6.25	0	0	4.75	21.75	0		
October	28	4.2	0	20	4.6	0	0	0	1.6	11	0	0	0	8.4	2.75	4.25	21.25	0	5.25	0	0.25	0	22.5	0	0.75	3.5	4.25	0		
October	29	21	0	8	0	0	0	0	0.2	3.2	1	0	0	13.4	0.5	15	1.25	0	14.75	12.5	0.5	0	8.75	0	0	52	0.25	0		
October	30	47.2	0	44.4	0	6.4	0	0	12.6	12	0	0	0.6	14.4	0.5	0	22.5	0	2.75	0.75	6	0	3.5	0	8.25	0	37	0		
October	31	7.8	1.8	27.4	1.8	13.6	0	0	0	17.8	0	0	2.4	3	4.25	7	3.75	0.25	11.25	15.75	6	0	6	0	0	0	3.75	0		
Total Monthly Rainfall		**167.4**	**57.6**	**170.4**	**74**	**124.4**	**4.6**	**384.4**	**105.2**	**48.2**	**48**	**100.4**	**56**	**170.8**	**86.25**	**80.25**	**131.25**	**30.25**	**137.25**	**81**	**135**	**45.75**	**89.5**	**93.75**	**139**	**143.5**	**112**	**137**		
Maximum Daily Rainfall		**47.2**	**14.2**	**44.4**	**24.8**	**21.4**	**1.8**	**104.4**	**27.2**	**17.8**	**11.8**	**27.4**	**13.4**	**48.6**	**23**	**16.25**	**22.5**	**9.25**	**25.75**	**15.75**	**23**	**13**	**22.5**	**22.25**	**34.25**	**52**	**21.75**	**56**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
November	1	0.8	1	0	0	0.6	0	0	15.4	5.6	0	0	0	0	2.75	0	10	1.5	3	48.5	14.5	0	2.25	0	0	0	0.25	0		
November	2	0	19.4	0	0	0	0	0.6	36.4	12.6	16.6	0	1.4	0.8	0.25	0	1.25	4	0	16	14.5	22.25	20	0	0	8.5	13.5	12.75		
November	3	9.4	0	0.8	0	0	0	0	0	2.2	15.6	4	3.4	0	0	7.75	3	3	1.75	0	0.25	3.5	7	0	27.25	14	22.75	32.75		
November	4	0	7.4	1.2	9.8	5	0	0	n/a	10.2	21.4	0.2	6.4	0	0	1	5.75	0	21.25	0	2.25	4.75	21.5	0	9.75	15.75	8	7.75		
November	5	0.4	13	0	1.4	0.8	0	0	n/a	21.2	26.2	0	0	19.4	9	0	11	2.25	5	0.25	19	0.5	9.25	0	5	8.5	0	20		
November	6	3.2	0	14	7.8	0	4.2	0	n/a	2.2	88	2.6	66	17	2.75	0	0	5.75	8.25	0.5	0.5	0	0	0	0	1.5	7.75	1.25		
November	7	3.6	0	0	0	0	2.8	0	n/a	0	4.2	2	36.6	18.6	0.25	0	3.75	3.25	10.25	4.25	2.75	0	0	0	0	3.25	4.25	3.25		
November	8	0	0	2.8	11.8	0	4	0	n/a	2.4	17.6	7.4	2.2	0.8	0	0.75	0.25	11.75	0	15	1.75	3	0	0.75	0	12.75	3.25	0		
November	9	0	0	1.4	4	0	7	0	n/a	0.8	1	2	3	6.4	1	2.75	0	0	0	0.5	8.25	1.75	0	3.25	6	0.25	0	0.5		
November	10	0	0.2	6.2	0	0	4	0	n/a	3.4	18.2	4.2	2.2	8.2	0	0	0	0	3.25	2.5	0	0	4.25	0	0	14.5	0	3		
November	11	0	0	18.8	0	0	7.6	0	n/a	27.8	1.2	1.6	12	0.6	3.25	0	0	0	0	6.25	0	3.25	0.25	0	0	4	0.25	9.75		
November	12	0	22.2	14.6	0	4.8	11.6	0	n/a	0	42.2	22.6	22	0	0	9.5	24.5	0	0	0.5	0.75	2.5	0	0	25	17.25	0	20.75		
November	13	0	53.6	7.8	1.4	4.6	5.6	0	n/a	14	18	1.8	0	6.4	6.25	8.25	4	3.75	0	44.5	7	14.5	0	0	13	2.75	0	6.75		
November	14	0	22.2	4.4	0	25.8	4	0	n/a	0	0.6	2	0.8	0	2.25	0.25	3	0.5	0	23.25	0	20.5	9	0	2.5	34.5	0	0.75		
November	15	0	33.6	2.6	0	18.4	0	2.2	n/a	0	39.8	14.2	0.2	17	1.5	0	0.25	0	0	13	5.25	10.5	18	0	6.75	71.25	0.25	0.25		
November	16	0	27	10.6	0	6.4	11	22.6	n/a	0.6	0	4.6	0	58.4	0	0	0	3	0	3.75	6.5	2.5	0	0.75	33	81.75	0.5	1		
November	17	2.4	0	3.8	0	0	0	1.2	n/a	0	12.8	5.4	0	15	12.75	11.75	0.5	0	0	7	0	0.25	0.25	0.25	11.75	0	0	0		
November	18	0	0	0	0	0	15.2	68	14.4	0	6.8	1	0	16.4	2	6.5	4.5	5	0	49	0	0.25	0	9.75	5.5	0	0	0		
November	19	1.2	3.6	1	0	15.2	21.8	27.4	0	0	7.8	1.6	0	42.2	0.75	0	7	24	0	0	0	18.75	0	0.25	3.5	14.5	0	4.5		
November	20	8.4	35.2	9.4	0	6.8	1	0	0	0	14.4	0	3.4	7.2	0	0.25	3.75	0	0	0	1.25	7.75	0	0	1.25	0.75	0.75	1		
November	21	0.2	28.8	4	0	7.6	0	0	0	0	35.2	0	7.2	1	0	0	10.75	0	2.25	0	0	2.75	0	0	0.25	0	0	0		
November	22	1.4	19.6	3.4	0	7.2	0	0	1.2	0	1.8	0	0	17.6	0	5.75	14	0	17.75	0	16	7.75	9	0	2.5	0	17.75	8.5		
November	23	0.8	3.8	4.8	6.6	0.8	0	10.6	5.6	0	10.2	0	0	10.2	0	58	0.25	0	1.5	0	0.5	8.5	6.5	2.25	6	2	0	0.5		
November	24	3.2	28.2	18.4	0	0	0	5	13.4	0.8	1.4	0	0	2.6	0	15	10.25	0	18	8	11	2	8.75	0.5	8.5	2.25	0	0		
November	25	2.2	43.2	7.2	9	0.6	0	8	2.8	20.4	14.4	0	0	17.2	4.5	9.75	0.25	0	9.75	0.75	8.25	5.25	0	0	0.25	0	5.75	0		
November	26	0	10.8	0	25.6	2	0	0	1.6	0	32	10.6	0	9.4	14.25	0	0	0	27.75	0	6.5	6.5	3	0	1	43.75	10	0		
November	27	8	0.8	0.4	3.8	6.8	0	0.2	0.8	0	17.8	0	0	0	0.25	1.25	0	0	5.75	0	5.75	0.75	36	0	5	1.25	0	0.5		
November	28	16.8	0	0.4	0	33	0	66.8	0	5.2	0.8	10.4	2.2	8.2	0	24.25	0	0	7.25	0	0	2.25	13.5	0	0	34.25	0	0		
November	29	1.8	0.6	0	2	8.8	0	2.6	1.2	12	17.4	0.2	6	7	8	0	5.5	0	3.25	0	1.5	0.5	2	0	0	9.25	15.25	0		
November	30	9.4	1.2	2.8	4.4	2.4	0	0	5.6	0.2	2	0	0.6	1	17.75	7	0.5	7.75	0.25	0.25	0.25	7.5	0.25	0	11.5	1	6.5	0		
Total Monthly Rainfall		**73.2**	**375.4**	**140.8**	**87.6**	**157.6**	**99.8**	**215.2**	**98.4**	**141.6**	**485.4**	**98.4**	**175.6**	**308.6**	**89.5**	**169.75**	**124**	**75.5**	**146.25**	**243.75**	**134.25**	**160.25**	**170.75**	**17.75**	**185.25**	**399.5**	**116.75**	**135.5**		
Maximum Daily Rainfall		**16.8**	**53.6**	**18.8**	**25.6**	**33**	**21.8**	**68**	**36.4**	**27.8**	**88**	**22.6**	**66**	**58.4**	**17.75**	**58**	**24.5**	**24**	**27.75**	**49**	**19**	**22.25**	**36**	**9.75**	**33**	**81.75**	**22.75**	**32.75**		

Appendix C-1. Daily Rainfall Data: Hartland Landfill Weather Station

Date		Daily Rainfall (mm)																												
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
December	1	0	5.2	9.4	0	8.2	0	0	0	2.6	0	15.2	1.8	0	0.25	0.25	16	6.75	0.25	0.25	1	17.25	2.5	0	0	8.5	0	1.25		
December	2	0	19.4	16.4	12.4	12.8	0	1.4	0.2	0	0	46.4	0	0	0.25	0	23.25	5.75	0	9.5	0	2.5	1	0	0	0	3.5	8.25		
December	3	0	3.6	0	0	0	0	9	0.2	0	0	100.4	0	0	0.25	0	10.25	0	0.25	2.25	4.5	0	0	0	0	0	10	13.75		
December	4	0	0	0	0	6	3.2	0	16.6	0	3.6	18	0	0	0	0	13	0	0	7.75	0	0	0	0	0	0	0	9		
December	5	0	2.4	4.8	0	4.6	0	6.6	1.4	0	0.4	0.2	0	0	0	0	10.75	0	2	2.25	5	0	0	0	0.75	6.5	0.25	47.25		
December	6	0	0.4	16.2	0	5.2	0	9.8	12.4	0	0	0	4.2	0	0	0	8.5	0	1	17.5	0.25	0	0	0.25	0	0.25	5.25	6.75		
December	7	0.4	3	0	0	0	0	10.8	6	0	0.2	0	0.4	0	7	0	11	0	5.25	9.75	0	0	0	0.75	10.5	17.75	0.25	0.25		
December	8	1	2.8	1	0	12.4	0	0	16.2	0	0.2	0	0	0	4.25	1.75	7	0	0	5.75	0	0	0	0	16	2.75	7.75	4.75		
December	9	2.6	2.8	2.6	1.6	0	0	0	22	0	0.6	3.4	9.6	0	18.25	0	0	0	19.75	43	0	0.25	0	0	0	0.5	2	0		
December	10	1.8	8.4	3.2	0.8	5.4	4.4	9.2	38.4	0	1.4	0.2	3.8	0	0	0	9.25	0	13.75	15.25	8.25	0	8	0	0	0.5	3	33.75		
December	11	0	2.8	2.2	0	2.8	6.2	2	0	0	19.2	0.4	0	0	3.75	0	0.25	0	38.25	8	1.5	0	4.25	0	0.5	25	0	8		
December	12	0	11.4	28.8	0	8.4	20	4.4	0	0.2	17	0	22.2	0	5	0	6	0	6	0	0.25	0	36.75	4.75	0.25	27	0	0.5		
December	13	0	33.2	7.2	0	32.4	0.4	3.4	3	0	29.4	2.2	4.2	0	0.5	0	0	2	1.25	19	0	0	22.25	0.5	11.25	12	0	0		
December	14	1.6	0	22.6	1.2	15	21.4	18.6	14.4	0	31.8	9	1.6	10.4	3.25	0	7.75	2	0	10.25	0	0	24	0	2	4.25	0	0		
December	15	2.8	10	63	4.2	3.6	5	0	0.8	0	6.4	16.2	0	25.75	2	2.25	1.5	2.5	0	0	0	3	2.25	0	8.25	0.5	0	2.75		
December	16	47.6	7	0	49.2	61.8	5.8	8.4	0.6	0	0	0	0	14.25	0	1.25	0.75	4.5	0	0.25	0	4.5	0.75	0	8.5	0	0	3.75		
December	17	24.6	1	9.8	5.6	29.8	0.2	1.6	3.8	0	0	1.8	5.8	9.5	0	0.75	24.75	0	0.25	0	0	11	7	0.25	6.5	1	1.75	0.25		
December	18	2.2	0	3.8	0	1.6	0.2	0	1.8	0	1.8	6.2	3.4	4	0.75	0.75	10.75	0	2	25.75	1	6.5	13.5	0	16.5	9.25	0	0.25		
December	19	9.8	0	2.4	1.2	6	0.2	0	0	2	10	15.2	0	4.75	0.75	0.5	1.75	0	3.25	15.25	4	3	20	0	20.75	45.25	0	3.5		
December	20	7.8	0	1	3.8	0	0	0.6	0	15.2	6.2	0	0	11	1.5	0	22.75	0	3.75	0	1.25	0.75	5.5	0.5	0	0	0.25	3.75		
December	21	0.6	6.6	0	1.2	0	0	0.4	0	6.4	15.8	0	27.4	4.75	0	0	7.25	10.75	23.5	9	0	2.25	11.25	0.25	35.5	0	0	0.25		
December	22	0	0	0	4.8	0	0.4	0	0	10.6	1	19.4	13.2	0	0	0	0	2.5	3	9.25	0.25	0.75	0	0	12.5	5.25	0	1		
December	23	7	0.6	0	3.2	0	0	0	0	11.8	17.2	12.6	0.4	0	7	0.25	2.5	7.25	0	2.5	1.5	0	10.75	0	0.25	21.75	8.25	1.25		
December	24	0.2	18.2	0	4.6	0	1.2	4.8	0.8	15.4	23	0.2	21.8	0	5.25	1.25	4.25	6.75	11.75	8.25	0.25	0	12.25	0	0	1.25	44.75	0		
December	25	0	17.6	0	7.6	0	14.6	5.2	9.4	12.8	3.4	0	1.8	0	1	5.75	2	0	0.75	0	0	2.75	0	0	7	4.5	9.25	0		
December	26	7.4	21.8	0	2.4	0	12.2	0	4.4	0.4	4.8	0	7.8	0	8	3.5	22.25	0	0	0	0	0	0.5	0	4.75	3.25	26.75	3.75		
December	27	4.6	17	0	4.8	0	22.4	3.6	0	6.2	0	4.2	5	0	10.75	5.25	10	0	1.5	1	1	0.25	5.5	0	6.5	0	10.5	0.5		
December	28	10.6	15.4	0	0	2	1	1.8	0	13.8	0	7.6	0.6	0.25	0.5	30.75	0.75	2.5	6.25	12.25	0.25	19	1	0	0	0	0.75	0.25		
December	29	0.2	46.4	0.2	0	0	0	0	5.6	0.2	0.6	4.2	12.6	0	0	19.75	3	0	0.25	0	2.75	2.75	24.25	0	12.5	0	5	1.25		
December	30	0	0	0.2	3	0	4.2	0.2	0.6	5.6	0	1.8	1.6	3.5	0	5.25	3	0	0	0	0	4	19.5	0	29.25	0	13	0.25		
December	31	0	0.8	11.6	3.6	6.4	0	4.6	3.2	16.2	0	0	3	16.25	0	3.75	0	0.25	0	0	0.25	0	0	0	9.75	0	2.75	0.5		
Total Monthly Rainfall		**132.8**	**257.8**	**206.4**	**115.2**	**224.4**	**123**	**106.4**	**161.8**	**119.4**	**194**	**284.8**	**152.2**	**104.4**	**80.25**	**83**	**240.25**	**53.5**	**144**	**234**	**33.25**	**80.5**	**232.75**	**7.25**	**219.75**	**197**	**155**	**156.75**		
Maximum Daily Rainfall		**47.6**	**46.4**	**63**	**49.2**	**61.8**	**22.4**	**18.6**	**38.4**	**16.2**	**31.8**	**100.4**	**27.4**	**25.75**	**18.25**	**30.75**	**24.75**	**10.75**	**38.25**	**43**	**8.25**	**19**	**36.75**	**4.75**	**35.5**	**45.25**	**44.75**	**47.25**		

Appendix C-2

Monthly Rainfall Data

Appendix C-2. Monthly Rainfall Data: Hartland Landfill Weather Station

Month	Monthly Rainfall (mm)																							
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Avg
January	205.8	119.8	210.2	277.4	312.4	106.8	121.6	180.5	161.8	150.75	53.75	70.25	160.8	114.5	26	153.5	158.8	166.5	194.5	149.5	45.3	206.0	42.8	148.6
February	29	53	39.2	79.2	94	63	43.8	50.25	72.5	122.5	67.3	130	133	172.8	50	70	39.3	129.0	104.8	56.0	99.0	117.3	125.3	89.1
March	149.6	97	86	36.6	162.2	71.4	99.2	92	108	129.5	91	113	123	137	158	132	15.0	40.0	41.3	117.0	70.0	64.0	149.3	95.5
April	46.2	4.8	43.6	55.6	40.8	70.4	94.6	67.75	109.75	53.5	70.5	66	35	14	90.75	108	54.3	32.8	37.3	118.0	64.3	43.5		54.7
May	25.4	38.4	9.2	34.2	18.4	15.8	62.6	76.5	61.75	32	53.5	40.25	4	11.8	41.25	10.5	31.3	47.5	22.0	50.3	15.3	52.25		35.2
June	2	20.2	1.6	30.4	34.4	24.2	7.2	1.8	7.5	44.75	30.25	12	3.5	41.5	34	19.3	19.0	45.3	26.3	46.5	28.0	31		25.7
July	11.8	31	1.2	2	41.7	7	10.6	2.65	26.25	21	0	6.5	17.5	18.5	0	3.3	22.3	10.3	0.0	21.5	13.5	13.75		14.1
August	0.6	106.2	2.8	3.4	23.2	43.6	22.2	26.25	16.5	2.25	3	12.75	15.5	2.8	3.25	0.5	12.8	18.8	7.8	1.9	6.3	51		17.6
September	34.6	83.2	0.4	31.8	27.2	21.4	54.8	133.75	43.75	0.5	60.25	51.25	76.5	42.8	19.25	40.5	80.3	94.3	123.8	1.3	18.3	48		44.5
October	384.4	105.2	48.2	48	100.4	56	170.8	86.25	80.25	131.25	30.25	137.25	81	135	45.75	89.5	93.8	139.0	143.5	112.0	137.0	131.25		110.2
November	215.2	98.4	141.6	485	98.4	175.6	308.6	89.5	169.75	124	75.5	146.25	243.8	134.3	160.25	170.8	17.8	185.3	399.5	116.8	135.5	96		168.6
December	106.4	161.8	119.4	194	284.8	152.2	104.4	80.25	83	240.25	53.5	144	234	33.3	80.5	232.8	7.3	219.8	197.0	155.0	156.8	151		151.8
Total Yearly Rainfall	**1211**	**919**	**703**	**1278**	**1238**	**807**	**1100**	**887**	**941**	**1052**	**589**	**929**	**1127**	**858**	**709**	**1031**	**552**	**1128**	**1298**	**946**	**789**	**1005**		**956**

Notes:
No weather data was collected from Nov 4 - 17, 2004
Weather data collected in 2009 is unreliable due to equipment failure

Appendix D

Leachate Pipeline Flow Data (1997 to 2025)

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-1997	13	2148	0	2148	40816
Feb-1997	0	2700	732	2226	62334
Mar-1997	0	2759	2412	2696	83557
Apr-1997	0	2655	214	2545	78899
May-1997	4	2654	0	956	29561
Jun-1997	11	1563	0	546	17503
Jul-1997	17	2452	0	525	16090
Aug-1997	15	1608	0	386	11606
Sep-1997	21	2662	0	456	14159
Oct-1997	6	2782	0	1233	36996
Nov-1997	4	2533	0	1437	44565
Dec-1997	2	2408	0	1695	52547
TOTAL	**93**	**2782**	**0**	**1404**	**488633**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-1998	0	2603	879	2187	65977
Feb-1998	3	2603	0	1624	43531
Mar-1998	3	2419	0	n/a	35275
Apr-1998	10	1542	0	542	16675
May-1998	13	1890	0	423	12574
Jun-1998	17	1241	0	239	7239
Jul-1998	21	1919	0	240	7645
Aug-1998	31	0	0	0	0
Sep-1998	27	1020	0	58	1821
Oct-1998	19	2379	0	511	14962
Nov-1998	7	2462	0	1538	45248
Dec-1998	0	2619			76518
TOTAL	**151**	**2619**	**0**	**736**	**327465**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-1999	0				69000
Feb-1999	0	2970	1966	2681	74930
Mar-1999	0	2970	2539	2875	92028
Apr-1999	5	2894	0	1812	57986
May-1999	11	2889	0	660	20656
Jun-1999	18	1215	0	257	7480
Jul-1999	18	2772	0	365	11687
Aug-1999	30				1000
Sep-1999	4	1193	0	148	4597
Oct-1999	19	1473	0	163	4719
Nov-1999	4	2840	0	1497	43972
Dec-1999	4	3480			67907
TOTAL	**113**	**3480**	**0**	**1162**	**455962**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2000	3	2791	0		55088
Feb-2000	7	2235	0		29318
Mar-2000	7	2211	0		37258
Apr-2000	8	1737	0		21289
May-2000	19	2772	0	501	15547
Jun-2000	19	2685	0	396	11902
Jul-2000	22	1086	0	155	4831
Aug-2000	26	907	0	116	3619
Sep-2000	21	2640	0	354	10623
Oct-2000					8572
Nov-2000					11737
Dec-2000	12	2926	0	943	29235
TOTAL	**144**	**2926**	**0**	**411**	**239019**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2001					38089
Feb-2001					30154
Mar-2001					24565
Apr-2001	15	2622	0	646	18746
May-2001	16	1647	0	400	12407
Jun-2001	22	2026	0	295	8862
Jul-2001	22	1521	0	244	7576
Aug-2001	24	2873	0	291	9047
Sep-2001	23	1633	0	157	4723
Oct-2001	15	2631	0	552	17112
Nov-2001	7	2899	0	993	29819
Dec-2001	0	3397	58	2241	69492
TOTAL	**144**	**3397**	**0**	**647**	**270592**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2002	1	2892	0	1946	60342
Feb-2002	1	3395	0	1946	54497
Mar-2002	2	3412	0	2200	68224
Apr-2002	6	2444	0	1022	29651
May-2002	13	2118	0	578	17928
Jun-2002	16	1683	0	381	11435
Jul-2002	20	2330	0	330	10231
Aug-2002	23	1521	0	253	7848
Sep-2002	28	1154	0	72	2160
Oct-2002	26	1356	0	143	4450
Nov-2002	14	2477	0	618	18555
Dec-2002	9	2896	0	987	30615
TOTAL	**159**	**3412**	**0**	**873**	**315936**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2003	5	4880	0	1569	48664
Feb-2003	4	2819	0	1354	37921
Mar-2003	3	2849	0	1533	47546
Apr-2003	6	2185	0	846	24562
May-2003	18	1892	0	514	15962
Jun-2003	15	1397	0	340	10224
Jul-2003	20	1126	0	282	8768
Aug-2003	21	1140	0	214	6658
Sep-2003	23	1147	0	222	6671
Oct-2003	15	3869	0	1621	50260
Nov-2003	4	3681	0	2546	76397
Dec-2003	0	3587	96	2218	68773
TOTAL	**134**	**4880**	**0**	**1105**	**402406**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2004	0	2859	99	1597	49509
Feb-2004	0	2833	2	1536	44551
Mar-2004	2	2792	0	1170	36288
Apr-2004	22	1675	0	319	9272
May-2004	31	0	0	0	0
Jun-2004	13	3565	0	1104	33135
Jul-2004	30	63	0	2	63
Aug-2004	23	3007	0	601	18636
Sep-2004	24	2998	0	454	13640
Oct-2004	14	3668	0	1138	35284
Nov-2004	2	2889	0	1631	48938
Dec-2004	4	3659	0	2191	67947
TOTAL	**165**	**3668**	**0**	**979**	**357263**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2005	7	3671	0	2247	69680
Feb-2005	2	3662	0	2571	72002
Mar-2005	11	2484	0	824	25551
Apr-2005	4	2800	0	1041	30206
May-2005	18	2840	0	691	21437
Jun-2005	16	1800	0	431	12946
Jul-2005	18	1301	0	274	8512
Aug-2005	22	2771	0	417	12927
Sep-2005	19	1301	0	274	8512
Oct-2005	24	3025	0	432	13393
Nov-2005	5	2999	0	1347	40421
Dec-2005	5	2916	0	1180	36601
TOTAL	**151**	**3671**	**0**	**977**	**352188**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2006	0	3415	1123	3075	95329
Feb-2006	2	3435	0	2206	61795
Mar-2006	8	2926	0	846	26247
Apr-2006	14	2141	0	558	16762
May-2006	19	2058	0	464	14402
Jun-2006	21	2175	0	359	10795
Jul-2006	28	1996	0	105	3277
Aug-2006	23	1991	0	327	10148
Sep-2006	22	1770	0	255	7654
Oct-2006	23	2043	0	304	9427
Nov-2006	2	3677	0	2872	86167
Dec-2006	0	3563	3130	3425	106180
TOTAL	**162**	**3677**	**0**	**1233**	**448183**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2007	0	3657	3272	3464	107411
Feb-2007	0	3619	815	2398	67168
Mar-2007	0	3442	38	2130	66034
Apr-2007	6	1929	0	872	26177
May-2007	14	2120	0	572	17740
Jun-2007	18	2127	0	477	14331
Jul-2007	22	2157	0	387	12019
Aug-2007	28	1730	0	92	2859
Sep-2007	29	76	0	2	76
Oct-2007	14	3288	0	945	29316
Nov-2007	11	2306	0	793	23813
Dec-2007	1	3715	0	2549	79041
TOTAL	**143**	**3715**	**0**	**1223**	**445985**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2008	0	2949	260	1644	50970
Feb-2008	2	2927	0	1322	38343
Mar-2008	0	1874	0	901	27953
Apr-2008	7	1849	0	845	25364
May-2008	18	2946	0	537	16670
Jun-2008	25	2695	0	286	8594
Jul-2008					0
Aug-2008					0
Sep-2008					28892
Oct-2008					29892
Nov-2008					17433
Dec-2008					37620
TOTAL	**52**	**2949**	**0**	**923**	**281731**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2009	0	3522	799	2400	74404
Feb-2009	2	1551	0	867	24263
Mar-2009	0	2388	42	1040	32247
Apr-2009	5	2838	0	1056	31692
May-2009	11	2292	0	761	23589
Jun-2009	18	1839	0	427	13224
Jul-2009	9	2880	0	805	25749
Aug-2009	0	2871	402	942	29208
Sep-2009	18	2847	0	313	9396
Oct-2009	7	2838	0	815	25250
Nov-2009	0	3345	210	2426	72783
Dec-2009	0	3246	1125	2169	67251
TOTAL	**70**	**3522**	**0**	**1168**	**429056**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2010	0	3438	1080	2461	76278
Feb-2010	0	1824	387	1013	28377
Mar-2010	10	1617	0	629	19509
Apr-2010	10	2853	0	1281	38419
May-2010	11	1989	0	704	21834
Jun-2010	16	1776	0	499	14961
Jul-2010	17	1815	0	400	12396
Aug-2010	18	2481	0	392	12147
Sep-2010	13	1752	0	648	19425
Oct-2010	7	1719	0	792	24540
Nov-2010	1	2034	0	1108	33237
Dec-2010	1	3462	0	2674	82893
TOTAL	**104**	**3462**	**0**	**1050**	**384016**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2011	1	3324	0	2521	75630
Feb-2011	5	2823	0	1544	46323
Mar-2011	2	2832	0	1762	52860
Apr-2011	5	2715	0	1430	42891
May-2011	7	2847	0	895	27735
Jun-2011	13	1563	0	535	16044
Jul-2011	15	1428	0	441	13677
Aug-2011	13	1434	0	338	10818
Sep-2011	8	2604	0	455	14103
Oct-2011	20	1932	0	360	11148
Nov-2011	8	3288	0	1020	30609
Dec-2011	6	2589	0	1012	31365
TOTAL	**103**	**3324**	**0**	**1026**	**373203**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2012	0	2556	156	1694	52512
Feb-2012	1	2742	0	1634	47394
Mar-2012	1	2472	0	1519	47079
Apr-2012	3	2121	0	915	27438
May-2012	11	1671	0	563	17458
Jun-2012	16	1848	0	450	13493
Jul-2012	10	2979	0	607	18816
Aug-2012	20	1266	0	206	6372
Sep-2012	9	1410	0	461	13827
Oct-2012	15	2688	0	641	19872
Nov-2012	3	2847	0	1602	48051
Dec-2012	0	2610	779	2347	72747
TOTAL	**89**	**2979**	**0**	**1053**	**385059**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2013	0	2526	43	1616	50094
Feb-2013	2	1986	0	1017	28476
Mar-2013	3	2694	0	1750	54258
Apr-2013	5	2136	0	997	29919
May-2013	10	1840	0	627	19437
Jun-2013	12	2515	0	594	17829
Jul-2013	14	1390	0	379	11757
Aug-2013	16	1590	0	356	11022
Sep-2013	9	2199	0	524	15705
Oct-2013	6	2448	0	773	23957
Nov-2013	6	2418	0	845	25346
Dec-2013	7	1848	0	709	21971
TOTAL	**90**	**2694**	**0**	**849**	**309771**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2014	1	2316	0	1349	41804
Feb-2014	2	3366	0	1951	54634
Mar-2014	0	3387	150	2252	69824
Apr-2014	2	2535	0	1004	30128
May-2014	7	2562	0	797	24704
Jun-2014	5	1677	0	474	14213
Jul-2014	18	2517	0	486	15056
Aug-2014	14	911	0	303	9379
Sep-2014	16	959	0	305	9163
Oct-2014	16	2163	0	447	13872
Nov-2014	8	2808	0	1420	42601
Dec-2014	0	2589	600	1814	56247
TOTAL	**89**	**3387**	**0**	**1050**	**381625**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2015	0	2472	460	1976	61260
Feb-2015	0	2508	312	1750	49008
Mar-2015	0	2481	45	1494	46305
Apr-2015	1	2763	0	1118	33549
May-2015	15	2078	0	519	16096
Jun-2015	17	1744	0	450	13487
Jul-2015	23	1758	0	267	8283
Aug-2015	19	2595	0	377	11678
Sep-2015	15	1679	0	455	13649
Oct-2015	15	2251	0	460	14271
Nov-2015	3	3186	0	2154	64629
Dec-2015	0	3350	386	2693	83492
TOTAL	**108**	**3350**	**0**	**1143**	**415707**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2016	1	3240	0	1836	56923
Feb-2016	1	3267	0	2639	76542
Mar-2016	1	3099	0	1819	56385
Apr-2016	8	3096	0	784	23532
May-2016	16	3098	0	540	16740
Jun-2016	10	1251	0	455	13642
Jul-2016	16	1222	0	340	10540
Aug-2016	16	1553	0	330	10243
Sep-2016	19	1707	0	324	9720
Oct-2016	7	2610	0	1329	41193
Nov-2016	0	3228	603	2038	61152
Dec-2016	0	3378	774	2344	72675
TOTAL	**95**	**3378**	**0**	**1232**	**449287**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2017	1	2436	0	1390	43099
Feb-2017	2	3234	0	2049	57377
Mar-2017	0	3192	384	2050	63555
Apr-2017	0	2328	111	1547	46422
May-2017	11	3312	0	759	23526
Jun-2017	21	1410	0	292	8748
Jul-2017	7	882	0	356	11037
Aug-2017	15	2790	0	494	15324
Sep-2017	17	3375	0	494	14820
Oct-2017	23	2028	0	290	9000
Nov-2017	3	3324	0	1851	55527
Dec-2017	5	3276	0	1764	54681
TOTAL	**105**	**3375**	**0**	**1111**	**403116**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2018	2	3213	0	2401	74436
Feb-2018	1	3438	0	2098	58736
Mar-2018	9	27775	0	1049	32518
Apr-2018	11	3111	0	1023	30690
May-2018	17	2892	0	629	19497
Jun-2018	17	2184	0	482	14473
Jul-2018	11	1608	0	385	11942
Aug-2018	21	1593	0	158	4908
Sep-2018	18	1286	0	234	7026
Oct-2018	8	1692	0	520	16127
Nov-2018	1	2676	0	1157	35865
Dec-2018	1	3234	0	2428	75255
TOTAL	**117**	**27775**	**0**	**1047**	**381473**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2019	2	3300	0	2607	80823
Feb-2019	3	2787	0	1302	36442
Mar-2019	5	2439	0	1013	31393
Apr-2019	8	2526	0	769	23078
May-2019	11	2172	0	595	18437
Jun-2019	21	802	0	152	4546
Jul-2019	29	14	0	1	19
Aug-2019	25	3320	0	158	4888
Sep-2019	12	3298	0	858	25725
Oct-2019	14	3010	0	897	27803
Nov-2019	7	2114	0	785	23560
Dec-2019	2	2196	0	1196	37091
TOTAL	**139**	**3320**	**0**	**861**	**313805**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2020	0	3108	1092	2793	86573
Feb-2020	0	2990	2608	2910	84399
Mar-2020	3	2892	0	1117	34616
Apr-2020	6	2772	0	711	21319
May-2020	13	1342	0	483	14962
Jun-2020	26	1502	0	126	3791
Jul-2020	21	692	0	68	2107
Aug-2020	15	2840	0	356	11031
Sep-2020	17	4804	0	710	21298
Oct-2020	4	1956	0	976	30254
Nov-2020	4	2474	0	1749	52828
Dec-2020	0	3396	274	1767	54774
TOTAL	**109**	**4804**	**0**	**1147**	**417952**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2021	0	6558	2122	3284	101810
Feb-2021	15	18835	0	1722	48208
Mar-2021	20	12720	0	1444	44771
Apr-2021	29	3446	0	114	3446
May-2021	25	32661	0	1297	40133
Jun-2021	30	0	0	0	0
Jul-2021	21	17081	0	1158	37060
Aug-2021	25	2067	0	318	9846
Sep-2021	7	6273	0	954	28633
Oct-2021	9	3532	0	894	27700
Nov-2021	0	6133	1496	3850	115487
Dec-2021	0	5258	1377	3079	95452
TOTAL	**181**	**32661**	**0**	**1510**	**552546**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2022	0	6256	1303	3202	99263
Feb-2022	2	4019	0	1443	40395
Mar-2022	3	6506	0	2118	65646
Apr-2022	4	3539	0	1880	56406
May-2022	10	6914	0	1538	47688
Jun-2022	20	5661	0	854	25631
Jul-2022	14	5058	0	1293	41368
Aug-2022	8	4974	0	716	22212
Sep-2022	0	6619	3	1266	38006
Oct-2022	1	2454	0	578	17933
Nov-2022	5	4306	0	1052	31578
Dec-2022	2	6489	0	1588	49249
TOTAL	**69**	**6914**	**0**	**1461**	**535375**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2023	0	7783	538	2912	90297
Feb-2023	0	4881	503	1762	49340
Mar-2023	5	5463	0	1701	51032
Apr-2023	4	3388	0	1199	35963
May-2023	11	2487	0	752	23303
Jun-2023	15	6015	0	507	15212
Jul-2023	20	5557	0	783	24282
Aug-2023	18	4496	0	659	20421
Sep-2023	8	5228	0	818	24528
Oct-2023	10	3905	0	915	28373
Nov-2023	0	3951	0	1606	48193
Dec-2023	0	907	4531	2564	79476
TOTAL	**91**	**7783**	**0**	**1348**	**490420**

Appendix D. Leachate Pipeline Flow Data - 1997 to 2025

AECOM

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2024	0	388	4225	2705	83858
Feb-2024	0	1254	5096	2764	80149
Mar-2024	0	958	3240	2161	66977
Apr-2024	0	1873	464	998	29947
May-2024	17	2793	0	431	13369
Jun-2024	20	4287	0	598	17932
Jul-2024	22	3787	0	561	17382
Aug-2024	22	2905	0	440	13629
Sep-2024	23	2792	0	386	11577
Oct-2024	12	4257	0	1394	43204
Nov-2024	0	3210	361	1747	52417
Dec-2024	1	4613	0	2468	76519
TOTAL	**117**	**4613**	**0**	**1388**	**506960**

Hartland Leachate System Monthly Flow Data					
	Days Without Flow	Maximum Daily Flow (m^3)	Minimum Daily Flow (m^3)	Average Daily Flow (m3)	Monthly Total Flow (m3)
Jan-2025	2	3509	0	1862	57727
Feb-2025	0	4221	138	1824	51072
Mar-2025	0	4710	1258	2418	74960
Apr-2025	1	4161	0	1550	46496
May-2025					
Jun-2025					
Jul-2025					
Aug-2025					
Sep-2025					
Oct-2025					
Nov-2025					
Dec-2025					
TOTAL	**3**	**4710**	**0**	**1914**	**230255**

Appendix E

Hartland Site Plans (CRD)

CRD - Facilities Management & Engineering Services - Jun 07, 2021 - Technologist: jpbezeau - Map Document: HartlandSiteFacilitiesPhases2021.mxd

HARTLAND LANDFILL SITE PLAN

Mount Work Regional Park
Juan de Fuca Electoral Area
District of Saanich
Hartland North Site
Compost Access Road
Leachate Pipeline
Hartland Valve Chamber (compliance point)
Northwest Sedimentation Pond (fresh water)
West Face Leachate
Upper Leachate Lagoon
C3PO
PS
Lower Leachate Lagoon
Aggregate Stockpile
Microtunnel
Gas Utilization Facility
Sedimentation Pond (fresh water)
Quarry Access Road
Future Landfill Extent
Phase 2, Cell 1 North Face Closure (2011)
Perimeter East Road
Toutle Leachate Underdrain
Phase 2, Cell 3 (Active)
Phase 1 Closure (1997)
Phase 2, Cell 2 (2016)
Phase 1 Crest Road
South West Progressive Closure (2008)
South Leachate Pump Station
PS
Entrance
Main Access Road
Bin Drop-off
Parking
Hartland Ave
Recycling Area
Mount Work Regional Park

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Metres
0 50 100 200
Projection: UTM ZONE 10N NAD 83

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- Observation Chamber
- Pump Station
- Residual Solids & Centrate Return Line
- Hartland Leachate Line

Contours (5m interval)
- Index
- Index-Depression

- Cell Phases
- Lot Lines
- Regional Park

HARTLAND LANDFILL
GROUNDWATER LEVEL MONITORING LOCATIONS

GW-55-1-1
GW-41-1-1
GW-56-1-1
GW-57-1-1
GW-42-1-1
GW-43-1-1
GW-44-1-1
GW-62-1-1
GW-62-2-1
GW 91-1-1
GW 93-1-1
GW 92-1-1
GW 94-1-1
GW-87-1-1
GW-87-2-1
GW-88-1-1
GW-88-2-1
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GW-25-1-1
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LW22-01
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GW-107-1-1
GW-107-1-2
GW-81-1-0-P9
GW-52-1-1
GW-52-2-0
GW-36-1-1
GW-36-2-1
GW-36-3-1
GW-52-3-0-P52
GW-52-4-0-P7
GW-80-1-0-P8
GW-27-1-1
GW-27-1-2
GW-110-1-1
GW-83-1-1
GW-58-1-0
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GW-16-1-2
GW-16-2-1
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GW-90-1-1
GW-90-2-1
GW-82-1-1
GW-17-1-1
GW-17-1-2
GW-17-1-3
GW-75-1-1
GW-54-1-1
GW-54-2-1
GW-54-3-1
VLGW-26-D
VLGW-21-D
VLGW-20-D
VLGW-08-D
GW-46-3-1
GW-46-4-1
GW-46-2-1
VLGW-19-D
GW-89-1-1
GW-89-2-1
GW-74-2-1
VLGW-18-D
GW-18-1-1
GW-18-1-2
GW-18-2-1
GW-18-2-2
VLGW-11-S
GW-61-1-1
VLGW-17-D
GW-76-1-1
GW-76-2-1
GW-76-3-1
VLGW-16-D
GW-47-2-1
VLGW-04-D
VLGW-15-D
GW-48-1-1
GW-48-2-1
VLGW-01-D
GW-63-1-1
GW-63-2-1
VLGW-03-D
VLGW-02-D
P4
P2
P10
P1
P3
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GW-72-2-1
GW-72-3-1
GW-60-1-1
GW-60-2-1
GW-60-3-1
GW-71-1-1
GW-71-2-1
GW-71-3-1
GW-07-1-0
GW-19-1-1
GW-19-1-2
GW-19-2-1
GW-19-2-2
GW-73-1-1
GW-73-2-1
GW-73-3-1
GW-04-2-1
GW-04-3-1
GW-04-4-1

Willis Point Entrance Road
Willis Point Rd
Old Compost Road
Turtle Valley Road
Toutle Slope Rd
160 Bench Road
170 Bench Road
140 Bench Road
150 Bench Road
Northwest Slope Road
East Perimeter Road
High Level Road
North Main Haul Road
South Diversion Road
Main Access Road
Recycle & Public Road
Berm Road
East Hydro Road
Hartland Ave

N
W
E
S

Making a difference...together

Metres
0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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Groundwater Level Monitoring Locations
Monitoring Frequency (# times per year)
- 4
- Continuous
- Variable - Focused Investigation

Roads
Contours (5m interval)

HARTLAND LANDFILL
GROUNDWATER QUALITY MONITORING LOCATIONS



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

- Groundwater Monitoring Location – Non-Compliance Well
- Groundwater Monitoring Location – Compliance Well
- Roads
- Contours (5m interval)

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CRD - Parks & Environmental Services - Facilities Management & Engineering Services - May 30, 2023 - Technologist: jpbezeau - Map Document: HartlandSurfaceWaterQuality2023Seasonal.mxd

HARTLAND LANDFILL
SURFACE WATER QUALITY MONITORING LOCATIONS

N
W
E
S

SW-N-65
SW-N-63
SW-N-64
SW-N-41-S-4
SW-N-41s3
SW-N-15
SW-N-CSs2
SW-N-41s1
SW-N-14
SW-N-42s1
SW-N-45
SW-N-17
SW-N-05
SW-N-16
SW-N-61
SW-N-60
SW-N-53
SW-N-59
SW-N-18
SW-N-57
SW-N-58
SW-N-54
SW-N-19
SW-N-62
SW-S-52
SW-S-12
SW-S-03
SW-S-20
SW-S-27
SW-S-24
SW-S-21
SW-S-04

Capital Regional District

Making a difference...together

Metres
0 50 100 200

Projection: UTM ZONE 10N NAD 83

Surface Water Monitoring Location – Compliance Station
Surface Water Monitoring Location – Non-compliance Station
Road
Contours (10m interval)

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CRD - Parks & Environmental Services - Facilities Management & Engineering Services - Apr 12, 2022 - Technologist: jpbezeau - Map Document: HartlandLeachateQuality2022.mxd

HARTLAND LANDFILL
LEACHATE QUALITY MONITORING LOCATIONS



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

★ Leachate Quality Monitoring Locations

Roads

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Movement of Aggregate (Past and Future)

Quarry

Stockpile

Drainage to Leachate Collection System

NW Stockpile (Shotrock):
To be consumed second
May 2, 2024 Maximum thickness: 39m
May 2, 2024 volume: 435,000m³
Full stockpile maximum thickness (latest design): 39m
Max volume (latest design): 550,000m³

Triangle Stockpile (2 Inch Minus):
July 2, 2025 Maximum thickness: 21m
July 2, 2025 volume: 46,000m³
Full stockpile maximum thickness (latest design): 15m
Max volume (latest design): 73,000m³

NE Stockpile (Shotrock):
To be consumed first
June 2, 2025 Maximum thickness: 19m
June 2, 2025 volume: 130,000m³
Full stockpile maximum thickness (latest design): 27m
Max volume (latest design): 303,000m³

Phase 1 Stockpiles:
Max volume listed here
Full stockpile maximum thickness (latest design): 2m
June 2, 2025 Volume/Max Volume:
Area C: Current 0m³ (Max 4700³)
Area E: Current 900m³ (Max 5100³)

Surface Runoff Drains to Leachate Collection System

DRAFT

Hartland Landfill
Aggregate Plan - June 2025

CRD
Making a difference...together

Metres
0 50 100 200 300

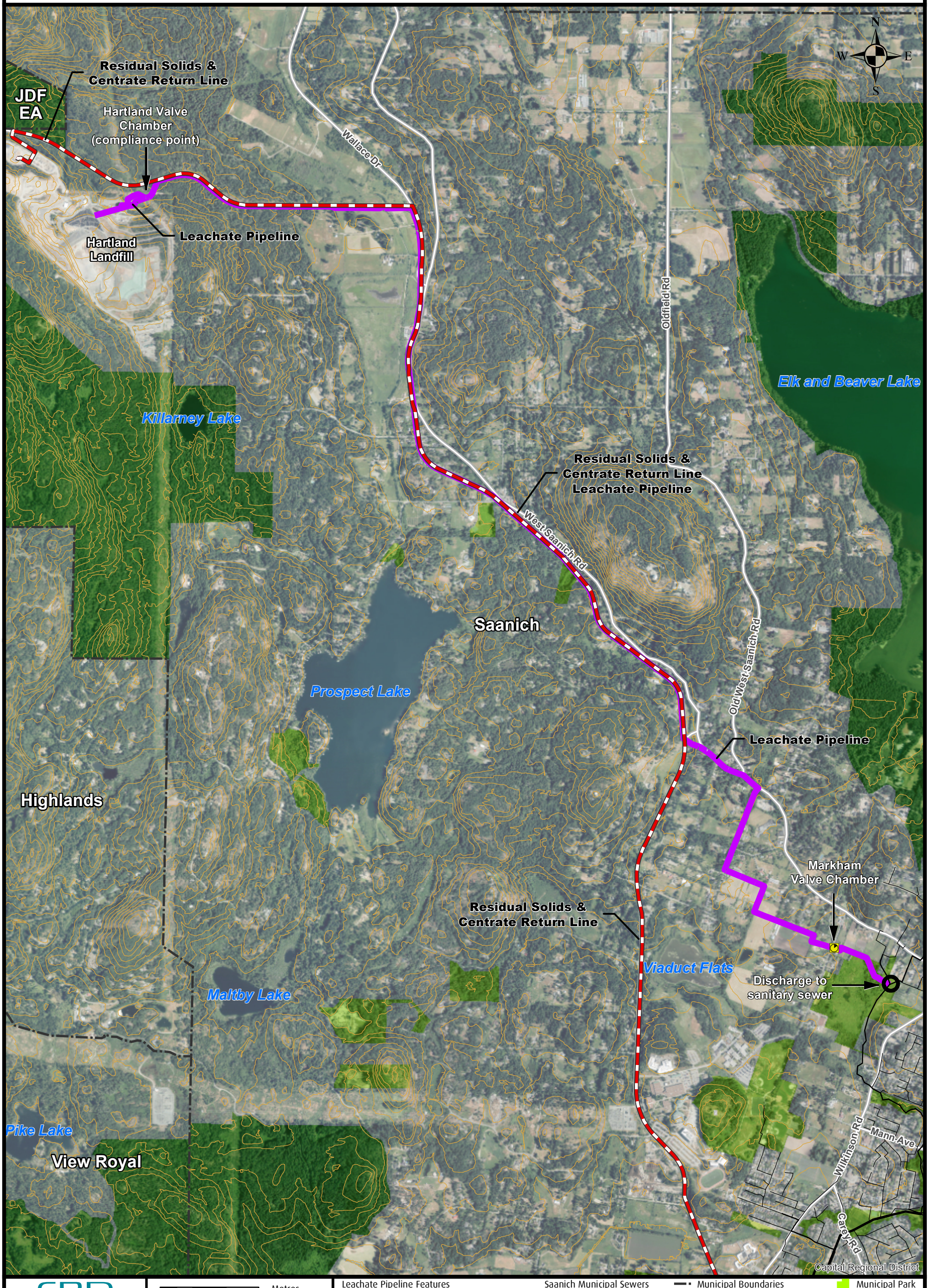
Coordinate System: NAD 1983 UTM Zone 10N
Disclaimer: This map is for general information only and may contain inaccuracies.

Appendix F

Leachate Pipeline Plan (CRD)

CRD - Facilities Management & Engineering Services - Jun 08, 2021 - Technologist: jpbezeau - Map Document: Hartland_Leachate_Line.mxd

HARTLAND LANDFILL - LEACHATE PIPELINE PLAN



Making a difference...together

Metres

0 100 200 400 600

Projection: UTM ZONE 10N NAD 83

Important This map is for general information purposes only. The Capital Regional District (**CRD**) makes no representations or warranties regarding the accuracy or completeness of this map or the suitability of the map for any purpose. **This map is not for navigation.** The CRD **will not be liable** for any damage, loss or injury resulting from the use of the map or information on the map and the map may be changed by the CRD at any time.

Leachate Pipeline Features
- Metering Chamber
- Observation Chamber
- Pump Station (PS)
- Residual Solids & Centrate Return Line
- Leachate Pipeline

Saanich Municipal Sewers
- 0 - 200 mm
- 201 - 599 mm
- 600 - 899 mm
- > 900 mm

- Municipal Boundaries
- Major Roads

Contours (10m Interval)
- Major Contour
- Major Contour - Depression

- Municipal Park
- Regional Park

Orthophoto flown in 2019

AECOM

Appendix G-1

Statistical Analysis Results

Groundwater

AECOM

Appendix G-2 & G-3

Statistical Analysis Results

- Surface Water
- Leachate

Appendix G-1. Results of Statistical Analysis - Groundwater

AECOM

Station	Time Period	Parameter									
		Conductivity		Ammonia		Chloride		Sulphate		Nitrate	
		Increasing	Decreasing	Increasing	Decreasing	Increasing	Decreasing	Increasing	Decreasing	Increasing	Decreasing
		Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Compliance Monitoring Wells											
Gw-04-3-1	2020-2025	Y	N	NA	NA	Y	N	N	N	N	N
Gw-04-4-1	2020-2025	Y	N	NA	NA	N	N	N	N	N	N
Gw-17-1-1	2020-2024	N	N	NA	NA	N	N	N	N	N	N
Gw-17-1-2	2020-2024	N	N	NA	NA	N	Y	N	N	N	N
Gw-17-1-3	2020-2024	N	N	NA	NA	N	N	N	N	N	N
Gw-18-1-1	2020-2025	N	N	N	N	N	Y	Y	N	NA	NA
Gw-18-2-1	2020-2025	N	N	NA	NA	Y	N	N	N	N	N
Gw-18-2-2	2020-2025	N	N	NA	NA	Y	N	N	N	N	N
Gw-20-1-1	2020-2025	N	N	N	N	N	Y	N	N	NA	NA
Gw-20-1-2	2020-2025	N	N	N	Y	N	Y	N	N	NA	NA
Gw-21-1-1	2020-2025	N	N	N	N	N	Y	N	N	NA	NA
Gw-21-1-2	2020-2025	Y	N	N	N	N	N	Y	N	NA	NA
Gw-21-2-1	2020-2025	N	N	N	N	N	N	Y	N	Y	N
Gw-28-1-0	2020-2025	Y	N	NA	NA	N	N	N	N	Y	N
Gw-29-1-1	2020-2025	Y	N	N	N	N	N	N	N	Y	N
Gw-29-1-2	2020-2025	Y	N	NA	NA	N	N	N	N	N	N
Gw-30-1-1	2020-2025	N	N	N	N	N	Y	Y	N	N	N
Gw-30-1-2	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-31-1-1	2020-2025	N	N	N	N	N	N	N	N	Y	N
Gw-31-1-2	2020-2025	N	N	N	Y	N	N	N	N	Y	N
Gw-41-1-1	2020-2025	N	N	N	N	N	N	N	Y	Y	N
Gw-42-1-1	2020-2025	N	N	N	N	Y	N	N	N	NA	NA
Gw-53-1-1	2020-2025	N	N	N	N	N	N	Y	N	NA	NA
Gw-55-1-1	2020-2024	N	N	NA	NA	N	N	N	N	N	N
Gw-56-1-1	2020-2025	N	N	N	N	N	N	N	Y	NA	NA
Gw-57-1-1	2020-2024	N	N	NA	NA	N	N	N	Y	NA	NA
Gw-71-1-1	2020-2025	N	N	N	N	N	Y	Y	N	NA	NA
Gw-71-2-1	2020-2025	Y	N	N	N	N	Y	Y	N	NA	NA
Gw-71-3-1	2021-2025	Y	N	NA	NA	N	N	N	N	N	N
Gw-72-1-1	2020-2025	N	N	N	N	N	Y	N	N	NA	NA
Gw-72-3-1	2020-2025	N	N	N	N	N	Y	N	N	NA	NA
Gw-73-1-1	2020-2025	Y	N	N	N	N	N	Y	N	N	N
Gw-73-2-1	2020-2025	N	N	NA	NA	N	N	N	N	Y	N
Gw-73-3-1	2020-2025	Y	N	N	N	N	N	Y	N	N	N
Gw-111-1-1	2024-2025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gw-111-2-1	2024-2025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gw-112-1-1	2024-2024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gw-112-2-1	2024-2024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other Monitoring Wells											
Gw-16-1-1	2020-2024	Y	N	NA	NA	Y	N	Y	N	N	N
Gw-16-1-2	2020-2024	N	N	N	N	N	N	N	N	N	N
Gw-16-2-1	2020-2024	Y	N	N	N	Y	N	N	N	N	N
Gw-16-2-2	2021-2024	N	N	NA	NA	N	N	N	N	N	N
Gw-19-1-1	2020-2025	N	N	N	N	N	N	N	N	NA	NA
Gw-19-1-2	2020-2025	N	N	N	N	N	N	N	Y	NA	NA
Gw-19-2-1	2020-2025	Y	N	N	N	N	N	N	N	NA	NA
Gw-19-2-2	2020-2025	Y	N	N	Y	N	N	N	Y	NA	NA
Gw-25-1-1	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-25-1-2	2020-2025	Y	N	N	Y	N	N	N	N	Y	N
Gw-36-3-1	2020-2025	N	N	N	N	Y	N	N	N	N	Y
Gw-37-3-1	2020-2025	Y	N	Y	N	Y	N	N	N	N	N
Gw-38-1-1	2020-2025	Y	N	N	N	Y	N	N	N	Y	N
Gw-39-1-1	2020-2025	Y	N	N	N	Y	N	Y	N	Y	N
Gw-39-2-1	2020-2025	Y	N	N	N	Y	N	Y	N	Y	N
Gw-40-1-1	2020-2025	N	N	N	N	N	N	N	N	Y	N
Gw-43-1-1	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-44-1-1	2020-2025	Y	N	NA	NA	N	N	Y	N	N	N
Gw-51-1-1	2020-2024	N	N	NA	NA	N	N	N	N	Y	N
Gw-51-2-1	2020-2024	N	N	NA	NA	N	N	N	Y	N	N
Gw-51-3-1	2020-2024	N	N	NA	NA	N	N	N	N	N	N
Gw-52-1-1	2020-2025	N	Y	N	N	N	Y	N	N	NA	NA
Gw-52-4-0 (P7)	2020-2025	N	N	N	N	N	N	N	N	NA	NA
Gw-58-1-0	2020-2024	Y	N	N	N	N	N	Y	N	Y	N
Gw-60-1-1	2020-2025	Y	N	N	N	Y	N	N	Y	NA	NA
Gw-60-2-1	2020-2025	N	N	NA	NA	N	N	N	Y	N	Y
Gw-60-3-1	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-62-1-1	2020-2024	N	N	NA	NA	N	N	N	N	Y	N
Gw-62-2-1	2021-2024	N	N	NA	NA	N	N	Y	N	N	N
Gw-63-1-1	2020-2024	N	N	NA	NA	N	Y	N	N	NA	NA
Gw-63-2-1	2020-2024	N	N	NA	NA	N	N	N	N	NA	NA
Gw-77-1-1	2020-2024	N	N	NA	NA	N	N	Y	N	NA	NA
Gw-77-2-1	2020-2024	Y	N	NA	NA	N	N	Y	N	NA	NA
Gw-85-1-1	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-87-1-1	2020-2024	N	N	NA	NA	N	Y	Y	N	N	N
Gw-87-2-1	2020-2024	N	N	NA	NA	N	N	N	N	N	N
Gw-88-1-1	2020-2024	Y	N	NA	NA	N	Y	Y	N	Y	N
Gw-88-2-1	2020-2024	N	N	NA	NA	N	N	Y	N	N	N
Gw-91-1-1	2020-2025	Y	N	N	N	N	N	Y	N	N	Y
Gw-92-1-1	2020-2025	Y	N	N	Y	N	N	Y	N	N	N
Gw-93-1-1	2020-2020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gw-94-1-1	2020-2023	N	N	NA	NA	N	Y	N	N	Y	N
Gw-95-1-1	2022-2025	Y	N	N	N	N	N	Y	N	N	N
Gw-96-1-1	2022-2025	N	N	NA	NA	N	N	Y	N	N	N
Gw-97-1-1	2022-2025	N	N	NA	NA	N	N	N	N	N	N
Gw-98-1-1	2022-2025	Y	N	NA	NA	Y	N	Y	N	N	N
Gw-103-1-1	2022-2024	N	N	NA	NA	N	N	Y	N	N	N
Gw-104-1-1	2022-2025	N	N	NA	NA	N	N	Y	N	N	N
Gw-108-1-1	2022-2025	N	N	NA	NA	Y	N	N	N	NA	NA
Gw-109-1-1	2022-2025	N	N	N	N	Y	N	N	N	N	N
Gw-P1	2020-2025	N	N	N	N	N	N	N	N	NA	NA
Gw-P2	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-P3	2020-2025	N	N	N	N	N	Y	N	N	N	N
Gw-P4	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-80-1-0 (P8)	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-81-1-0 (P9)	2020-2025	N	Y	N	N	N	Y	N	Y	N	N
Gw-P10	2020-2025	N	N	N	N	N	N	N	N	N	N
Gw-P11	2022-2024	N	Y	N	N	N	N	N	N	N	Y
Gw-P12	2023-2025	N	N	NA	NA	N	N	N	N	N	N
Gw-07-1-0	2020-2022	N	N	N	N	Y	N	N	N	NA	NA
Gw-113-1-1	2024-2025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gw-113-2-1	2024-2025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA indicates the analysis is unable to run due to insufficient dataset (<4 detected values and/or <2 years of data) or over 80% of values were under detection limits

N - No Trend

Green highlights indicate decreasing trends

Red highlights indicate increasing trends

Appendix G-2, G-3. Results of Statistical Analysis - Surface Water, Leachate

AECOM

Station	Time Period	Parameter									
		Conductivity		Ammonia		Chloride		Sulphate		Nitrate	
		Increasing	Decreasing	Increasing	Decreasing	Increasing	Decreasing	Increasing	Decreasing	Increasing	Decreasing
		Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Boundary Surface Water Quality Location											
SW-S-04	2020-2025	N	N	N	N	N	N	N	N	N	N
SW-N-05	2020-2025	Y	N	N	N	Y	N	Y	N	N	N
SW-N-16	2020-2025	Y	N	N	N	Y	N	N	N	Y	N
SW-N-41S1	2020-2025	N	N	N	Y	N	N	N	N	Y	N
SW-N-42S1	2020-2025	N	N	N	N	Y	N	N	N	Y	N
Routine Surface Water Quality Location											
SW-S-03	2020-2025	N	N	N	N	N	N	N	N	N	N
SW-N-CS2	2020-2024	Y	N	NA	NA	N	N	Y	N	N	N
SW-S-12	2020-2024	N	N	N	N	N	N	N	N	N	N
SW-N-14	2022-2025	N	N	NA	NA	N	N	N	N	N	N
SW-N-15	2023-2025	N	N	NA	NA	N	N	N	N	N	N
SW-N-17	2020-2025	N	N	N	N	Y	N	N	N	N	N
SW-N-18	2020-2023	N	N	N	N	N	N	N	N	Y	N
SW-N-19	2020-2025	N	N	N	N	Y	N	N	N	Y	N
SW-S-20	2020-2024	N	N	N	N	N	N	N	N	N	N
SW-S-21	2020-2025	N	N	NA	NA	N	N	N	N	N	N
SW-S-24	2020-2025	N	N	N	N	Y	N	N	N	N	N
SW-S-27	2020-2025	Y	N	N	N	N	N	N	N	N	N
SW-S-52	2020-2023	N	N	N	N	N	N	N	N	NA	NA
SW-N-41S3	2020-2025	N	N	N	N	N	N	N	N	Y	N
SW-N-41S4	2023-2025	N	N	N	N	N	N	N	N	N	N
SW-N-45	2020-2025	Y	N	N	N	Y	N	N	N	N	N
SW-N-50	2020-2021	N	N	N	N	N	N	N	N	N	N
SW-N-51	2020-2020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-53	2020-2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-54	2020-2025	Y	N	N	N	Y	N	N	N	Y	N
SW-N-58	2023 (dry)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-59	2023 (dry)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-60	2023 (dry)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-61	2023 (dry)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-62	2023-2023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-N-63	2023-2025	N	N	N	N	N	N	N	N	N	N
SW-N-64	2023-2025	N	N	N	N	N	N	N	N	N	N
SW-N-65	2023-2025	N	N	N	N	N	N	N	N	N	N
SW-N-55	2023-2025	N	N	NA	NA	N	N	N	N	N	N
SW-N-56	2023-2025	N	N	NA	NA	N	N	N	N	N	N
SW-N-57	2023-2025	N	N	N	N	N	N	N	N	N	Y
SW-N-66	2024-2025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA indicates the analysis is unable to run due to insufficient dataset (<4 detected values and < 2 years of data) or over 80% of values were under detection limits

Green highlights indicate decreasing trends

Red highlights indicate increasing trends

Appendix G-3. Results of Statistical Analysis - Leachate

Station	Time Period	Parameter									
		Conductivity		Ammonia		Chloride		Sulphate		Nitrate	
		Increasing Y/N	Decreasing Y/N	Increasing Y/N	Decreasing Y/N	Increasing Y/N	Decreasing Y/N	Increasing Y/N	Decreasing Y/N	Increasing Y/N	Decreasing Y/N
Hartland Valve Chamber	2020-2025	N	Y	N	N	N	Y	N	N	N	N

Notes:

N - No Trend

Green highlights indicate decreasing trends

Red highlights indicate increasing trends

Appendix H

Aggregate Geochemistry (2023)

Appendix H-1. XRD Results

		Sample ID	WR23-01	WR23-02	WR23-03
		Depth (m BGS)	Surface	Surface	Surface
		Sampling Location	Toutle Valley	Northeast. Stockpile	Northeast. Stockpile
		Lithology	Meta. Mafic Rock	Meta. Mafic Rock	Meta. Mafic Rock
		Age	<1 week	<2 days	<2 days
Minerals	**Mineral Formula**		wt%	wt%	wt%
Actinolite	$Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2$		29.54	36.13	61.86
Calcite	$CaCO_3$		2.49	1.17	1.24
Diopside	$CaMgSi_2O_6$		29.07	22.89	9.86
Prehnite	$Ca_2Al_2Si_3O_{10}(OH)_2$		4.49	11.26	2.61
Clinozoisite	$Ca_2Al_3(SiO_4)_3(OH)$		4.54	3.3	-
Albite low	$NaAlSi_3O_8$		2.28	2.72	-
Magnetite	$Fe^{2+}Fe^{3+}{}_2O_4$		2.05	-	3.36
Clinochlore	$(Mg,Al)_6(Si,Al)_4O_{10}(OH)_8$		25.33	20.39	18.09
Quartz low	SiO_2		0.22	0.36	0.28
Lizardite	$Mg_3Si_2O_5(OH)_4$		-	1.78	2.11
Rutile	TiO_2		-	-	0.58
		Total	100	100	100

NOTES

m BGS - meters below ground surface

"-": Minerals not identified by XRD

Appendix H2. Acid-Base Accounting (ABA) Results

Sample ID	Depth (m BGS)	Age	Lithology Description	Sampling Location	Fizz Rating	Paste pH	Total S
					Unit	-	wt%
					Detection Limit	0.2	0.02
WR23-01	Surface	<1 week	Meta. Mafic Rock	Toutle Valley	SLIGHT	8.79	0.09
WR23-02	Surface	<2 days	Meta. Mafic Rock	Northeast. Stockpile	SLIGHT	8.79	0.14
WR23-03	Surface	<2 days	Meta. Mafic Rock	Northeast. Stockpile	SLIGHT	8.96	0.05

Sample ID	HCl Extractable Sulphate Sulphur[e]	Sulphide Sulphur (by difference)[f]	Acid Generation Potential (AP)[b]	Std Sobek Neutralization Potential (NP)	Net Neutralization Potential [d]NNP=NP-AP	Neutralization Potential Ratio NPR = NP/AP	Acid Generation Status[a]
Unit	wt%	wt%	Kg $CaCO_3/T$[c]	Kg $CaCO_3/T$[c]	Kg $CaCO_3/T$[c]		
Detection Limit	0.01	0.02	0.6	N/A	N/A	0.1	N/A
WR23-01	0.5	0.41	0.6	35.2	34.6	59.7	non-PAG
WR23-02	0.79	0.65	1.3	25.3	24	20.5	non-PAG
WR23-03	0.56	0.51	0.3	30.8	30.5	102.7	non-PAG

NOTES

mbgs - meters below ground surface

[a] Std Sobek Neutralization Potential - Field and Laboratory Methods Applicable to Overburdens and Minesoils, (EPA 600 / 2-78-054, March 1978) MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.

*[b] AP = HNO_3 Extractable Sulphide Sulphur*31.25*

[c] $CaCO_3$ Equivalency = Total Inorganic Carbon (TIC)(100/12)*10*

[d] NNP = Modified NP-AP

[e] Sulphate Sulphur determined by 25% HCl Leach with S by ICP.

[f] Sulphide Sulphur determined by Sobek 1:7 Nitric Acid Leach with S by ICP Finish.

[g] Mod. ABA Neutralization Potential - MEND Acid Rock Drainage Prediction Manual, MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.

Insoluble S is acid insoluble S (Total S - (Sulphate S + Sulphide S)).

Appendix H3. Comparison of Total Recoverable Constituents to Crustal Abundance

Sample ID	Units	Detection Limit	Average Crustal Abudance in Rocks		WR23-01	WR23-02	WR23-03
Depth (m BGS)					Surface	Surface	Surface
Sampling Location					Toutle Valley	Northeast. Stockpile	Northeast. Stockpile
Lithology Description			Price (1997)[a]		Meta. Mafic Rock	Meta. Mafic Rock	Meta. Mafic Rock
Acid Generating Status			Basaltic Rock	Basaltic Rock*10[b]	non-PAG	non-PAG	non-PAG
Age					<1 week	<2 days	<2 days
Parameters							
Aluminum (Al)	%	0.01	7.8	78	3.40	3.51	2.60
Antimony (Sb)	ppm	0.02	0.2	2	<0.02	<0.02	0.03
Arsenic (As)	ppm	0.1	2	20	0.2	0.3	0.5
Barium (Ba)	ppm	0.5	330	3300	5	12	11
Bismuth (Bi)	ppm	0.02	0.007	0.07	<0.02	<0.02	<0.02
Boron (B)	ppm	20	5	50	<20	<20	<20
Cadmium (Cd)	ppm	0.01	0.22	2.2	0.01	0.02	0.02
Calcium (Ca)	%	0.01	7.6	76	2.09	2.32	1.78
Chromium (Cr)	ppm	0.5	22	220	67	108	129
Cobalt (Co)	ppm	0.1	170	1700	50.6	40.5	43.7
Copper (Cu)	ppm	0.01	87	870	31.5	91.7	26.2
Gallium (Ga)	ppm	0.1	17	170	9	5	6
Gold (Au)	ppb	0.2	0.004	0.04	<0.2	<0.2	0.9
Iron (Fe)	%	0.01	8.65	86.5	7.30	3.92	5.18
Lanthanum (La)	ppm	0.5	15	150	<0.5	1	1
Lead (Pb)	ppm	0.01	6	60	0.3	0.3	0.5
Magnesium (Mg)	%	0.01	4.6	46	3.39	3.72	4.07
Manganese (Mn)	ppm	1	1500	15000	657	445	526
Mercury (Hg)	ppm	5	0.09	0.9	<5	<5	<5
Molybdenum (Mo)	ppm	0.01	1.5	15	0.3	0.1	0.8
Nickel (Ni)	ppm	0.1	130	1300	44.1	81.9	70.5
Phosphorus (P)	%	0.001	1100	11000	0.013	0.021	0.018
Potassium (K)	%	0.01	8300	83000	0.01	0.04	0.05
Scandium (Sc)	ppm	0.1	30	300	5.9	9.4	13.1
Selenium (Se)	ppm	0.1	0.05	0.5	0.1	0.2	0.1
Silver (Ag)	ppm	2	0.11	1.1	**10**	**13**	**8**
Sodium (Na)	%	0.001	1.8	18	0.032	0.055	0.125
Strontium (Sr)	ppm	0.5	465	4650	86	45	49
Sulfur (S)	%	0.02	0.03	0.3	0.08	0.12	0.05
Tellurium (Te)	ppm	0.02	-	-	<0.02	<0.02	<0.02
Thallium (Tl)	ppm	0.02	0.21	2.1	<0.02	<0.02	<0.02
Thorium (Th)	ppm	0.1	4	40	<0.1	0.1	0.2
Titanium (Ti)	%	0.001	1.38	13.8	0.204	0.154	0.257
Tungsten (W)	ppm	0.1	0.7	7	<0.1	<0.1	<0.1
Uranium (U)	ppm	0.1	1	10	<0.1	<0.1	<0.1
Vanadium (V)	ppm	1	250	2500	324	107	203
Zinc (Zn)	ppm	0.1	105	1050	63	32	38

NOTES

[a] *From Price (1997), Appendix 3, Distribution of the elements in the Earth's crust.*

[b] *Enrichment criteria based upon crustal abundance data multiplied by a factor of 10.*

[c] *Order of magnitude estimate from Price (1997) - most conservative value used.*

- : Data not available for these elements.

Exceeds Screening Criteria

Appendix H4. Shake Flask Testing Results

Sample ID	Units	Referenced Guidelines		WR22-01 (Old)	WR22-02 (Fresh)	WR23-01	WR23-02	WR23-03	Averages	Medians
Depth (m BGS)				Surface	Surface	Surface	Surface	Surface		
Sampling Location		BCWQG[a]		Northwest Stockpile	Northwest Stockpile	Toutle Valley	Northeast. Stockpile	Northeast. Stockpile		
Lithology Description				Diorite Gneiss	Diorite Gneiss	Meta. Mafic Rock	Meta. Mafic Rock	Meta. Mafic Rock		
Acid Generating Status		Short-Term Acute	Long-Term Chronic	-	-	non-PAG	non-PAG	non-PAG		
Age				Approx. 1 year	<1 week	<1 week	<2 days	<2 days		
Inorganics										
Hardness (as CaCO3)	mg/L	---	---	24.1	27.7	21.5	33.2	24.6	26.2	24.6
pH (Lab)	---	6.5-9	6.5-9	7.95	8.46	**9.05**	**9.19**	8.99	8.73	8.99
Electrical Conductivity (Lab)	µS/cm	---	---	67.0	74.0	49.0	56.0	84.0	66.0	67.0
Total Alkalinity	mg CaCO3/L	---	---	16.0	16.0	21.0	16.0	18.0	17.4	16.0
Bicarbonate	mg/L	---	---	20.0	19.0	26.0	19.0	22.0	21.2	20.0
Carbonate	mg/L	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	---	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sulfate (SO4)	mg/L	128 - 429[c]	128 - 429[c]	9.20	8.10	1.70	9.80	5.50	6.86	8.10
Ammonia (NH3)	mg/L as N	0.75 - 5.74[c]	0.135 - 1.770[c]	0.061	0.104	0.166	0.768	0.167	0.25	0.17
Nitrite (NO2)	mg/L as N	0.06 - 0.6[f]	0.02 - 0.2[f]	<0.05	<0.05	0.007	0.07	0.023	0.05	0.05
Nitrate (NO3)	mg/L as N	32.8	3.0	<0.20	2.40	0.25	2.52	0.44	1.71	2.40
Total Nitrogen (NH3+NO2+NO3 as N)	mg/L as N	---	---	0.31	2.55	0.42	3.36	0.63	1.46	0.63
Fluoride (F)	mg/L	0.4 - 1.876[d]	---	0.07	0.04	<0.01	<0.01	0.02	0.04	0.04
Chloride (Cl)	mg/L	600	150	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5
Dissolved Metals										
Aluminum (Al)	mg/L	---	---	0.278	0.281	0.238	0.187	0.155	0.23	0.24
Antimony (Sb)	mg/L	---	---	0.000088	0.000040	0.000077	0.000146	0.000098	0.00009	0.00009
Arsenic (As)	mg/L	---	---	0.000257	0.000105	0.000132	0.000088	0.000358	0.00019	0.00013
Barium (Ba)	mg/L	---	---	0.00262	0.00074	0.000546	0.00121	0.000612	0.00115	0.00074
Beryllium (Be)	mg/L	---	---	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)	mg/L	---	---	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)	mg/L	---	---	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cadmium (Cd)	mg/L	0.000038 - 0.0028[d]	0.000018 - 0.0028[d]	0.0000078	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00001	0.00001
Cesium (Cs)	mg/L	---	---	<0.00005	<0.00005	0.000127	0.000311	0.000153	0.00005	0.00005
Calcium (Ca)	mg/L	---	---	8.660	8.450	6.280	10.800	6.910	8.22	8.45
Chromium (Cr)	mg/L	---	---	0.00027	0.00010	<0.0001	<0.0001	0.00012	0.00014	0.00010
Cobalt (Co)	mg/L	---	---	0.0001780	0.0000688	0.0000351	0.0000179	0.000103	0.00008	0.00007
Copper (Cu)	mg/L	Variable[g]	Variable[g]	**0.002260**	0.000051	0.000242	0.000099	0.000135	0.00056	0.00014
Iron (Fe)	mg/L	0.35	---	0.175	0.031	0.0619	0.0218	0.0884	0.07570	0.06190
Lead (Pb)	mg/L	---	---	0.000215	0.000006	0.0000264	0.0000109	0.0000365	0.00006	0.00003
Lanthanum (La)	mg/L	---	---	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	mg/L	---	---	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)	mg/L	---	---	0.591	1.610	1.410	1.530	1.780	1.38	1.53
Manganese (Mn)	mg/L	---	---	0.0044	0.0014	0.00121	0.000931	0.00161	0.00190	0.00140
Mercury (Hg)	mg/L	---	---	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum (Mo)	mg/L	---	---	0.000476	0.001150	0.001	0.000395	0.00324	0.00125	0.00100
Nickel (Ni)	mg/L	---	---	0.000433	0.000149	0.00008	0.000067	0.000199	0.00019	0.00015
Phosphorus (P)	mg/L	---	---	0.0147	0.0056	0.0163	0.0116	0.0073	0.01	0.01
Potassium (K)	mg/L	---	---	0.41	0.29	0.134	0.204	0.272	0.26	0.27
Rubidium (Rb)	mg/L	---	---	0.00033	0.00088	0.00135	0.00199	0.00304	0.00152	0.00135
Selenium (Se)	mg/L	---	---	0.000243	0.000297	0.000071	0.000137	0.00009	0.00017	0.00014
Silicon (Si)	mg/L	---	---	1.28	1.53	1.54	1.48	1.99	1.56	1.53
Silver (Ag)	mg/L	---	---	0.0000109	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)	mg/L	---	---	0.661	0.961	0.379	0.755	0.42	0.64	0.66
Strontium (Sr)	mg/L	---	---	0.01920	0.02320	0.0283	0.0368	0.0203	0.03	0.02
Sulphur (S)	mg/L	---	---	<10	<10	<10	<10	<10	<10	<10
Thallium (Tl)	mg/L	---	---	<0.0000020	0.0000033	0.0000041	0.0000052	0.0000032	0.0000040	0.0000037
Thorium (Th)	mg/L	---	---	0.000010	0.000007	<0.000050	<0.000050	<0.000050	0.00001	0.00001
Tellurium (Te)	mg/L	---	---	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Tin (Sn)	mg/L	---	---	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)	mg/L	---	---	0.00746	0.00161	0.00161	0.00064	0.00314	0.00289	0.00161
Uranium (U)	mg/L	---	---	0.000019	0.000022	0.0000034	0.0000022	0.0000025	0.00001	0.00000
Vanadium (V)	mg/L	---	---	0.00297	0.00330	0.0403	0.0044	0.0113	0.01245	0.00440
Tungsten (W)	mg/L	---	---	0.000036	0.000044	0.000152	0.000035	0.000024	0.00006	0.00004
Zinc (Zn)	mg/L	Variable[e]	Variable[e]	<0.0001	<0.0001	0.0005	0.00013	0.00033	0.00010	0.00010
Zirconium (Zr)	mg/L	---	---	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

NOTES

[a] *Approved BC Water Quality Guidelines for Freshwater Aquatic Life - Long-Term Chronic and Short-Term Acute Solute Concentrations*

[b] *Guideline/standard varies with hardness*

[c] *Guideline/standard varies with pH and temperature. pH and Temperature at receiving water is assumed to be 7.5 and 10°C, respectively.*

[d] *Guideline/standard varies with hardness*

[e] *Guideline/standard varies with hardness, DOC, and pH; DOC of 4.5 mg/L was applied for calculation, derived from the average DOC concentrations measured in surface water during the 2020-2021 monitoring period*

[f] *Applicable guideline varies with chloride. Background chloride concentration of 20 mg/L is applied for criteria calculation*

[g] *Dissolved copper guidelines determined using BLM*

Exceeds BCWQG AW 30-Day Average

Exceeds BCWQG AW MAC

Appendix I

Dust Suppressant Analytical Results

Your Project #: HARTLAND GROUND WATER QUALITY
Your C.O.C. #: 08539314

Attention: Geo Lab Data

CAPITAL REGIONAL DISTRICT
CRD-VIC 625 FISGARD
PO Box 1000
625 Fisgard Street
VICTORIA, BC
Canada V8W 2S6

Report Date: 2024/07/12
Report #: R3526794
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C450249
Received: 2024/07/05, 08:48

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	1	N/A	2024/07/11	BBY6SOP-00026	SM 24 2320 B m
Chloride/Sulphate by Auto Colourimetry	1	N/A	2024/07/11	BBY6SOP-00011 / BBY6SOP-00017	SM24-4500-Cl/SO4-E m
Conductivity @25C	1	N/A	2024/07/11	BBY6SOP-00026	SM 24 2510 B m
Hardness (calculated as CaCO3)	1	N/A	2024/07/10	BBY WI-00033	Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	1	N/A	2024/07/10	BBY WI-00033	Auto Calc
Elements by ICPMS Low Level (dissolved) (1)	1	N/A	2024/07/09	BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	1	N/A	2024/07/10	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate + Nitrite (N)	1	N/A	2024/07/06	BBY6SOP-00010	SM 24 4500-NO3- H m
Nitrite (N) Regular Level Water	1	N/A	2024/07/06	BBY6SOP-00010	SM 24 4500-NO2- m
Nitrogen - Nitrate (as N)	1	N/A	2024/07/06	BBY WI-00033	Auto Calc
pH @25°C (2)	1	N/A	2024/07/11	BBY6SOP-00026	SM 24 4500-H+ B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: HARTLAND GROUND WATER QUALITY
Your C.O.C. #: 08539314

Attention: Geo Lab Data

CAPITAL REGIONAL DISTRICT
CRD-VIC 625 FISGARD
PO Box 1000
625 Fisgard Street
VICTORIA, BC
Canada V8W 2S6

Report Date: 2024/07/12
Report #: R3526794
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C450249
Received: 2024/07/05, 08:48

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(2) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Debbie Nordbruget, Key Account Specialist
Email: Debra.NORDBRUGET@bureauveritas.com
Phone# (250)385-6112

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CQQ442		
Sampling Date		2024/07/04 14:50		
COC Number		08539314		
	UNITS	**2024-0038698**	**RDL**	**QC Batch**
ANIONS				
Nitrite (N)	mg/L	<0.050 (1)	0.050	B429086
Calculated Parameters				
Dissolved Hardness (CaCO3)	mg/L	11.0	0.50	B428387
Nitrate (N)	mg/L	<0.20	0.20	B427826
Misc. Inorganics				
Conductivity	uS/cm	520	2.0	B434568
pH	pH	5.37	N/A	B434565
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	B434533
Alkalinity (Total as CaCO3)	mg/L	40	1.0	B434533
Bicarbonate (HCO3)	mg/L	48	1.0	B434533
Carbonate (CO3)	mg/L	<1.0	1.0	B434533
Hydroxide (OH)	mg/L	<1.0	1.0	B434533
Chloride (Cl)	mg/L	<10 (1)	10	B434602
Sulphate (SO4)	mg/L	<100 (1)	100	B434602
Nutrients				
Total Ammonia (N)	mg/L	51	0.75	B433338
Nitrate plus Nitrite (N)	mg/L	<0.20 (1)	0.20	B429084

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to matrix interference.

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		CQQ442		
Sampling Date		2024/07/04 14:50		
COC Number		08539314		
	UNITS	2024-0038698	RDL	QC Batch
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	43.6	0.50	B430636
Dissolved Antimony (Sb)	ug/L	0.080	0.020	B430636
Dissolved Arsenic (As)	ug/L	1.14	0.020	B430636
Dissolved Barium (Ba)	ug/L	18.0	0.020	B430636
Dissolved Beryllium (Be)	ug/L	0.012	0.010	B430636
Dissolved Bismuth (Bi)	ug/L	<0.0050	0.0050	B430636
Dissolved Boron (B)	ug/L	17	10	B430636
Dissolved Cadmium (Cd)	ug/L	0.0391	0.0050	B430636
Dissolved Chromium (Cr)	ug/L	2.37	0.10	B430636
Dissolved Cobalt (Co)	ug/L	0.115	0.0050	B430636
Dissolved Copper (Cu)	ug/L	1.66	0.050	B430636
Dissolved Iron (Fe)	ug/L	1750	1.0	B430636
Dissolved Lead (Pb)	ug/L	0.172	0.0050	B430636
Dissolved Lithium (Li)	ug/L	<0.50	0.50	B430636
Dissolved Manganese (Mn)	ug/L	159	0.050	B430636
Dissolved Molybdenum (Mo)	ug/L	0.219	0.050	B430636
Dissolved Nickel (Ni)	ug/L	2.04	0.020	B430636
Dissolved Phosphorus (P)	ug/L	231	2.0	B430636
Dissolved Selenium (Se)	ug/L	0.096	0.040	B430636
Dissolved Silicon (Si)	ug/L	161	50	B430636
Dissolved Silver (Ag)	ug/L	<0.0050	0.0050	B430636
Dissolved Strontium (Sr)	ug/L	19.4	0.050	B430636
Dissolved Thallium (Tl)	ug/L	<0.0020	0.0020	B430636
Dissolved Tin (Sn)	ug/L	<0.20	0.20	B430636
Dissolved Titanium (Ti)	ug/L	<0.50	0.50	B430636
Dissolved Uranium (U)	ug/L	0.0029	0.0020	B430636
Dissolved Vanadium (V)	ug/L	<0.20	0.20	B430636
Dissolved Zinc (Zn)	ug/L	7.17	0.10	B430636
Dissolved Zirconium (Zr)	ug/L	<0.10	0.10	B430636
Dissolved Calcium (Ca)	mg/L	1.85	0.050	B428117
Dissolved Magnesium (Mg)	mg/L	1.55	0.050	B428117
Dissolved Potassium (K)	mg/L	3.33	0.050	B428117
Dissolved Sodium (Na)	mg/L	13.9	0.050	B428117
RDL = Reportable Detection Limit				

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		CQQ442		
Sampling Date		2024/07/04 14:50		
COC Number		08539314		
	UNITS	**2024-0038698**	**RDL**	**QC Batch**
Dissolved Sulphur (S)	mg/L	83.7	3.0	B428117
RDL = Reportable Detection Limit				

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B429084	Nitrate plus Nitrite (N)	2024/07/06	120	80 - 120	109	80 - 120	<0.020	mg/L	1.7	25
B429086	Nitrite (N)	2024/07/06	113	80 - 120	107	80 - 120	<0.0050	mg/L	NC	20
B430636	Dissolved Aluminum (Al)	2024/07/10	101	80 - 120	99	80 - 120	<0.50	ug/L	5.0	20
B430636	Dissolved Antimony (Sb)	2024/07/10	100	80 - 120	99	80 - 120	<0.020	ug/L	NC	20
B430636	Dissolved Arsenic (As)	2024/07/10	102	80 - 120	100	80 - 120	<0.020	ug/L	NC	20
B430636	Dissolved Barium (Ba)	2024/07/10	101	80 - 120	97	80 - 120	<0.020	ug/L	NC	20
B430636	Dissolved Beryllium (Be)	2024/07/10	98	80 - 120	95	80 - 120	<0.010	ug/L	NC	20
B430636	Dissolved Bismuth (Bi)	2024/07/10	104	80 - 120	102	80 - 120	<0.0050	ug/L	NC	20
B430636	Dissolved Boron (B)	2024/07/10	105	80 - 120	96	80 - 120	<10	ug/L	NC	20
B430636	Dissolved Cadmium (Cd)	2024/07/10	101	80 - 120	97	80 - 120	<0.0050	ug/L	NC	20
B430636	Dissolved Chromium (Cr)	2024/07/10	102	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
B430636	Dissolved Cobalt (Co)	2024/07/10	96	80 - 120	94	80 - 120	<0.0050	ug/L	NC	20
B430636	Dissolved Copper (Cu)	2024/07/10	99	80 - 120	97	80 - 120	<0.050	ug/L	NC	20
B430636	Dissolved Iron (Fe)	2024/07/10	102	80 - 120	100	80 - 120	<1.0	ug/L	0.52	20
B430636	Dissolved Lead (Pb)	2024/07/10	101	80 - 120	100	80 - 120	<0.0050	ug/L	12	20
B430636	Dissolved Lithium (Li)	2024/07/10	99	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
B430636	Dissolved Manganese (Mn)	2024/07/10	101	80 - 120	99	80 - 120	<0.050	ug/L	NC	20
B430636	Dissolved Molybdenum (Mo)	2024/07/10	103	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
B430636	Dissolved Nickel (Ni)	2024/07/10	100	80 - 120	98	80 - 120	<0.020	ug/L	NC	20
B430636	Dissolved Phosphorus (P)	2024/07/10	104	80 - 120	100	80 - 120	<2.0	ug/L	NC	20
B430636	Dissolved Selenium (Se)	2024/07/10	100	80 - 120	96	80 - 120	<0.040	ug/L	NC	20
B430636	Dissolved Silicon (Si)	2024/07/10	103	80 - 120	104	80 - 120	<50	ug/L	NC	20
B430636	Dissolved Silver (Ag)	2024/07/10	100	80 - 120	98	80 - 120	<0.0050	ug/L	NC	20
B430636	Dissolved Strontium (Sr)	2024/07/10	100	80 - 120	98	80 - 120	<0.050	ug/L	NC	20
B430636	Dissolved Thallium (Tl)	2024/07/10	103	80 - 120	101	80 - 120	<0.0020	ug/L	NC	20
B430636	Dissolved Tin (Sn)	2024/07/10	102	80 - 120	100	80 - 120	<0.20	ug/L	NC	20
B430636	Dissolved Titanium (Ti)	2024/07/10	102	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
B430636	Dissolved Uranium (U)	2024/07/10	104	80 - 120	104	80 - 120	<0.0020	ug/L	NC	20
B430636	Dissolved Vanadium (V)	2024/07/10	101	80 - 120	98	80 - 120	<0.20	ug/L	NC	20
B430636	Dissolved Zinc (Zn)	2024/07/10	101	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
B430636	Dissolved Zirconium (Zr)	2024/07/10	101	80 - 120	98	80 - 120	<0.10	ug/L	NC	20
B433338	Total Ammonia (N)	2024/07/10	91	80 - 120	98	80 - 120	<0.015	mg/L	NC	20
B434533	Alkalinity (PP as CaCO3)	2024/07/11					<1.0	mg/L	NC	20

Bureau Veritas Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
B434533	Alkalinity (Total as CaCO3)	2024/07/11			101	80 - 120	<1.0	mg/L	1.1	20
B434533	Bicarbonate (HCO3)	2024/07/11					<1.0	mg/L	1.1	20
B434533	Carbonate (CO3)	2024/07/11					<1.0	mg/L	NC	20
B434533	Hydroxide (OH)	2024/07/11					<1.0	mg/L	NC	20
B434565	pH	2024/07/11			100	97 - 103				
B434568	Conductivity	2024/07/11			103	90 - 110	<2.0	uS/cm		
B434602	Chloride (Cl)	2024/07/11	99	80 - 120	97	80 - 120	<1.0	mg/L		
B434602	Sulphate (SO4)	2024/07/11	87	80 - 120	98	80 - 120	<1.0	mg/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

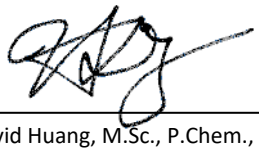
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Raphael Kwan, Senior Manager, BC and Yukon Regions responsible for British Columbia Environmental laboratory operations.

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08539314

COMPANY NAME:	CAPITAL REGIONAL DISTRICT (CRD)
COMPANY ADDRESS:	HARTLAND LANDFILL 280 WILLIS POINT ROAD VICTORIA, B.C. V9E 1K1
SAMPLER NAME:	Shelley Donovan
PH. #:	250-360-347
CELL #:	250-4808711
EMAIL	geolabdata@crd.bc.ca
CLIENT PROJECT ID: (#)	HARTLAND GROUND WATER QUALITY
PROJECT MANAGER:	DEBBIE NORDBRUGET

ANALYSIS REQUESTED

	CRD ID	Sample Type	PSC LAB # (Lab Use Only)	MATRIX: Ground Water	MATRIX: Surface Water	MATRIX: Soil	MATRIX: Other	SAMPLING: DATE (DD-MMM-YYYY)	SAMPLING: TIME	CRD Groundwater Package Routine
1	2024-0038698	SS		X				4-Jul-2024	14:50	X
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

MVAN-2024-07-255

TAT (Turnaround Time)
< 5 DAY TAT ONLY WITH PRIOR APPROVAL

Regular TAT

OTHER (SPECIFY)

IOL SITE LOCATION:

PSC SAP#:

IOL CONTACT:

SPECIAL INSTRUCTIONS:
Invoice to: geolabinvoices@crd.bc.ca

☐ CCME ☐ CSR
☐ ALBERTA TIER ☐ OTHER

RELINQUISHED BY SAMPLER:	Shelley Donovan	**DATE:** 4-Jul-2024	**TIME:** Shipped 15:30
RELINQUISHED BY:		**DATE:**	**TIME:**
RELINQUISHED BY:		**DATE**	**TIME:**

LAB USE ONLY

Sample Arrival Temp °C	DUE DATE	LOG IN CHECK
11/11/11		

RECEIVED BY:

RECEIVED BY:

RECEIVED BY LABORATORY: N Ocampo Zamora 2024/07/05

NO Seal / ICE Pack frozen. 08:48

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